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Reading Threat Everywhere: A Scoping Review of Hostility Biases and Dark Personality Traits in Offenders

Laura OPRIȘ^{1,2} , Laura VISU-PETRA^{1,3*} 

ABSTRACT. Despite significant interest and relevance to society, the triggers that lead to antisocial behavior are still insufficiently investigated, especially in key populations such as convicted offenders.

This study aimed to summarize the current literature on *hostility biases* and aggressive behavior in incarcerated individuals, in relation to their dark personality traits. A thorough search across multiple electronic citation databases (Google Scholar, PsycInfo, Scopus, Science Direct, and Web of Science) was performed, focusing on articles published from January 1990 to August 2025. Out of the 344 articles initially identified, only 14 were deemed suitable for inclusion in the scoping review following the eligibility screening process. The studies that were included measured hostility biases (HBs) occurring at different stages of social information processing (perception, interpretation, attribution, expectation). The research had to be conducted on offenders and include a measure of aversive personality traits alongside other relevant variables.

A diverse population of convicted individuals displaying aggressive propensities (proactive/reactive) or mental health problems, as well as malevolent dimensions in their personality structure, was analyzed for extracting potential triggers of law breaking.

Our review revealed that delinquent behavior emerges as a result of a multilevel processing of social cues, from facial recognition of emotions to interpretive and intentional attributions, differentially flavored by antagonistic personality traits. Analyzing research carried out in correctional facilities

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offers valuable insights into the core of the information decoding mechanism that precipitates offenders' propensity to engage and persist in committing antisocial behaviors.

Keywords: social information processing, hostility bias, aversive personality, psychopathy, aggression, incarcerated offenders.

INTRODUCTION

Effective social interaction and engagement rely on the accurate processing of social information. Individuals who exhibit disruptive behaviors are believed to perceive, interpret, and react to social cues in ways that elevate the likelihood of acting aggressively (Dodge & Crick, 1990). Considerable research has so far examined the intricate links between aggressive behavior and challenges in understanding and processing social information. Aggression can be amplified when an individual perceives a threat, anger, or malevolent intentions even in neutral contexts. This phenomenon is conceptualized as a **hostility bias** (Orobio de Castro et al., 2002; Dodge, 2006; Smeijers et al., 2019). The Social Information Processing (SIP) framework (Dodge & Crick, 1994) suggests that distortions in social information processing can appear at various stages, including cue encoding, interpretation, and response evaluation. From this theoretical standpoint, individuals who exhibit aggression are more likely to ascribe hostile intentions to others, compared to those who are nonaggressive (Dodge, 1980; Huesmann, 1998).

Empirical studies consistently demonstrated a positive correlation between *hostility biases* (HBs) and *aggressive behaviors* in children and adolescents (Crick & Dodge, 1996; Crick et al., 2002; Orobio de Castro et al., 2002), as well as in the adult population (Epps & Kendall, 1995; Matthews & Norris, 2002; MacBrayer et al., 2003; Basquill et al., 2004; Miller & Lynam, 2006; Bailey & Ostrov, 2008; Zajenkowska et al., 2021; Ursulet et al., 2022). Additionally, comprehensive reviews and meta-analytic research indicate that HBs are consistently linked to reactive aggression and disruptive behaviors throughout childhood, adolescence (Crick & Dodge, 1994; Verhoef et al., 2019), and adulthood (Smeijers et al., 2019; Tuente et al., 2019). HBs significantly impact the interpretation of unclear social situations and serve as cognitive triggers for reactive or impulsive behavior, emerging as the most robust cognitive correlates of aggression and antisocial conduct (Orobio de Castro et al., 2002; Dodge, 2006).

Beyond cognitive factors, ***personality traits*** also significantly influence the development and manifestation of delinquent behavior. According to the General Aggression Model (Anderson & Bushman, 2002; Allen et al., 2018), the combination of individual and situational elements activates a person's internal state, including cognition, emotion, and physiological arousal, as well as their interaction. This subsequently leads to specific behavioral responses (Anderson & Bushman, 2002). Consequently, a significant amount of research has been carried out to determine which personality characteristics are linked to the manifestation of aggression. So far, research based on the Five-Factor model of personality (Big Five, Costa & McCrae, 1992) has consistently associated low levels of agreeableness and conscientiousness with externalizing behaviors and antisocial outcomes (Malouff et al., 2005; Jones et al., 2011). Additionally, agreeableness, conscientiousness, extraversion, and openness negatively correlated with the hostile attribution bias (HAB, see Table 1) and with aggressive behavior levels, whereas neuroticism showed a positive correlation with the latter outcomes (Kokkinos et al., 2017). A connection was also found between relational aggression and a specific combination of Big Five traits, including high neuroticism and low levels of agreeableness, conscientiousness, extraversion, and openness, which was mediated by the HAB (Kokkinos et al., 2017). The authors proposed that individuals with this specific blend of traits may be more inclined to engage in hostile attributions, which is associated with a greater likelihood of exhibiting aggression. Beyond typical personality traits, a variety of features known as “dark” personality traits: callous-unemotional, psychopathy, narcissism, Machiavellianism, and sadism emerge as correlates for aggressive responses, antisocial behavior, and even offending (Law & Falchenbach, 2017; Subra, 2023; Jiang et al., 2024; Kersten et al., 2024; Potter, 2024). Apparently, HBs are functioning as cognitive pathways linking antagonistic dispositions and interpersonal aggression, in the general adult population (Jiang et al., 2024), as well as in delinquents (Slaby & Guerra, 1988; Potter, 2024).

Hostility biases: conceptual and methodological clarification

According to SIP (Crick & Dodge, 1994), HBs manifest when negative cognitive schemas and past experiences related to others and situations are triggered by current adverse events that evoke conscious or unconscious links to previous incidents (Guerra & Huesmann, 2004). The model integrates the social, cognitive, behavioral, and emotional factors that contribute to the emergence of aggression. Accordingly, an individual's response to a perceived provocation or threat is impacted not only by objective social cues but is also significantly shaped by the manner in which that social information is unraveled.

Based on the SIP framework, the mechanism of social information processing requires the following six phases: (1) encoding cues; (2) interpreting signals; (3) clarifying a goal; (4) generating a response; (5) selecting a response and evaluating its effects; and ultimately (6) exhibiting behavior (Crick & Dodge, 1994). The first two stages represent early social information processing and are thought to lead to reactive aggressive behavior due to the misinterpretation of unclear and ambiguous situations, which trigger feelings and thoughts of threat. The final four stages are categorized as late information processing and are mostly defined by cognitive processing. Analyzing this multiphasic mechanism reveals that various deviations can occur along the complex path of decoding social cues.

However, aside from the hostility bias in intent attribution – the most investigated construct – additional hostility-related biases may emerge during the different phases of processing social information. Thereby, three other hostility biases have been emphasized: hostile interpretation bias, perception bias, and expectation bias, respectively (see Table 1).

Table 1. *Hostility biases (perception/ attribution/ interpretation/ expectation) – Conceptual clarifications*

Concept	Definition and conceptual clarifications
Social information processing (SIP)	= decoding and interpreting social cues in others and in situations
Hostility bias (HB)	= <i>the 'a priori tendency(es) to perceive and interpret social information in a hostile manner'</i> (Smeijers, 2022)
Attributional bias/ style	= pattern in which individuals explain the causes, or the significance for social interactions and contexts
Hostile perception bias (HPB)	= identifying and assigning a hostile meaning to recognition of emotions based on facial/ non-facial indicators or bodily movements
Hostile interpretation bias (HIB)	= deciphering social cues as negative (e.g., misinterpretation of words, facial expressions, or tone)
Hostile attribution bias (HAB)	= the tendency to ascribe a provocative intent to others' actions in ambiguous situations
Hostile expectation bias (HEB)	= anticipating a harmful outcome from what appears to be neutral or unclear stimuli.

The **hostile perception bias (HPB)** pertains to the inclination to perceive ambiguous social exchanges as hostile (Bushman, 2016). For example, when observing two people speaking loudly to each other, a hostile perception could imply that they are engaged in an argument or preparing to fight. The **hostile interpretation bias (HIB)** is defined as the preexisting tendency to view social stimuli as hostile. For instance, if someone is gazing at you, a hostile interpretation might suggest that their facial expression indicates anger, when it is actually neutral. The distinction between the HIB and the HPB is that interpretation bias focuses solely on understanding social stimuli, while the perception bias has a wider scope, encompassing entire social interactions interpreted based on facial/bodily movement cues. The **hostile attribution bias (HAB)** is defined as a cognitive tendency to process social cues by assigning a threatening intent to neutral, unclear, or vaguely expressed actions. Therefore, HAB requires a higher level of reasoning about intentions behind actions, while HPB and HIB occur at a lower level of decoding and attaching a malevolent meaning to emotional expressions. Lastly, **hostile expectation bias (HEB)** refers to the tendency to anticipate that someone will respond to potential conflicts with hostility (Bushman, 2016). For instance, if you bump into someone accidentally in a crowded place, a hostile expectation might lead you to believe that the person will think you did it intentionally and, due to this, react aggressively. It is essential to underline that all these concepts referring to biases are occasionally used interchangeably in the literature, which makes it difficult to clearly delineate the links, similarities, and specific cognitive mechanisms.

As a general *mechanism* responsible for the relation between HBs and aggression, it has been posited that a person is more inclined to behave aggressively when they perceive, anticipate, or interpret hostility in others. Consequently, this elicits a more aggressive response from those nearby. Misinterpreting situations as hostile significantly contributes to the development and persistence of aggressive behavior. This tendency is associated with the overarching view that hostility is a fundamental aspect of social interactions (Guerra & Huesmann, 2004). Thus, both HBs and aggression will be perpetuated through this vicious cycle. However, it remains unclear whether hostility biases are mainly a cause or a consequence of aggressive behavior. Due to the robust and reciprocal relationship between HBs and aggressive behavior, these distortions are important targets for understanding and treating aggression and delinquency.

Hostility biases and (aversive) personality traits

The persistent decoding of social information in a hostile rather than positive attributional style can evolve into a consistent personality trait (Dodge,

2006). Conversely, exploring the role of certain dimensions of personality in precipitating antisocial outcomes associated with HBs is also of significant scientific and applied interest.

A substantial body of research on the relationship between personality traits and antisocial behavior has found that individuals who engage in criminal activities often exhibit self-centeredness, hostility, distorted beliefs, and deficits in impulse control (Bate et al., 2014; Blair & Mitchell, 2009; Blonigen et al., 2012; Hare, 1996; Stalenheim, 2004; Tharshini et al., 2021). Therefore, considering callous-unemotional (CU) traits, psychopathy, and antisocial personality was a natural step in delving into the mechanisms of HBs.

CU traits shape the manifestation of unique socio-cognitive characteristics. Research on children aged between 8 and 17 years with behavioral problems revealed that these characteristics, which involve a lack of empathy, guilt, and remorse, are correlated with an increased propensity to decode unclear social indicators as hostile (Hartmann et al., 2020). A subsequent study on middle-school children aged between 11 and 14 years found that the accuracy of emotion recognition for anger was low in those with higher CU scores, regardless of the level of conduct problems. Conversely, children who scored low on CU traits exhibited less accuracy in recognizing emotions as the severity of conduct problems increased (Ciucci et al., 2024). Consequently, different paths to aggression have been identified by the fact that while some individuals with elevated scores on CU traits demonstrate diminished emotional responsiveness, others still manifest exacerbated HBs when provoked (Ciucci et al., 2024).

Antisocial personality and *psychopathic traits* have been associated with deficits in the recognition of facial affect (Marsh & Blair, 2008; Dawel et al., 2012). However, impairments in recognition may arise from an a priori proclivity to interpret facial expressions in a distorted stance, which is aligned to the concept of HB (Smeijers et al., 2017). Previously, researchers proposed that HBs are more prevalent among individuals with psychopathic traits, since their lack of emotional responsiveness might impede their ability to interpret subtle social signals and differentiate between ambiguous and explicit hostile scenarios (Maccoon & Newman, 2006). Lastly, it was found that secondary psychopathy is associated with attributing hostile intent and reactive aggression (Law & Falchenbach, 2017).

Across adults from community samples, new findings reveal that HAB mediates the link between *dark traits* (especially psychopathy, sadism, and Machiavellianism), and relational and reactive aggression (Jiang et al., 2024; Kersten et al., 2024). Positive correlations have been revealed between all aspects of the Dark Tetrad (narcissism, Machiavellianism, psychopathy, and everyday sadism) and aggressive behaviors (Barlett, 2016; Paulhus et al., 2018).

However, recent research highlights that HBs are not only associated with clinical levels of antagonistic personality dimensions, mainly represented by psychopathy, but the explicative frame needs to be extended to other 'dark' or 'aversive' personality traits (Moshagen et al., 2025). Due to the findings that reveal that these subclinical personality dimensions predict engagement in criminal behavior (Bonfá-Araujo et al., 2022; Hurezan et al., 2024), exploring the role of HBs in predicting law violations and persistent offending is required. For instance, *narcissism* (both vulnerable and grandiose) is a strong predictor of HAB (Subra, 2023). Prior studies have shown that individuals with high levels of narcissism tend to perceive more hostility in social situations and react aggressively when they perceive threats to their ego (Baumeister et al., 1996). Therefore, HAB is seen as a crucial factor interfering with the correlation between narcissism and reactive aggression (Bushman & Baumeister, 1998). Also, a temporary increase in state narcissism made individuals more angry and aggressive after unexpected provocation in a sample of college students (Li et al., 2016). These results are in line with prior findings, which highlight that activating narcissism can lead to negative emotions (e.g., anger, hostility) and aggression (Back et al., 2013). A recent study (Eriksson & Schmidt, 2026) identified a subgroup of adolescents with moderate symptoms of social anxiety, for whom a combination of vulnerable and grandiose narcissism traits specifically predisposed them to aggressive behaviors and impulsivity, rather than to shyness and withdrawal.

Although HBs were frequently identified as robust correlates of reactive aggression in general adult samples, the findings in offender and delinquent populations are notably less consistent, mostly focused on evoking the manifestation of the HAB, with inconsistent attention to other HBs. The present scoping review addresses how antagonistic personality traits interact with attributional processes occurring at different levels of information decoding, to trigger and maintain delinquent behaviors, particularly among adults in prison.

Hostility biases and offending: links and explanations

Research on criminal behavior focused on the role of attribution distortions, attempting to decipher how individuals interpret the causes or intentions behind others' actions. Among these biases, especially HAB has emerged as one of the most consistent cognitive correlates of behaviors that defy social norms (Orobio de Castro et al., 2002; Dodge, 2006). However, the research examining the impact of social cognition on violent offending remains limited (Hutchings et al., 2010). Meta-analytic evidence highlights that HAB is consistently associated with reactive aggression and conduct problems across childhood and adolescence (Crick & Dodge, 1994; Zajenkowska et al., 2020). More recent longitudinal research

on juvenile offenders confirms that HAB often mediates the relationship between early environmental risk factors (e.g., harsh parenting, peer rejection) and subsequent delinquent behavior (Lin et al., 2023).

Despite the correlation already posited between aggressive behavior and HAB, the question arises as to whether all HBs are a consequence of the extreme aggressive behavior or whether they mainly lead to difficulties in managing aggressive tendencies. This is especially concerning because a deeper insight into the social, cognitive, and emotional processes contributing to aggression is crucial for enhancing assessment methods and interventions (Coccaro et al., 2017).

Besides HAB, in a sample of psychopathic and non-psychopathic offenders, HIB was found not to significantly correlate with psychopathy, although it was related to an inclination towards proactive rather than reactive aggression. It was also linked to a heightened ability to recognize angry-looking eyes and a greater accuracy in attributing mental states compared to non-psychopathic offenders (Nentjes et al., 2015). This latter observation indicates that individuals exhibiting high levels of psychopathy may not demonstrate a bias; rather, they seem to possess an enhanced awareness of hostile mental states.

The majority of existing studies carried on with adults have indicated a small to medium positive correlation between aggression and HAB (see review by Tuente et al., 2019). One seminal research in highlighting the specific manifestation of HBs among adults in general and offenders in particular, analyzed 25 studies assuming that the link between HAB and aggression is more pronounced in groups that exhibit elevated levels of aggression (e.g., violent offenders and forensic patients). Several studies have found a positive correlation between HAB and aggression (Hornsveld et al., 2007; Lim et al., 2011). Specifically, Hornsveld et al. (2007) indicated a significant relationship between the Buss-Perry Aggression Questionnaire and the Physical Fear Scale - Aggression Violence in a sample of inpatients and outpatients in forensic psychiatric settings. Furthermore, both physical and verbal aggression showed significant positive correlations with assessed HAB.

Lim et al. (2011) reported that an overall sample of both violent and non-violent inmates exhibited a significant positive correlation between aggression expectancy and HAB. Lastly, individuals who commit violent offenses perceive others' actions as more deliberately hostile than those who commit nonviolent offenses (Lim et al., 2011).

Edwards & Bond (2012) revealed that 62 offenders with mental disorders produced considerably more aggressive statements after reading narratives depicting physical aggression. The same study found that high narcissism and low self-concept clarity predicted the HAB in mentally disordered offenders.

Furthermore, forensic outpatients with antisocial and borderline personality disorders showed not only more elevated levels of reactive and proactive aggression compared to healthy controls and non-forensic patients with the same personality disorders, but they exhibited more pathological forms of aggression (Smeijers et al., 2017).

While attributing hostile intent to the actions of others does, in fact, play a role in fostering aggressive behavior in adults, the initial hypothesis presumed by Tunte and collaborators (2019) was not substantially supported by empirical findings. Of the seven investigations involving forensic or offender samples, three showed an absence or mixed relationships between HAB and aggression. In particular, Bowen et al. (2016) found that HAB did not serve as a predictor of aggressive responses in male offenders and, in some instances, was inversely related to these responses; Lobbestael et al. (2013) found that HAB was only associated with reactive, not proactive, aggression. Coccato et al. (2017) discovered unexpected inverse correlations in their SIP-based model, showing that low inhibitory control and increased emotional reactivity may coexist with intact or even enhanced socio-cognitive abilities.

These results imply that, unlike community samples, HBs do not consistently serve as a reliable indicator of aggression among delinquent adults. Some possible explanations for these contrasting results may be attributed to the increased prevalence of instrumental aggression, to the overlapping characteristics of HBs, or to certain personality characteristics among offenders, and to the variability in methods used to measure HBs within these groups (Tunte et al., 2019).

Heterogeneous findings from the aforementioned studies led to the conclusion that further investigation into the relationship between HBs and aggression in adults should utilize multiple methods (such as interviews, surveys, and scenarios) and multi-informant sources (combining self-reports and behavioral observations). Moreover, HBs are a constellation of biases that operate at several stages of social information processing rather than a single process therefore, it is crucial to address them in an integrative manner. This approach would lead to an unifying model in which all HBs are manifestations of one general hostility bias mechanism (Smeijers, 2019).

PURPOSE OF THE REVIEW

The causal factors and mechanisms of aggression are intricate and multidimensional. Aggressive behavior generally occurs when a mix of individual and environmental triggers leads to increased distorted thoughts, „hot” emotions, and physical arousal. An abundance of studies consider that HBs aid in both the

formation and the ongoing persistence of aggressive behavior (Crick & Dodge, 1996). Besides that, integrative models propose that personality traits and attribution processes interact in a dynamic interplay. In addition, extensive studies have been carried out to identify personality characteristics associated with aggressive behavior. Findings have indicated positive correlations between all dimensions of the Dark Tetrad (narcissism, Machiavellianism, psychopathy, and everyday sadism) and aggressive tendencies maintained by HBs (Barlett, 2016; Paulhus et al., 2018).

To the best of our knowledge, no review has been published regarding the HBs of convicted offenders with elevated levels of aversive personality traits. Initially, we focused on existing studies conducted with inmates to map the current state of research on HBs and aggressiveness. However, the aforementioned association's interference with aversive personality dimensions led us to extend our analysis of information processing distortions to include offenders characterized by dark personality traits. We considered studies that measured antagonistic personality traits to refine the investigation of potential explanatory models of crime occurrence.

This scoping review summarizes the types of HBs investigated and the instruments used to measure them. It provides an overview of the main findings and examines the aversive personality traits of incarcerated offenders (mainly psychopathy and narcissism), as well as other involved variables (e.g., proactive/reactive aggression, cognitive abilities, thinking styles, social desirability, etc.).

METHOD

In conducting this scoping review, we followed the six-step framework provided by Arksey and O'Malley (2005) and the general guidelines outlined by PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses, Liberati et al., 2009).

Search strategy and included studies

A complex search was performed in September 2025 for articles in English, published between January 1990 and August 2025, and focusing on the link between hostility biases and aggressive behavior in multiple electronic citation databases: Google Scholar, PsycInfo, Scopus, Science Direct, and Web of Science. The following keywords were used with all databases: hostile (attribution, interpretation, perception, expectation) AND bias AND aggress*; hostile (attribution, interpretation, perception, expectation) AND bias AND violen*; hostile (attribution,

interpretation, perception, expectation) AND bias AND offend*; hostile (attribution, interpretation, perception, expectation) AND bias AND prison*; hostile (attribution, interpretation, perception, expectation) AND bias AND inmate; hostile (attribution, interpretation, perception, expectation) AND bias AND personality AND delinquen*; hostile (attribution, interpretation, perception, expectation) AND bias AND personality AND psychopathy.

This initial search resulted in 344 references, of which 25 were duplicates. The remaining 319 articles were evaluated for eligibility, leading to a final selection of **14 relevant** references (see Figure 1 for the flowchart depicting the study selection process). As a first step, the titles and abstracts were separately screened by the first author to establish if they reported studies regarding HBs and were (1) measuring HBs through self-report questionnaires or experimental tasks, (2) conducted on a forensic population, (3) exploring dimensions of aversive personality (e.g., psychopathy, narcissism). All articles meeting the mentioned criteria were included in the scoping review. Further, we obtained the full-text version for each article selected after the title and abstract screening. For this step, we established a set of inclusion and exclusion criteria.

Relevant articles were selected using the following inclusion criteria:

- (a) Research should be written in English;
- (b) Studies should use for measuring self-report questionnaires, experimental tasks, regarding HBs (attribution, interpretation, perception, expectation) and dark personality traits;
- (c) Studies should be conducted on convicted offenders (currently serving a prison sentence inside a prison/ correctional facility) or forensic inpatients in a secure clinical setting;
- (d) All research should focus on adult samples, including participants with psychiatric disorders;
- (e) Participants of all genders (men, women, and non-binary individuals) were considered eligible";
- (f) The date of publication should be between January 1990 and August 2025;
- (g) Grey literature (unpublished theses and dissertations).

The screening process of the relevant articles had certain exclusion criteria:

- (a) Articles focused only on emotion recognition or on different variables related to hostility attribution bias (e.g., personal space intrusion);
- (b) Research with a different age category than adults (e.g., juvenile delinquents);
- (c) Samples composed by offenders that were not serving a sentence in a correctional/ psychiatric facility (e.g., under surveillance of the probation service);

(d) Articles describing research focused solely on outcomes of programs aimed at improving attribution bias or reducing aggression rate (e.g., pilot studies, pre/post-measures of HBs);

(e) Articles that were focused solely on the instruments used to measure HBs and their psychometric properties;

(f) Qualitative studies (e.g. thematic analysis), systematic reviews, scoping reviews, books, and book chapters,

(g) Articles written in a language other than English.

Articles categorization. Following the articles' screening process, three main categories emerged, based on the type of HBs that were investigated: a) hostile perception bias (HPB), b) hostile interpretation bias (HIB), c) hostile attribution bias (HAB), and d) multiple HBs. Each article was included in only one category that best characterized the purpose for which the research instruments were used to investigate the HBs. For example, although some studies seemed to measure the HPB due to the morphing task or other perceptual-focused instruments, the inclusion of the article was made accordingly to the purpose pursued. The present scoping review focuses on all of the categories mentioned above and reports the outcomes regarding individual differences in offenders' processing information bias.

Data summary and analysis

For data summarization, a structured table was developed, containing the following information: author(s), year of publication, type of HBs investigated, measure(s) for HBs (vignettes or experimental tasks), personality instruments and other variables, study population (type – prison group and/or community sample, sample size, average age) and main findings. Further, we collated all extracted details and produced a table, mapping the basic characteristics of the selected studies: HBs assessed in the prison setting, with convicted adult offenders, the type of personality instrument used, as well as other related variables, and the main findings. Lastly, we discussed the outcomes according to the category of the investigated HBs, underlying the particularities related to the prison setting.

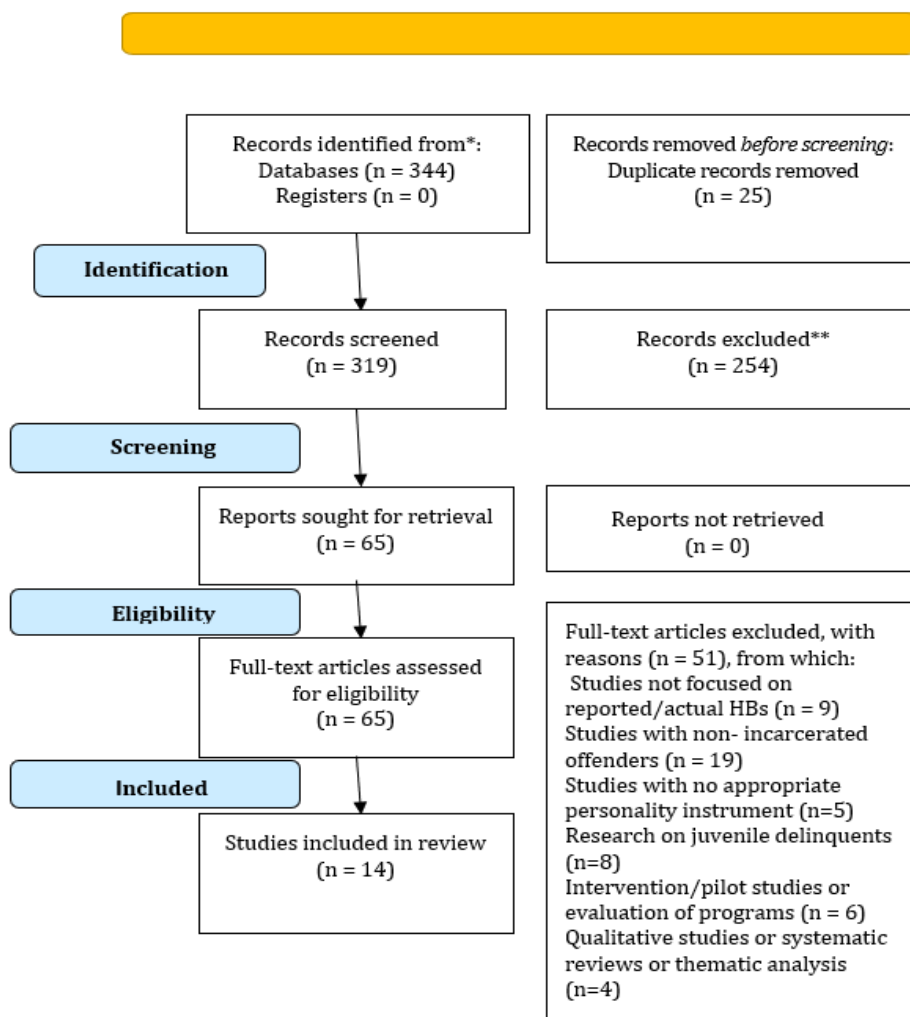
RESULTS

The 14 selected articles were divided into four categories, according to the HB measured: exclusively HPB ($n = 3$ articles), exclusively HIB ($n = 2$ articles), exclusively HAB ($n = 5$ articles, out of which 2 were a doctoral thesis

and a dissertation), and mixed HPB/HIB/HAB ($n = 4$ articles). No articles on measuring HEB were found to meet the established criteria.

Besides measuring various HBs assessment in offenders, the research had to include a measure of aversive personality traits placed in the relation between HAB and aggressive behavior. *Table 2* presents an overview of the study design, population, and main findings for each article.

Figure 1. *The PRISMA Flow Diagram*



*Databases: Google Scholar (first 344 hits), Scopus, Science Direct, Web of Science, and PsycINFO

**The records were excluded by the authors

Table 2. *Summary of studies measuring HBs in offenders*

Author(s), year of publication / Participants (N/n= number, M=mean age)	Type of hostile bias and task(s) used	Assessment of aversive personality (I) and other variables (II)	Main findings
Faith et al., 2022 / <u>Offenders:</u> N=280 (M = 26.66)	HPB Monomorph Facial Affect Task	I. PCL-R; II. SILS-2; WRAT-4	- psychopathy was negatively correlated with d' (sensitivity) for anger, according to Signal Detection Theory (SDT); - noticeable impact of psychopathy on the response criterion (c) for fear and on the response criterion (c) for anger were observed; - HPB is not only a perceptual impairment, but also decision-based mechanism.
Gillespie et al., 2015 / <u>Sexual offenders:</u> N=13 (M = 50.5), <u>Violent offenders:</u> N=16 (M = 37.8) <u>Non-offending controls:</u> N=19 (M = 48.2)	HPB NimStim for expression recognition	I. LSRP; II. MC-C;	- sexual offenders showed HPB (reduced sensitivity to detect emotional expressions compared with non-offenders); - sexual and violent offenders had a reduced sensitivity to perceive fearful expressions; - compared with controls, sexual and violent offenders exhibited impaired sensitivity to high-intensity female fearful expressions.
Philipp- Wiegmann et al., 2017 / <u>Violent offenders:</u> N=41 assigned to the group of <u>proactive</u> (n=24; M = 34.04) or <u>reactive</u> violent offenders (n=17; M = 34.94); <u>Control group:</u> N = 29 students; (M = 31.55)	HPB FEEL	I. PCL-R II. MWT-B; PROREA	- emotion recognition in reactive offenders was significantly lower compared to proactive violent offenders and controls (in general and particularly in recognition of negative emotions such as anxiety, sadness, and disgust); - reactive violent offenders were more likely to show HPB by misreading non-anger emotions as anger; - proactive violent offenders performed similar to controls.
Kuin et al., 2017 / <u>Offenders:</u> N = 85, of which <u>violent offenders</u> (n = 71; M = 36.56); <u>non-violent offenders</u> (n = 14; M = 37.43); <u>Control group</u> (n = 32; employees of the prison service; M = 41.75)	HIB Emotion perception task	I. PPI-R; II. RPQ; BPAQ; IPAS-30; SDAS-11; RSPM; TMT; The beads-in-a-jar task	- no significant data to support that violent offenders perceived facial emotional expressions as more angry than non-violent offenders or healthy controls; - age and a self-report measure of hostility successfully predicted results on the emotion perception task (older offenders made fewer hostile ratings assigned to the facial expressions; -psychopathic traits, IQ, attention and a tendency to jump to conclusions were not correlated with interpretation of anger in facial emotional expressions.

READING THREAT EVERYWHERE:
A SCOPING REVIEW OF HOSTILITY BIASES AND DARK PERSONALITY TRAITS IN OFFENDERS

Author(s), year of publication / Participants (N/n= number, M=mean age)	Type of hostile bias and task(s) used	Assessment of aversive personality (I) and other variables (II)	Main findings
Schönenberg & Jusyte, 2014 / <u>Violent offenders</u> (N=55; M = 33.35) <u>Control group</u> (N=55; M = 30.38)	HIB Ambivalence task	I. PPI-R; II. BPAQ; MINI	- aggression was associated with HIB, respectively with a strong preference to interpret ambiguous facial expressions as hostile; - no biased interpretation of distress cues under conditions of uncertainty.
Czajkowska-Łukasiewicz et al., 2025 / <u>Violent offenders:</u> N = 125 (M = 38.67), from which 61 women <u>Non-offenders:</u> N = 183 (M = 38.29), 94 women	HAB AIHQ	I. HSNS; II. ARSQ	- vulnerable narcissism was positively associated with HAB, with rejection sensitivity as mediator; - rejection sensitivity had a significant indirect effect on HAB among controls, but not in the inmates.
Edwards & Bond (2012) / <u>Offenders:</u> N = 62 male mentally disordered offenders, (M = 39)	HAB Computerized Stories Task; SIP-AEQ	I. NPI; II. SCC	- significant correlation between the physical aggression category of the story and HAB; - HAB associated with writing more aggressive sentences after offensive stories displaying physical aggressive behavior.
Vitale et al., 2005 / <u>Offenders:</u> N=150, from which Caucasians (n=73; M = 28.20), African-Americans (n=77; M = 27.28)	HAB Ten hypothetical vignettes; Questions about attribution of intent	I. PCL-R II. ISQ; SCL-R 90	- PCL-R and ISQ scores were significant predictors of HAB; - HAB did not mediate the links between psychopathy and violent crime.
Hendry, 2013 (Dissertation thesis) / <u>Offenders:</u> N = 56 (M = 33.48), 34% on probation, 28 women; <u>Civil psychiatric patients:</u> N = 118 (M = 34.14), from which 55 women	HAB EHAS	I. PPI-R, PCL-SV; PCL-R II. SCID-I RV; STAXI-2; BPRS-E; CSS-M;	- HAB was a dynamic risk factor for violence and recidivism; - HAB was a significant predictor of violence and recidivism, especially in the short-term.

Author(s), year of publication / Participants (N/n= number, M=mean age)	Type of hostile bias and task(s) used	Assessment of aversive personality (I) and other variables (II)	Main findings
Dhalival, 2002 (Doctoral thesis, Study 2) / <u>Offenders:</u> (N= 70; M = 31.5)	HAB HAI	I. PCL-R II. SAR-FC2; My ETV; PDS,	- significant positive correlation between HAB and psychopathy in the case of ambiguous scenarios was observed; - HAB was indirectly related to aggression, with anger as a mediator.
Zajenowska et al., 2025 / <u>Offenders:</u> homicide offenders - <u>premeditated</u> (N=74; M=36.79) and <u>impulsive</u> (N=39; M=29.25)	HIB+HAB Visual scenes; Emotion recognition on morphed faces; Emotion Preferences task; AIHQ	I. TriPM; II. Eye-tracking	- higher disinhibition and meanness - more hostile attributions in ambiguous relational harm scenarios. - higher levels of disinhibition, meanness, and boldness - reduced recognition of anger in ambiguous facial expressions; - higher meanness - delayed initial fixations on angry faces compared to other emotions, and longer gaze durations on male fearful faces compared to female fearful faces.
Stein et al., 2024 / <u>Violent offenders:</u> N = 65 (M = 40.86); <u>Control group:</u> N = 60, age-matched control participants (M = 43.40)	HPB+HIB Visual search tasks; Ambivalence task; Morphing task	I. PCL-R II. BPAQ; WMT	- no evidence for a fear deficit in violent offenders, nor for an association of psychopathy or aggression with impaired processing of fearful faces; - no evidence for a HPB for angry faces linked to psychopathy or aggression; - violent offenders showed a categorization bias (HIB) for anger, and this anger bias correlated with self-reported trait aggression (but not with psychopathy).
Wegrzyn, et al., 2017 / <u>Offenders (N=45),</u> convicted for <u>violent offences</u> (n = 30; M = 42), <u>child sexual abuse</u> (n = 15; M = 42) <u>Control group</u> (N=17, M = 43)	HPB+HIB Morphed faces experiment; Basic emotion recognition task; KDEF; Basic expression recognition task	I. PPI-R; II. SCID II; AFAS	- violent offenders rate ambiguous fear-anger face expressions as more angry (HPB), compared to both the control population and perpetrators of child sexual abuse; - a lowered threshold to detect anger in violent offenders compared to the general population was revealed.

READING THREAT EVERYWHERE:
A SCOPING REVIEW OF HOSTILITY BIASES AND DARK PERSONALITY TRAITS IN OFFENDERS

Author(s), year of publication / Participants (N/n= number, M=mean age)	Type of hostile bias and task(s) used	Assessment of aversive personality (I) and other variables (II)	Main findings
Jusyte & Schönenberg, 2016 / <u>Violent offenders</u> (N = 34; M = 37.79) <u>Control group</u> (N=35; M = 30.51)	HPB + HIB Emotion sensitivity task; Ambiguous expressions task	I. SRP-III; II. BPAQ; WMT	- experiment 1 (emotional sensitivity) showed no group differences and no evidence for HPB; - experiment 2 revealed the presence of HIB in violent offenders, in the form of a deficit in the categorization of ambiguous fearful blends; - the impairment was associated with self-reported psychopathy and aggression only in violent offenders.

Notes. HBs measures: Visual search tasks (Jusyte et al., 2019); Ambivalence task (Jusyte & Schönenberg, 2017; Schönenberg & Jusyte, 2014); Morphing task (Schönenberg et al., 2013); Monomorph Facial Affect Task (facial affect recognition, Blair et al., 2001); Emotion Expression Labeling Test (FEEL, Kessler et al., 2002); Morphed faces experiment (GIMP and the GAP toolbox, www.gimp.org); Basic emotion recognition task; Face stimuli (KDEF, Lundqvist et al., 1998); NimStim, Tottenham et al., 2009); Basic expression recognition task (Hager et al., 2002); Emotion perception task (Penton-Voak et al., 2013); Emotion sensitivity task (FantaMorph, Abrosoft, Beijing, China); Ambiguous expressions task (FantaMorph, Abrosoft, Beijing, China); Ambiguous intentions and hostility questionnaire (AIHQ, Combs et al., 2007); Visual scenes (Wilkowski et al., 2007; Zajenowska & Rajchert, 2020); Emotion recognition on morphed faces (Schönenberg & Jusyte, 2014); Emotion Preferences task; Ambiguous intentions and hostility questionnaire (AIHQ, Combs et al., 2007; Polish adaptation, Zajenowska et al., 2020); Ambivalence task (Radboud faces database, Langner et al., 2010); Computerised Stories Task (Bond et al., 2004); SIP-AEQ (Coccaro et al., 2009); Ten hypothetical vignettes (adapted from Serin, 1991 & Rose et al., 1994); External Hostile Attributions Scale (EHAS, McNiel et al., 2003); Hostile Attributions Inventory (HAI, Epps & Kendall, 1995); NimStim for expression recognition (Tottenham et al., 2009); Levenson Self Report Psychopathy Scale (LSRP; Levenson et al., 1995);

Personality: Psychopathy Checklist- Revised (PCL-R, Hare, 2003); Psychopathy Checklist- Revised (PCL-R, Hare, 1991); Psychopathy Checklist- Revised (PCL-R, Hart et al., 1995); SCID II (First & Gibbon, 2004); Psychopathic Personality Inventory Revised (PPI-R, Lilienfeld & Widows, 2005); Self-reported Psychopathy Scale (SRP-III, Neumann et al., 2012); Hypersensitive narcissism scale (HSNS, Hendin & Cheek, 1997; Polish version: Czarna et al., 2014); Triarchic Psychopathy Measure (TriPM, Patrick et al., 2009; Polish adaptation, Pilch et al., 2015); Narcissistic Personality Inventory (NPI: Raskin & Terry, 1988); Psychopathy Checklist – Screening Version (PCL-SV; Hart et al., 1995); Structured Clinical Interview for the DSM-IV – Axis I Disorders Research Version (SCID-I/RV; First et al., 1997)

Other variables: Buss-Perry Aggression Questionnaire (BPAQ, Buss & Perry, 1992); Scale of proactive and reactive violence (PROREA, Müller, 2014); State-Trait Anger Expression Inventory -2 (STAXI-2; Spielberger, 1999); Scenario Aggression Response Ratings-Forced Choice 2 (SAR-FC2, VanOostrum and Horvath, 1997); My Exposure to Violence (My ETV, Selner- O'Hagan et al., 1998); Appetitive and Facilitative Aggression Scale (AFAS, Köbach et al., 2015); Reactive-Proactive Aggression Questionnaire (RPQ, Raine et al., 2006); Impulsive/ Premeditated Aggression Scales (IPAS-30, Stanford et al., 2003); Social Dysfunction and Aggression Scale (SDAS-11, Wistedt, 1990); Rejection sensitivity questionnaire for adults (ARSQ, Berenson et al., 2009; Downey et al., 2006; Polish version: Bodecka et al., 2021); Self-Concept Clarity scale (SCC; Campbell et al., 1996); Inferential Styles Questionnaire (ISQ, Rose et al. 1994); Symptom Checklist-90-Revised (SCL-R 90, Derogatis, 1992); Mini International Neuropsychiatric Interview (MINI, Lecrubier et al., 1997, German version); Brief Psychiatric Rating Scale – Expanded Version (BPRS-E; Lukoff, et al., 1986); Criminal Sentiments Scale – Modified (CSS-M; Shields & Simourd, 1991); Paulhus Deception Scales (PDS, Paulhus, 1984); Marlowe-Crowne Form C (MC-C; Reynolds, 1982); Wiener Matrizen Test – short version, (WMT, Formann, Waldherr, & Piswanger, 2011); Shipley Institute of Living Scale-2 (SILS-2, Shipley, Gruber, & Martin, 2009); Wide Range Achievement Test (Reading Test), 4th edition (WRAT-4, Wilkinson & Robertson, 2006); Multiple-Choice Vocabulary Intelligence Test (MWT-B, Lehl et al., 1995); Raven Standard Progressive Matrices (RSPM, Raven et al., 2000); Trail Making Test (TMT, Partington & Leiter, 1949); The beads-in-a-jar task (Huq et al., 1988); Eye-tracking (Real Eye – web-based software).

General considerations regarding the investigation of HBs

The analysis of the 14 studies revealed important conclusions about the manner in which we should understand each HB and the determinants involved in producing these distortions.

Although this scoping review did not intend to explain the variables that contribute to HB formation, however, it is still unclear how each HB is acquired and related to antisocial behaviors. This led researchers to study HBs separately, as if they were non-interacting phenomena. However, different papers used overlapping terminology for HPB, HIB and HAB without being explicit about the level of processing they investigate and thus, creating confusion in conceptually delineating between the actual HB assessed.

In their desire to explore as comprehensively as possible the deficits that arise in information processing, researchers themselves came to consider that certain instruments which required participants only to name basic emotions or decode mixed emotional expressions actually measured the attribution of intention. However, for this stage to occur, higher-order cognitive processing must intervene.

It is extremely difficult to separate the phases of decoding the cues from the social information we permanently receive, and to refer to them as only perception, strictly interpretation, or just attribution of intent. In real-time situations, it is hard to clearly set limits on how long each sequence lasts; therefore, in recent research, complex methodologies have been developed to measure multiple HBs within the same study.

In drawing conclusions from the analyzed papers, we faced the same challenges. This prompted us to first present how specific tasks can be mapped to the measurement of different HBs, in close alignment with the sequences involved in decoding social information. Our approach is not motivated by a desire to create an artificial segregation of the phenomenon, but rather to foster a multidimensional understanding of the process and subsequently offer an integrative perspective on it. Therefore, from the outset we decided that important conceptual distinctions are necessary.

Differentiating between studies that tackled HPB and HIB was more difficult. To clearly differentiate the level of information processing at which a potential distortion occurs it was required the clarification of the following concepts: perceptual encoding, interpretation of information (assigning a meaning) and emotion sensitivity.

When impairments which generate HBs occur at a more basic level, involving simple perceptual processes involved in scanning the emotional landscape and intentions of others, this is translated in evaluating HPBs. To

effectively determine HPB in offenders, researchers used tasks exposing emotions through *facial expression* since processing facial indicators is one of the most direct sources of information in social interactions, (e.g. basic expression recognition task, emotion sensitivity task, etc.). Previously, it was posited that higher order HBs are mainly caused by impairments in emotion decoding, especially of anger and fear. When individuals perceive more anger or fear than is objectively present, a HPB is inferred. Therefore, for capturing HPB, the instruments used require participants to recognize and name basic emotions (*perceptual level*). For example, participants are asked to label the presence of a certain emotion when non-ambiguous stimuli (faces) are shown. The threshold for accurately perceiving the presence of a certain emotion offers hints about an important perceptual parameter – ***emotion sensitivity***, which refers to how much emotional signal is required before a person detects or recognizes an emotion.

The *interpretation* bias occurs after the perceptual phase, when the person assigns a meaning to the perceived stimuli either by interpreting uncertain expressions as angry or misclassifying them as such. HIB emerges in a context of conflicting signals, which creates difficulty in accurately interpreting the facial cues. Ambiguity forces the assignment of a meaning, thus intervening interpretation of the stimuli, despite the completion of the perceptual phase. This leads to the production of HIB, by assigning a distorted meaning to what they previously perceived. In this regard, in the ***ambivalence task*** two distinct emotions coexist and are blended together in various proportions to create ambiguous stimuli, from low ambiguity pairs (containing 90% and 10% of each emotion), mid ambiguity (70%/30%), to high ambiguity pairs (50%/50%). The instrument requires to the participants to evaluate the emotional expression (e.g. happy, angry or fearful) in a forced-choice manner. Subsequently, subjects rate the intensity level of the identified emotion for each face on a rating scale ranging from 0 (not present at all) to 10 (full-blown emotion). Additionally, the ***morphing tasks*** are ideal candidates for exposing HIB by manipulating the emotion intensity through a continuum varying from one emotion to another. A morphing task is based on a perceptual categorization paradigm in which an emotion is gradually transformed along a continuum between two fully-saturated extremes in a succession of multiple sequences (from neutral 0% to 100%). Participants have to announce the recognition of the emotional expression as soon as they detect it while the researchers manipulate its intensity. In summary, HIB arise on ambiguous cues (ambivalent or morphed faces with unclear emotional signals) which change in seconds and require directing attentional resources for solving the task. Differing from HPB instruments, these tasks involve active changes and unclear cues which also allow measuring perceptual sensitivity as well as thresholds of detecting several emotions.

The investigation of HAB was more easily detectable through *vignettes* depicting ambiguous social scenarios that explicitly required (hostile) attributing intent to an actor's actions. However, *attributions of intentions* were assessed through *self-reported questionnaires* designed to measure the attributional style. For the latter, the items typically describe ambiguous interpersonal interactions and require respondents to rate how hostile the other person's intent is.

Specific considerations regarding measurements of HBs in offenders

As previously presented, several instruments are used to assess HBs, including questionnaires, vignettes, as well as computerized tasks (especially for displaying ambivalence and morphing tasks).

The present scoping review aims to provide a comprehensive analysis of instruments used for measuring HBs in offenders to reflect the level of manifestation of each distortion, starting from the perceptual stage, to interpretative and finally to cognitive processing. For every study included in the review, we preliminarily clarified the purpose for which it was used a certain methodology and subsequently classified the type of bias examined (see Table 2).

The use of vignettes, for example, did not automatically ensure inclusion of the study in the review, despite an initial tendency to consider it would meet the criteria. Several studies were not considered eligible after the content analysis, due to the use of social scenarios for investigating variables other than HBs, respectively criminal thinking patterns (Walters, 2007) or neural activation during personal space intrusion (Schienle et al., 2016).

Fourteen studies were selected that investigated the manifestation of HBs in the criminal population. Three of these studies used measurements to elicit perceptual impairments through signal detection theory (SDT; Stanislaw & Todorov, 1999) and recognition of facial emotional expressions. Two papers investigated HIB with ambivalence and morphing tasks, and five studies highlighted HAB through self-reported questionnaires and vignettes. Lastly, four studies employed a complex methodological approach to expose multiple HBs, with the purpose of clearly delineating the different phases of social information processing.

Specifically, the application of SDT in revealing HPB underscores the importance of distinguishing between perception sensitivity and response bias (i.e. the decision to report perceiving a certain emotion) when analyzing the perception deficits in forensic population (Gillespie et al., 2015; Faith et al., 2022). Furthermore, the ability to recognize facial expressions depicting basic emotions highlights the significance of emotion misinterpretation in explaining maladaptive behaviors across different categories of aggressive offenders (Philipp-Wiegmann et al., 2017).

The dynamics of facial expressions reflect immediate changes in internal emotional states (Eckman & Friesen, 1975), providing cues for adjusting social behaviors. With regard to this, the ability to recognize facial expressions in others has been demonstrated to influence aggressive behaviors, being impaired in individuals displaying antisocial behaviors (Sato et al., 2009; García-Sancho et al., 2015; Gillespie et al., 2015; Schönenberg et al., 2016). Therefore, the instruments that require the correct identification of emotions within ambivalence or morphing task were deemed appropriate for revealing HIBs. A large body of the selected studies investigated potential impairments in the accurate interpretation of emotions and thus detected HIB using morphed facial expression tasks (Wegrzyn et al., 2017; Faith et al., 2022; Stein et al., 2024; Zajenkowska et al., 2025) and ambivalence tasks (Schönenberg & Jusyte, 2014; Stein et al., 2024). These tasks require participants to identify the first/main emotion they observe when two primary emotions are combined, or when they are presented on a continuum from neutral to fully salient.

Finally, for assessing HAB, the analyzed papers used self-report instruments, such as External Hostile Attributions Scale (EHAS; Hendry, 2013), and also vignettes, which present uncertain and unclear social interactions. Regarding the self-report measures, they assessed distortions occurring in processing social information, providing valuable insights into an individual's subjective experience of depicting others' actions. Compared to other methods, they are easier to administer to larger populations and the results can be interpreted more efficiently, using standardized ratings.

One of the studies that used vignettes to evaluate the propensity to ascribe threatening purpose to others' intentions (Czajkowska-Łukasiewicz et al., 2025) displayed a commonly used instrument for HAB, respectively Ambiguous Intention Hostile Attribution Questionnaire (AIHQ; Combs et al., 2007). This task measures the extent to which the respondent attributes a hostile evaluation to certain stories with an unclear connection between characters or a diffuse social context. To capture specific cultural differences and refine the interpretation behind the provocateur's intention, this task was used in an adapted Polish version in a recent study (Zajenkowska et al., 2025). From the vignettes-category, we also mention the studies that used SIP-AEQ task and Stories Task (Edwards & Bond, 2012), Hostile Attribution Inventory (HAI; Dhalival, 2002), as well as an adapted version of Serin's vignettes (Vitale et al., 2005).

Prior research investigated the presence of HBs by mainly relying on overlapping and confusing terminology, as well as a conceptual mixture of the different phases of SIP. Using a vignette-based methodology exclusively fails to consider the significance of basic perceptual stages and the influence of facial expressions as relevant emotional cues on the production of HBs in the early

phases of information processing. Nevertheless, facial expressions are crucial in social interactions and may trigger aggressive intentions and actions if misinterpreted. To correctly address these shortcomings and globally assess the multi-level mechanism of SIP, a more comprehensive explicative model was developed. The computational model (Smeijers, 2019) allows for the measurement of more than one HB by using multiple tasks in the same research for an integrative understanding of the process (e.g. emotion recognition on facial morphs, AIHQ, visual scenes, emotion preferences task, and eye tracking; Zajenkowska et al., 2025). Relatively similar methodologies have been used in other studies that measured multiple HBs in offenders, with results that led to significant conclusions about this mechanism of information processing, which cannot be isolated solely at the perceptual, interpretive, or cognitive level, but must be viewed as a whole (Jusyte & Schönenberg, 2016; Wegrzyn et al., 2017; Stein et al., 2024).

Findings from measuring HPB in offenders

Our summary revealed significant HPBs across the three analyzed studies, especially in aggressive offenders who are characterized by a marked tendency to perceive anger in ambiguous faces.

For understanding the prerequisites of HPB production, it should be acknowledged that altered recognition of emotional states is regarded as a primary cause of aggressive behavior, which is an essential characteristic of disorders like psychopathy and antisocial personality disorder (Marsh & Blair, 2008). Two significant yet different models have been postulated to link disruptive behavior to impairments in social information processing. On one side, in the *integrated emotion system theory* (Blair, 2005), an accurate perception and detection of distress cues ensures the suppression of aggressive impulses (Blair, 2005). Conversely, the *HAB model* (Milich & Dodge, 1984) accounts for aggression through a tendency to depict unclear expressions as angry, due to a cognitive misinterpretation that occurs during subsequent information processing.

In order to effectively assess whether impairments in facial affect recognition are attributable to a decisional process or are simply consequences of a perceptual sensitivity, SDT was employed, as it provides a more nuanced approach to the study of affect recognition in offenders characterized by high levels of aggression and psychopathy.

One study found that sexual offenders exhibited lower sensitivity (d') to facial emotional expressions in general (across various intensities, genders of faces, and types of emotions) when compared to non-offenders (Gillespie et al., 2015). The results indicate that difficulties in recognizing facial emotions are

found not just in individuals who commit violent crimes, but also in those who commit sexual offenses. The displayed impairment with intense expressions of female anger and disgust indicates that their deficiencies are complex, emotion- and gender-related. This study was conducted with sexual perpetrators, connecting emotion recognition with HAB frameworks through the lens of SDT, distinguishing between sensitivity (d') and decision bias (c). The findings support the idea that deficits in recognizing fear may significantly contribute to the likelihood of involvement in both violent and sexual offenses — potentially by diminishing their awareness of vulnerability or distress in others (Gillespie et al., 2015).

The previous conclusions are in line with another analyzed paper (Faith et al., 2022), which revealed that deficits in fear recognition were better explained by another mechanism than IES, which involves a hostile attribution, aside from that which causes low control of aggressive impulses in psychopathy.

Taken together, the previous studies claim the importance of SDT as a practical modality for elucidating inconsistent findings pertaining to the existence of a HPB arising from emotion recognition by disentangling perceptual sensitivity from the response bias.

Trying to capture the fear-anger sensitivity to emotional facial perception, Philipp-Wiegmann et al. (2017) examined differences among reactive offenders (with impulsive responses to provocation, marked by anger and lack of control, aimed at attacking the provocateur) and proactive perpetrators (with planned and goal-directed actions, seeking a desired outcome). As posited, in comparison with proactive violent offenders and the control group, the reactive offender group demonstrated a significantly lower capacity for emotion recognition, both in general and with regard to negative emotions such as sadness and disgust. Reactive violent offenders demonstrated a tendency to misperceive non-anger emotions as anger. In contrast, proactive violent offenders demonstrated a performance that was similar to that of the control group. Surprisingly, in visual search tasks, offenders and controls exhibited no substantial differences in their processing of fearful faces. Lastly, in the tasks involving perceptual sensitivity, individuals with high levels of psychopathy did not demonstrate a decreased threshold for recognizing anger earlier than other emotions.

These outcomes add a skeptical stance to the theories that posited that fear processing is impaired both in aggressive individuals and in psychopathy, and provide the perspective that aggression is much more linked to HAB that unfolds after the perceptual processing stage. In fact, someone can perceive the stimulus accurately, but interpret them as hostile due to beliefs, or personality dimensions.

This more comprehensive perspective indicates a step ahead from solely perceptual-deficit models (such as *integrated emotion system theory*, Blair, 2005) towards a more refined approach where cognitive biases play a central role in understanding aggression in individuals with psychopathy or other antagonistic personality traits.

Findings from measuring HIB in offenders

Considering that aggressive individuals struggle with identifying facial emotions, it can be inferred that they may encounter greater uncertainty in social situations and are consequently prone to adopting their maladaptive tendency of assuming the worst about others.

Our summary included two studies which aimed to explore if impairments in the interpretation of ambiguous social cues (i. e., facial expressions) are linked to aggressive behavior and psychopathy in violent and non-violent offenders (Schönenberg & Jusyte, 2014; Kuin et al., 2017).

Among the stimuli that are constantly decoded in current interactions, facial expressions convey a wide range of socially significant information that reflects the emotional states of other individuals. Therefore, difficulties in accurately interpreting subtle variations in facial signals during social interactions may contribute to a negative perception of others' emotions and intentions. Besides this, emotional facial expressions play a crucial role in modulating interpersonal connections. Indeed, substantial evidence indicates that deficits in recognizing clear facial emotions are associated with socially deviant and aggressive behavior (Marsh & Blair, 2008).

Although individuals who committed violent offenses showed a mild inclination to interpret ambiguous (neutral) faces as "*angrier*" compared to non-violent offenders or healthy individuals, the differences were not statistically significant (Kuin et al., 2017). These controversial outcomes indicate that the absence of highlighting HIB among violent inmates could be less consistent, or that its impact may be nuanced due to the characteristics of the sample (e.g., heterogeneity of the violent offences, low statistical power) or to methodological issues (e.g., tasks with binary choice).

In an effort to expose HIB production, Schönenberg & Jusyte (2014) demonstrated that aggressive offenders not only that they (mis)interpreted ambiguous facial signals as hostile, but also exhibited a pronounced inclination to consistently overrate the perceived intensity of anger compared to the control group. Their findings support the assumption that uncertain facial signals with elements of anger can act as strong indicators of provocations or imminent threats for aggressive individuals. Consequently, these evidences reveal the strong link between antisocial behavior and an enhanced perceptual sensitivity

of angry facial cues. However, the study found no evidence to support the hypothesis of a link between the degree of self-reported psychopathic traits and the propensity to interpret ambiguous cues as hostile, which conflicts with earlier research (Serin, 1991; Vitale et al., 2005).

The aforementioned research (mostly) shows that when cues are ambiguous, offenders, especially violent ones, are more prone to exhibit biases. Specifically, they might react aggressively by overestimating danger in situations where clarity is lacking rather than misreading clear cues.

Findings from measuring HAB in offenders

Defined as the tendency to consider the intentions of others as hostile in situations where social cues are unclear and unpredictable (Milich & Dodge, 1984), HAB is considered a significant factor in the development of problematic behaviors (Orobio de Castro et al., 2002), being the most investigated HB.

A consistent body of research was conducted on capturing the impact of ascribing a malevolent intention to others' actions, instigating problematic social interactions. Our summary analyzed five studies which explored the links between HAB and narcissism (Edwards & Bond, 2012; Czajkowska-Łukasiewicz et al., 2025), respectively psychopathy (Dhalival, 2002; Vitale et al., 2005; Hendry, 2013) mainly by using vignettes, but also tasks with pictorial stimuli.

Two decades ago, Vitale et al. (2005) investigated HAB in approximately 150 incarcerated adult males and revealed that, particularly in offenders, this bias seems to stem from at least two separate pathways: (1) one associated with psychopathy (marked by interpersonal hostility and deficits in response modulation) and (2) a more depressogenic/negative-schema pathway (encompassing broader negative beliefs about oneself and the world). These pathways demonstrate different relationships with personality traits, attributional styles, and criminal actions. Despite the promising findings, this study has one important limitation: it attempted to capture the role of HAB in offenders through only a few hypothetical situations and questions about the attribution of intent. These may not have accurately reflected a real-life context; therefore, the use of vignettes in this study may have influenced the non-significant outcomes of HAB mediating the link between psychopathy and violence.

For exposing the specific manifestation of HAB in offenders, in this scoping review, two unpublished research studies were also included alongside peer-reviewed articles, aligned to the eligibility criteria – a doctoral thesis (Dhalival, 2002) and a dissertation thesis (Hendry, 2013). Although not formally peer-reviewed, these works serve as supplementary evidence to enrich the published literature and to complete the existing research with new potential directions. Due to the changeability of HAB over time, it was explored its role as

a dynamic risk factor in producing violent behavior and reoffending is also a target in clinical interventions (Hendry, 2013). Previously, Dhaliwal (2002) found a significant association between HAB and aggression in ambiguous social scenarios, as well as a positive correlation between psychopathy and HAB. Dhaliwal proposed a model in which psychopathy and HAB contribute to anger, which then leads to affective (emotional) aggression. Specifically, state anger mediates the relationship between HAB and affective aggression, indicating that offenders who attribute hostile intent experience increased anger, which in turn predict aggressive behavior.

Expanding the area of research to other personality traits, Czajkowska-Łukasiewicz and colleagues (2025) compared Polish inmates and a sample from the general population, which revealed nuanced findings. It was hypothesized that individuals with higher scores in vulnerable narcissism tend to make more hostile attributions and that this link might be explained by sensitivity to rejection. The claimed link between HAB and vulnerable narcissism was validated, a positive correlation being emphasized, with rejection sensitivity acting as a mediator. However, only in the general population, rejection sensitivity demonstrates a significant indirect impact on HAB. The absence of mediation in the inmates group suggests that the path might operate differently and not exclusively through sensitivity to rejection, but could be explained by other contextualized mechanisms (differences in social cognition, history of violence, the incarceration experience etc.).

Based on the idea postulated by Bushman & Baumeister (1998) that narcissistic individuals react violently to threats because they seek to punish others and restore their sense of superiority, Edwards & Bond (2012) also investigated the attribution processes that mediate the relationship between narcissism and aggression in a sample of 62 mentally disabled offenders. A key finding was that narcissism made a smaller but still significant contribution to the prediction of HAB, while self-concept clarity was a strong predictor of HAB.

Taken together, these studies expand the avenues for exploring the links between multiple antagonistic personality traits and aggression, triggered by inappropriate information processing strategies. The path is already paved with outcomes that support HAB as a mediator between Dark Triad and relational aggression (Jiang et al., 2024).

Findings from measuring multiple HBs in offenders

In their efforts of disentangling the level in which HBs occur, researchers initiated complex methodologies for measuring more than one HB. In this regard, our summary identified four studies that addressed different distortions, with the aim of accurately pointing whether the bias is sensory, interpretative or attributional.

Following Smeijer's computational model (2019), research in the field of HBs has reached a turning point by diversifying the methodology in order to more clearly determine the levels at which impairments occur, adopting an integrative view of the whole information processing mechanism.

Previously to this innovative model, a consistent approach in examining both HPB and HIB was made by Jusyte and Schönenberg (2016). Their study emphasizes the idea that when assessing social-cognitive deficits in violent offenders, it's crucial to distinguish between *detection* vs. *categorization* tasks – just because someone detects emotional cues doesn't guarantee accurate interpretation. The aim was to investigate how aggression relates to the perception of facial expressions of anger and fear in violent offenders compared to healthy controls in two separate experiments. Actually, the findings from both experiments suggest that the fear deficit noted extensively in research on psychopathy, antisocial personality disorder, and aggression is likely due to an impairment in adequate categorizing (i.e., assigning a verbal label to) emotional expressions.

Actually, the aforementioned research enhances comprehension of social cognition impairments in violent individuals – it's not that they perceive danger in all situations (perception sensitivity), but they might incorrectly identify specific emotions (categorization), especially fear, when facial expressions are unclear (Jusyte & Schönenberg, 2016).

Investigating also HPB and HIB, Wegrzyn et al. (2017) showed that the HPB is particularly pronounced for male faces, suggesting that the effect depends on face gender. Violent offenders exhibited a diminished threshold for anger detection. These findings are consistent with those reported by Schönenberg & Jusyte (2014), who observed that when exposed to ambiguous face stimuli, impaired performances arise when anger is at the end of the emotion spectrum. Additionally, all participants showed a similar pattern of confusion, with fear being persistently confused with surprise, or disgust with anger. To note, though, fear is undeniably more challenging for even emotionally healthy individuals to identify compared to feelings like happiness and sadness (Russell, 1994; Elfenbein & Ambady, 2002).

More recently, using combined measures (vignettes, morphing task, eye-tracking) for revealing how hostile intent attribution appear from an early perceptual stage, Zajenkowska and colleagues (2025) investigated how the three facets of psychopathy (Disinhibition, Meanness, Boldness – The Triarchic Psychopathy Model, TriPM; Patrick et al, 2009) are associated to different types of HBs in homicide offenders (impulsive and premeditated). Surprisingly, individuals with high levels of psychopathy have reduced recognition of anger; rather than overestimating its presence, they fail to identify it in unclear facial expressions. This might indicate a complicated emotional-cognitive profile:

they might not be excessively alert to anger in facial expressions, yet still assess hostile intent through different methods (such as vignette-based or relational approaches).

This research enhances our understanding of psychopathy and hostile attribution, but it is simplistic to presume that individuals with psychopathy consistently perceive only threats around them. Certain dimensions of psychopathy (such as meanness and disinhibition) are associated with attributing hostility, yet these same traits may also correlate with a reduced awareness of facial expressions of anger.

Once the integrative models of HBs mechanism appeared, testing the consistency of previous ones increased. For example, one of the studies included in the present scoping review and investigating mixed HBs does not support the perspective (from IES) that aggression and psychopathy are primarily caused by an inability to recognize fear (Stein et al., 2024). Instead, the findings align better with the HAB model (Orobio De Castro et al., 2002): individuals who display aggression may not misinterpret emotions themselves, but rather view ambiguous emotional cues (particularly "mixed" signals) as more hostile or angry. To investigate the bias, the tasks used in the experimental phase were designed to separate bottom-up perceptual processing from higher-level cognitive labeling and/or interpretation. HAB seems to develop during later cognitive processes (after perception), during the labeling or interpretation of emotion, not during the initial perceptual detection.

Nevertheless, mixed-method approaches in exploring unique associations between personality facets and HBs can reveal surprising profiles of attributing hostility by those with dark sides of psychopathy.

Findings from measuring HBs in relation with (aversive) personality traits, aggression and other relevant dimensions

Exploring the flavored specificity that aversive personality traits can add to the manifestation of HBs in perpetrators, the most prevalent conclusion is that psychopathy significantly influences offenders' perceptions of social cues, often leading to an inflated perception of hostility (Vitale et al., 2005). It became clearer that offenders higher in psychopathy are more likely to perceive, interpret, and attribute malevolent meanings to social cues. These biases operate predominantly in the context of ambiguity, from misreading facial expressions to impaired interpretation of a social scenario, and over-attribution of hostile intention.

Consequently, aggressive offenders with high psychopathy scores expressed more anger when faced with hypothetical provocative scenarios and

assigned a higher degree of hostile intent to the ambiguous acting character when they imagined themselves as the victim in comparison to violent individuals without psychopathy (Serin, 1991).

Therefore, psychopathy emerges as a crucial factor that shapes hostile perception through reduced sensitivity to distress cues, lowered thresholds for detecting anger (Faith, 2022).

Furthermore, there have been limited studies that have comprehensively examined whether psychopathy is associated with diminished facial mimicry or reduced physiological responses to the dynamic facial expressions of others.

For example, psychopathy was not significantly associated with anger categorization bias (Stein et al., 2024). Moreover, there was no significant relationship between psychopathic traits (measured with PPI-R), intelligence, attention, or the tendency to jump to conclusions and how individuals perceived ambiguous facial expressions (Kuin et al., 2017). Nevertheless, these findings leave open questions about the robustness, specificity, and underlying mechanisms of this ability in psychopathic individuals.

Altogether, these mixed conclusions reinforce the hypothesis that HBs in offenders are intertwined with antagonistic personality traits. Still, antisocial manifestations do not rely exclusively on a psychopathic foundation. Despite the clinical levels of certain personality disorders, there are other facets, themes, or constellations of traits that can converge to aggression and violence, even from a non-clinical intensity.

Although investigating aversive personality traits related to HBs in offenders was mainly oriented towards psychopathy, seen as a crucial marker of antisocial personality, for our summary were found only two studies that explored the occurrence of HBs in relation to narcissism (Edwards & Bond, 2012; Czajkowska-Łukasiewicz et al., 2025).

One of the possible reasons for the low interest in expanding research to other personality traits might be that the majority of meta-analyses indicate that individuals with high levels of psychopathy exhibit lower accuracy in categorizing or recognizing typical facial emotional expressions of others (Wilson et al., 2011; Dawel et al., 2012).

Beyond the two aforementioned studies, there is a lack of research exploring the role of HBs in the relation between several other aversive personality traits that interfere with aggressive behavior, such as sadism, Machiavellianism, or even Dark Factor of personality (Moshagen et al., 2018). Although previous research has indicated theoretical support for a link between the dimensions of Dark Triad (Machiavellianism, psychopathy, and narcissism) and relational aggression, the mediating factors influencing the connection still require in-depth exploration (Jiang et al., 2024).

Inventorying the measurements employed for assessing *antagonistic personality traits*, the Psychopathy Checklist-Revised (PCL-R, Hare, 2003) was used in six studies (Dhalival, 2002; Vitale et al., 2005; Hendry, 2013; Philipp-Wiegmann et al., 2017; Faith et al., 2022; Stein et al., 2024). The self-reported level of psychopathy was assessed through the Psychopathic Personality Inventory-Revised (Hendry, 2013; Schönenberg & Jusyte, 2014; Wegrzyn, 2017), the Self-Reported Psychopathy Scale (Jusyte & Schönenberg, 2016), Levenson Self-Report Psychopathy Scale (Gillespie et al., 2015). One of the studies explored the different facets of psychopathy through The Triarchic Psychopathy Measure (Zajenkowska et al., 2025), deciphering the particular profiles that disinhibition, meanness, and boldness make in association with HAB

Aside from the influence of personality, research involving forensic population has shown conflicting results about the impact of HBs in determining aggressive responses. While some of the findings reinforced the impact of hostile processing of information in producing disruptive behaviors (Jusyte & Schönenberg, 2016; Kuin et al., 2017; Wegrzyn, 2017), other outcomes were contradictory (Vitale, 2005; Lobbestael et al., 2013). Possible explanations include confounded variables (e.g., age, IQ, social desirability, etc.), small and heterogeneous samples of offenders, or a lack of diversity in using appropriate tasks to detect potential links.

In measuring *aggressive behavior* and the propensity to develop diverse forms of hostile manifestations, the BPAQ (Buss & Perry, 1992) was used, a widely known instrument. Four studies describe using this task in revealing links between HBs and aggression (Schönenberg & Jusyte, 2014; Jusyte & Schönenberg, 2016; Kuin et al., 2017; Stein et al., 2024). All of them reported links between different facets of aggression and HBs. One of the analyzed studies used multiple tasks for deciphering the role of several facets of aggression in relation to HBs (Kuin et al., 2017).

For a more refined methodological approach, some studies used multiple instruments in order to capture the aggression spectrum (Dhalival, 2002; Kuin et al., 2017). The latter study employed instruments to measure also reactive vs. proactive aggression, impulsive vs. premeditated aggression, and a scale for social dysfunction and aggression. This study provides evidence that HIB is a risk mechanism for emotionally driven violence and that violent offenders exhibit a stronger correlation between HIB and reactive aggression.

Also, when the methodological frame was diversified (including self-reported tasks – vignettes, and perceptual – morphing tasks), the results outlined evident links between the measured variables (Edwards & Bond; Gillespie et al., 2015; Zajenkowska et al., 2025).

Gender differences observed in the association between HBs – aggression appear to be of scientific interest, although in this scoping review, twelve studies featured exclusively male samples, and only two examined particular features

in women offenders. Specifically, among female inmates, there was a medium correlation between vulnerable narcissism and HAB (Czajkowska-Łukasiewicz et al., 2025), but with no differences compared to the male offenders. Hendry (2013) showed that while men had considerably higher scores in HAB task than women, there was no significant correlation between gender and any of the outcomes (violence or recidivism).

The tendency to endorse socially acceptable traits was addressed in three of the included studies (Dhalival, 2002; Hendry, 2013; Gillespie et al., 2015) by using tasks designed to measure *social desirability*. Additionally, to control for covariates, IQ tasks were employed, both verbal and figural (Jusyte & Schönenberg, 2016; Kuin et al., 2017; Philipp-Wiegmann et al., 2017; Faith et al., 2022; Stein et al., 2024).

Regarding the samples' composition, most of the studies focused on revealing differences between violent and non-violent offenders, but mixed numerous offences under the same category (heterogeneous offences with no cut-off point regarding the level of violence used). Still, two studies of sexual offenders (Wegrzyn, 2017; Gillespie, 2015) revealed particular features of their HBs. For example, it was found that sexual offenders exhibit reduced sensitivity to emotional facial expressions (fear, anger, disgust) compared to non-offenders. This incorporates the idea of a broader impairment in decoding facial cues involved in emotion regulation and inhibition of violent behavior.

Therefore, a considerable focus is needed on ensuring greater sample homogeneity by offence type, as well as a more in-depth analysis of multiple separate categories of offences, to better detect variance in HBs manifestation.

In summary, the type of aggression is a key factor in the investigation of HBs which have been consistently linked to reactive aggression, a manifestation triggered by a perceived threatening and emotional disturbance. However, HBs are not associated with proactive or instrumental aggression, which is more typical to psychopathy. Thus, when aggression is split into subtypes, the association between HBs and proactive aggression becomes insignificant (Vitale et al., 2005; Philipp-Wiegmann et al., 2017).

DISCUSSION

For all the growing literature from the last two decades, there are still many challenges and controversies in understanding HBs, especially in incarcerated offenders, mainly because different research approaches tend to use distinct methodologies to explore various sides of information processing, while at the same time being limited to specific developmental stages, populations or to some psychiatric conditions.

Although some studies underline the role of HBs in producing antisocial behavior (Andrews & Bonta, 2010; Walters & DeLisi, 2013), there is still a lack of systematic research on the relationship between facets of aversive personality and aggressiveness determined by any kind of HBs, or on the potential differences between offenders and non-offenders.

Despite the aforementioned gaps, the inconsistent findings could be explained by the variety of methods used to capture different HBs manifestations, overlooking the role of individual differences in shaping personal and situational factors related to information processing. Also, the challenges and limitations inherent to the prison environment make the behavioral study of HBs less feasible. In this regard, the present scoping review clarifies the overall methodology and outcomes that were counted so far from studies that linked HBs in incarcerated inmates to dark personality features.

Several conclusions emerge from the analyses performed, aspects that will serve as future research directions in exploring the various variables that intervene across the path of information processing prior to the crime.

First, the studies selected for inclusion suggest that offenders have *higher levels of HBs than the general population*, which may trigger higher levels of aggressiveness, with the association being stronger for those with psychopathic traits (Schönenberg & Jusyte, 2014; Jusyte & Schönenberg, 2016), or for those exhibiting higher levels of narcissism (Edwards & Bond, 2012; Zajenkovska et al., 2025). Contrary to common assumptions, two of the analyzed studies did not support the hypothesis of HBs being stronger in offenders with higher scores in psychopathy (Vitale, 2005; Kuin et al., 2017). The inconsistencies rely on the different mechanisms underlying both psychopathy and HBs, which need to divide the variables involved into primary or secondary psychopathy or the type of aggression (proactive, reactive).

Secondly, despite these contradictory outcomes, a specific impairment seems to be particular to offenders even in *detecting basic emotions, with fear and anger as the most problematic*, being a relevant predictor for violent behaviors and reoffending (Hendry, 2013), although not all studies supported this basic deficit (Kuin et al. 2017; Stein et al., 2024).

Thirdly, combining findings from studies that investigated the perceptual level of HBs, a core conclusion is that in forensic populations exhibiting aggressive behavior (especially reactive aggression), there is a *propensity to interpret ambiguous emotional cues as hostile* (specifically, angry). This hostile bias does not merely reflect a difficulty in recognizing emotions; instead, it seems to manifest more during the interpretative or decision-making stages of processing facial expressions. Consequently, rather than being "*blind*" to the emotions of others,

offenders may assign threats where others might not — and this interpretive bias could potentially fuel aggressive actions.

Then, another comprehensive finding across various studies is that particularly *HAB is notably higher among impulsive, reactive, and emotionally dysregulated offenders* rather than those committing instrumental or proactively planned violence. Recent research by Zajenkowska and colleagues (2025) indicated that impulsive homicide offenders possess significantly greater HAB compared to premeditated offenders, correlating this bias with secondary psychopathy and reactive aggression. Previously, Vitale et al. (2005) identified multiple pathways of HAB, revealing that offenders with high anger sensitivity or emotional dysregulation exhibit stronger tendencies for hostile intent. Collectively, these studies emphasize HAB as a critical factor distinguishing types of offenders, elucidating why some respond violently to ambiguous provocations while others act for strategic purposes.

Lastly, *a strong link between HAB, rejection sensitivity, and vulnerable narcissism was highlighted* within the study of Czajkowska-Łukasiewicz et al. (2025), emphasizing that HAB also stems from emotional fragility rather than exclusively from antisocial traits. Previously, Schönenberg & Jusyte (2014) illustrated that offenders with antisocial traits often misinterpret ambiguous facial expressions as threatening, suggesting that HAB is deeply rooted in emotion processing and threat detection systems. These findings expand the understanding of the explanatory frame of offender behavior by including emotional disturbance and interpersonal sensitivity, beyond already posited antisocial traits. We can conclude that especially HAB influences how offenders interpret interpersonal conflicts and ambiguous social interactions, operating beyond the perceptual level of threat perception.

This multi-faceted approach shows that HBs are operating as a cognitive-emotional filter, shaping how offenders perceive, interpret, and react to social cues. Thus, incorporating HBs in the explanatory model of offending enhances understanding of why some individuals escalate ambiguous or even neutral situations into conflict, while others do not.

Nevertheless, the mixed findings in the explored research may be attributed also to the specificity of the prison environment, which can sometimes interfere with the manifestation of HBs due to the adaptive strategies and the dynamics of the relationships between offenders. In some cases, the prison setting may affect the reduced level of hostile attributions, due to the process of habituation, which determines inmates to purposefully avoid hostile interpretations of others' actions to avoid more conflict and confrontation (Czajkowska-Łukasiewicz et al., 2025).

Likewise, social desirability has to be addressed, as it is known that offenders tend to align with the internal regulations that promote socially acceptable behaviors, fostered by a system of rewards and sanctions. Thus, the declared non-hostile approach of threatening social scenarios should be treated with caution, as they may try to portray themselves in a positive stance. Additionally, the lack of a connection between HBs and proactive aggression indicates that addressing proactive or instrumental violence may require focusing on different targets that could interfere (e.g., moral reasoning, reward evaluation, and theory of mind).

In conclusion, methodological issues, such as the use of heterogeneous tasks, small samples, and inadequate control over the confounding variables, may have led to the inconsistent results obtained in the area of how offenders decode social cues before acting in a socially unacceptable manner.

IMPLICATIONS

All research conducted within the correctional system leads to valuable insights into the mechanisms by which social information is processed by convicted individuals and plays a crucial role in shaping explanatory models on which effective rehabilitation strategies will be designed. Nevertheless, the findings should be regarded as preliminary, but with great potential for rehabilitation practices.

The multi-faceted block of research encompasses a broad range of topics, but in addition to this variety, given the limited number of studies, it may be interpreted that HBs have been approached inconsistently in understanding the biases that affect the information decoding process by offenders. Although it appears to employ the same principles, only a few studies examine similar dimensions and provide an in-depth look at specific aspects of HBs, making it challenging to compare outcomes and clarify contradictory findings.

More than that, in relation to the prison population, most research has focused on incarcerated males, particularly those involved in violent crimes. Although the majority of prisoners are male, limited research on female inmates and juvenile offenders creates a notable gap in understanding HBs of convicted individuals. While violent offenses carry significant negative repercussions, they do not represent the entirety of the prison demographic. Therefore, to achieve a nuanced and accurate understanding of the biases in attributing intent among convicted offenders, future research should explore these distortions in multiple types of offenses.

Acknowledging HBs as harmless deficits in interpreting ambiguous social scenarios can prompt more aggressive responses. Therefore, we stress the importance of understanding the mechanisms involved in HBs and Social

Information Processing more broadly, as this insight could aid in the creation of training programs focused on aggression regulation training. Additionally, individuals exhibiting severe aggressive behavior issues, such as forensic patients, should recognize their inclination to view ambiguous social situations as threatening. When individuals gain a better understanding of their HB, interventions can concentrate on teaching them to assess ambiguous social contexts more appropriately.

A greater focus on HBs and the methods of their assessment is crucial, as understanding the cognitive mechanisms and connections related to aggression can improve the development of more effective aggression training programs. For example, recent research posits that CBM-I can significantly increase the rate of positive interpretation bias and reduce the self-reported level of physical aggression in youth offenders (Ren et al., 2021). Also, HAB can be targeted using five-session training techniques with effects in reducing reactive aggression in adolescents (Van Bockstaele et al., 2020).

Hence, further investigation is needed to determine if the hostile bias in facial recognition serves as a crucial precursor (for instance, in youths prone to aggression), how it connects to aggressive reactions, and if it can be altered by traditional or innovative techniques. A recent study suggests that adjusting the categorical threshold between angry and happy facial expressions through biased feedback may enhance the perception of happiness in ambiguous expressions. This adjustment has been linked to a potential reduction in aggressive behavior among high-risk youths (Penton-Voak et al. 2013), with promising outcomes in designing future interventions, adult-tailored.

CONCLUSIONS

This scoping review reaffirms the strong link between HBs and aggressive manifestations in general, but especially with antisocial behavior in particular. This endeavor aimed to adopt an inclusive stance on previous research by summarizing literature on all types of HBs conducted with incarcerated offenders identified as having antagonistic personality facets.

In summary, this review has compiled the existing research investigating the link between HBs and various aversive personality traits, primarily psychopathy and narcissism, in adult offenders. The majority of studies reflected a strong correlation between the distortion of information in a hostile manner of processing, which characterizes incarcerated individuals, with aggression or cognitive biases. Additionally, the aversive personality structure contributed as a catalyst to the overall spiteful depiction of others' intentions.

Concluding, the research indicates that HBs develop through a variety of personality-based routes, some of which are directly linked to aggression, others to psychopathy. To analyze the distinction that proactive/reactive aggression and primary/secondary psychopathy bring to the apparently contradictory outcomes, both pathways need to be disaggregated. Moreover, the methodological variations lead to conflicting results due to the stages of processing that are measured. While tasks measuring emotion recognition or perception accuracy capture primary stages of processing, the social scenario tasks depict higher-order inference. Combining these types of measurements would lead to a more comprehensive approach to identifying significant differences in the occurrence of HBs. Finally, exploring the multidimensional aversive stance of personality may reveal particular features of social data processing that stand as pillars in repeated offending. An integrative approach to analyzing various paths to aggression that considers the roles of cognition, emotion, and personality in processing social information will bring more clarity in scientific research and impact the design of effective intervention models.

Conflicts of Interest

The authors declare no conflict of interest.

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The Only Constant is Change: Reconciling Agentic and Communal Tensions from a Dynamic Identity Perspective

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ABSTRACT. We propose a narrative conceptual framework for understanding identity as a dynamic system sustained by two ongoing negotiations between agentic (self-focused) and communal (other-focused) motives. Traditional models were often grounded in stability, consistency, and moral coherence and tended to underplay the adaptive complexity of modern identity. In a world where individuals continuously shift between social, professional, and digital selves, coherence emerges not from sameness but from the capacity to integrate contradiction. Existing classical and contemporary frameworks either privileged continuity or pathologised inconsistency, failing to recognise how personal fluidity could be a source of growth rather than conflict. Drawing on socio-developmental, cognitive, and motivational research, we argue that apparent tensions within self-motivations (e.g., self-interest and care for others) are not indicators of dysfunction but hallmarks of a resilient, flexible identity. Arguments are presented for an integrative model reframing identity coherence as a process of agentic–communal negotiation, in which stability emerged as a property of adaptation across different contexts. By acknowledging both the prosocial bias in existing research and the functional role of self-contradictions, this perspective offers new avenues for conceptualising identity health, measurement, and resilience in a dynamic social world.

Keywords: self-concept, identity, self-awareness, self-coherence, agentic, communal, authenticity

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INTRODUCTION

The ever-present question “*Who am I?*”, although a deeply personal inquiry, can nowadays feel deceptively simple and overused. Yet, each time we address it, it can land differently, as the answer is not universal or easily defined by listing characteristics of one’s subjective experience. It is more like a moving target that shifts with each moment of reflection, failure, or reinvention when people revise themselves through memory, contradiction, or whatever new version of “true self” they can comfortably live with.

McAdams (2013) calls this process narrative identity, or the ongoing story through which individuals make sense of who they are. However, even this story can be split, or it can hold conflicting chapters. Seemingly contradictory traits (such as kindness and cruelty, or even confidence and insecurity) often coexist or alternate in quick succession, calling into question the notion of a fixed, unified self. As Stern (1930) insightfully put it, “*Apparently...(some people) can abruptly become a fully different person because so many human forms are present and ready in the depths of (their) existence*” (as cited in Renner & Laux, 2000, pp. 53–54). This suggests that the search for identity may not result in a singular, stable entity, but rather a constellation of potential selves that emerge in response to varying internal and external contexts.

What matters now is not being aware of the existence of multiple selves, as this idea is not new to identity research (e.g., possible selves; Markus & Nurius, 1986; self-complexity; Linville, 1987; dialogical selfhood; Hermans & Kempen, 1993, see *Table 1*), but rather how people can successfully manage them. When identity is stretched across cultures, social media statuses, professional and social roles, the tension between stability and flexibility is not just theoretical, but immediate, and sometimes resource-draining. When people must navigate between being the dutiful (adult) child in one context, a parent striving to stay current with gentle parenting practices, a competitive employee, a “woke” friend online, and a law-abiding citizen who self-regulates efficiently to keep the peace in their neighbourhood, coherence becomes less about consistency and more about negotiating personal and (possibly opposing) relational motivations in real time. As a result, models of identity may overstate stability or underestimate the complexity of navigating multiple, sometimes conflicting motives and roles. What is missing is a framework that explicitly considers the tension between more agentic (self-serving, self-focused) and communal (prosocial, other-focused) goals (Bakan, 1966) as central to maintaining a coherent self.

In other words, coherence is not just about holding a consistent narrative or stable traits (Cooper et al., 2018). It emerges from the ongoing negotiation between self-focused and other-focused goals, between personal ambition and

obligation or responsibility, between independence and connection. This agentic–communal tension may not be a flaw or a source of fragmentation, but the very backbone of a resilient, adaptable identity. Also, within this negotiation, authenticity (the feeling of acting in alignment with one’s genuine priorities and values) emerges as we “*experience the self as a fluid process rather than (..) static*” (Kernis & Goldman, 2006, p.294).

This conceptual framework examines how psychological models and empirical data account for (or fail to account for) this dynamic coherence. By examining existing models, highlighting biases in the literature, and exploring possible emerging theories of adaptive identity, this work seeks to illuminate how stability could be understood differently from sameness, and more as adaptive integration of both (or multiple) social and personal drives.

EXISTING VIEWS OF IDENTITY STABILITY

Various theories have offered competing answers to the question posed at the beginning (“*Who am I?*”), but approached the problem in different ways. A need for greater conceptual clarity in self-concept theories has been noted in the literature, and a streamlined framework spanning multiple psychological domains has recently been proposed as a response to this integrative necessity (Hards et al., 2024; also see Manzi et al., 2022). We set out our paper by also drafting a comparative overview of key theories related to the manifestations of identity function and dysfunction (*Table 1* summarises these existing theories; for a *contemporary developmental focus* on identity theories, please see Karaś et al. (2018)). This synthesis clarifies how different scholars (from developmental, social, cognitive, narrative, and even clinical domains) have approached identity flexibility, stability, and fragmentation (a subjective feeling of distress caused by incoherence in one’s self), offering a deeper understanding of the factors that shape identity and how it changes over time.

Psychology has long attempted to chart the terrain of *the self*, often treating it as a static entity. Classical frameworks, such as Erikson’s (1956) psychosocial stages and Marcia’s (1986) identity statuses (as discussed in Berzonsky et al., 1999), typically conceptualise identity in terms of achievement or crisis, stability or failure (see *Table 1* for an overview). The classical view points towards a *relatively stable* and structured configuration of commitments and explorations that emerge through typical development. Within this tradition, identity is often understood as the achievement of a coherent and enduring sense of self, reflected in the consolidation of consistent roles, values, and life directions over time (Berzonsky et al., 1999).

Although this developmental perspective is widely acknowledged, it is implicitly treated as a marker of identity resolution and psychological maturity. Building on this, most developmental research has increasingly focused on the concept of identity commitment (or the degree to which individuals internalise choices about their values, goals, and roles). Research in this area consistently demonstrates that stronger, more stable commitments are associated with higher levels of well-being. For example, a cross-national study (Karaś et al., 2014) showed that different facets of well-being (subjective, psychological, and social well-being) are consistently linked to higher identity commitment, greater in-depth exploration (actively reflecting on and understanding personal choices), and lower reconsideration of commitment (less frequent questioning or comparison of alternative paths) in both educational and job identity domains. Implicitly, these classic developmental models, although insightful and aligned with the traditional view of identity as stable and coherent, assume that the self can and should remain relatively consistent over time. In contrast, more recent dynamic perspectives extend this view by emphasising identity as an ongoing process of integration and reorganisation rather than a fixed endpoint.

In trying to understand how these developmental views materialise beyond adolescence, a recent conceptual framework on identity integration (Mitchell et al., 2021) emphasises that maintaining a coherent sense of self is an ongoing process, requiring adaptation and reestablishment of identity in response to life changes, highlighting that coherence can coexist with change throughout adulthood. Thus, coherence may not look the same for everyone. For some individuals, both in the developmental years and beyond (Fadjukoff et al., 2016), maintaining a sense of coherence may paradoxically require change, adaptation, or even becoming someone entirely different over time.

This raises the question of how coherence is maintained when identity change is foundational. Drawing on narrative identity theory (McAdams, 2013), coherence in such cases is not defined by stability of identity content, but by the continuity of a self-narrative that integrates change into a temporally meaningful life story. This fluidity allows for growth and the possibility of identity transformation without losing the core stability of the self. Even when an individual's identity changes substantially, coherence can be preserved insofar as the change is experienced as part of a personal developmental trajectory rather than as fragmentation or rupture. Accordingly, the referential criteria for coherence are not fixed traits or roles, but can be narrowed down to: (1) narrative integration (McAdams, 2013), (2) perceived continuity of self-authorship over change (Adler et al., 2016), and (3) relative stability of higher-order values or guiding principles (Vecchione et al., 2016). These elements allow individuals to interpret even profound identity change as self-continuous rather than discontinuous.

Self-reflection (i.e., self-awareness) alone is therefore not sufficient to ensure coherence, as comfortable self-integration (narrative and value structure that preserves psychological continuity over time; McAdams & McLean, 2013) is required.

Even if there seems to be a common understanding of the nature of a dynamic self, the way we understand stability and change as main processes remains debated. As mentioned, traditional identity models (as discussed in Berzonsky et al., 1999), although they provide solid foundational frameworks, do not fully account for the complexities of identity and self-fragmentation in adulthood. Moreover, the concept of multiple identities was already echoed in more other classic theories such as Markus and Nurius's (1986) Theory of Possible Selves, Hermans and Kempen's (1993) Dialogical Self Theory, Linville's (1987) Self-Complexity Theory and Stern's (1923) Unitas Multiplex (as cited in Renner & Laux, 2000; but see *Table 1* for more examples), which also explore the adaptive nature of identity flexibility, focusing on how self-concept shifts in response to internal conflicts or external pressures. However, these models also do not clearly differentiate between healthy flexibility and a disruptive fragmentation of the self.

Other contemporary theories try to answer this by emphasising the engagement with future possible selves (hypothetical images of who we might become, see *Table 1* for more details), as another mechanism that explains identity development (e.g., Carroll's (2018) Expanded Self-as-Theory model builds on Epstein's (1973) original framework). Unlike actual selves (who we currently are), possible selves are speculative and thus more susceptible to failure (e.g., "My future self might not get that scholarship"). However, their failure does not necessarily destabilise core identity structures. This is because self-revision (updating our self-beliefs) functions less as replacement and more as refinement (i.e., reshaping existing self-concepts to align more closely with feedback from the environment).

In response to setbacks, individuals often preserve their core identity by attributing inconsistencies to external factors rather than internal deficiencies (Carroll et al., 2015). This aligns with the idea that identity change mirrors scientific reasoning: failed predictions are integrated or dismissed without disrupting global self-coherence. This is usually achieved by using two overarching strategies: teleological strategies, which aim to preserve self-worth (e.g., avoiding situations that could invalidate or challenge someone's self-view), and epistemic strategies, which prioritise learning and self-growth (e.g., seeking constructive feedback to improve performance; Carroll, 2018). When individuals successfully realise a possible self by perceiving an alignment between their outcomes and their desired identity, they experience increased self-trust and identity coherence (Cohen & Sherman, 2014).

Also, theories of clinical instruments, while offering insights into the dysfunctional nature of self-instability, do not provide specific mechanisms or delimitations among different types of identity. For example, the Identity Consolidation Inventory (ICI; Samuel & Akhtar, 2009) was designed to assess the stability of an individual's sense of identity, with high instability being associated with distress and depression (Samuel & Akhtar, 2009). Also, the Identity Distress Survey (IDS; Berman et al., 2004) gauges the extent of emotional distress a person experiences due to unresolved identity-related concerns, such as those found in individuals with borderline personality disorder (Fuchs, 2007). An emerging trend is thus to focus on the disruptive nature of self-instability and connect it to unusual circumstances, such as trauma (Martin & Shkreli, 2019), or to clinical conditions (Bogaerts et al., 2021).

A more in-depth model that encompasses both functional and dysfunctional aspects of self-flexibility is Kaufman's Self-Concept and Identity Measure (SCIM; Kaufman, 2015) and Theoretical Model, categorising identity structures as **consolidated** (*stable and coherent*), **disturbed** (*conflicted and fragmented*), and **a lack of identity** (diffuse and undefined). Each category reflects varying degrees of identity integration and stability versus fragmentation. A consolidated identity is characterised by a stable self-concept, marked by self-awareness, consistent values, and a positive sense of self-worth over time. Disturbed identity, by contrast, manifests perceived temporal instability and a self-perception primarily shaped by external validation. Individuals with disturbed identities struggle with internal consistency, often adapting their values and behaviours to meet external expectations (Kaufman, 2015). Lastly, a lack of identity represents an extreme form of identity fragmentation, in which individuals possess a solely interdependent self with unclear priorities, leading to profound confusion, emptiness, and difficulty in forming a perceived coherent self (Bogaerts et al., 2021). While Kaufman's model effectively maps identity dysfunction and stability, it still offers little insight into how coherence is actively maintained across multiple, sometimes conflicting contexts and, thus, selves. Moreover, the model does not explicitly consider the possibility of having multiple selves and still adhering to a consolidated identity. This can provoke a deeper inquiry (that we try to address in the next section of this conceptual framework): *Do inherent contradictions within the self really challenge the stability of identity, OR do they actually highlight its adaptability within a functional and evolving self-framework?*

We will now try to shape an answer to our question above by examining the relationship between identity contradictions, stability, and adaptability.

Table 1. *Identity Theories: Implications for Functional and Dysfunctional Identities**

Key Theory**	Functional Identity	Dysfunctional Identity	Key author(s)
Looking-Glass Self (<i>Social Theory</i>)	People may shift their self-views across different social contexts, reinforcing the idea that identity is adaptive rather than fixed.	If people rely too heavily on external validation, they may develop a fragmented sense of self and experience confusion about who they are.	Cooley (1902), as seen in Yeung & Martin (2003)
Unitas Multiplex - Conception of the person (<i>Developmental Theory</i>)	The self is unified in its underlying purpose and constantly evolving, and does not necessarily lead to fragmentation. Instead, it offers a framework where multiple identities ("Unitas Multiplex" or <i>Multiple Unity</i>) can coexist harmoniously. When these identities are linked by a deeper sense of purpose and a story binds them together, they become integrated. This is different from Gergen's (1991) more fragmented perspective.	N/a	Stern (1923) as seen in Renner & Laux (2000)
Self-presentation (<i>Social Theory</i>)	Self-presentation is adaptive and shaped by context and strategic performance. It could be seen as a strategic tool , but it can also allow individuals to experiment with different versions (e.g. roles) of themselves and discover new ways of being	However, people may struggle to reconcile the different aspects of themselves across roles and contexts when self-presenting. This can lead to feelings of internal conflict or identity dissonance. Identity can become fragmented when it is overly performative and completely disconnected from the authentic self.	Goffman (1959)
Psychosocial Development Theory (<i>Developmental, Social Theory</i>)	People go through multiple identity statuses and roles, which shows how adaptive identity development can be. They progress, have setbacks, identity conflicts, and redefine themselves over time.	People who utilise avoidant or normative processing styles are more likely to experience identity confusion (or diffusion), as these styles make it harder for them to explore themselves. These approaches can mess with one's sense of self by making them ignore key personal decisions, leaving them feeling incomplete.	Erikson (1968) & Marcia (1966); as seen in Berzonsky et al (1999)

Key Theory**	Functional Identity	Dysfunctional Identity	Key author(s)
Attachment Theory (<i>Developmental Theory</i>)	Attachment theory has implications for identity formation: a secure attachment lets people explore themselves in relationships with others and adds new experiences to their self-concept, helping them learn more about different parts of themselves.	People with avoidant or anxious attachment may define who they are by how others see them, which makes their sense of self very unstable and dependent.	Bowlby (1969)
Self-Schema Theory (<i>Cognitive, Clinical Theory</i>)	Self-schemas represent evaluations, descriptions, and capabilities about the self that evolve and adapt over time. If someone's self-concept includes the possibility of growth or change, they are more likely to accept novel or even contradictory aspects of themselves.	Fragmentation can occur when contradictory self-schemas emerge (without the understanding of growth or change). Maladaptive self-schemas can lead to a fragmented identity (e.g., " <i>I am not worthy</i> "), in which individuals struggle to incorporate new self-relevant elements, resulting in confusion and distress .	Beck, (1967) & Markus (1977)
Expanded Self-as-Theory Model (<i>Cognitive, Developmental Theory</i>)	Functional identity is shaped by a reciprocal dynamic between one's core self and possible selves. People can regularly revise and expand who they are by integrating new aspirations and self-concepts across different contexts.	Dysfunctional identity in this model could be reflected by a breakdown in that reciprocal process. When individuals fail to connect or revise their core self with new possible selves, they experience confusion, stagnation, or a fractured sense of identity.	Epstein (1973), as seen in Carroll (2018)
Theory of Possible Selves (<i>Cognitive, Developmental Theory</i>)	The concept of multiple alternative selves in this theory shows how flexible identity can be, since people can change their roles and goals depending on the situation. This can help people grow and act in ways that help them reach their goals more efficiently.	Yet when possible selves are in conflict or competition, it can lead to an internal conflict that does not resolve, and the self-concept might become fragmented. This can cause identity uncertainty, instability, and trouble creating a clear sense of self over time.	Markus & Nurius (1986)

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Key Theory**	Functional Identity	Dysfunctional Identity	Key author(s)
Self-Discrepancy Theory <i>(Cognitive, Social Theory)</i>	If individuals can adapt and reconcile their different self-representations over time (between the ideal, ought and actual self), this suggests that their identity can evolve to resolve inconsistencies.	Self-discrepancy (between the ideal, ought, and actual self) can often be experienced as internal conflict, characterised by a lack of integration between different aspects of the self. This can be a hallmark of identity confusion, leading to emotional distress, guilt, shame, and disappointment.	Higgins (1987)
Self-Complexity Theory <i>(Cognitive, Developmental Theory)</i>	This theory incorporates and balances multiple identities, enabling individuals to transition between different aspects of themselves without losing their sense of coherence. This can also help prevent the feeling of being stuck in one rigid self-concept , or help people move on and adapt more effectively when one role or self-concept is affected or lost. This can contribute to a more adaptive, flexible identity.	Low self-complexity (having very few roles) may contribute to identity fragmentation. If individuals see themselves as limited to a few roles or aspects of themselves, an adverse event related to one of those roles (e.g., a breakup affecting their romantic identity) could significantly disrupt their overall sense of self.	Linville (1987)
The Saturated Self <i>(Social Theory)</i>	N/a	People today are always connected to the internet and social media, which means they are constantly exposed to other perspectives, values, and commitments. This, in turn, makes the unified sense of self unstable and creates fractured identities. This can lead to anxiety, indecision, and internal conflict. People with this “multiphrenic” condition may feel like they have several different “selves,” each with its own social identity, job, etc.	Gergen (1991), as seen in Renner & Laux (2000)

Key Theory**	Functional Identity	Dysfunctional Identity	Key author(s)
The Dialogical Self (<i>Cognitive, Social Theory</i>)	Identity is dynamic, shaped by multiple internal “voices” that interact like an ongoing dialogue. The self adapts based on social, cultural, and personal contexts, supporting the idea that identity is not fixed but constantly evolving.	Different roles, voices, and perspectives can also create tension, especially when external expectations (e.g., cultural, societal) conflict with internal desires or personal history. This “fragmentation” may manifest as a lack of coherence in one’s identity, and can lead to confusion, insecurity, or distress.	Hermans & Kempen (1993), as seen in Hermans (2003).
Self and Identity Theory (<i>Social, Cognitive Theory</i>)	Identities can emerge from social roles (Identity Theory) or group membership (Social Identity Theory). Thus, this framework shows that the self is not fixed but adaptable across social contexts.	When role-based identities (e.g., being a student, parent, or worker) and group-based identities (e.g., ethnic, political, or gender identity) clash, individuals may experience disturbances in identity integration (a role conflict).	Stets & Burke (2000)
Social Cognitive Theory (<i>Social, Cognitive Theory</i>)	Self-concept is dynamic, and it evolves through experience and social comparison. Self-beliefs about capabilities change with new learning experiences.	Difficulty in self-regulation or self-efficacy (which might be a sign of identity disruption) can make your self-concept change, which makes it harder to keep your sense of identity stable	Bandura (2001)
Self-Determination Theory (<i>Social, Cognitive Theory</i>)	Intrinsic motivation affects how well you can explore different identities. People are more likely to explore themselves when they feel free and supported, which makes their identity more flexible and adaptable.	People may feel alienated, confused about who they are, or have internal conflicts if their requirements for autonomy, competence, or relatedness are not addressed. This can lead to identity problems.	Deci & Ryan (2002)
Diachronic vs. Synchronic Perspectives (<i>Philosophical, Cognitive Theory</i>)	Episodic selfhood does not necessarily mean fragmentation: some people naturally experience themselves as episodic, meaning they do not construct a continuous self-story but still accept that they are the same person. Those people do not necessarily experience identity fragmentation. They do not view their lives through a narrative lens.	A deficit in the diachronic self (the perception of a coherent, continuous self across time), especially for individuals with a need for a cohesive life narrative, such as rapid, frequent changes in values or goals, may also weaken the synchronic self (the sense of “who they are” in the moment). This can create general distress and internal conflict.	Strawson (2004) & Dorahy et al (2020), & McAdams (2021)

Key Theory**	Functional Identity	Dysfunctional Identity	Key author(s)
Narrative Identity Theory (<i>Social, Cognitive, Developmental Theory</i>)	From this perspective, people can reshape their stories, reinterpret past experiences, and incorporate new facets of their identity. Rather than being static, identity evolves through ongoing experiences, cultural influences, and self-reflection.	Trauma, significant life changes, or deeply conflicting self-perceptions can disrupt personal narratives, leading to identity confusion. When individuals struggle to maintain a coherent life story, narrative identity can become fragmented.	McAdams & McLean (2013)

*Note**Reviewing these theoretical perspectives provides a comprehensive foundation for understanding the existing conceptualisations of adaptive identity (i.e., consolidated and fluid) and dysfunctional fragmentation (i.e., disturbed) in the literature.

*Note***Theories are presented in chronological order

Disclaimer: This table may not be exhaustive. Other perspectives in the literature may exist that were not included here, and new theories or refinements of existing ones may emerge over time.

HOW IDENTITY NAVIGATES CONTRADICTION

To explore this, we first consider how identity negotiates the tension between continuity and change, drawing on theoretical approaches by Sinnott's (2017) cognitive flexibility account, Wheeler's (2017) narrative integration perspective, and Strawson's (2004) critique of narrativity. We then turn to empirical evidence that supports our line of inquiry.

Sinnott (2017) invites us to consider a surprising question: "(...) *how can I create and hold a unified concept of my self and my identity and at the same time (...) hold a concept of my self and my identity as growing, evolving, and changing?*" (p. 19). When we recall our past (e.g., remembering who we were at the age of twenty-two), those memories shift in light of new experiences, a phenomenon she terms "reentry shock" (Sinnott, 2017, p. 20). Rather than fragmenting our identity, this process allows us to weave fresh insights into our life story, maintaining a stable core even as details evolve. Moving forward and drawing on complexity and chaos theories, Sinnott (2017) argues that our self is like a self-regulating system: memory, emotion, and thought interact in a non-linear fashion to balance continuity with change (pp. 21-23). She also highlights "postformal" thinking (i.e., the ability to hold multiple, even conflicting self-views at once), similar to the Theory of Possible Selves, or even the concept of future possible selves (Carroll, 2018; Markus & Nurius, 1986, see Table 1 for more details), as the very tool we use to navigate apparent contradictions. Only when this flexible machinery breaks down, as in certain neurological conditions, do inconsistencies become pathological (Sinnott, 2017).

Specifically, at a cognitive level, executive control and working memory processes allow individuals to maintain and coordinate competing self-views simultaneously, while autobiographical memory supports their integration into a continuous self-narrative (Conway & Pleydell-Pearce, 2000). At a broader neurocognitive level, emergent work shows that self-continuity is also supported by semantic self-representation networks, including the default mode network (DMN), which contributes to the integration of self-related information across time (Menon, 2023). Therefore, difficulties in integrating contradictions may arise when these systems are disrupted. For example, in clinical conditions such as borderline personality disorder (Fossati et al., 2012; Fuchs, 2007) and trauma-related disorders (Martin & Shkreli, 2019; Láng, 2015), there are studied associations with impairments in affect regulation and autobiographical integration, which can lead to such unstable self-representations rather than coherent ones.

On the other hand, there is also evidence in narrative strategies observed in morally complex contexts. For example, Kruse and Skilbrei (2024) show that individuals who have committed sexual offences may construct either “adaptation” narratives, which maintain coherence through distancing from aspects of the offending self, or “transformation” narratives, which integrate these aspects into a revised self-concept oriented toward change and moral development. These strategies illustrate different ways in which contradictory self-aspects can be either compartmentalised or integrated.

Taken together, these findings suggest that identity flexibility depends on the capacity of cognitive, affective, and narrative systems to integrate multiple self-representations into a higher-order coherent structure. When these integrative processes are compromised, flexibility may instead result in fragmentation.

Also, even if Sinnott does not explicitly state this, we can see how her words relate to navigating multiple roles and to the constant need to balance self-focused and other-focused goals. Agency and communion goals represent two complementary motivational dimensions: agency emphasises personal goals and self-interest, while communion emphasises social connection and prosocial concerns (Abele & Wojciszke, 2018; Bakan, 1966). Although subsequent work has refined measurement approaches (e.g., Trapnell & Paulhus, 2012), they are still commonly conceptualised as contrasting forces. This tension between being “selfish” and “prosocial” has never been addressed in classical identity models, yet these forces shape how self-related concepts are experienced (e.g., self-esteem and self-concept studies; Chen et al., 2018; Abele & Hauke, 2018). For example, a parent who works long hours and pushes hard to be the best at their job has a strong drive for success and pride (agentic drive). At home, the same person is caring, patient, and focused on keeping everyone close and safe (communal drive).

However, those goals can clash, as the parents' want to provide sometimes turns into being absent or neglectful, and what started as love begins to look like selfishness. Understanding how identity navigates contradictions, therefore, requires attention not only to temporal stability but also to the interplay between agentic and communal orientations (contextual stability: both internal and external).

The ability to flexibly pursue both self-focused and relationship-focused drives may underlie a resilient, coherent self in contemporary life. Sinnott's (2017) work confirms that what appears to be self-contradictions can actually signal a robust, evolving, and "fluid" self, adapting to new contexts without losing core coherence.

Wheeler's (2017) view also mirrors seminal autobiographical and narrative approaches (McAdams, 2013; McAdams & McLean, 2013; Oyserman et al., 2012) that help us understand how internal contradictions do not necessarily destabilise identity but can enhance the self's adaptability over time. Drawing on both psychological and sociological evidence, Wheeler (2017) argues that although identity is generally viewed as stable (especially after adolescence), it remains amenable to change throughout adulthood via narrative processes. Identity is built upon self-knowledge and autobiographical storytelling, as individuals integrate moral developments into a coherent narrative - "(...) maybe identity is not what we know, but what we stand for", thus signalling the importance of authentic (agentic & communal) values and goals (Wheeler, 2017, p. 7). One way to view this is that narrative integration enables identity to remain both flexible and continuous, accommodating contradictions without compromising coherence.

By contrast, Strawson's (2004) famous manifesto "*Against narrativity*" challenges the presumption that having a life story is a universal feature of human self-experience. He distinguishes "*Diachronic*" selves, in which individuals perceive their lives as a unified story, from "*Episodic*" selves, which do not rely on temporal continuity to maintain psychological well-being. Similar to McAdams' (2021) analysis of a U.S. president (the so-called "*Episodic man*"), Strawson (2004) notes that the drive of these Episodic individuals to force narrative coherence can actually misrepresent their lived experiences and may even prove counterproductive. From this perspective, internal contradictions require no narrative reconciliation and are accepted as natural aspects of a moment-to-moment self, and not self-instability.

Usually, these disruptions in self-continuity and identity integration are seen as central features of clinical disorders. Clinical literature has consistently shown that self-instability is associated with heightened psychological distress, particularly in conditions such as borderline personality disorder, mood disorders,

substance abuse, eating disorders, schizophrenia, depression, suicidality, and trauma-related presentations (Fossati et al., 2012; Berman et al., 2004; Bogaerts et al., 2021; Rose & Bond, 2008; Verschueren et al., 2017; Láng, 2015). Within these frameworks, instability is typically understood as contributing to affective dysregulation and perceived as a sense of self-incoherence. However, more recent perspectives suggest that the relationship between identity variability and distress is not inherently linear.

Specifically, identity change may be adaptive when it occurs within a structurally integrated system that allows for flexibility without fragmentation (McAdams & McLean, 2013). Evidence from Buchanan and Bardi (2015) supports the presence of this potentially adaptive mechanism. For example, across four studies, both agentic and communal behaviours were associated with psychological well-being. This well-being was not predicted by the degree of alignment between behaviour and consciously endorsed personal values. Interestingly, subjective experiences of “rightness” in one’s actions (i.e., state authenticity) emerged as a more consistent predictor of well-being than dispositional value–behavior congruence (i.e., trait authenticity). Similarly, occupational research indicates that job satisfaction is more strongly related to self-perceived person–job fit than to objectively assessed fit (Kristof-Brown & Guay, 2011).

As mentioned in the beginning, this idea of a self-identity that is both highly fluid and self-experienced as coherent is not entirely new. It closely relates to Flexible Identity Theory (Rachmad, 2017, as seen in Rachmad, 2024), a culturally sensitive theory that emerged in response to rapid globalisation, digitisation, and increased social mobility. This view also sees identity as constantly shaped by social interactions and individual experiences rather than as fixed. Thus, having a flexible identity helps people navigate changing situations with ease and adjust their social roles to meet contextual demands. This idea is somewhat similar to Kaufman’s (2015) SCIM consolidated identity type, which incorporates characteristics such as authenticity and a strong internal compass, yet may constrain flexibility in how the self is understood. Nevertheless, Flexible Identity Theory (Rachmad, 2024) also does not explicitly distinguish between dysfunctional and functional adaptation.

We thus reiterate that a possible answer to this conundrum might involve accepting the existence of another identity type in a revised or new version of Kaufman’s (2015) SCIM framework (i.e., **a fluid identity**). A fluid identity is conceptualised as maintaining self-concept coherence even as individuals must flexibly (or strategically) adapt their self to meet contextual (self)demands (see also Fleeson & Wilt, 2010) and may function as a protective factor when integrated with stable higher-order structures, without implying

pathology. Empirical data could also support the existence of such an identity, research showing that high openness to experience is a strong predictor of identity flexibility, defined as the tendency to explore and change identity commitments in work/family contexts (Whitbourne, 1986). In this sense, flexibility may serve a regulatory function, reducing distress when it enables adaptive reorganisation rather than destabilising fragmentation.

However, an important question remains: do these approaches actually capture identity flexibility as an adaptive feature within a functional and evolving self-framework? One way to address this is to examine how identity organisation translates into everyday dynamics. One approach focuses on the dimensions of agency (self-focused, achievement-oriented) and communion (other-focused, relational), as identity-related processes that shape self-esteem regulation (a self-related concept; Guðmundsdóttir et al., 2025). While agentic narratives were associated with lower instability in daily self-esteem, communion actually did not predict it as strongly. This can represent a direct link between agentic/communal motives and identity-related concepts (Guðmundsdóttir et al., 2025). However, it does not explicitly examine identity flexibility/stability across multiple roles or contexts, nor does it examine behaviour (self-serving vs prosocial) directly.

Other studies (Becht et al., 2021) tracked individuals aged 13 to 24 and examined day-to-day identity processes and their influence on longer-term identity stability. Results suggest that identity is both flexible at shorter timescales and builds stable structure at longer timescales, as low daily commitment levels and high identity reconsideration were associated with a greater likelihood of maintaining weak identity commitments in emerging adulthood. This shows that identity flexibility and stability are not opposites and can coexist. If an individual leans towards a flexible identity, it gives them room to shift roles/goals more easily. If they lean towards stability, they anchor in specific identity commitments. The main gap in this study is that it does not map how those identity processes link to how flexible/ fluid identity might shift goal orientation (towards more self vs. other-oriented goals).

Another adolescent study (Klimstra et al., 2010) confirms this, showing that identity formation involves both stability and change: commitments remained relatively stable, while exploration and reconsideration changed over time. In this study, identity processes were assessed using the Utrecht-Management of Identity Commitments Scale (U-MICS; Crocetti et al. 2008), where commitment refers to the degree of certainty and satisfaction with current identity choices, in-depth exploration reflects active reflection on and evaluation of those existing commitments, and reconsideration of commitment

looks at the extent to which individuals question current commitments in light of alternative options. This developmental approach allows for the separation of identity stability (commitment) from processes of identity change (exploration and reconsideration), thereby enabling a more in-depth analysis of how adolescents can maintain continuity while simultaneously engaging in developmental revision of identity content. Thus, so far, research shows that identity formation in adolescence and young adulthood seems to be guided by progressive changes in how individuals handle commitments, rather than by changes in commitments themselves, and less is known about how this flexibility can manifest once identity has reached adulthood.

Another non-WEIRD (i.e., non- Western, Educated, Industrialised, Rich, and Democratic) study (Chui et al., 2015) looked at how identity status (e.g., achieved identity, moratorium, diffusion) can moderate the link between values (individualistic and future orientation values) and prosocial behaviour. The main results indicated that the effect of future orientation on prosocial engagement was stronger for those in “searching moratorium” and “carefree diffusion” identity statuses (less stable commitments) than for those in “achievement” or “foreclosure” identity statuses (more stable commitments). In this case, a less stable identity status (i.e., more flexibility or lower commitment) actually enabled prosocial engagement. This interesting twist could help us understand how a fluid identity can also lead to prosocial, not just self-serving, behaviours. However, this research still does not explicitly capture the self-serving (agentic) vs prosocial (communal) tension, nor does it map behaviour across different contexts.

Last, but not least, one cross-cultural study found that people of higher socioeconomic status see themselves as more agentic and slightly less communal (Boileau, 2024). This can be seen as a link between social self-concept (a part of identity that explains social self-perception) and an agentic vs communal orientation. Nevertheless, it does not tie identity flexibility/ stability to self-serving vs prosocial behaviour across contexts.

Taken together, these perspectives suggest that coherence is not merely a product of narrative integration or temporal stability, but also of how individuals negotiate the pull of competing goals, both agentic and communal. This can pose important questions, such as: *How exactly does identity flexibility/fragmentation or stability relate to agentic (self-serving) vs communal (prosocial) goals? Also, to what extent do current identity models and measures reflect a bias toward prosocial, communal goals, thereby potentially influencing our understanding of identity coherence and the role of self-focused, agentic goals?* This will be addressed in the next section.

COHERENCE OF AGENTIC & COMMUNAL GOALS

So far, we know that identity flexibility/stability research primarily delves into developmental and social contexts of identity formation (adolescence, early adulthood) rather than directly linking it to self-serving vs. prosocial motives. We see research on agentic vs communal motives, but not necessarily tied to how one's identity shifts or stabilises over time. No studies seem to model identity fluidity/stability and agentic vs communal behavioural motives together (e.g., how a flexible identity may enable shifting between self-serving/communal goals, or how a stable identity anchors towards one or the other).

We now examine emerging empirical work that, while not explicitly integrating identity flexibility/stability with agentic and communal motives, offers partial insight into how these domains may intersect. For example, one study that looked at adolescents (Findley-Van Nostrand et al., 2018) examined agentic (status) and communal (closeness) goals in relation to self-reported altruistic, reactive, and proactive prosocial behaviours (Study 1). Results showed that different forms of prosocial behaviour link differently to agentic vs communal goals: proactive behaviour (instrumental, self-benefit) is tied to agentic goals, and altruistic behaviour is tied to communal goals. Another study (Luyckx et al., 2017) examined how identity exploration and commitment relate to goal types (intrinsic goals, conceptualised as communal and more prosocial/meaningful, and extrinsic goals, similar to agentic or more self-serving/material goals). Results showed stronger identity commitment and a greater tendency to pursue intrinsic (versus extrinsic) goals. Also, exploration was associated with some shifts in goal orientation. If we connect this to our inquiry, as it ties identity processes (flexibility/stability) to goal type (which aligns with self-serving vs. prosocial). It shows that when identity commitments are clearer/stable, people lean more toward intrinsic/prosocial goals.

Yet, this research does not clearly map how agentic vs communal motives (or, in this case, extrinsic and intrinsic motives) could be influenced by one's identity flexibility and vice versa, how a flexibility in one's identity can enable self-serving vs prosocial switching. If someone's identity is highly flexible (the person often shifts roles, values, and commitments), they may be better able to switch between agentic and communal motives depending on context. That can be adaptive, but it can also be slippery if personal values (and thus, authenticity) have a low importance, or the person has a low awareness of such matters. On the other hand, if someone's identity is stable (clear commitments, consistent roles), they might lean more consistently towards either communal or agentic motives, depending on their core values and the way their identity is anchored. Unfortunately, almost no literature attempts to

link identity flexibility/stability to agentic vs. communal behaviour/motives within a single model.

Furthermore, much of the identity literature has implicitly favoured communal approaches, emphasising coherence through moral growth, empathy, and social integration, while downplaying the role of agency in self-continuity. Classic studies on autobiographical memory showed that people selectively reconstruct past events to highlight moral improvement and distance themselves from earlier failings (Alicke & Sedikides, 2011). This “prospection bias” paints the present self in a positive light, reinforcing communal values like benevolence. Furthermore, when individuals believe they are being observed, they tend to adopt more communal behaviours in order to manage their reputations (Cañigueral & Hamilton, 2019). This underlying “audience effect” could suggest that identity-research paradigms, when conducted in the presence of experimenters or confederates, may unintentionally prime prosocial goals and thus overrepresent prosocial aspects of the self.

Reputation management research (e.g., Cage, 2015) also demonstrates that concern about how one is perceived activates communal motives, which, in turn, can shape responses on identity measures, offering another perspective on the phenomenon of social desirability. Consequently, traits and behaviours linked to agency, such as competition or self-enhancement, and those associated with the dark traits, may be underdetected when social desirability pressures favour prosocial displays (Bulbuc & Visu-Petra, 2024). Identity researchers could consider incorporating anonymous, private, or even competitive contexts, as well as implicit and ecological methods, to counteract this prosocial bias and more accurately capture both communal and agentic aspects of the self.

Another argument is presented by Amiot et al. (2017), who suggest that integrating relevant self-aspects is far from neutral. In three experiments, individuals who had a high acceptability of pro-discrimination norms (e.g., harmful, non-communal behaviours) reported significantly greater compartmentalisation and intra-individual conflict than those who adhered to pro-merit norms (social standards prioritising fairness; Amiot et al., 2017). This suggests that communal, morally laudable actions are more readily integrated into a coherent identity. In contrast, harmful or non-communal actions are often isolated from one’s overall self-view, triggering dissonance (Ryan & Deci, 2003).

Together, these perspectives could again highlight a prosocial bias in identity research: studies conducted in socially-oriented contexts may overestimate the stability and coherence of communal values while underrepresenting agentic or morally ambiguous behaviours. Future research should also examine how both communal and agentic goals (i.e., those that conflict with group norms) influence self-concept stability and psychological well-being.

Nonetheless, it is worth noting that clear definitions of prosocial behaviour in research are frequently lacking. According to Pfattheicher et al. (2022), only 74% of studies actually define and operationalise what is considered “prosocial.” Some researchers adopt a consequentialist view or even a utilitarian view (labelling any action that benefits others as prosocial). By contrast, “intentionalist perspectives” argue that what matters most is the actor’s motive to help, even if the outcome is harmful (Pfattheicher et al., 2022).

Although much of the identity literature emphasises communal aims (such as moral growth, empathy, and social integration), this emphasis may overstate the coherence of the self. Agentic goals, including competition, self-enhancement, and morally ambiguous pursuits, are often underexamined, creating a blind spot in understanding how individuals maintain continuity in the face of conflicting motives. Put differently, what appears as a stable, coherent identity in the research may partly reflect a bias toward prosociality in measurement and study design. Attending to both agentic and communal goals is therefore essential for capturing the full range of identity flexibility and the ways coherence emerges in real life.

DISCUSSIONS AND IMPLICATIONS

Towards an integrative model: Identity coherence through agentic–communal negotiation

Together, these accounts suggest that adult identity might even inhabit a spectrum that ranges from richly narrated (“diachronic”) stability to non-narrative synchronicity, where stability and change coexist through either the power of meaning-making through story or the acceptance of disjunction (OR, even a complete lack of awareness and concern for such discontinuities).

Agentic and communal goals interact dynamically, sometimes reinforcing each other, sometimes pulling the self in opposing directions. The present theoretical paper sought to critically examine these tensions and highlight the limitations within existing conceptualisations of identity, while outlining a possible direction for the inclusion of a “fluid identity” within a revised or expanded version of a framework (E.g., Kaufman’s (2015) SCIM framework). However, several limitations should be acknowledged. First, as noted in Table 1 (see *Disclaimer* at the bottom of the table), the overview provided is by any means not exhaustive. The selection of theories reflects those most relevant to the present discussion. Thus, other perspectives within the literature may offer complementary or competing accounts that were not included. Moreover,

theoretical developments in this area remain ongoing, and future work may refine, challenge, or even expand the perspective outlined here. Second, the proposal advanced in this paper is conceptual in nature and does not constitute a fully specified theoretical model at this stage. Accordingly, it requires further elaboration and more importantly, empirical validation. While prior, tentative findings (e.g., associations between identity exploration and commitment and intrinsic goals/prosocial or extrinsic goals/ material goals; Luyckx et al., 2017) offer preliminary support, the integration suggested here remains hypothetical. Finally, the interpretative nature of this analysis introduces an element of subjectivity in how theoretical tensions and convergences are identified, which the authors are aware should be considered when evaluating the scope and implications of the present contribution.

Nonetheless, rather than treating existing contradictions within one's identity system as dysfunction, they can be understood as the very mechanism by which identity stays responsive and relevant across contexts. This perspective raises numerous open questions for research. *How do different social, cultural, or digital environments shift the balance between agentic and communal aims? What processes allow some individuals to tolerate, or even thrive, amid apparent contradictions?* We know that people with higher self-transcendence values (e.g. benevolence) tend to choose more cooperative outcomes (versus self-maximising values, such as power; Heilman & Kusev, 2020; Daniel et al., 2015), as self-transcendence values are positively associated with helping behaviour, whereas self-enhancement values are negatively associated with helping others. We also know that authenticity can act as a resource under stress (Nartova-Bochaver, 2023). People who report higher authenticity cope better, so when identity, values, and behaviour align, people are less likely to feel fragmented or self-dysregulated. However, recent theoretical developments on “dark authenticity” (the perspective that highlights authenticity as an agentic, self-focused form when internal self-concepts are organised around Machiavellian, narcissistic, or psychopathic tendencies) suggest that alignment does not always imply prosocial expression (Bulbuc & Visu-Petra, 2024). For example, individuals high on dark personality traits may experience a sense of authenticity precisely when pursuing self-serving or norm-violating goals, as these behaviours reflect what they perceive as their “true self.” Such cases illustrate how a coherent identity may still motivate antisocial or strategically manipulative behaviours. What we do not know is whether identity coherence can be measured dynamically, capturing emergent stability rather than static traits or categorical types. Moreover, future studies should examine whether identity flexibility increases the risk of self-serving shifts when the person lacks value alignment.

An additional avenue worth considering is how identity fusion intersects with these processes. Identity fusion describes a visceral sense of oneness between the personal and social self (Swann et al., 2012). Although often studied in relation to groups, fusion can also occur with romantic partners, siblings, leaders, animals, brands, or even deeply held values (Hamid et al., 2019). Bringing fusion into dialogue with identity fluidity raises the possibility that some individuals with unstable or fragmented identities may be more likely to “anchor” themselves through intense fusion experiences. Conversely, people with a highly consolidated identity (Kaufman et al., 2015) might become overly rigid and poorly adapted to changing situations, suggesting that too much stability can actually be dysfunctional. In this way, fusion might function as a stabilising force for unclear self-concepts, providing a sense of external continuity when a person’s internal sense of self is shaky, or vice versa. Future studies could further explore this possibility.

Last but not least, recent studies are showing that helping stems partly from feeling valued/seen (agentic motivation; Lin et al., 2025), as gratitude mediates the relationship between perceived social support and prosocial behaviour, alongside a sense of personal gain. Moreover, recent work in the leadership organisational field (Bunjak et al., 2024) conceptualises authenticity as a dynamic process, adaptable across different identity levels (personal, relational, collective), with self-identity shifting contextually in line with the dominant identity level. This can make us wonder: *Which type of identity tends to lead to more self-serving behaviour vs more prosocial behaviour?* And, more importantly, *how do people negotiate internal conflicts without collapsing into distress or fragmentation?* Addressing these questions may reveal new mechanisms of self-maintenance and psychological resilience.

One possible answer lies in a set of integration skills that allow individuals to tolerate, rather than eliminate, internal conflict. From a classical perspective, identity coherence has traditionally been associated with the formation and maintenance of stable commitments (as discussed in Berzonsky et al., 1999), as well as the internalisation of social expectations (e.g., the Looking-Glass Self; Cooley, 1902, *see Table 1* for more details), implying that consistency is achieved through consolidation and social interaction. However, more contemporary perspectives also remind us that coherence may be influenced by our ability to coordinate multiple, and sometimes conflicting, self-representations across contexts (Linville, 1987; Hermans & Kempen, 1993; Markus & Nurius, 1986, as mentioned in *Table 1*), all of which emphasise the multiplicity of the self.

Empirically grounded work highlights the role of narrative integration processes (McAdams & McLean, 2013), emotion regulation (Fossati et al., 2012), and executive control (Conway & Pleydell-Pearce, 2000) in supporting the

coordination of competing self-representations and the incorporation of conflicting experiences into a coherent life story. These mechanisms may enable individuals to maintain continuity while accommodating (internal) conflict (between self vs. others' needs).

At the same time, other factors may also contribute to this, although they are less directly linked. For example, the presence of higher-order values or guiding principles (Vecchione et al., 2016) may provide a stable reference point for interpreting contradictions over the years, and individual differences in the need for coherence or levels of self-awareness may influence how strongly such conflicts are experienced or resolved. Vecchione et al. (2016) show that changes in value importance tend to preserve the overall coherence of the value system. When a given value becomes more important, compatible values tend to become more important as well, while conflicting values tend to become less important. For instance, if someone begins to value conformity more strongly, they may also place greater importance on tradition and social expectations, while reducing the importance of self-direction in situations where independent choices could conflict with group norms (Vecchione et al., 2016).

We also argue that, in some cases, lower levels of self-awareness may also reduce the perceived need to integrate inconsistencies, thereby limiting experienced distress, albeit potentially at the cost of deeper (challenging) integration in the long run.

For research, a model incorporating fluid identity encourages study designs that account for context, multiple goals, and contradictions, moving beyond prosocial bias. In clinical practice, this could suggest reframing internal conflict: rather than pathologising dissonance, clinicians could view it as a natural feature of an adaptive reframing process. In everyday life, this new model can offer validation of fluid and adaptable identity, where juggling multiple, sometimes opposing roles is not a flaw but a sign of resilience and pragmatism.

CONCLUSIONS

We have integrated various pieces of the identity puzzle: identity stability and flexibility research, and agentic/communal social-orientation research. However, we do not yet have strong, integrated work that examines how the “tension” between self-serving/prosocial motives may interact with identity flexibility. Fluid identity (i.e., perceived coherence of self while shifting between social roles, responsibilities and personal needs) influences how someone shifts between self-serving and prosocial motives and could be a valid research lead, but it has some implications.

First, a fluid identity can mean a person is able to shift between roles, motives, and possibly even moral stances depending on context. Someone leaning more self-serving could mean that fluidity can turn into a tool for survival or manipulation as they adapt to protect themselves or to get what they need (which might be a valid experience for individuals with dark personality traits; Bulbuc & Visu-Petra, 2024). If an individual is more prosocial, that same fluidity could help them connect with others and cooperate more easily.

Second, future research must address the unresolved question of which “self” takes precedence when agentic and communal motives collide. Identity coherence may be less about sameness, but about sustaining continuity through change, and adapting to a fast-moving society and technological age.

In conclusion, fluid identity could serve as a lens for seeing how people navigate contradiction, preserving a (narrative or not) thread of coherence in the very act of comfortably holding multiple selves together. This perspective integrates identity stability, flexibility, and goal-based tensions into a unified but open-ended theoretical lens for future research.

Conflicts of Interest

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A Meta-analysis of Learning Outcomes in Serious Games and Narrative Synthesis of Goal Orientation Effects

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ABSTRACT. The effectiveness of serious games as learning environments has been consistently documented but remains variable across individuals and contexts. The present study investigated the effect of serious games on learning outcomes and examined the role of goal orientation as an individual-difference variable within this relationship. A systematic review following PRISMA guidelines was conducted, combining a meta-analysis of pre–post learning outcome data with a structured narrative synthesis of goal orientation findings in accordance with Synthesis Without Meta-Analysis (SWiM) guidance. The meta-analysis included nine studies and revealed a statistically significant, moderate-to-large overall effect size ($d = 0.637$, 95% CI [0.483, 0.791], $p < .001$), indicating that participation in serious game environments is associated with meaningful improvements in knowledge acquisition. High heterogeneity was ($I^2 = 82.13\%$), and no significant moderating effects were found for task type, sampling method, participant status, age, or gender. The narrative synthesis identified a consistently positive directional relationship between goal orientation and learning outcomes. Findings are discussed in terms of the motivational mechanisms underlying serious game effectiveness.

Keywords: serious games, goal orientation, learning outcomes, meta-analysis, narrative synthesis, systematic review

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INTRODUCTION

Recent years have seen a constant increase in the use of serious games in various learning contexts, reflecting a sustained growth in interest that continues into the present day, specifically linked to their potential positive outcomes on learning (Susi et al., 2007; Tene et al., 2025).

Work on serious games is rooted in the Experiential Learning Theory (Kolb, 1984) which reflects “the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience” (Kolb, 1984, p. 41). The mechanism implies that participants in an experiential learning environment, such as a serious game setting, are immersed into concrete experiences which they then abstract and conceptualize, reflecting their ability to grasp experience and then transform it through reflective observation and active experimentation. In terms of learning outcomes, the experiential learning cycle is most productive when learners actively engage with all four stages—concrete experience, reflective observation, abstract conceptualization, and active experimentation—rather than cycling through them superficially (Kolb & Kolb, 2005). The proposition here is that serious games provide this exact outcome.

Drawing on experiential learning theory, we define serious games as “a game in which education (in its various forms) is the primary goal, rather than entertainment” (Michael & Chen, 2006, p.17). While entertainment still plays a crucial role, the main functionality of serious games is to facilitate and stimulate deep learning and understanding of the content or subject presented. They do that by providing opportunities for exploration, experimentation, and problem solving (Jenkins et al., 2009). Serious games create contexts in which players must engage their cognitive and motivational resources to advance through structured challenges (Facchino et al., 2025). This positions them as designed environments effective for the positive development of a number of different learning outcomes like skill acquisition (Fantozzi & Schiraldi, 2025), knowledge construction (Blasko et al., 2014), and behavioral change (Schuller et al., 2014).

While earlier work established the potential of employing serious games as learning tools in educational environments, the effectiveness of serious games remains a widely debated topic, with consistent reporting of mixed findings across the literature (Girard et al., 2013). Systematic reviews have documented both the potential and the limitations of educational games in producing reliable learning gains (Zuhri et al., 2025), and broader meta-reviews of the theoretical landscape have further highlighted the fragmented state of the field (Krath et al., 2021).

On the one hand, research shows that serious games and game-based learning interventions have positive effects on student cognitive learning outcomes like knowledge retention, problem-solving and critical thinking (Barz et al., 2024) and that they are positively related to academic achievement as well as affective-motivational outcomes (Soriano-Sánchez et al., 2026).

On the other hand, there is also evidence to suggest that, when games are not well integrated with curricular objectives, they might produce superficial level learning and reduced learning transfer due to shallow information processing (Yu et al., 2021), increase cognitive load (Chen & Chang, 2024), and even lead to frustration, anxiety and demotivation (Karimov et al., 2024).

Most of these findings are anchored in game design effects. The introduction of meaningful choice, scaffolded learning, reward systems, and integration with curriculum objectives are crucial for maximizing learning benefits (Wong et al., 2024). The framing of the serious game itself (as a ‘game’ versus a ‘serious exercise’) can also influence depth of learning and information processing, sometimes even reduce learning if student focus shifts too much to gameplay at the expense of educational goals (Sanchiz et al., 2024).

However, the effectiveness of serious games as learning tools depends not only on game design features (Lameras et al., 2017) but also on the characteristics and orientations that individual learners bring to the experience, and how different learners interact with those features (Blasko et al., 2014). The intersection of these fields is critical because serious games do not merely coexist with learner motivation; they actively shape it. Understanding these individual differences is central to explaining the variability in learning outcomes documented across the literature (Blasko et al., 2014; Tene et al., 2025).

Current literature supports the idea that players are motivated to play games to satisfy their need for attaining or proving competency (Cheah et al., 2022). Achievement and learning motivation are generally thought to be a direct function of the individual’s mindset (Garcia-Marquez & Bauer, 2021). Building on this idea, we clarify the connection by proposing that goal orientation dictates learning motivation—determining what makes games useful for learning for some individuals while remaining less effective for others (Backlund & Hendrix, 2013). Using the principles of experiential learning, serious games rely on the player’s cognitive and motivational resources to transform the gaming environment into a setting for learning (Kolb & Kolb, 2009).

Learners who are oriented toward mastering new skills and deepening understanding are more likely to reflect on in-game feedback, revise their strategies, and extract transferable knowledge (Mayer, 2019), whereas those focused primarily on performance outcomes may disengage when faced with difficulty or failure (Garris et al., 2017). The motivational orientations that learners

bring to the game, in particular their goal orientation, may be a key variable in determining how effectively they engage with the experiential learning cycle embedded in serious game design (Garcia-Marquez & Bauer, 2021). Goal orientation, in this sense, may function as a moderator of how deeply learners traverse the experiential cycle embedded in serious game design.

Goal orientation theory (Dweck, 1986) encompasses the how and the why of people's approach to achievement situations. The origins of this theory are rooted in educational psychology, developed to interpret how individuals respond to learning and performance demands (Elliot & Dweck, 1988). Goal orientation is broadly defined as the disposition that guides individuals' purposes and behaviors in achievement settings, encompassing their desire for knowledge and skill acquisition as well as their concerns about demonstrating competence (Kaplan & Maehr, 2007). At its most foundational level, goal orientation has been described as a disposition toward developing or demonstrating mastery in an achievement situation (Dweck, 1986).

Moving from this foundational dichotomy, it is important to note that the literature has not converged on a uniform terminology for these constructs (Garcia-Marquez & Bauer, 2021; Krath et al., 2021). A more differentiated model is the 2×2 achievement goal framework proposed by Elliot and McGregor (2001), which integrates the mastery–performance distinction with an approach–avoidance dimension. This produces four goal types: mastery approach (MAP), mastery avoidance (MAV), performance approach (PAP), and performance avoidance (PAV). Furthermore, more recent research has refined this model to distinguish specifically between three dimensions: learning goal orientation (LGO), prove performance goal orientation (PPGO), and avoid performance goal orientation (APGO) to capture the nuances of how learners seek to demonstrate competence (Vandewalle, 1997; Garcia-Marquez & Bauer, 2021).

To provide a better transition between the stable trait view and context-specific behaviors, we must consider that goal orientation functions not only as a stable individual trait but also as a contextually activated motivational state that may be shaped by specific game attributes (Garcia-Marquez & Bauer, 2021). This underscores the need to account for goal orientation as an individual-difference variable when evaluating the effectiveness of serious games. Crucially, this perspective implies that the serious game environment acts as a situational moderator. While a learner might arrive with a specific trait orientation, the structural elements of a game, such as leaderboards, branching narratives, or sandbox exploration, which can temporarily 'override' these tendencies (Garcia-Marquez & Bauer, 2021; Vandewalle et al., 2019). By creating a specific 'state' orientation, the game environment dictates how the learner engages with challenges and, ultimately, how much knowledge they retain (Mayer, 2019; Tene et al., 2025).

We draw on goal orientation as an individual-difference variable that involves drive, cognition, feedback reactions, and achievement mentality (DeShon & Gillespie, 2005; Robins & Pals, 2002). While several studies have identified goal orientation as a trait influencing performance (Luijt, 2020; Shaw et al., 2026) and learning outcomes (Erhel & Jamet, 2016; Liu & Liu, 2020; Tapingkae et al., 2020), a systematic and methodologically rigorous investigation remains absent.

Unlike static instructional methods, the interactive and iterative nature of games provides a dynamic feedback loop that can ‘prime’ a learner’s goal orientation. For instance, a game that rewards exploration and ‘safe failure’ may shift a learner from a performance-avoidance stance toward a mastery-oriented state, thereby directly influencing the cognitive gains measured in this meta-analysis. By identifying inter-individual differences as a potential moderator, we can more effectively justify the need for the proposed systematization of game-based learning research.

The primary contribution of this work lies in its dual synthesis: first, it provides a quantitative meta-analysis to establish the magnitude of learning gains, and second, it offers a narrative systematization of how goal orientation functions as a key individual difference that shapes those outcomes. The aim of the present study is to assess both the overall effect of serious games on learning outcomes and the role of goal orientation within this relationship.

- H1. The use of serious games increases affective, cognitive, or achievement outcomes in the learning environment.
- H2. The use of serious games has a significant positive effect on learning outcomes, in terms of gains and acquisition, compared to prior knowledge.
- H3. Goal orientation has a positive effect on cognitive, behavioral, motor, and social learning outcomes in serious game contexts.

METHOD

We employed a dual-method approach to evaluate the current literature, following the updated PRISMA guidelines (Veroniki et al., 2025). There is a discrepancy between the 12 studies included in the narrative synthesis and the 9 studies shown in the meta-analysis; this arises because three studies lacked the specific pre–post statistical data (means and standard deviations) required for effect size computation. This exclusion is made early to ensure that the meta-analysis remains statistically rigorous while the narrative synthesis remains inclusive of qualitative findings.

Inclusion and Exclusion Criteria

Studies were selected based on specific inclusion criteria, including the use of serious games as a primary intervention and the assessment of learning or goal orientation outcomes, as summarized in Table 1.

Studies were excluded if they failed to report the necessary descriptive statistics required for effect size calculation, such as standard deviations or specific sample sizes for each experimental condition. This selection process ensured that the meta-analysis relied exclusively on complete, verifiable data to maintain high internal validity and prevent the introduction of bias through statistical estimation.

Table 1. *Inclusion and exclusion criteria*

Criterion	Description
<i>Inclusion criteria</i>	1. Using <i>serious games</i> for learning purposes; 2. Utilizing <i>goal orientation theory</i> as framework, outcome explanation, moderator, mediator; 3. Reporting learning outcomes at /all levels: cognitive, social, motor, affective.
<i>Exclusion criteria</i>	4. Not using <i>serious games</i> as learning context 5. Using games and/or <i>serious games</i> for entertainment purposes; 6. Not reporting individual level learning outcomes 7. Not having a direct measure of the variable of interest (goal orientation, learning outcomes).

Note. Criteria developed in accordance with PRISMA (Veroniki et al., 2025).

Eligibility Criteria

Language constitutes the main eligibility criterion, based on potential language barriers and limitations. As such, only studies in Romanian and English were eligible for inclusion. No further eligibility restrictions were applied.

Information Sources

Selection of information sources was guided by recommendations for common search bases (DeCoster, 2004) and the available access possibilities. The final list consists of five research databases: Sage, Wiley, Science Direct,

ProQuest, and Google Scholar. From the initial list, three databases were excluded due to lack of relevant search results (SCOPUS, EBSCO, ERIC). Additional sources were identified through snowball sampling from the reference lists of selected articles. We included a range of publication types (journal articles, book chapters, case studies, dissertations, and conference papers); company reports were not included (Rahi, 2017). No attempts to contact authors for additional data were made, and no manual search of physical journals or books was conducted.

Screening

The flow diagram (Figure 1) provides a transparent summary of the review process and consists of five stages: (1) identification of studies from the literature search and removal of duplicates; (2) exclusion of ineligible studies based on title and abstract screening, with reasons documented; (3) exclusion of ineligible studies based on full-text review, with reasons; (4) inclusion of studies in the qualitative synthesis; and (5) inclusion of studies in the quantitative synthesis (meta-analysis) where applicable.

Search Strategy and Selection Process

The search strategy was constructed in accordance with the updated PRISMA checklist (Veroniki et al., 2025). For each database we have utilized the same sequence of key words, in the exact order, each time: *serious games*, *goal orientation theory/goal orientation*, *learning outcomes*. The intention of research is to identify the studies assessing individuals' goal orientation in serious games. We approached this topic broadly, without limiting to specific subdimensions, interventions, population or framework used.

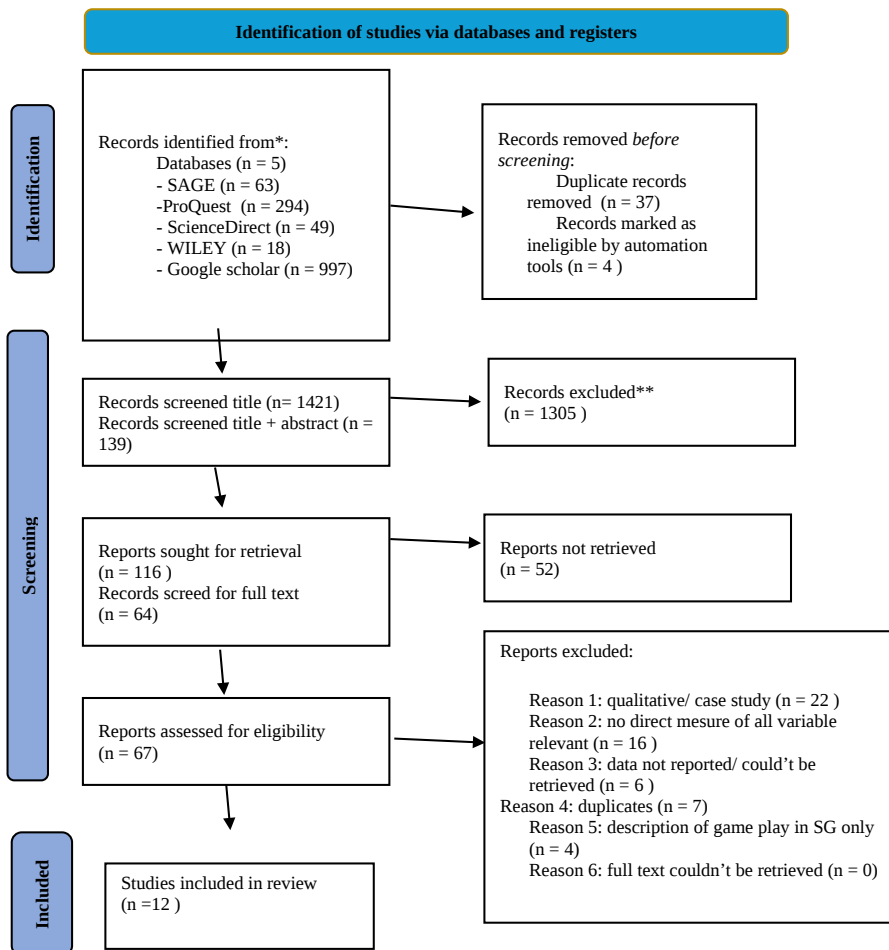
A record of the total results for each initial search has been kept and constantly updated. Specifically, the first step of the search process consists of sorting through articles by title screening ($n = 1421$). While following the inclusion and exclusion criteria, articles have been included by judgement sampling. Furthermore, a duplicate of the database has been made and kept at each step in the search and selection process. The coding process has been conducted by two independent coders. This step includes a prior assembled and agreed upon protocol of coding.

Moving onto the second stage of the screening process, Referencing the inclusion, exclusion and eligibility criteria, we have conducted a screening of 131 articles. We paid close attention to the key words, assessment methods, sample and results presented in the abstract. The selection process was conducted by

two reviewers, with the second one comparing a random sample out of the pool of studies, for assessing their agreement rate. The overall agreement rate from all stages of the screening process is 84% from both reviewers.

The last stage of screening required evaluation of the remaining studies based on full text assessment. 52 papers were considered in this stage, and after full text analysis we have discarded most of them based on different arguments, such as: not meeting inclusion criteria, not having a direct measure for the relevant variables, study design (i.e. qualitative, case reports). At the end of this screening process, we ended up with a total of 12 studies.

Figure 1. PRISMA (Veroniki et al., 2025) flow chart illustrating the screening process.



Data Collection

The data collection process followed an established protocol based on DeCoster (2004) and the PRISMA checklist (Veroniki et al., 2025). We compiled a list of mandatory extraction requirements, including reference details, study purpose, population characteristics, study design, and type of intervention. We also developed codes relevant to the assessment of the study variables, including details on the serious games used (e.g., name, type, task type, game genre), description of goal orientation types and learning outcomes assessed, and methods of measurement. For the meta-analysis, additional codes captured the statistical data required for effect size computation (means, standard deviations, sample sizes).

Narrative Synthesis of Goal Orientation Data

For outcomes pertaining to goal orientation, a quantitative synthesis was not feasible due to substantial methodological heterogeneity across the included studies. Three distinct sources of incompatibility were identified.

First, the timing of goal orientation measurement varied considerably across studies. Some studies assessed goal orientation both prior to and following the game-based intervention (pre–post design), others measured it exclusively at a single post-intervention time point, and others embedded measurement within the game itself through in-game behavioral indicators. These differences precluded aggregation of scores, as the constructs captured at each time point are not conceptually equivalent.

Second, the instruments used to operationalize and measure goal orientation differed substantially across studies. Studies employed a range of validated and custom questionnaires, including the Achievement Goals Questionnaire (AGQ; Elliot & McGregor, 2001), the Goals Inventory (Roedel et al., 1994), the Goal Orientation Questionnaire (Button et al., 1996), the Science Motivation Questionnaire (Glynn & Koballa, 2006), the Learning Goal Orientation scale (VandeWalle, 1997), and instruction-based priming paradigms. This instrument diversity reflects a broader challenge in the field, as Krath et al. (2021) documented in their meta-review of theoretical foundations in gamification and serious game research, motivational constructs in this literature are operationalized inconsistently across studies, drawing on over 100 distinct theoretical frameworks. A pattern that seemed to surface and become apparent to this study as well.

Third, the theoretical framework underlying goal orientation was not uniform across studies. Some studies adopted a dichotomous model distinguishing learning or mastery goal orientation from performance goal orientation. Others

applied the more differentiated 2×2 achievement goal framework (Elliot & McGregor, 2001), which distinguishes mastery approach, mastery avoidance, performance approach, and performance avoidance goals. Still others employed a three-factor model (Garcia-Marquez & Bauer, 2021). This theoretical fragmentation means that studies using different frameworks are not measuring the same underlying construct, even when they use the same label.

In accordance with the guidance for Synthesis Without Meta-Analysis (SWiM; Page et al., 2021), we therefore conducted a structured narrative synthesis of goal orientation findings. This involved grouping studies by the direction and consistency of reported effects, describing patterns across the sample. Full details of the studies included in the narrative synthesis are presented in Table 7.

Following the narrative synthesis of goal orientation, the results of the meta-analytic synthesis for the remaining outcomes are presented below.

RESULTS

Heterogeneity analysis

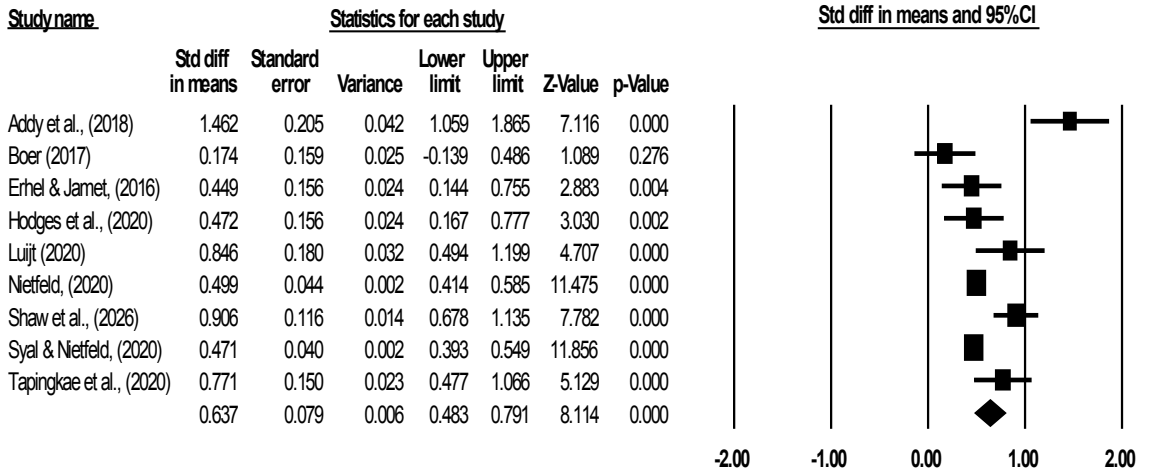
The heterogeneity analysis performed for the distribution of effect sizes in our meta-analysis indicated a significant heterogeneity, $Q(8) = 44.77$, $p < 0.001$, $I^2 = 82.13$. Taking into account also the diversity related to the characteristics of participants, we decided to perform all the data analysis using a random-effects model.

The overall effect size

As illustrated in the forest plot (Figure 2), nearly all effect sizes are positive and significant, varying from small to large (Addy et al., 2018; Erhel & Jamet, 2016). Boer (2017) is the only study where a non-significant effect was found.

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Figure 2. Forest plot of studies included in the analysis and the overall effect size.



The overall corrected effect size is $d = 0.637$, 95% CI = [0.483, 0.791] and statistically significant ($Z = 8.11$, $p < 0.001$).

Table 2. Summary of the effect size of each study included in the analysis

Study	Std diff	Standard	Variance	Lower	Upper	Z-Value	p-Value
Addy et al	1.462	0.205	0.042	1.059	1.865	7.116	0.000
Erhel & Jamet	0.449	0.156	0.024	0.144	0.755	2.883	0.004
Hodges et al	0.472	0.156	0.024	0.167	0.777	3.030	0.002
Nietfeld	0.499	0.044	0.002	0.414	0.585	11.47	0.000
Shaw et al	0.906	0.116	0.014	0.678	1.135	7.782	0.000
Syal & Nietfeld	0.471	0.040	0.002	0.393	0.549	11.85	0.000
Tapingkae et	0.771	0.150	0.023	0.477	1.066	5.129	0.00

Note. Std. diff. in means = standardized mean difference (Cohen's d). Lower and upper limits reflect the 95% confidence interval boundaries. Effects estimated using a random-effects model. Two-tailed p -values reported.

Table 3 contains data regarding the magnitude of these findings. The results indicate a statistically significant, moderate-to-large overall effect size ($d = 0.637$, 95% CI [0.483, 0.791], $Z = 8.11$, $p < .001$). There was high heterogeneity among the studies, $Q(8) = 44.77$, $p < 0.001$, $I^2 = 82.13$, which suggests that the variance in effect sizes is likely due to moderating variables rather than sampling error alone.

These findings explicitly map back to our hypotheses, confirming that the data supports H1 and H2. Specifically, the results demonstrate that the use of serious games leads to substantial gains in learning acquisition compared to prior knowledge, even when accounting for the diversity of the study designs included in the sample.

Table 3. *Overall effect of learning outcomes*

Metric	Value
Mean effect size	0.637
Standard error	0.079
Variance	0.006
95% CI	[0.483, 0.791]
Z-value	8.114
p-value	0.000

Note. Effects estimated using a random-effects model. Two-tailed p-value reported.

Publication Bias Analysis

Publication bias analysis was performed using two methods, the Classic Fail-safe N of Rosenthal, and the Begg and Mazumdar's rank correlation test.

One concern of publication bias is that some non-significant studies are missing from our analysis and that these studies, if included, would nullify the observed effect. This meta-analysis incorporates data from 9 studies, which yield a z-value of 18.35 and corresponding 2-tailed p-value less than 0.001. The fail-safe N is 781. This means that we would need to locate and include 781 'null' studies in order for the combined 2-tailed p-value to exceed 0.05. Put another way, there would be need to be 86.8 missing studies for every observed study for the effect to be nullified.

The classic case of publication bias is the case depicted by the funnel plot. Large studies tend to be included in the analysis regardless of their treatment effect whereas small studies are more likely to be included when they show a relatively large treatment effect. Under these circumstances there will be an inverse correlation between study size and effect size. Begg and

Mazumdar suggested that this correlation can serve as a test for publication bias. Concretely, they suggest that we compute the rank order correlation (Kendall's tau b) between the treatment effect and the standard error (which is driven primarily by sample size).

In this case Kendall's tau b (corrected for ties, if any) is 0.25, with a 1-tailed p -value (recommended) of 0.174 or a 2-tailed p -value of 0.348 (based on continuity-corrected normal approximation) which indicates no publication bias.

Moderator Analyses

Type of Task

As shown in Table 4, no significant differences were found between categories $Q(1) = 0.52, p = .468$).

Table 4. *Effect size as a function of task type*

Tasks	No. of studies	d	Limits of confidence interval (95%)		Z	p
			Lower	Upper		
Decision-making	7	0.576	0.441	0.711	8.36	0.000
Problem-solving	2	0.947	-0.046	1.939	1.87	0.062

Note. k = number of studies; d = standardized mean difference (Cohen's d); CI = confidence interval. Effects estimated using a random-effects model. Two-tailed p -values reported. Heterogeneity between subgroups tested using Cochran's Q . Interpret problem-solving subgroup effect with caution due to small number of studies ($k = 2$).

The heterogeneity test between categories proved no significant differences, $Q(1) = 0.52, p = 0.468$.

Sampling Method

The results in Table 5 indicate that significant medium to large effect sizes were obtained for each sampling type, showing that the positive impact of serious games is not dependent on a specific recruitment strategy ($Q(1) = 1.65, p = .198$).

Table 5. *Effect size as a function of sampling method*

Sampling	No. of studies	d	Limits of confidence interval (95%)		Z	p
			Lower	Upper		
Convenience sampling	5	0.757	0.370	1.144	3.836	0.000
Random sampling	4	0.499	0.430	0.569	14.049	0.000

Note. *k* = number of studies; *d* = standardized mean difference (Cohen's *d*); CI = confidence interval. Effects estimated using a random-effects model. Two-tailed *p*-values reported. Heterogeneity between subgroups tested using Cochran's *Q*.

Type of Participants

The data summarized in Table 6 demonstrates that the learning benefits of serious games remain robust across different populations, with no significant variance found between the performance of students and professionals ($Q(1) = 0.74, p = .691$).

Table 6. *Effect sizes as a function of participant status*

Participants	No. of studies	d	Limits of confidence interval (95%)		Z	p
			Lower	Upper		
Middle school	3	0.537	0.369	0.704	6.27	0.000
Primary school	2	0.629	0.300	0.958	3.74	0.000
University students	4	0.738	0.255	1.221	2.99	0.003

Note. *k* = number of studies; *d* = standardized mean difference (Cohen's *d*); CI = confidence interval. Effects estimated using a random-effects model. Two-tailed *p*-values reported. Heterogeneity between subgroups tested using Cochran's *Q*.

Gender Differences

Gender was quantified as the percentage of women in each sample and tested as a predictor of the effect sizes. The meta-regression performed revealed that this variable had a non-significant predictive value ($B = -0.007, Z = -0.23, p = 0.813$).

Age

The meta-regression performed revealed that the mean age of the samples had no significant predictive value on the effect sizes ($B = 0.008$, $Z = 0.99$, $p = 0.319$).

Narrative Synthesis: Goal Orientation in Serious Game Contexts

The synthesis of 12 studies identified a consistently positive directional relationship between goal orientation and learning outcomes. These results are explicitly mapped back to H3, indicating that higher levels of mastery-oriented goals are associated with better achievement in serious game contexts.

Direction of effects

Across the twelve studies, the overall pattern of findings was positive in direction. Studies that examined goal orientation as a predictor or correlate of learning outcomes consistently reported positive associations, with reported effect sizes ranging from small to moderate. In studies employing pre–post designs, goal orientation scores showed small but statistically significant increases from pre- to post-game measurement, suggesting that engagement with serious games may exert a modest influence on learners' motivational orientations over the course of an intervention, in addition to its documented effect on knowledge outcomes. This directional consistency across varied populations and contexts lends preliminary support to the hypothesis that goal orientation operates as a relevant individual-difference variable in serious game learning environments.

Measurement heterogeneity and its implications

Despite the broadly positive directional pattern, direct comparison across studies was not possible due to the three sources of methodological incompatibility described in the Method section. Notably, studies using embedded in-game measurement capture a different facet of goal orientation, its behavioral expression during gameplay, than those relying on self-report questionnaires administered outside the game context. This distinction is theoretically meaningful as Garcia-Marquez and Bauer (2021) have argued, goal orientation functions not only as a stable individual trait but also as a contextually activated motivational state that may be shaped by specific game attributes. Measurement timing and method therefore constitute substantive moderating factors, not merely technical nuisances.

Framework heterogeneity and conceptual implications

The coexistence of dichotomous and multidimensional frameworks across the study pool reflects an unresolved theoretical debate in the goal orientation literature more broadly. Studies employing the simpler learning-versus-performance distinction (e.g., Addy et al., 2018; Boer, 2017; Evans, 2010) cannot be directly compared to those using the 2×2 approach–avoidance model (e.g., Syal & Nietfeld, 2020; Shaw et al., 2026; Liu & Liu, 2020), as the finer-grained distinctions between approach and avoidance subtypes carry different theoretical predictions. The field has not yet converged on a standard framework for examining goal orientation in game-based learning, a gap also identified in broader reviews of theoretical foundations in gamification research (Krath et al., 2021). This lack of consensus is itself a substantive finding of the present review, with direct implications for the design of future research.

The available evidence suggests a consistent, if modest, positive relationship between goal orientation and learning outcomes in serious game contexts. However, the methodological and theoretical fragmentation documented here underscores the need for greater standardization in how goal orientation is conceptualized, operationalized, and measured in this literature before cumulative quantitative synthesis becomes feasible.

Table 7. *Summary of studies examining goal orientation, context, and measurement instruments*

Study ID	Reference	Domain	Task Type	Participants	Goal Orientation	Instrument
SYAL2020	Syal & Nietfeld (2020)	Educational	Decision-making	Middle school	PAP; PAV; MAP; MAV	Achievement Goals Questionnaire (AGQ)
ADDY2018	Addy et al. (2018)	Educational	Problem-solving	University students	Learning; Performance	Goals Inventory (Roedel et al., 1994)
BOER2017	Boer (2017)	Educational	Decision-making	University students	Performance; Mastery	Goal Orientation Questionnaire (Button et al., 1996)
ERHEL2016	Erhel & Jamet (2016)	Educational	Problem-solving	University students	Mastery; Performance	Instruction-based priming (time on demonstration)

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Study ID	Reference	Domain	Task Type	Participants	Goal Orientation	Instrument
EVANS2010	Evans (2010)	Military	Problem-solving	University students	Learning; Prove performance; Avoid performance	Survey (Yarbrough, 2007)
HODGES2020	Hodges et al. (2020)	Educational	Decision-making	Middle school	Performance (fixed); Learning (growth)	Mindset quiz
LIU2020	Liu & Liu (2020)	Educational	Problem-solving	University students	TAP; TAV; SAP; SAV; OAP; OAV	Goal Orientation Inventory (Elliot et al., 2011)
LUIJT2020	Luijt (2020)	Educational	Decision-making	Primary school	Performance (fun vs perform); Mastery (test vs learn)	Achievement goal reframing (Hawlitsek & Joeckel, 2017)
NIETFELD2020	Nietfeld (2020)	Educational	Decision-making	Primary school	Performance approach; Mastery approach	AGQ (Elliot & McGregor, 2001)
SHAW2026	Shaw et al. (2026)	Educational	Decision-making	University students	PAP; PAV; MAP; MAV	Achievement Goals Questionnaire (AGQ)
SUPER2020	Liu & Liu (2020)	Educational	Problem-solving	University students	Learning goal	Learning Goal Orientation (VandeWalle, 1997)
TAPINGKAE2020	Tapingkae et al. (2020)	Educational	Decision-making	Middle school	Goal orientation	Science Motivation Questionnaire (Glynn & Koballa, 2006)

Note. PAP = performance approach; PAV = performance avoidance; MAP = mastery approach; MAV = mastery avoidance; TAP = task approach; TAV = task avoidance; SAP = self approach; SAV = self avoidance; OAP = other approach; OAV = other avoidance; AGQ = Achievement Goals Questionnaire.

DISCUSSION

The present study investigated the effectiveness of serious games on learning outcomes while exploring the role of goal orientation as a critical individual-difference variable. Our meta-analysis of nine studies revealed a statistically significant, moderate-to-large overall effect size ($d = 0.637$), confirming that participation in serious game environments is associated with meaningful improvements in knowledge acquisition. These findings explicitly support H1 and H2, demonstrating that serious games lead to substantial gains compared to prior knowledge across diverse study designs in both academic and professional training contexts.

This study strengthens the current literature by bridging the gap between quantitative outcomes and qualitative drivers. By mapping robust learning effects directly to individual differences in goal orientation (H3), we provide a clearer picture of why games work. This dual perspective addresses the “mixed findings” often cited in the literature by demonstrating that while games are generally effective tools, the learner’s motivational mindset acts as a critical boundary condition.

Furthermore, the narrative synthesis suggests that serious games may activate and reinforce learners’ motivational orientations in ways that standard instructional approaches do not. By providing a safe environment for trial and error, these games allow for the “transformation of experience” into knowledge that is central to experiential learning theory. This confirms that goal orientation functions not only as a stable trait but as a situational state that is actively shaped by the game’s goal-embedded structure and immediate, performance-contingent feedback mechanisms.

From a design perspective, these results suggest that a uniform approach to serious game mechanics may be counterproductive. Developers should consider implementing motivational tools, such as the option to disable public leaderboards for learners with a high performance-avoidance orientation, to mitigate the negative effects of goal interference and maximize cognitive gains.

Additionally, because the positive effect of serious games appears robust across different ages and genders, practitioners can confidently implement these tools in diverse settings, including employee training, leadership development, and simulation-based decision-making. Educators and organizational trainers should focus on the quality of feedback loops, as these are the primary drivers of engagement and knowledge retention. Ensuring that game challenges align with the learner’s goal orientation will likely lead to more consistent and deeper cognitive engagement across both academic and professional environments.

While the absence of significant moderators indicates that the sources of variability remain largely unexplained, the consistency of the positive directional relationship between goal orientation and learning outcomes is encouraging. This study provides a necessary systematization of the field, moving beyond simple effectiveness measures to a more nuanced understanding of how individual differences dictate the success of game-based learning.

Limitations

Several limitations should be considered when interpreting these results. First, the relatively small number of studies included in the meta-analysis.

Second, many included studies employed pre-post designs without control groups. While such designs can detect improvements over time, they limit the ability to draw strong causal inferences regarding the effectiveness of serious games relative to other instructional methods.

Third, the high heterogeneity observed suggests substantial variability in effect sizes, which reduces the precision of the overall estimate. This variability may be partly explained by differences in study design, implementation, and measurement.

Fourth, learning outcomes were operationalized differently across studies, making it difficult to determine whether observed differences reflect intervention effects or measurement inconsistencies.

Fifth, a further limitation concerns the goal orientation component of this review. The inability to conduct a quantitative synthesis of goal orientation data is itself a reflection of the state of the field: the absence of a shared measurement standard and a common theoretical framework constrained what could be concluded. While the directional pattern of findings is informative, the narrative synthesis cannot establish the magnitude, moderators, or mechanisms of goal orientation effects with the same precision as a meta-analytic estimate.

Finally, although no evidence of publication bias was detected, the small number of studies reduces the sensitivity of these tests, and the possibility of unpublished null findings cannot be entirely ruled out.

Future research directions

Future research should aim to better understand the factors that contribute to variability in the effectiveness of serious games. In particular, studies should investigate the role of specific design features, such as feedback mechanisms, levels of interactivity and narrative elements, as well as instructional variables such as duration of exposure and integration into curricula.

There is also a need for more rigorous experimental designs, including randomized controlled trials that compare serious games with traditional instructional methods. Such designs would allow for stronger causal conclusions regarding their effectiveness.

With respect to goal orientation specifically, future research would benefit substantially from the adoption of a common theoretical framework, ideally the 2×2 achievement goal model (Elliot & McGregor, 2001) and a standardized measurement approach applied consistently across pre-game, in-game, and post-game time points. This would enable future meta-analytic synthesis of goal orientation effects and allow researchers to disentangle the contributions of mastery and performance orientations, and their approach and avoidance subtypes, to learning in serious game environments.

Finally, the development and use of standardized measures of learning outcomes would enhance comparability across studies and improve the overall quality of evidence in this field.

CONCLUSION

This study provides evidence that serious games have a significant positive effect on learning outcomes, with a moderate-to-large overall effect size. At the same time, the substantial heterogeneity observed across studies highlights the complexity of this field and the need for further research to identify the conditions under which serious games are most effective. A more systematic and standardized approach to research which would encompass both game effectiveness and goal orientation measurement, will contribute to a deeper understanding of how and when serious games can best support learning.

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Intolerance of Uncertainty and Depressive Symptoms in Female Freshmen: The Mediating Role of Cognitive and Behavioral Emotion-Regulation Strategies

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ABSTRACT. Depression among university freshmen has become a serious public health problem; however, the underlying psychological factors and mechanisms remain insufficiently understood in this population. Intolerance of uncertainty (IU) has been considered a strong transdiagnostic risk factor for depression, yet few studies have investigated the pathways through which IU contributes to depressive symptoms in university freshmen. The present study explored whether adaptive and maladaptive cognitive and behavioral emotion regulation strategies mediate the relationship between global and dimensional IU (Prospective Anxiety and Inhibitory Anxiety) and depressive symptoms. A sample of 600 female Romanian freshmen completed self-report measures of IU, cognitive and behavioral emotion regulation strategies, and depressive symptomatology. Hypotheses were tested using PROCESS v5.0, model 4 (Hayes et al., 2025). Our results indicate that only maladaptive cognitive ER strategies mediated the relationship between IUS-Prospective Anxiety and depressive symptoms. In contrast, both deficits in adaptive regulation and increases in maladaptive regulation processes partially mediate the relationship between IUS-Inhibitory Anxiety and global IU and depressive symptoms. Thus, from a clinical point of view, early screening for global and dimensional IU and (mal)adaptive emotion regulation strategies in mental health programs targeting freshmen may help identify students with elevated risk of depression.

Keywords: intolerance of uncertainty; depressive symptoms; cognitive emotion regulation; behavioral emotion regulation; freshmen

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INTRODUCTION

Involvement in high-quality education exceeds individual benefits, significantly impacting national economies and societal well-being (Sabates et al., 2021). Despite universities' efforts to attract students and increase student retention, academic attrition has been increasing due to individual, financial, and social factors (Lorenzo-Quiles et al., 2023). Mental health problems are one of the most important individual contributors to academic failure (dropout and poor performance), with multiple consequences (Lipson et al., 2019).

For most freshmen, the transition from high school to university is stressful (Beiter et al., 2015), further exacerbated by the growing number of uncertainty-related challenges (The Lancet, 2022). In this regard, first-year university students represent a highly vulnerable group, frequently reporting depressive symptoms (Heumann et al., 2024; Zhao et al., 2023). Due to difficulties in adequately addressing these provocations, a considerable number of first-year students worldwide drop out of university. Between 2021 and 2022, over 23% of full-time freshmen in the U.S. abandoned their studies (Hanson, 2024). Similar trends have been documented in Australia (McKee, 2024) and Europe (Spain = 31.8%; Romania = 31.3%; Italy = 26%) (Ibáñez-Cubillas et al., 2023).

Beyond the economic consequences (Neugebauer & Daniel, 2022), the individual psychological repercussions of academic attrition are also significant. Compared to graduates, those who fail to complete their higher education tend to experience higher levels of distress, depression, and social stigma, and lower levels of well-being (Zajac et al., 2024). The extent to which university freshmen can tolerate and manage uncertainty is associated with their future physical, psychological, and professional trajectories (Ye et al., 2023). If not promptly addressed, freshmen's psychological maladjustment may have serious short- and long-term consequences (Li et al., 2021).

Students' capacity to tolerate uncertainty and to use adaptive emotion-regulation (ER) strategies plays a significant role in how they manage the increasing number of novel challenges encountered during their transition to university. Both constructs represent patterns of cognitive, emotional, and behavioral responses that can be modified through relatively short-term, evidence-based interventions (Joormann & Stanton, 2016).

Extant research indicates a strong relationship between the frequent use of maladaptive ER strategies and the development and maintenance of depressive symptoms (Aldao et al., 2010), a pattern that may be particularly relevant for university freshmen, who are especially vulnerable to depressive symptomatology (King & dela Rosa, 2019). Nonetheless, the relationship between one's IU, cognitive and behavioral ER strategies, and depressive symptomatology

is complex and still debated (Sahib et al., 2024). A consistent body of research indicates that IU contributes to the development and maintenance of depressive symptoms through direct (by negative cognitive biases and maladaptive information processing) and indirect (through mediators such as maladaptive coping mechanisms, perceived lack of control) pathways, both in the general and student populations (Carleton, 2016; Gentes & Ruscio, 2011). Theoretical models supported by empirical studies link IU to the use of maladaptive ER strategies (e.g., rumination, reassurance-seeking, avoidance), thus contributing to emotional dysregulation (Sahib et al., 2023). The relationship between IU and adaptive and maladaptive ER strategies is key to understanding the underlying mechanisms and prevention/treatment of several mental health problems (Aldao et al., 2010; Sahib et al., 2023).

Male and female students may experience and navigate the transition to university differently (Yau & Cheng, 2014), males tending to adapt more quickly (Cabras & Mondo, 2017). Female freshmen often face more challenges during the transition (higher emotional distress, academic pressure, financial and interpersonal problems) (Graves et al., 2021). Such differences highlight the need to examine these mechanisms more specifically within female freshmen samples.

Most studies have concentrated on the investigation of direct relationships between IU and mental health problems, nevertheless, ER strategies may play a significant, but under-investigated mediating role (Sahib et al., 2023). Although recent pandemic-era research (Wan et al., 2024) has linked IU to depressive symptoms in university students, these results partly reflect situation-specific uncertainty rather than dispositional IU, thus limiting their generalizability.

Literature supports the approach of analyzing IU both as a global construct and in terms of its two dimensions - prospective anxiety and inhibitory anxiety - for several interrelated reasons. First, literature reveals that the global IU score is a robust predictor of general psychological distress across disorders, capturing an overall vulnerability to emotional disorders (McEvoy & Mahoney, 2012). Second, empirical factor-analytic work consistently supports a two-factor structure of IU, distinguishing between PA and IA (Carleton et al., 2007) or a bi-factorial structure including two dimensions (i.e., prospective and inhibitory anxiety) and one general factor (Hale et al., 2016; Shihata et al., 2017; 2018). Although moderately correlated, the two dimensions of IUS capture partially distinct aspects of responding to uncertainty rather than a single homogeneous construct and they have incremental validity over the general factor (Gentes & Ruscio, 2011). Third, empirical research highlights differential patterns of associations for the two dimensions of IU. While PA is more strongly

related to cognitive processes such as worry and repetitive negative thinking, IA is more closely associated with behavioral inhibition, avoidance, and functional impairment (Carleton et al., 2007; Gentes & Ruscio, 2011).

Given that the temporal sequence through which ER strategies mediate the relationship between IU and depressive symptoms has not yet been clearly established (Sahib et al., 2023), the present study investigated the effects of the global and bidimensional components of IU (prospective and inhibitory anxiety) on depressive symptoms through four parallel mediators: (a) adaptive cognitive, (b) maladaptive cognitive, (c) adaptive behavioral, and (d) maladaptive behavioral ER strategies. The present study explores these mechanisms in the context of transition to university (a psychologically demanding life event) using a sample of female freshmen in a post-pandemic context. The focus on this specific population is justified for two major reasons: *(i)* women consistently report higher levels of depressive symptoms than men, disparity particularly pronounced in adolescence and early adulthood (Kuehner, 2017), trend confirmed among university students as well (Heumann et al., 2024); *(ii)* women also tend to employ more frequently than men maladaptive ER strategies (e.g., rumination) (Nolen-Hoeksema et al., 2008), and report significantly higher levels of IU (Buhr & Dugas, 2006).

Theoretically, examining prospective and inhibitory anxiety separately allows for greater mechanistic precision in understanding cognitive versus behavioral pathways to psychopathology, such as depressive symptoms. A better understanding of the proposed relationships is particularly relevant for adolescents and young adults, who face an increasing number of personal and social challenges during a critical developmental stage (Williams & Roberts, 2023), and who are highly vulnerable to the consequences of maladaptive reactions.

LITERATURE REVIEW

Depressive symptoms refer to a group of physiological (fatigue, weight change), cognitive (impaired concentration, memory), affective (low mood, sadness, worthlessness, anhedonia), and behavioral (isolation, low levels of activity) reactions that persist for a longer time and interfere with adaptive daily functioning (Fried & Nesse, 2015).

Li et al.'s (2022) systematic review and meta-analysis, including 63 published studies and over 100.000 participants, yielded a pooled prevalence of depressive symptoms of 33.6% (95%CI 29.3%-37.8%), with an increase observed in investigations conducted after the COVID-19 pandemic (35.9%, 95%CI 20.2-51.7%). Heumann et al.'s (2024) meta-analysis, including 60

published investigations on higher education students in Germany, indicated that over 21% report depressive symptoms, female students being more affected than males (29%-23.1%). Lasting depressive symptoms in freshmen may reduce motivation, impair physical health, lead to poor sleep habits, lower academic performance, increase engagement in risk-behaviors, and impair quality of life (Bruffaerts et al., 2018; Ibrahim et al., 2013; Pascoe et al., 2020). A significant predictor of depressive symptoms in university students is the reduced capacity to tolerate uncertain situations (Sahib et al., 2023).

IU is frequently conceptualized as the *“individual's dispositional incapacity to endure the aversive response triggered by the perceived absence of salient, key, or sufficient information, and sustained by the associated perception of uncertainty”* (Carleton, 2016, p. 31). IU may also be considered a cognitive bias that increases distress in uncertain situations, thereby functioning as a significant transdiagnostic vulnerability factor in the development and persistence of psychopathology, especially anxiety and depressive symptoms (Sahib et al., 2023; Saulnier et al., 2019). Chronic perceptions of uncertainty and constant fear of future possibilities may undermine adaptive psychological functioning, and further lead to hopelessness and helplessness, core features of depressive symptomatology (Nekić & Mamić, 2019). Accordingly, individuals with higher levels of IU are more susceptible to depressive symptomatology, as they tend to struggle to efficiently cope with situations which they perceive as ambiguous or unpredictable (Shihata et al., 2016).

IU typically comprises two components: Prospective Anxiety (i.e., cognitive need for predictability) and Inhibitory Anxiety (i.e., behavioral tendency to avoid situations perceived as uncertain) (McEvoy & Mahoney, 2011). Based on the belief that anticipating all possible outcomes is helpful, prospective IU often leads to information-seeking behaviors (Birrell et al., 2011), even if this can hinder problem-solving processes (Einstein, 2014). In contrast, inhibitory IU is associated with avoidance and maladaptive coping behaviors that impair optimal functioning (Einstein, 2014). These two dimensions of IU may contribute to psychological dysfunctions through distinct mechanisms and pathways. This distinction is especially relevant, given that many forms of mental illness are characterized by different patterns of emotion dysregulation (Aslan et al., 2024).

ER refers to the processes through which individuals influence their emotional experiences and expressions (Gross, 1998). Literature distinguishes between adaptive (consistently linked to improved emotional functioning and psychological well-being) and maladaptive strategies (associated with emotional distress and increased risk for psychopathology) (Aldao et al., 2010). These strategies may operate through both cognitive and behavioral mechanisms, a distinction that has guided the development of measurement tools, such as the Cognitive Emotion Regulation Questionnaire (CERQ) and Behavioral Emotion

Regulation Questionnaire (BERQ) (Garnefski et al., 2002; Kraaij & Garnefski, 2019). CERQ is a 36-item self-report instrument measuring nine specific cognitive strategies people use to emotionally cope with negative events, including theoretically considered adaptive (acceptance, positive refocusing, refocus on planning, positive reappraisal, putting into perspective) and maladaptive (self-blame, rumination, catastrophizing, other-blame) forms of ER. The CERQ has been widely applied across diverse populations and is valued for identifying changeable cognitive patterns that are modifiable through personal experiences or psychotherapy (Garnefski et al., 2001).

Individuals may also rely on behavioral ER strategies to manage intense negative emotions following adverse events. To assess such patterns, Kraaij and Garnefski (2019) developed the 20-item self-report Behavioral Emotion Regulation Questionnaire, which includes both maladaptive (withdrawal and ignoring) and adaptive (distraction, active approach, and social support seeking) strategies (Joormann & Stanton, 2016; Kraaij & Garnefski, 2019).

A potential mechanism underlying the relationship between IU and depressive symptoms is emotion regulation, including both adaptive and maladaptive cognitive and behavioral strategies. Higher IU may predict increased depressive symptom severity indirectly through reduced use of adaptive emotion regulation strategies and greater reliance on maladaptive emotion regulation strategies.

Adaptive cognitive emotion regulation strategies may likewise reduce the impact of IU on depression. For example, cognitive reappraisal and mindfulness facilitate more flexible interpretations of ambiguous situations and reduce emotional distress associated with uncertainty (Garland et al., 2015). Moreover, research evidenced that higher IU is associated with reduced reappraisal capacity and greater reliance on suppression strategies (Shu et al., 2022). Thus, it is expected that individuals who struggle to implement adaptive emotion regulation strategies may be particularly susceptible to experiencing depressive symptoms in the context of elevated uncertainty.

The same reduced effect of IU on depressive symptoms could be found in the case of adaptive behavioral ER strategies. Indirect evidence for this effect is provided by the role of adaptive behavioral strategies such as behavioral activation and problem-solving in buffering the negative effects of uncertainty by promoting psychological flexibility, environmental reward, and effective coping (Shudo et al., 2017). Thus, based on these empirical arguments, we advance that:

Hypothesis 1: adaptive cognitive and behavioral ER strategies mediate the relationship between global IU and depressive symptoms.

IU has been identified as a critical transdiagnostic vulnerability factor that contributes to maladaptive cognitive and behavioral strategies across multiple mental health disorders (McEvoy & Mahoney, 2012).

From a cognitive perspective, individuals high in IU may engage in repetitive negative thinking, particularly rumination, as an attempt to reduce ambiguity and gain certainty. Huang et al. (2019), using cross-sectional and longitudinal analyses, have shown that rumination significantly mediated the relationship between IU and depressive symptoms. Moreover, Sahib et al.'s (2023) meta-analysis has revealed that individuals high in IU are more likely to rely on maladaptive emotion regulation strategies and less likely to engage in adaptive forms of regulation. Similarly, longitudinal evidence indicates that maladaptive strategies such as rumination and thought suppression mediate the association between IU and emotional difficulties, including depressive symptoms (Sahib et al., 2024). These findings suggest that maladaptive cognitive emotion regulation strategies may partially explain how IU contributes to depression.

Individuals with elevated IU frequently engage in avoidance behaviors and behavioral withdrawal in an effort to minimize distress associated with uncertain situations (Boswell et al., 2013; Dugas & Robichaud, 2007). Although avoidance may provide short-term emotional relief, it reduces engagement with rewarding and meaningful experiences, thereby reinforcing helplessness and contributing to the maintenance of depressive symptoms (Kanter et al., 2010; Veale, 2008). Based on these empirical arguments, we advance that:

Hypothesis 2: maladaptive cognitive and behavioral ER strategies mediate the relationship between global IU and depressive symptoms.

The cognitive tendency to anticipate and excessively worry about future uncertainty (i.e., PA), may generate depressive symptoms through its influence on emotion regulation processes. It can affect adaptive cognitive and behavioral regulation by increasing anticipatory worry and indecisiveness, thereby reducing engagement in using adaptive strategies like cognitive reappraisal and acceptance, and respectively in rewarding or goal-directed activities (Carleton et al., 2007; McEvoy & Mahoney, 2012; Sahib et al., 2023). Rather, individuals high in PA frequently engage in maladaptive cognitive emotion regulation strategies, such as rumination, catastrophizing, and repetitive negative thinking, in an attempt to reduce ambiguity and increase predictability (Carleton et al., 2007). They can also adopt behaviors that in the short term reduce distress, but in the long run these behaviors tend to intensify negative affect and sustain cognitive vulnerability to depression over time. Accordingly, we consider that adaptive and maladaptive

cognitive and behavioral emotion regulation strategies can explain how tendency to anticipate and excessively worry about future uncertainty translates into depressive symptomatology. Therefore, considering the cognitive nature of PA, we expect that maladaptive cognitive ER strategies will be a stronger mediator of the relationship between PA and depressive symptoms. Thus, we consider that:

Hypothesis 3: adaptive cognitive and behavioral ER strategies mediate the relationship between prospective anxiety and depressive symptoms;

Hypothesis 4: maladaptive cognitive and behavioral ER strategies mediate the relationship between prospective anxiety and depressive symptoms;

IA is the behavioral tendency to avoid situations perceived as uncertain. High scores on IA may limit an individual's opportunities to employ adaptive regulation strategies, including the cognitive and behavioral ones. We expect that IA may contribute to depressive symptoms more through maladaptive behavioral emotion regulation mechanisms than the cognitive ones and adaptive ER strategies. Individuals high in IA often respond to uncertain situations with behavioral withdrawal, avoidance, and reduced initiation of goal-directed behavior (Carleton et al., 2007; Morriss et al., 2023). As literature reveals, these behavioral strategies are strongly linked to depression and they may act as mediators in the relationship between IU and emotional distress (Choudhary et al., 2023; Panjwani et al., 2024). Thus, based on these empirical arguments, we advance that:

Hypothesis 5: adaptive cognitive and behavioral ER strategies mediate the relationship between inhibitory anxiety and depressive symptoms;

Hypothesis 6: maladaptive cognitive and behavioral ER strategies mediate the relationship between inhibitory anxiety and depressive symptoms;

METHODS

Participants

Our sample included 600 Romanian female students ($M_{\text{age}} = 22.61$ years, $SD = 7.32$) from a large university in northwestern Romania. Participants were recruited through convenience sampling and participated voluntarily after providing informed consent to anonymously take part in the study. Regarding the highest level of education, 78.83% of the participants finished high school, 10.33% had a bachelor's, 10.11% had a master's, and 0.67% a PhD degree. 73%

of the participants were enrolled in full-time education, and 27% in the distance-learning program. Furthermore, 54.17% of the participants declared that they were involved in a romantic relationship. Regarding employment status, 67.17% reported being unemployed, 4.50% reported working on projects, 6.50% had a part-time job, and 21.83% were employed full-time.

Instruments

We assessed the following demographic variables: age, type of educational enrolment (full-time education vs. distance learning), highest form of education, having a romantic partner (no vs. yes), and status of employment (no, projects, part-time, full-time).

Depressive symptoms were measured using the Beck Depression Inventory-II (BDI-II) (Beck et al., 1979; Romanian adaptation by David & Dobrean, 2012). This 21-item, self-report instrument evaluates the presence and severity of depressive symptoms in adolescents and adults, covering somatic, cognitive, and behavioral dimensions of depression.

Intolerance of Uncertainty was measured using the 12-item Intolerance of Uncertainty Scale (IUS-12) (Carleton et al., 2007), with the Romanian translation and adaptation completed by the authors in 2020. The IUS-12 provides a total score, along with scores for two subscales: Prospective Anxiety (IUS-PA) and Inhibitory Anxiety (IUS-IA).

Cognitive ER strategies were assessed using the Cognitive Emotion Regulation Questionnaire (Garnefski et al., 2002; Romanian adaptation by Perte & Tincas, 2010). The CERQ is a 36-item self-report tool designed to evaluate cognitive ER strategies individuals use in response to adverse events. The nine subscales of the CERQ have been theoretically grouped in adaptive (acceptance, positive refocusing, refocus on planning, positive reappraisal, putting into perspective), and maladaptive scales (self-blame, rumination, catastrophizing, and other-blame). Based on the results of previous studies conducted on Romanian population and preliminary investigations of the present data, the adaptive strategies facet was computed excluding the acceptance subscale (Kállay & Visu-Petra, 2014; Kállay & Cheie, 2022).

Behavioral ER strategies were measured using the 20-item Behavioral Emotion Regulation Questionnaire (Kraaij & Garnefski, 2019; translated by the authors in 2021). The five subscales of the BERQ assess adaptive (seeking distractions, active approach, seeking social support), and maladaptive behavioral ER strategies (withdrawal, ignoring). Based on the factor analysis conducted on a Romanian sample, the adaptive strategies facet was computed excluding the seeking distraction subscale, since its items did not adequately load on the adaptive strategies subscale (Kállay & Rus, in review).

Procedure

The research protocol of this study was approved by the Ethics Committee of the Babeş-Bolyai University, Cluj-Napoca, Romania [Research Ethics Approval No. 830/03.11.2023; data available at request to authors]. Data were collected in January 2025 using Google Forms. The instruments were administered only after the participants formally consented to participate in the study.

Analytical strategy

Analyses were performed using IBM SPSS v25 (IBM Corp., 2017). First, we conducted preliminary descriptive, correlational, and internal consistency analyses. Next, multiple parallel mediation analyses were performed using the PROCESS v5.0 for IBMSPSS v. 25 (Hayes et al., 2025), Model 4 with 5000 bootstrap samples. In this model, the dimensions and global score of IU were predictors, depression was the criterion, and the mediators comprised adaptive vs. maladaptive cognitive and behavioral ER strategies. The covariates were age, type of actual education form (regular vs. distance learning), highest form of education, having a romantic partner (no vs. yes), and status of employment (no, projects, part-time, full-time employment). To reduce the impact of family-wise error, we considered each dimension of IU one by one as covariate in the mediation analysis.

RESULTS

Table 1 presents indicators of internal consistency, means, standard deviations, and *r* Bravais-Pearson correlation coefficient matrix.

Table 1. *Descriptive statistics and correlations matrix (N = 600)*

Variables	Mean	Standard deviation	1	2	3	4	5	6	7	8
1. IUS-PA	20.70	5.83	(.87)							
2. IUS-IA	13.47	4.51	.77***	(.84)						
3. IU-global score	34.17	9.73	.95***	.92***	(.91)					
4. Adaptive cognitive ER strategies	45.63	13.31	-.16***	-.22***	-.20***	(.88)				
5. Maladaptive cognitive ER strategies	32.95	9.72	.37***	.36***	.39***	.00	(.80)			
6. Maladaptive behavioral ER strategies	17.19	6.48	.32***	.39***	.37***	-.14***	.31***	(.86)		
7. Adaptive behavioral ER strategies	26.24	6.47	-.04	-.13***	-.08*	.37***	.08*	-.36***	(.80)	
8. Depressive symptoms	11.46	8.31	.42***	.48***	.47***	-.29***	.48***	.47***	-.22***	(.88)

Note: **p* < .05, ***p* < .01, ****p* < .001 (2-tailed); alpha Cronbach internal consistency coefficient is presented in parentheses.

Three parallel mediation analyses were conducted with depressive symptoms as dependent variable, prospective and inhibitory anxiety, and global scores of IU as predictors, and adaptive and maladaptive cognitive and behavioral ER strategies as mediators. Partial results of these regressions are presented in Table 2-4.

Global scores of IU were negatively associated with adaptive cognitive and behavioral ER strategies ($b = -.27, p < .001$; $b = -.06, p < .05$). Furthermore, global IU was positively associated with both maladaptive cognitive and behavioral ER strategies ($b = .37, p < .001, b = .24, p < .001$) and depressive symptoms ($b = .18, p < .001$). Depressive symptoms were negatively associated with adaptive cognitive and behavioral ER strategies ($b = -.12, p < .001$; $b = -.10, p < .05$) and positively related to both maladaptive cognitive and behavioral ER strategies ($b = .28, p < .001, b = .28, p < .001$). Depressive symptoms were higher in the case of the students enrolled in the distance learning education form ($b = 2.26, p < .01$) (Table 2).

The total effect of global scores of IU on depressive symptoms was significant and positive ($.39, p < .001, 95\%CI [.33; .45]$). Both direct and total indirect effects were positive ($.18, p < .001, 95\%CI [.12; .23]$; $.21, 95\%CI [.17; .26]$). An indirect relationship was found between IU and depressive symptoms through adaptive cognitive ($.03, 95\%CI [.02; .05]$) and behavioral ER strategies ($.01, 95\%CI [.001; .02]$), respectively through maladaptive cognitive and behavioral ER strategies ($.10, 95\%CI [.08; .14]$; $.07, 95\%CI [.04; .10]$). The variance explained by the total model in depression was 26.35% ($p < .001$). Hypotheses 1 and 2 were fully supported.

Table 2. *Partial results of the parallel mediation analyses with depressive symptoms as outcome and global score on IU as predictor (N = 600)*

Type of Effect	B	SE	LLCI	ULCI	bootMean	bootSE	bootLLCI	bootULCI
Direct effects								
IU-global score	.18***	.03	.12	.23	.18	.03	.11	.24
Adaptive cognitive ER strategies	-.12***	.02	-.16	-.08	-.12	.02	-.16	-.08
Maladaptive cognitive ER strategies	.28***	.03	.22	.34	.28	.03	.22	.35
Maladaptive behavioral ER strategies	.28***	.05	.19	.38	.28	.05	.18	.39
Adaptive behavioral ER strategies	-.10*	.05	-.19	-.01	-.10	.05	-.20	-.01
Age	-.09	.06	-.22	.03	-.09	.06	-.21	.02
Type of education	2.26**	.90	.50	4.03	2.26	1.01	.26	4.20

Type of Effect	B	SE	LLCI	ULCI	bootMean	bootSE	bootLLCI	bootULCI
Level of education	-.88	.64	-2.14	.38	-.88	.63	-2.15	.35
Relationship status	.61	.51	-.40	1.62	.61	.53	-.44	1.64
Type of work	-.55	.29	-1.13	.03	-.54	.31	-1.15	.06
Indirect effects								
Adaptive cognitive ER strategies	.03					.001	.02	.05
Maladaptive cognitive ER strategies	.10					.02	.08	.14
Maladaptive behavioral ER strategies	.07					.01	.04	.10
Adaptive behavioral ER strategies	.01					.004	.001	.02
Total indirect effect	.21					.02	.17	.26

Note: * $p < .05$, ** $p < .05$, *** $p < .001$; SE = standard error; LLCI = low-level confidence interval; ULCI = upper-level confidence interval.

We found that IUS-PA was not significantly associated with the adaptive cognitive ER strategies ($b = .03$, $p > .05$) but was associated with maladaptive cognitive ER strategies ($b = .42$, $p < .001$). Furthermore, IUS-PA positively related with adaptive behavioral ER strategies ($b = .14$, $p < .05$) but not with maladaptive behavioral ER strategies ($b = .08$, $p > .05$) and depressive symptoms ($b = .06$, $p > .05$). Depressive symptoms were negatively related with both adaptive cognitive and behavioral ER strategies ($b = -.12$, $p < .001$, $b = -.10$, $p < .05$) and positively related to both maladaptive cognitive and behavioral ER strategies ($b = .28$, $p < .001$, $b = .28$, $p < .001$) (Table 3). Depressive symptoms were higher in the case of the students enrolled in the distance learning education form ($b = 2.18$, $p < .05$).

The total effect of the IUS-PA on depressive symptoms was significant and positive ($.19$, $p < .05$, $95\%CI [.03; .34]$). The direct effect was not significant ($.06$, $p > .05$, $95\%CI [-.07; .20]$), while the total indirect effect was significant and positive ($.12$, $95\%CI [.03; .22]$). An indirect relationship was found only between IUS-PA and depressive symptoms through maladaptive cognitive ER strategies ($.12$, $95\%CI [.06; .19]$). The other tested mediation paths were not significant. 27.30% of the variance in depressive symptoms was explained by all variables included in the total model. Thus, Hypothesis 3 has not received empirical support, while Hypothesis 4 was partially supported.

Table 3. *Partial results of the parallel mediation analyses with depressive symptoms as outcome and IUS-PA as predictor (N = 600)*

Type of Effect	b	SE	LLCI	ULCI	bootMean	bootSE	bootLLCI	bootULCI
Direct effects								
IUS-PA	.06	.07	-.07	.34	.06	.07	-.07	.20
Adaptive cognitive ER strategies	-.12***	.02	-.16	.20	-.12	.02	-.16	-.07
Maladaptive cognitive ER strategies	.28***	.03	.22	.34	.28	.03	.22	.34
Maladaptive behavioral ER strategies	.28***	.05	.19	.37	.28	.05	.27	.38
Adaptive behavioral ER strategies	-.10*	.05	-.18	-.01	-.10	.05	-.28	-.01
Age	-.09	.06	-.21	.04	-.09	.06	-.21	.02
Type of education	2.18*	.90	.41	3.94	2.18	1.02	.11	4.15
Level of education	-.88	.64	-2.13	.38	-.88	.63	-2.15	.33
Relationship status	.67	.52	-.34	1.68	.67	.53	-.38	1.71
Type of work	-.52	.30	-1.10	.06	-.52	.31	-1.11	.09
IUS-IA	.33***	.10	.15	.51	.33	.09	.15	.52
Indirect effects								
Adaptive cognitive ER strategies	-.00					.02	-.04	.03
Maladaptive cognitive ER strategies	.12					.03	.06	.19
Maladaptive behavioral ER strategies	.02					.02	-.01	.07
Adaptive behavioral ER strategies	-.02					.01	-.04	.00
Total indirect effect	.12					.05	.03	.22

Note: * $p < .05$, ** $p < .05$, *** $p < .001$; SE = standard error; LLCI = low-level confidence interval; ULCI = upper-level confidence interval.

IUS-IA had consistent associations with both adaptive cognitive and behavioral ER strategies. Specifically, IUS-IA was negatively associated with both adaptive cognitive and behavioral ER strategies ($b = -.68, p < .001$; $b = -.33, p < .001$), and positively with both maladaptive cognitive and behavioral ER strategies ($b = .32, p < .05, b = .45, p < .001$), and depressive symptoms ($b = .33, p < .001$). Depression was negatively correlated with adaptive cognitive and behavioral ER strategies ($b = -.12, p < .001, b = -.10, p < .05$), and positively with maladaptive cognitive and behavioral ER strategies ($b = .28, p < .001, b = .28, p < .001$) (Table 4). Depressive symptoms were higher in the case of the students enrolled in the distance learning education form ($b = 2.18, p < .05$).

The total effect of the IUS-IA on depressive symptoms was significant and positive (.66, $p < .001$, 95%CI [.46; .86]). Both direct and total indirect effects were positive (.33, $p < .001$, 95%CI [.15; .51]; .33, 95%CI [.22; .46]). An indirect relationship was found between IUS-IA and depressive symptoms through adaptive (.08, 95%CI [.04; .14]; .03, 95%CI [.01; .08]) and maladaptive cognitive and behavioral ER strategies (.09, 95%CI [.01; .17]; .13, 95%CI [.07; .21]). 27.30% of the variance in depressive symptoms is explained by all variables included in the total model. Hypothesis 5 and Hypothesis 6 received empirical support.

Table 4. *Partial results of the parallel mediation analyses with depressive symptoms as outcome and IUS-IA as predictor (N = 600)*

Type of Effect	b	SE	LLCI	ULCI	bootMean	bootSE	bootLLCI	bootULCI
Direct effects								
IUS-IA	.33***	.10	.15	.51	.33	.10	.16	.52
Adaptive cognitive ER strategies	-.12***	.02	-.16	-.08	-.12	.02	-.16	-.08
Maladaptive cognitive ER strategies	.28***	.03	.22	.34	.28	.03	.22	.34
Maladaptive behavioral ER strategies	.28***	.05	.19	.37	.28	.05	.17	.39
Adaptive behavioral ER strategies	-.10*	.05	-.19	-.01	-.10	.05	-.19	-.01
Age	-.09	.06	-.21	.04	-.09	.06	-.21	.02
Type of education	2.18*	.90	.41	3.94	2.16	1.01	.23	4.12
Level of education	-.88	.64	-2.13	.38	-.87	.64	-2.15	.39
Relationship status	.67	.51	-.34	1.68	.69	.53	-.40	1.70
Type of work	-.52	.30	-1.10	.06	-.51	.31	-1.14	.17
IUS-PA	.06	.07	-.07	.20	.06	.07	-.08	.19
Indirect effects								
Adaptive cognitive ER strategies	.08					.02	.04	.14
Maladaptive cognitive ER strategies	.09					.04	.01	.17
Maladaptive behavioral ER strategies	.13					.04	.07	.21
Adaptive behavioral ER strategies	.03					.04	.01	.08
Total indirect effect	.33					.06	.22	.46

Note: * $p < .05$, ** $p < .05$, *** $p < .001$; SE = standard error; LLCI = low-level confidence interval; ULCI = upper-level confidence interval.

DISCUSSION

The present study examined the mediating role of both adaptive and maladaptive cognitive and behavioral ER strategies in the relationship between IU, respectively its components (prospective and inhibitory anxiety) and depressive symptoms in a sample of female Romanian freshmen.

Adaptive and maladaptive cognitive and behavioral ER strategies partially mediated the relationship between the global score of IU and depressive symptoms (H1, H2). These results indicate that higher levels of IU were associated with lower use of adaptive cognitive and behavioral ER strategies, which in turn predicted greater depressive symptom severity, indicating a significant indirect effect. Thus, individuals high in dispositional incapacity to endure the aversive response triggered by the perceived absence of salient, key, or sufficient information, and sustained by the associated perception of uncertainty may be less likely to engage in adaptive strategies thereby increasing their vulnerability to depressive symptomatology. These results are consistent with prior evidence showing that IU is negatively associated with adaptive regulatory capacities and that such strategies play a protective role in emotional functioning (Garland et al., 2015; Shu et al., 2022). Moreover, our data also indicate that individuals high in IU rely greater on cognitive and behavioral maladaptive ER strategies. In turn, these emotion regulation strategies relate to increased depressive symptom severity. These findings align with previous research that evidenced significant relationships between IU with maladaptive cognitive and behavioral ER strategies (Carleton, 2016), associative patterns between mental health problems such as depressive symptoms and adaptive and maladaptive ER strategies (Brzozowski & Crossey, 2024; Garnefski et al., 2002; Sahib et al., 2023; Saulnier et al., 2019).

We found that only maladaptive cognitive ER strategies fully mediated the relationship between IUS-PA and depressive symptoms (H4 partially supported). None of the other ER strategies tested mediated this relationship (H3). An explanation for this result may lie in the heightened cognitive need for predictability (McEvoy & Mahoney, 2011), which may more proximally be linked to cognitive appraisal processes. This may increase threat sensitivity and activate maladaptive ER strategies such as rumination and catastrophizing (Birrell et al., 2011). In line with this interpretation, maladaptive cognitive ER strategies emerged as mediators in contrast to behavioral strategies, which operate later in the emotion generation process, downstream of cognitive appraisal (Gross, 1998). This pattern of results suggests that the relationship between the cognitive tendency to anticipate and worry about future uncertainty (i.e., PA) and depressive symptoms is primarily driven by maladaptive cognitive regulatory processes, rather than by deficits in cognitive and behavioral adaptive regulation. Prospective

forms of intolerance of uncertainty are inherently cognitive in nature and therefore more strongly expressed through maladaptive cognitions (Carleton et al., 2007; McEvoy & Mahoney, 2012) than through adaptive cognitions and (mal)adaptive behaviors. Furthermore, evidence suggests that adaptive behavioral ER strategies are less frequently employed by individuals high on IU (Knowles et al., 2022).

In contrast, our data provided empirical support for both hypothesized mediation pathways linking IA to depressive symptoms through all the four categories of emotion regulation (ER) strategies. Specifically, both adaptive and maladaptive cognitive and behavioral ER strategies significantly partially mediated the relationship between IA and depressive symptomatology (H5; H6). These results suggest that IA relates to depressive symptoms through multiple regulatory mechanisms. Consistent with our expectation, higher levels of IA are related to reduced engagement in adaptive cognitive and behavioral strategies, which in turn are associated with higher depressive symptom severity. This finding suggests that the behavioral inhibition characteristic of IA may indirectly limit opportunities for adaptive coping, thereby increasing vulnerability to depressive affect. When individuals are unable or unwilling to act under conditions of high uncertainty, they may also be less likely to implement behavioral and cognitive strategies that typically buffer emotional distress. Additionally, individuals high in IA manifest a greater reliance on maladaptive strategies, which in turn predicted increased depressive symptoms. These results are consistent with theoretical and empirical literature suggesting that IA reflects a behavioral tendency toward avoidance of uncertain situations, which may reinforce disengagement from functional activities and maintain depressive symptoms (Carleton et al., 2007; Morriss et al., 2023). Our findings are in line with past research that evidenced further maladaptive ER strategies are robust predictors of depressive symptoms and serve as key mediators in the relationship between IU and emotional distress (Choudhary et al., 2023; Panjwani et al., 2023).

Additionally, we found that female freshmen enrolled in distance learning reported significantly higher levels of depressive symptoms than freshmen enrolled in full-time education programs. Several explanations may be viable for this finding. First, usually female freshmen enrolled in distance learning are older and have more, sometimes conflicting roles (students, caregivers, employees) than those enrolled in full-time education (Waterhouse et al., 2022). Furthermore, it is also plausible to presume that female freshmen enrolled in distance learning may encounter more and different types of uncertainty/ambiguity (academic, personal, social) affecting their mental well-being. Secondly, the structure of teaching-learning is significantly different. Distance learning students need more effort to better manage time, academic tasks, and procrastination is more frequently encountered among them (Broadbent & Poon, 2015). Thirdly, they

are less exposed to possibilities of face-to-face contact and collaborative learning, which may lead to feelings of isolation and loneliness, one of the strongest predictors of depressive symptoms (Rutkowska et al., 2022).

Our investigation contributes to a better understanding of the complex relationship between IU and ER in the development and maintenance of depressive symptoms in female freshmen. More specifically, our findings show how the inability to efficiently tolerate uncertainty and regulate accompanying emotional states (through both cognitive and behavioral ER strategies) may lead to depressive symptoms. By considering IU both globally and bi-dimensionally and including both cognitive and behavioral adaptive and maladaptive ER strategies, this approach revealed essential differences between the two facets of IU in their pathways to depressive symptoms. Our results further clarify the way in which cognitive and behavioral ER strategies mediate the relationship between IU, respectively its dimensions, and depressive symptoms.

These findings have also clinical implications by highlighting IU and ER strategies, in particular the maladaptive ones, as key targets for screening and intervention programs designed to identify at-risk freshmen and prevent and reduce depressive symptomatology in female first-year students. Moreover, since female freshmen are typically more vulnerable than their male counterparts, such prevention and intervention programs may become even more efficient if adapted to gender specificities.

The present study has several limitations that should be taken into consideration when interpreting the results. While the mediation analyses examined indirect pathways between IU, ER strategies and depressive symptoms, due to the cross-sectional design of the study, causal relationships and the temporal ordering of variables could not be established. Consequently, it remains unclear whether IU or its dimensions influences ER strategies and depressive symptoms, or if the reverse is also possible. For instance, persistent reliance on maladaptive ER strategies may not only emerge as a consequence of IU and exacerbate emotional distress but may also contribute to the maintenance and amplification of uncertainty perceptions, thereby creating a self-perpetuating cycle that heightens vulnerability to depressive symptomatology (Aldao et al., 2010; Saulnier et al., 2019). Individuals high in IU are particularly prone to this cycle, since their difficulties in tolerating uncertainty and frequent use of maladaptive ER strategies may sustain depressive symptomatology (Zlomke & Jeter, 2014). Future studies should adopt longitudinal or experimental designs to capture the causal relationships between these variables and to reveal their mechanisms. Tracking these variables over time could clarify if fluctuations in IU result in adopting certain types of ER strategies that subsequently generate depressive symptoms. Also, such designs could establish whether these relationships are stable over time and/or context dependent (Knowles et al., 2022).

Our study focused on IU with particular emphasis on its downstream outcomes as ER strategies and depressive symptoms. Future research focusing on the identification of the most frequent sources of uncertainty among freshmen, and how this hierarchy of priorities changes as they adapt or not with the challenges of academic life, may facilitate a better understanding of the major risk and protective factors for depression in this population.

Moreover, as our measures focused on the dispositional behavioural ER strategies, future studies should investigate behavioural ER strategies from a situational perspective as well (Kraaij & Garnefski, 2019). Combining dispositional and situational perspectives could provide an integrative picture of how individuals employ these strategies in general and specific stressful situations.

Furthermore, we exclusively focused on broad categories of adaptive and maladaptive cognitive and behavioral strategies based on work conducted by Garnefski et al. (2001;2002), and Kraaij and Garnefski (2019). Consequently, future studies are warranted to elucidate how specific strategies uniquely underlie the pathways linking global and dimensional IU to depressive symptoms.

The employed convenience sampling strategy might have resulted in a sample that is not representative to the general female freshman or general population. Furthermore, although most investigations indicate that women in general, as well as female freshmen are more prone to experience depressive symptoms (Graves et al., 2021), studying gender differences in the way male and female freshmen adapt and maladapt to the specific requirements of academic life remains highly relevant (Cabras & Mondo, 2017). Expanding the sample to include demographically more diverse groups (e.g., male participants, clinical samples), would allow potential subgroup analyses.

Being based on self-reports raises concerns about common method bias and social desirability effects. To overcome the limitations of self-report bias and common method variance, future research should incorporate multi-source (e.g., peers, family), multi-method and objective measures (e.g., behavioral observations, physiological measures) (Grupe & Nitschke, 2013). Triangulation could offer a more nuanced understanding of the relationships between the examined variables. As our data revealed that certain ER strategies do not function as theoretically expected, it would be worthwhile to examine in-depth the psychometric properties of the instruments used to measure such strategies and to better understand if these characteristics of the ER strategies are rather given by the context or culture and not by the measurement instrument itself.

CONCLUSION

This study advances previous knowledge by examining as parallel processes adaptive and maladaptive cognitive and behavioral ER strategies in the relationship between global and dimensional IU and depressive symptoms in female freshmen. Taken together, our findings underscore maladaptive cognitive ER strategies as the primary mechanism linking PA to depressive symptoms, while highlighting multiple regulatory mechanisms that are partially involved in the relationship between IA, global score on IU, and depressive symptoms. They emphasize the value of early detection of freshmen who have difficulties in tolerating uncertainties, as well as those who frequently rely on maladaptive cognitive and behavioral ER strategies. In this way, our investigation points to the possibility of reducing depressive symptomatology, while addressing challenges specific to the highly vulnerable freshmen population.

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Stuck in Time, Stuck in Mood? Cognitive Flexibility as a Mechanism Connecting Time Perspective and Depression

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ABSTRACT. How people mentally organize their past, present, and future has important implications for emotional well-being, yet the psychological mechanisms underlying this link remain poorly understood. Cognitive flexibility may represent a critical pathway through which temporal orientations shape vulnerability to depressive symptoms. This study examined whether the Alternatives and Control dimensions of cognitive flexibility mediate the relationships between time perspective dimensions and depressive symptoms. A sample of 441 adults (Mage = 29.9 years) completed measures of time perspective, cognitive flexibility, and depressive symptoms. Ten separate mediation models were estimated. Maladaptive time perspectives (Past Negative and Present Fatalistic) were positively associated with depressive symptoms, whereas adaptive perspectives (Future and Past Positive) were negatively associated. Both dimensions of cognitive flexibility emerged as significant partial mediators in most models, with stronger effects observed for the Control dimension. No significant mediation effects were found for Hedonistic Present. These findings suggest that enhancing cognitive flexibility (particularly perceived control) may offer a promising target for interventions aimed at reducing depressive symptoms by reshaping maladaptive temporal orientations.

Keywords: time perspective, depression, cognitive flexibility, control

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1. INTRODUCTION

Temporal perspective refers to how individuals cognitively and affectively frame past, present, and future experiences (Zimbardo & Boyd, 1999). According to temporal perspective theory, individuals differ in the extent to which they typically focus on specific time frames, such as the past, present, or future, and these orientations influence motivation, decision-making, and emotional functioning. A growing body of research has demonstrated robust associations between maladaptive temporal perspectives and psychological distress, particularly depressive symptoms (Allemand et al., 2025; Lefèvre et al., 2019; McKay & Cole, 2020).

Of the time perspective dimensions, the Negative Past variable correlates most consistently with depression (Desmyter & De Raedt, 2012; Lefèvre et al., 2019; Orkibi, 2015; Van Beek et al., 2011). Individuals with high scores on this dimension tend to focus on painful memories, failures, and regrets, which favors rumination and maintains negative cognitive schemas about the self, the world, and the future, which are central to depression (Addis et al., 2016; Maiese, 2018; Williams et al., 2022). In general, depressed individuals tend to be more focused on negative memories than non-depressed individuals (Addis et al., 2016; Anderson & Evans, 2015; Lefèvre et al., 2019).

At the same time, the Fatalistic Present variable, characterized by a perceived lack of control and the belief that events are determined by external forces, has also been associated with high levels of depression (Åström et al., 2019; Orkibi, 2015). On the other hand, time perspectives considered adaptive seem to have a protective role (Desmyter & De Raedt, 2012). Future orientation supports the idea of meaning and self-regulatory capacity, which negatively correlates with depression (Hamilton et al., 2015; Zheng et al., 2019). Similarly, the Positive Past variable is associated with psychological well-being and emotional stability, which contributes to personal identity reinforcement (Jankowski et al., 2020).

Regarding the Hedonistic Present variable, the results are less consistent. Some studies suggest a weak association with depression, possibly due to the ambivalent character, which includes both adaptive elements and traits associated with impulsivity (Jankowski et al., 2020; Orkibi, 2015).

The relationship between temporal perspective and cognitive flexibility

Cognitive flexibility refers to the ability to adapt thinking to situational demands and the ability to generate alternative interpretations and to perceive situations as controllable and manageable. A rigid cognitive style characteristic

of depression may reinforce the depressed state through a tendency to automatically accept maladaptive beliefs (Denis & Vander Wal, 2010). The model of cognitive flexibility proposed by Dennis and Vander Wal (2010) distinguishes two main dimensions: *Alternatives*, which reflects the ability to think about and identify multiple alternative solutions, explanations and perspectives, and *Control*, which refers to the perceived ability to influence events and to perceive difficult situations as manageable.

Deficits on both dimensions are associated with rigid cognitive styles and associated with depression (Dennis & Vander Wal, 2010; Murphy et al., 2012; Yu et al., 2020). Individuals with depression exhibit reduced cognitive flexibility, manifested by difficulties in reappraising situations, limited access to cognitive alternatives, and a low perception of personal control (Deveney & Deldin, 2006; Yu et al., 2020). Studies show that reduced levels of cognitive flexibility predict the severity of depressive symptoms, whereas improvements in this capacity are associated with reduced symptomatology and more favorable therapeutic outcomes (García-Fernández et al., 2025; Johnco et al., 2014).

Conceptually, temporal perspective and cognitive flexibility are closely intertwined. Temporal perspective reflects relatively stable cognitive frameworks through which the individual interprets life experiences, whereas cognitive flexibility determines the extent to which these frameworks can be adjusted or reinterpreted adaptively. Maladaptive temporal perspectives, such as Negative Past and Fatalistic Present, can be understood as expressions of cognitive processing characterized by difficulties in generating alternatives and a diminished perception of control. Emphasized Negative Past orientation may limit the ability to re-evaluate experiences, maintaining negative and ruminative emotional contents. The Fatalistic Present is associated with a low level of perceived control (Shahid et al., 2020), which may limit the individual's ability to evaluate situations as manageable and to adapt their cognitive responses, thus favoring cognitive rigidity.

Building on prior research highlighting the role of time perspective in emotional well-being (Desmyter & De Raedt, 2020; Tseferidi, et al., 2017) or depression (Lefèvre et al., 2019) and the importance of cognitive flexibility in adaptive functioning (García-Fernández et al., 2025), the present study examined whether cognitive flexibility mediates the relationship between time perspective dimensions and depressive symptoms. Given that cognitive flexibility is a multidimensional construct, two mediation sub-hypotheses were tested. The first examined the mediating role of alternative cognitive flexibility, reflecting the ability to generate alternative explanations and solutions when encountering difficult situations. The second focused on control cognitive flexibility, capturing perceived control over challenging circumstances and the capacity to maintain

an internal locus of control. Specifically, it was expected that both dimensions of cognitive flexibility would function as mediating mechanisms through which temporal orientations influence depressive symptomatology. Maladaptive time perspectives were expected to be associated with lower levels of cognitive flexibility, which in turn would be related to higher depressive symptoms, whereas adaptive time perspectives were expected to be associated with higher cognitive flexibility and, consequently, lower depressive symptoms.

2. METHODOLOGY

Participants and procedure

The questionnaire was created using Google Forms and disseminated through multiple social media platforms using the snowball sampling approach. Data were collected between 2024 and 2025. All participants were informed about the aims of the study, assured of the confidentiality and anonymity of their responses, and advised that participation was voluntary, with the option to withdraw at any time without consequences.

A total of 441 individuals ($M_{age} = 29.7$, $SD = 12.9$) participated in the study (Table 1). The sample comprised 143 men (32.4%) and 295 women (66.9%), while 3 participants (0.7%) did not report their gender. Most respondents resided in urban areas ($n = 359$; 81.4%), whereas 82 participants (18.6%) reported living in rural areas. Regarding educational attainment, 5 participants (1.1%) had completed middle school, 10 (2.3%) vocational school, 222 (50.3%) high school, 94 (21.3%) held a bachelor's degree, 94 (21.3%) a master's degree, and 16 participants (3.6%) had earned a doctoral degree. In terms of marital status, 123 participants (27.9%) were married, 176 (39.9%) were single, 129 (29.3%) reported being in a romantic relationship, 10 (2.3%) were divorced, and 3 (0.7%) were widowed.

Table 1. Demographic characteristics of sample

Demographic characteristic	Sample	
	<i>n</i>	%
Gender		
Female	295	66.9
Male	143	32.4
Unreported	3	0.7

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Demographic characteristic	Sample	
	<i>n</i>	%
Residence		
Urban	359	81.4
Rural	82	18.6
Education		
Middle school	5	1.1
Vocational school	10	2.3
High school	222	50.3
Bachelor's degree	94	21.35
Master's degree	94	21.3
Doctoral studies	16	3.6
Marital status		
Married	123	27.9
Single	176	39.9
In a relationship	129	29.3
Divorced	10	2.3
Widowed	3	0.7

Instruments

The Zimbardo Time Perspective Inventory (ZTPI) (Zimbardo & Boyd, 1999) was used to assess individuals' temporal orientation, reflecting the extent to which people focus on past, present, or future experiences when interpreting events and making decisions. The instrument consists of 56 items rated on a 5-point Likert scale and comprises five subscales: Negative Past, Positive Past, Hedonistic Present, Fatalistic Present, and Future. A confirmatory factor analysis (CFA) was conducted using maximum likelihood estimation. Model fit indices indicated an acceptable fit to the data: $\chi^2(1474) = 4246.08$, $p < .001$; CFI = .66; TLI = .65; SRMR = .10; RMSEA = .07, 90% CI [.06, .07]. Internal consistency estimates demonstrated acceptable reliability across all subscales: Negative Past ($\alpha = .87$), Positive Past ($\alpha = .75$), Hedonistic Present ($\alpha = .81$), Fatalistic Present ($\alpha = .73$), and Future ($\alpha = .76$).

Cognitive flexibility was assessed using the Cognitive Flexibility Inventory (CFI) (Dennis & Vander Wal, 2010), a 20-item self-report measure designed to evaluate individuals' ability to adapt their thinking and behavior in response to changing situational demands. The CFI includes two subscales (1) *Alternatives*, which reflects the ability to generate multiple explanations and solutions for difficult situations, and (2) *Control*, which assesses perceived control over

challenging circumstances and the ability to maintain an internal locus of control. Items are rated on a 7-point Likert scale, with higher scores indicating greater cognitive flexibility. Confirmatory factor analysis of the Romanian version of the CFI supported the proposed two-factor structure: $\chi^2(151) = 540.25, p < .001$; CFI = .92; TLI = .91; SRMR = .06; RMSEA = .08, 90% CI [.07, .08]. These indices fall within commonly accepted thresholds for adequate model fit (Hu & Bentler, 1999). Internal consistency was excellent for the Alternatives subscale ($\alpha = .94$) and good for the Control subscale ($\alpha = .83$).

Depressive symptoms were assessed using the Depression subscale of the Depression, Anxiety, and Stress Scale (DASS-21) (Lovibond & Lovibond, 1995). This subscale consists of 7 items rated on a 4-point Likert scale ranging from 0 to 3, with higher scores indicating greater severity of depressive symptomatology. The depression subscale measures core features of depression, including persistent sadness, hopelessness, diminished sense of meaning in life, low self-worth, withdrawal from activities, anhedonia, and reduced behavioral activation. Confirmatory factor analysis (CFA) of the DASS-21, indicated a very good model fit: $\chi^2(186) = 330.11, p < .001$; CFI = .99; TLI = .99; RMSEA = .04; SRMR = .04. Internal consistency for depression subscale was high, with a Cronbach's alpha coefficient of $\alpha = .92$, demonstrating a strong reliability.

Data analysis

Data analyses were conducted using Jamovi. Descriptive statistics were first computed to characterize the sample. Frequencies and percentages were calculated for demographic variables (gender, area of residence, education level, and marital status), while means and standard deviations were computed for age. For the study variables, means and standard deviations were calculated to describe central tendency and variability. Pearson correlation analyses were then performed to examine bivariate associations among time perspective dimensions, cognitive flexibility, and depressive symptoms.

Mediation analyses were conducted using the *medmod* module in Jamovi, within a regression-based mediation framework. Separate mediation models were estimated for each time perspective dimension, with depressive symptoms specified as the outcome variable and cognitive flexibility factors (Alternative or Control) entered as the mediators. In this regard, ten separate mediation models were estimated (one for each combination of time perspective dimension and cognitive flexibility component) in order to examine their unique indirect effects on depressive symptoms while avoiding multicollinearity and ensuring clearer interpretation of each mediation pathway. All variables included in the mediation models were standardized prior to analysis. Direct, indirect, and total effects were estimated. The proportion of the total effect explained by the indirect pathway was reported as an indicator of effect size.

3. RESULTS

Pearson correlation analyses were conducted to examine the relationships among cognitive flexibility (Alternative - CFI_A, Control - CFI_C), time perspective dimensions (Negative Past - PNTP, Positive Past - PPTP, Hedonistic Present - PHTP, Fatalistic Present - FPTP, and Future - FTP), and depressive symptoms (DAS_D).

CFI_A was positively correlated with CFI_C ($r = .24, p < .001$), FTP ($r = .35, p < .001$), and PPTP ($r = .21, p < .001$). Negative associations were observed between CFI_A and PNTP ($r = -.25, p < .001$), FPTP ($r = -.32, p < .001$), and depressive symptoms ($r = -.24, p < .001$). The association between CFI_A and HPTP was not significant. CFI_C showed a similar pattern, displaying strong negative correlations with PNTP ($r = -.54, p < .001$), FPTP ($r = -.35, p < .001$), and depressive symptoms ($r = -.43, p < .001$). Positive correlations were found with FTP ($r = .19, p < .001$) and PPTP ($r = .17, p < .001$).

Regarding time perspective dimensions, PNTP was strongly positively correlated with depressive symptoms ($r = .60, p < .001$) and FTP ($r = .51, p < .001$), and negatively correlated with FTP ($r = -.19, p < .001$) and PPTP ($r = -.36, p < .001$). FPTP was also positively associated with depressive symptoms ($r = .45, p < .001$) and negatively associated with FTP ($r = -.49, p < .001$). FTP was negatively related to depressive symptoms ($r = -.28, p < .001$) and positively related to both dimensions of cognitive flexibility. HPTP showed weaker associations overall, being positively related to PNTP ($r = .17, p < .001$) and FPTP ($r = .44, p < .001$), but not significantly associated with depressive symptoms.

Table 2. *Descriptive Statistics and Correlations Between Variables*

	M (SD)	CFI_A	CFI_C	PNTP	PHTP	FTP	PPTP	PFTP	DAS_D
CFI_A	65.3 (13.0)	—							
CFI_C	34.4 (7.58)	0.24***	—						
PNTP	2.88 (0.86)	-0.25***	-0.54***	—					
PHTP	3.29 (0.58)	-0.07	-0.003	0.17***	—				
FTP	3.57 (0.56)	0.35***	0.19***	-0.19***	-0.29***	—			
PPTP	3.48 (0.68)	0.21***	0.17***	-0.36***	0.15**	0.25***	—		
FPTP	2.50 (0.66)	-0.32***	-0.35***	0.51***	0.44***	-0.49***	-0.10*	—	
DASS_D	7.39 (5.88)	-0.24***	-0.43***	0.60***	0.08	-0.28***	-0.36***	0.45***	—

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

CFI_A – CFI Alternative, CFI_C – CFI Control, PN – Past Negative, PH – Present Hedonistic, F – Future, PP – Past Positive, PF – Present Fatalistic, DASS_D – DASS Depression Factor.

The mediating role of cognitive flexibility in the relationship between time perspective and depression

A series of mediation analyses were performed to investigate whether cognitive flexibility functions as an intervening mechanism in the associations between time perspective dimensions and depressive symptoms. Specifically, the two components of cognitive flexibility (Alternatives and Control) were examined as mediators of the relationships between each time perspective dimension and depressive symptom severity (DAS_D). Separate mediation models were estimated for each combination of time perspective dimension and cognitive flexibility component in order to isolate their unique indirect effects. This approach allowed for a more precise examination of the distinct cognitive pathways through which temporal orientations may influence depressive symptoms.

The mediating role of Alternatives dimension of Cognitive Flexibility

Mediation analyses indicated that the Alternatives dimension of cognitive flexibility mediated the associations between several time perspective dimensions and depressive symptoms. Negative Past was negatively associated with CFI_A ($\beta = -0.25, p < 0.001$), which in turn was negatively associated with depressive symptoms ($\beta = -0.10, p = 0.014$). The indirect effect was statistically significant ($\beta = 0.024, p = 0.025$), while the direct association between PNTP and depressive symptoms remained statistically significant ($\beta = 0.58, p < 0.001$).

FTP has a significant indirect association with depressive symptoms through CFI_A. FTP was positively associated with cognitive flexibility ($\beta = 0.35, p < 0.001$), which was negatively associated with depressive symptoms ($\beta = -0.16, p < 0.001$). The indirect effect was significant ($\beta = -0.056, p = 0.002$) and accounted for 20.2% of the total effect, while the direct effect remained significant ($\beta = -0.22, p < 0.001$).

Similarly, PPTP exhibited a significant indirect effect via CFI_A. PPTP was positively related to cognitive flexibility ($\beta = 0.21, p < 0.001$), and cognitive flexibility was negatively related to depressive symptoms ($\beta = -0.17, p < 0.001$). The indirect effect was significant ($\beta = -0.036, p = 0.004$), accounting for 10.2% of the total effect, alongside a robust direct association ($\beta = -0.32, p < 0.001$).

FPTP was negatively associated with CFI_A ($\beta = -0.32, p < 0.001$), which in turn was negatively associated with depressive symptoms ($\beta = -0.11, p = 0.017$). The resulting indirect effect was significant ($\beta = 0.034, p = 0.024$), accounting for 7.5% of the total effect, while the direct effect remained strong ($\beta = 0.41, p < 0.001$).

No evidence for mediation was observed for HPTP. HPTP did not significantly influence CFI_A ($p = 0.155$), and neither the indirect ($\beta = 0.016$, $p = 0.171$) nor the total effect on depressive symptoms reached statistical significance.

The mediating role of Control - Cognitive Flexibility

Regarding the role of the Control dimension of cognitive flexibility, the mediation analyses indicated that it mediated the associations between multiple time perspective dimensions and depressive symptoms. PNTP was strongly and negatively associated with CFI_C ($\beta = -0.54$, $p < 0.001$), which in turn was negatively associated with depressive symptoms ($\beta = -0.15$, $p < 0.001$). The indirect effect was statistically significant ($\beta = 0.082$, $p = 0.001$), accounting for 13.6% of the total effect, while the direct association between PNTP and depressive symptoms remained substantial ($\beta = 0.52$, $p < 0.001$).

A significant indirect association was observed for FTP. FTP was positively associated with CFI_C ($\beta = 0.19$, $p < 0.001$), which was strongly and negatively associated with depressive symptoms ($\beta = -0.39$, $p < 0.001$). The indirect effect was significant ($\beta = -0.074$, $p < 0.001$) and accounted for 26.6% of the total effect, while the direct effect of FTP on depressive symptoms remained significant ($\beta = -0.20$, $p < 0.001$).

Similarly, FPTP demonstrated a significant indirect effect via CFI_C. FPTP was negatively associated with perceived control ($\beta = -0.35$, $p < 0.001$), and CFI_C was negatively associated with depressive symptoms ($\beta = -0.31$, $p < 0.001$). The indirect effect was significant ($\beta = 0.109$, $p < 0.001$), accounting for 24.3% of the total effect, alongside a robust direct association ($\beta = 0.34$, $p < 0.001$).

PPTP showed a significant indirect association with depressive symptoms through CFI_C. PPTP positively influenced perceived control ($\beta = 0.17$, $p < 0.001$), which in turn was negatively associated with depressive symptoms ($\beta = -0.38$, $p < 0.001$). The indirect effect was significant ($\beta = -0.065$, $p < 0.001$), accounting for 18.1% of the total effect, while the direct effect remained strong ($\beta = -0.29$, $p < 0.001$).

No evidence for mediation was observed for HPTP. HPTP did not significantly influence CFI_C ($p = 0.951$), and neither the indirect ($\beta = 0.001$, $p = 0.951$) nor the total effect on depressive symptoms reached statistical significance.

Table 2. *Estimated indirect effects*

TP	Mediator	Estimate	SE	Lower	Upper	Z	p	% Mediation
TPNP	CFI_A	0.024*	0.011	0.003	0.044	2.24	.025	3.9
	CFI_C	0.082**	0.025	0.033	0.131	3.28	.001	13.6
HPTP	CFI_A	0.016	0.012	-0.007	0.038	1.37	.171	—
	CFI_C	0.001	0.021	-0.039	0.042	0.06	.951	—
FTP	CFI_A	-0.06**	0.019	-0.093	-0.020	-3.04	.002	20.2
	CFI_C	-0.074***	0.020	-0.114	-0.035	-3.70	< .001	26.6
PPTP	CFI_A	-0.036**	0.012	-0.061	-0.012	-2.92	.004	10.2
	CFI_C	-0.065***	0.019	-0.102	-0.027	-3.35	< .001	18.1
FPTP	CFI_A	0.034*	0.015	0.005	0.063	2.26	.024	7.52
	CFI_C	0.109***	0.020	0.069	0.149	5.33	< .001	24.3

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

CFI_A – CFI Alternative, CFI_C – CFI Control, PN – Past Negative, PH – Present Hedonistic, F – Future, PP – Past Positive, PF – Present Fatalistic, DASS_D – DASS Depression Factor.

The present study shows that cognitive flexibility plays an important role in linking time perspective to depressive symptoms. Both the Alternatives and Control dimensions mediated the associations between maladaptive time perspectives (PNTP and FPTP) and higher depression, as well as between adaptive perspectives (FTP and PPTP) and lower depression. The Control dimension emerged as a stronger mediator, suggesting that perceived control is particularly important in understanding how temporal orientations influence depressive symptoms. These findings highlight cognitive flexibility as a relevant target for psychological interventions aimed at reducing depression.

4. DISCUSSIONS

This study examined whether cognitive flexibility (CFI - Alternatives and Control) helps explain how time perspective relates to depressive symptoms. The correlation pattern was consistent with prior evidence showing that maladaptive temporal orientations (particularly Negative Past and Fatalistic Present) are positively associated with depression, while more adaptive orientations (especially Future and Positive Past) are negatively associated with depressive symptoms. Similar associations have been reported in both community and clinical samples, including cross-cultural work and comparisons between depressed and non-depressed groups (Kaya Lefèvre et al., 2019).

Across mediation models, both cognitive flexibility dimensions emerged as statistically significant mediators for Negative Past, Fatalistic Present, Future, and Positive Past. Conceptually, these findings align with cognitive-behavioral accounts in which flexible appraisal and perceived controllability support adaptive re-interpretation and problem-solving, reducing vulnerability to depressive symptoms. This interpretation is consistent with the original conceptualization of the CFI, which was designed to capture flexibility relevant to challenging and replacing maladaptive thoughts, and has shown concurrent links with depression measures (Dennis & Vander Wal, 2010). Furthermore, independent research has documented negative associations between cognitive flexibility and depressive symptoms, supporting the plausibility of flexibility as a mechanism in depression-related pathways (Fukuzaki & Takeda, 2022).

A key contribution of the present findings is the comparative pattern across the two CFI dimensions: Control tended to show larger and more consistent indirect effects than Alternatives. This suggests that perceived controllability and an internal locus of control may be particularly important in linking temporal appraisals to depressive symptoms. This pattern is theoretically coherent with the CFI framework, where “control” captures perceived manageability of difficult situations, an element closely tied to helplessness-related processes central to depression (Dennis & Vander Wal, 2010).

Notably, Hedonistic Present did not show significant mediation effects in either model. This null pattern is not necessarily contradictory to prior literature, as findings regarding the present-hedonistic dimension have been mixed across outcomes and populations. For example, prior work has linked present-hedonistic tendencies more strongly to life satisfaction and well-being rather than depressive symptoms *per se*, and other studies report heterogeneity depending on context and sample characteristics (Tseferidi et al., 2017). Taken together, the present findings suggest that not all temporal orientations operate through cognitive flexibility in the same way, and that the

depression-relevant pathways may be most pronounced for negative past-focused and fatalistic present-focused appraisals, as well as future/positive-past protective orientations.

From an applied perspective, the results are consistent with emerging therapeutic approaches targeting temporal biases (e.g., Time Perspective Therapy) and support the idea that interventions may benefit from combining time-perspective work with strategies that increase cognitive flexibility, particularly perceived control (Mirzania et al., 2022). However, given the cross-sectional design, causal interpretations should be made cautiously.

5. CONCLUSIONS

The present study provides evidence that cognitive flexibility is a meaningful pathway linking time perspective to depressive symptoms. Negative Past and Fatalistic Present orientations were associated with higher depressive symptoms, whereas Future and Positive Past orientations were associated with lower depressive symptoms; these associations were partly accounted for by individual differences in cognitive flexibility. Across models, CFI_Control emerged as the more robust mediator, underscoring the potential importance of perceived control in understanding how temporal orientations become emotionally consequential (Lefèvre et al., 2019).

Future directions

Several directions follow from these findings. First, longitudinal and experimental designs are needed to clarify temporal ordering and test whether changes in time perspective predict subsequent changes in cognitive flexibility and depressive symptoms (or vice versa), particularly given evidence that time perspective profiles differ in clinically depressed versus non-depressed groups (Lefèvre et al., 2019).

Second, future studies could examine whether these mediation pathways generalize across clinical samples, age groups, and cultural contexts, extending large-scale cross-cultural work showing that time perspective dimensions can predict depression levels (Micillo et al., 2022).

Third, research should test expanded mechanistic models that include additional processes commonly implicated in depression, such as rumination, cognitive fusion, or emotion regulation, alongside cognitive flexibility. Recent work has already begun to link deviations from balanced time perspective to depression-related constructs (e.g., cognitive fusion), suggesting multi-process pathways may be especially informative (Pyszkowska et al., 2023).

Fourth, intervention research could evaluate whether boosting cognitive flexibility (especially perceived control) amplifies the benefits of time-perspective-focused approaches, consistent with clinical applications of time perspective therapy that report reductions in maladaptive temporal orientations (Mirzania et al., 2022)

Finally, measurement considerations deserve attention. While the ZTPI is widely used and foundational to the field, model fit issues are common in some samples and language adaptations; future work could consider alternative scoring approaches, shorter validated forms, or testing measurement invariance across groups before comparing pathways (Zimbardo & Boyd, 1999).

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The authors have no conflict of interest to declare.

Availability of data and material

Data available on request.

Author contribution

All authors contributed equally.

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A Qualitative Study of Truthful, Deceptive, and Mixed Interactions in a Daily Diary Paradigm

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ABSTRACT. Communication is the cornerstone of socialization. In their daily life, people share their feelings, opinions, or plans. These details can indicate the sender's true intentions or be strategically distorted, depending on the specific conversational goals. Most research on daily communication is quantitative, with few studies examining what is being said across contexts in a qualitative approach. Additionally, research on deception tends to treat truth and lies as two separate, dichotomous yet heterogeneous categories. However, emerging data on embedded deception show that most of the time, people mix truthful and deceptive information in the message, with very rare instances of completely deceptive interactions. The current qualitative study is a partial replication and extension of the seminal DePaulo et al.'s (1996) study, aiming to provide an up-to-date look at individuals' communication patterns in daily life. Using a daily diary method, 30 participants were asked to record details about their social interactions over 2 weeks. We classified 1,307 responses based on their content and referent. Additionally, in contrast with previous research, we organized these reports as truthful, deceptive, or instances in which both truthful and deceptive details were provided. Our thematic analysis revealed that truthful and deceptive interactions contained references to feelings, actions, and explanations. They are most often related to the sender of the message, as well as objects, events, and places. We discuss the findings in relation to the available literature on daily deception.

Keywords: daily communication, truthful information, deception, embedded lies, qualitative study

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*"Human nature is not contained in solitude but taught
even by necessity to live in society and friendship."*

Marcus Tullius Cicero (De Officiis, 1.17)

INTRODUCTION

Despite more than two thousand years having passed since Cicero wrote one of his most influential works, *De Officiis*, the core idea that social life is one of humanity's defining traits remains valid. Humans are social beings and thus choose to forge relationships that benefit both themselves and others (Mühl, 2018). Hence, effective communication represents one of the cornerstones of human evolution. Broadly defined as a dynamic, transactional process in which social actors exchange information through various means (verbal or nonverbal) and media (face-to-face or mediated), communication enables people to share their thoughts, beliefs, and feelings with one another, as well as their worldviews and personal goals (Duck & McMahan, 2017). According to truth-default theory (TDT; Levine, 2014; 2019), while most of these messages are conveyed truthfully, sometimes telling the truth may not be useful for achieving one's communicative goal; thus, lying occurs.

Research focusing on people's veracity in everyday settings indicates a strong tendency towards truthfulness, with an average of 1-2 lies told per day (DePaulo et al., 1996; Halevy et al., 2014), and even some reports of no lies for multiple days (see Curtis et al., 2021). However, this distribution is positively skewed, meaning that not all people engage in deception to a similar frequency (Serota et al., 2010; Serota et al., 2024). While some prefer to "stick to the truth", a small subgroup reports a greater number of lies per day, thus being referred to as "prolific liars". The reasons behind these tendencies are varied, ranging from individual to contextual (Markowitz, 2022; Serota et al., 2022). Moreover, even for the same individual, there are certain "good" and "bad" lying days (Serota et al., 2022).

When defining deception, several aspects are considered. They relate to the intention to deceive, the strategies employed (i.e., concealment, fabrication, or manipulation of information), the content (i.e., factual or emotional), and the means by which this is done (verbal and nonverbal) (Masip et al., 2004). Specifically for everyday deception, the strategies used to deceive and the contents of these utterances are of particular interest. However, while there are extensive quantitative studies on people's self-reported lying frequency and strategies, far less information is available on the qualitative dimensions of these lies. To date, a limited number of studies have examined the actual content of these lies (Arcimowicz et al., 2015;

Cantarero et al., 2018; DePaulo, 2009; DePaulo et al., 1996; Guthrie & Kunkel, 2013; Martinez et al., 2026). One of the most relevant sources is the DePaulo et al. (1996) mixed-method daily diary study. For 7 days, 147 participants (college students, and community members alike) were asked to provide details about their interactions, focusing on the deceptive instances. From a qualitative perspective, the data was assessed by looking at the **content** of these lies (i.e., feelings, achievements and knowledge, actions and plans, explanations and reasons, and facts and possessions), **reason** for lying (self-oriented, other-oriented), **type** of deception strategy (outright lie, exaggeration, subtle lies), and the **referent** of the message (liar, target, other person, object & event). The results across samples showed that, for the most part, people lied about their feelings, actions, plans, and whereabouts. Most of the lies were self-centered and told as outright lies (i.e., complete falsehoods), and referenced mostly the liar and objects or events, followed by references to the target and other people.

Another study (Arcimowicz et al., 2015) derived its qualitative analysis of daily deception communication from a larger, mixed-method study (Cantarero, 2013, as cited in Arcimowicz et al., 2015). The authors provided a nuanced map of **self- and other-motives related to lying, as well as protective and beneficial goals**. Following a round of semi-structured interviews, more insight was provided into *why* people decided to lie, and that the anticipated *consequences* of lying weighed into the decision to deceive. These findings are consistent with TDT, indicating that people keep the goal of their informational exchange in mind and resort to lying only after accounting for the emotional and relational risks. Furthermore, Cantarero et al. (2018) derived six lie types depending on the lie beneficiary and the motivation to lie. Namely, lies could be self, other, or Pareto-beneficial, while motivations were mainly protective and beneficial. Similar findings that lying is context-dependent are presented in a study examining deception in romantic relationships (Guthrie & Kunkel, 2013). The findings showed that people engaged in deception for relational reasons (to maintain a relationship, negotiate tensions, establish relational control), to manage “face” (to protect themselves or their partner), and to maintain prior lies.

More recently, Martinez et al. (2026) asked a sample of college students to report the content of the lies told over the last 24-hour period. Their findings showed that, while participants were overwhelmingly truthful, they actually told an average of 1.5 lies per day. The content of their lies varied depending on whom they interacted with. For instance, when talking to their parents or teachers, the deceptive information related to time management or school performance, while with friends and peers, lies tended to be more prosocial in nature or to be aimed at maintaining social boundaries. This research also provides insight into the strategies used to lie. Generally, participants resorted to falsifications (outright lies) more often than to using half-truths or exaggerations (embedded lies).

These findings double the findings from quantitative deception research, which show that throughout development, people tend to lie for self-oriented reasons (Visu-Petra et al., 2022; DePaulo et al., 1996; Cantarero et al., 2018). However, altruistic motives are an important factor in lying, alongside the need to save face (McArthur et al., 2022). Additionally, some of these qualitative studies (Arcimowicz et al., 2015; Cantarero et al., 2018) also provided much-needed insight into daily deception in a non-WEIRD population by following the communication patterns of Polish participants. While several quantitative studies successfully replicated the core assumptions of TDT (Daiku et al., 2021; Serota et al., 2024; Zvi et al., 2025), little is known about the potential qualitative differences of daily deceptive messages.

Last but not least, while these studies provide valuable insights into deceptive communication patterns, it is important to note that, as communication research indicates, bald-faced truths and bald-faced lies rarely occur in real-life situations (McCornack, 1992; Morrison & McCornack, 2025). When being asked about their lying strategies, participants in deception studies reportedly use embedded lies (for an overview, see Cacuci & Visu-Petra, 2026). However, there is limited evidence on how these interactions, which include both truths and lies, appear from a qualitative standpoint.

Thus, the current work aimed to replicate and build upon the research of DePaulo et al. (1996) by using the daily diary method administered for two weeks in a Romanian sample. We investigated (a) the content of the information being provided and (b) the referent of the message in truthful, deceptive, and mixed interactions. This ample investigation extends the existing research by 1) addressing truthful, deceptive, and mixed interactions, compared to the focus solely on deceptive interactions (Arcimowicz et al., 2015; Cantarero et al., 2018; Guthrie & Kunkel, 2013) as well as 2) prolonging the duration from a minimum of eight to a maximum of 14 days, compared to previous diary studies which involved a maximum of seven days (Arcimowicz et al., 2015; DePaulo et al., 1996).

METHOD

The current study is part of a larger research project on truthful and deceptive communication in daily settings, approved by the Ethics Committee of Babeş-Bolyai University (No. 12.299/04.08.2025). The entire process, from participant recruitment to completing the daily diary, took place exclusively online.

2.1. Participants

Initially, 40 participants enrolled in the larger study requesting them to fill in the daily diary for two weeks. Out of this larger sample, only 30 participants (27 females, 90%) were included in this qualitative study because they fulfilled the minimal completion criterion (at least half of them, seven days). Participants were aged 19-45 ($Mdn_{age} = 23$, $SD = 6.91$). All participants were Romanian nationals and reported using Romanian as their first language. Regarding their educational level, all participants reported having at least a high school degree, with most of them (83.3%) holding a bachelor's degree or higher.

2.2. Data Collection and Procedure

Participants were recruited using online ads posted on multiple social platforms or via word of mouth. The study was designed as a mixed-methods partial replication and extension of DePaulo et al. (1996). Similar to the original study, participants were provided with an initial meeting with the research team. A detailed, accessible presentation of the procedure and a description of key concepts, such as social interactions and truthful and deceptive information, were provided, along with adequate examples for each. All details were also sent via email and were available as hyperlinks embedded in the online diary form throughout the study. We also assured participants that all recorded data was anonymous and used solely for the study. Similar to Arcimowicz et al. (2015), one of the goals of this initial meeting was to debunk common misconceptions about lying, especially in everyday interactions, since this topic is generally frowned upon in Eastern European cultures.

Afterward, the participants were instructed to use the link sent to their email and complete the daily form for 14 days. The diary was uploaded on the online survey framework *Formr* (Arslan et al., 2020; Arslan & Tata, 2026; www.formr.org). The structure of the daily diary was adapted from the *Social Interaction and Deception Form* (SIDE; DePaulo et al., 1996) and included both quantitative and qualitative measures (see Appendix 1 for the diary workflow). One important change from the original study was that, for each reported interaction, we asked participants whether they included truthful and deceptive information. If so, we asked them to provide a brief description. As such, we collected data for 3 instances: completely truthful, completely deceptive, and those that included both truthful and deceptive details.

2.2.1. Qualitative and Quantitative Daily Diary

The detailed protocol is available in Appendix 1 and was developed by the authors following the self-report *Social Interaction and Deception Form* of DePaulo et al. (1996). It assessed participants' daily interactions as well as the specific truthful, deceptive, or mixed information they provided. Initially, participants were asked about the total number of interactions they had throughout the day. Depending on their answer, they had to complete the corresponding number of questions for each interaction. The quantitative information (not analyzed here) pertained to the mode of interaction (1- *face-to-face*, 2- *online*, 3 - *via email*, 4 - *on the phone*, 5 - *or via SMS*), the duration of the interaction (from 1 - *less than 5 minutes* to 4 - *more than 30 minutes*), the number of people involved, and their gender. Then participants had to select the type of relationship they had with this person (1 - *a close person*, 2 - *a member of the extended family*, 3 - *a close acquaintance*, 4 - *a distant acquaintance*), how relevant the interaction was (1- *superficial*, 9 - *extremely relevant*), how much time they spent thinking about what to say (1 - *not at all*, 2 - *minutes*, 3 - *hours*, 4 - *days*, 5 - *weeks*), and to rate the quality of the interaction (1 - *unpleasant*, 9 - *very pleasant*).

Then, they would be asked whether, during this interaction, they provided one truthful piece of information or more (*yes/no*). If participants responded "yes," they were asked to describe at least one instance. They were later asked two questions about the extent to which they perceived the information to be beneficial (1 - *not at all*, 9 - *very much*) for themselves and their partner, respectively. Furthermore, participants had to respond to a similar question about whether they included at least one piece of deceptive information in that specific interaction. If so, besides having to describe it, participants reported how planned the interaction was (1- *not at all*, 9 - *completely*), to what extent they considered to be believed by others (1 - *not at all*, 9 – *completely*), and how serious they think the consequences would be if their lie were discovered (1- *not at all*, 9 - *very serious*).

2.2.2. Qualitative Instructions – Truthful Information

Participants were asked whether they included one piece of truthful information and, if so, to describe it. *For this interaction, please think about one TRUTHFUL piece of information you have provided throughout the discussion. Remember: A truthful piece of information can be anything you've said and genuinely considered to be true. It can refer to feelings, thoughts, impressions, behaviors – yours or someone else's. Example: you told your mother her new haircut is great, and you genuinely thought so; you told your teacher you were feeling fine today (and it was true); etc.)*

Please try to remember as many details as you can. Even if you are not sure whether that information is genuine, we encourage you to write it anyway. However, there is no need to provide specific names; you can only use initials.

2.2.3. Qualitative Instructions – Deceptive Information

As with the truthful information, participants were asked to consider whether the interaction they had included one piece of deceitful information or more. *For this interaction, please think about one DECEPTIVE piece of information you have provided throughout the discussion. (Remember: deceptive information is something you don't personally consider to be true, but you've deliberately said to mislead someone else. It can be something as little as **a white lie** – you told someone you're fine, even though you're not feeling quite well – or **something more serious** – you told your teacher you didn't just Google that one answer on the test. It can be something you've said **to spare yourself** some trouble, or something you said **to protect another person** (perhaps to not hurt their feelings) – mom gets an awful haircut, but you tell her it's great. It can also be **something that's completely made-up**, or **something true to some extent**, but not entirely (you've told your mom you've eaten, but you didn't tell her it was instant soup and fast food... for the last 4 days).*

Please try to remember as many details as you can. Even if you're not sure if that information was deceptive, we encourage you to write it anyway. However, there is no need to provide specific names, you can only use initials.

2.3. Data analysis

We used *thematic analysis* (Braun & Clarke, 2006) to assess participants' qualitative reports. An initial assessment was conducted by the first author to identify meaningful patterns and to assess the suitability of using DePaulo et al.'s (1996) coding system. Of the 4 initial categories (content, reason, type, and referent), our qualitative data was deemed suitable for only 2: content and referent. Regarding the type of lies coded in the original study referred to, in the case of outright, subtle lies, or exaggerations, we believed this would be a large inferential leap departing from our data. Additionally, it wouldn't have been applicable to the truthful accounts. Therefore, we only mention the distinction between truths and lies (exclusive or embedded within otherwise truthful accounts), which was directly confirmed by the participants (see Table 1 for a presentation of the criteria). Secondly, our participants already indicated on numerical scales the extent to which their lies benefited themselves or others—an aspect which, by the way, would have been difficult to accurately assess from

the qualitative data, given the format of the participants' descriptions. Since here we focus on the qualitative information only, we excluded this dimension, which we are planning to address in a related paper reporting analyses of the quantitative information collected in this study. Some information was coded into multiple subcategories for both content and referent. This approach is different from DePaulo et al's (1996) study, where each lie was coded into a single category for content, but deemed suitable for more referent subtopics.

Based on these decisions, an updated list of criteria was created, following the definitions provided by DePaulo et al. (1996), and included examples from our collected data (see Table 1). To validate this system, a preliminary ICC analysis was conducted on 330 interactions (25% of the total sample), which was double coded by both the first author and a trained research assistant (see Table 2). For the remaining data, the first author coded 799 interactions, while the research assistant coded a subset of 176 interactions.

Table 1. *Categories and Definitions of Interaction Adapted from DePaulo et al. (1996, p. 983)*

Category	Subcategory	Definition
<i>I. Content</i>	Feelings, Opinions	Information related to affects, emotions, opinions, or assessments about other people, events, or objects.
	Achievements	Information about one's achievements,
	Knowledge	accomplishments, failures, shortcomings, knowledge, or lack of knowledge
	Actions, plans, whereabouts	Information about past, present, or future actions and behaviors, about past or prospective locations.
	Explanations, reasons	Reasons or explanations for one's behavior
	Factual information	Information about facts related to people, events, objects, or possessions
<i>II. Referent</i>	Sender/Liar	Information that refers to something about the person providing the information
	Target	Information referring to the conversation partner(s)
	Other person	Information referring to other people, not directly involved in the conversation
	Object/event	Refers to objects, events, or places.

Table 2. *Interrater Agreement for All Categories (Cohen’s κ)*

Category	Cohen's κ	SE	95% CI	
			Lower	Upper
<i>I. Content</i>				
Feelings	.88	.03	.83	.93
Achievements/ Knowledge	.86	.03	.80	.92
Actions, plans, whereabouts	.79	.04	.72	.86
Explanations, reasons	.85	.04	.76	.93
Facts, possessions	.70	.06	.59	.81
<i>II. Referent</i>				
Sender	.80	.04	.73	.87
Target	.76	.04	.69	.83
Other persons	.79	.06	.67	.91
Object, event	.80	.06	.70	.91

RESULTS

Participants reported their interactions for at least eight days ($M = 12.77$, $SD = 1.79$). Some participants reported more than one piece of information within a single interaction; we analyzed them as separate units. In total, 1305 units of information were presented, out of which 867 were reportedly entirely truthful, 32 entirely deceptive, and 406 were part of mixed information exchanges (215 reported as truths by the participants, and 191 reported as lies). While we assessed all answers, participants included different degrees of detail.

3.1. Truthful information

We included in this category all truthful details, whether reported as a standalone, completely truthful interaction or co-occurring with deceptive information. The thematic analysis revealed that all participants ($N = 30$) included details about all topics to varying degrees (See Table 3 for a presentation). However, not all participants provided justifications in their accounts, nor did they all address achievements or other people who were not directly involved in these interactions.

Table 3. *Frequencies and Percentages for Truthful Information Provided by Participants*

Category	N (30) %	Example of participants' responses
<i>I. Content</i>		
Feelings/	30	"I missed you."
Opinions	100%	"I don't agree with what they decided to do."
Achievements/	25	"I got a good grade on my exam."
Knowledge	83%	"I congratulated her for her achievement, thinking it wasn't easy to achieve that"
Actions, plans,	30	"I also said I'd like it very much to go out and talk some more."
whereabouts	100%	"My love, I'm so excited we're going to cook together tonight."
Explanations,	22	"I'm really happy that I can help someone so close to me."
reasons	73%	"They invited me over, but I politely declined, saying that I have some homework to do and I cannot postpone it."
Factual information	27	"I told my boss I don't like my colleague's poster."
	90%	"Information about the project deadline and details about the oral presentation."
<i>II. Referent</i>		
Sender	30	"I expressed certain needs that I had."
	100%	"I liked the food."
Target	30	"I told my partner I don't like to go to sleep mad at each other."
	100%	
Other persons	24	"I told the parents of eighth graders that their children made progress and they're going to get good grades on the National Exam."
	80%	
Object, event	29	"I told her that her cats are very similar to mine."
	97%	

3.2. Completely deceptive interactions

The second group of interactions we addressed involved instances in which participants reported providing only deceptive information. While all categories were covered, only a subgroup of participants reported this type of interactions ($n = 14$), which included varying degrees of subtopics (see Table 4). In terms of **content**, participants most often provided explanations or justifications, and also lied about their feelings, actions, and plans. As expected, all participants reported instances in which they were the referent, with objects and plans being the second-most frequently addressed topics.

Table 4. *Frequencies and Percentages for Deceptive Information Provided by Participants for the Interactions Where Only Lies Were Reported*

Category	n(14) %	Example of participants' responses
<i>I. Content</i>		
Feelings/ Opinions	7 50%	<i>I congratulated a presentation despite not actually liking it". I said I feel well enough to help my friends, but I was actually really tired."</i>
Achievements/Knowledge	3 21%	<i>I didn't forget that I should be seeing C. this weekend." I said I lost my job for other reasons than the actual ones,"</i>
Actions, plans, whereabouts	7 50%	<i>I'm busy, we cannot meet." Of course I want to go on holiday with your friends."</i>
Explanations, reasons	9 64%	<i>I said I have fed the baby, but that's just because I already knew that's how the conversation was going to end." I don't have enough money. I can't help you."</i>
Factual information	4 29%	<i>I lied and said I lost my job because of some other reasons." I said I liked the things I tried in the store, but actually I didn't plan on buying any of them."</i>
<i>II. Referent</i>		
Liar	14 100%	<i>"My teacher organizes a mini-trip to [redacted], and I told her that I'm not going to go with them, but get there separately. I don't intend to go". "I'm busy, I can't go out."</i>
Target	5 36%	<i>"I told my uncle's girlfriend that I am really interested in her recipes and even agreed that she lost some weight". "You look so much better without glasses."</i>
Other persons	3 21%	<i>"I don't mind your colleague crashing at our place tonight". "No, I totally did not forget that I should have met with C. during the weekend."</i>
Object, event	10 71%	<i>I told my dad that I don't mind running some errands for his boss, despite the fact that I found it unpleasant that he told me to do it, without asking for my opinion or about my schedule."</i>

3.3. Embedded lies

More than half of the participants ($n = 24$) reported including lies in their interactions than in situations where the entire interaction was deceitful. The embedded pieces of deceitful information were most often about feelings or opinions, and, like completely deceptive information, were also related to actions and provided justifications. All participants detailed instances where they were the main referent, followed by the interactions where objects or events were discussed (see Table 5).

Table 5. *Frequencies and Percentages for the Embedded Deceptive Information Provided by Participants*

<i>Category</i>	<i>n (24) %</i>	<i>Example of participants' responses</i>
<i>I. Content</i>		
Feeling/ Opinions	22 92%	"I told them I don't mind them talking to another girl, that we didn't say we're exclusive, but I see it as a lack of respect and another treason". "I told them I'm going to be upset if he keeps eating fast food."
Achievements/ Knowledge	9 38%	"I told them, of course, the product has the maps and languages they asked about, but I wasn't actually too sure about that". "I am really interested in learning about their funeral practices."
Actions, plans, whereabouts	17 71%	"I told my mom I'm going to get home early". "I told my partner that I don't plan on playing video games tonight because I am too tired. Actually, I was a bit upset with her because she can get really competitive."
Explanations, reasons	19 79%	"I declined going out with my friend, saying I have a lot of work to do. I had work, but actually I didn't feel like socializing in the remaining time". "The children really want to go to the seaside. I couldn't tell them that we actually won't be able to make it, so I explained to them that it's not settled yet, and if we go, I will sort things out."
Factual information	10 42%	"I told my child we don't have any cake in the fridge." "My neighbor asked me what my cat's name is. Her name is [Redacted], but I told him another name, because I didn't want him to think the name is silly."
<i>II. Referent</i>		
Liar	24 100%	"I said I'm not feeling too well." "I told them I'm not sure whether I'll stay in the city overnight or go home, but I actually decided what to do since morning."
Target	16 67%	"I told my conversation partner they started looking better since they've been training more often, but it wasn't true." "Yes, honey, you cooked a great meal, I loved it."
Other persons	7 29%	"I have no idea what X is doing." "I told them their baby is really cute."
Object, event	19 79%	"My friend showed me a meme he made about a specific situation that happened to him. I didn't find it funny [...], but I said it made me laugh and I liked it." "I said I haven't forgotten my health card, but I actually didn't know I'd need it."

DISCUSSION

The current study employed a qualitative approach to assess people's content in daily interactions. Overall, truthful interactions were more varied in topic, and more participants reportedly engaged with different themes when truthful. They discussed their feelings, actions and plans, and provided factual details. While all participants reported instances in which they talked about themselves, they also included details about targets, objects and events, or other people. For the deceptive reports, however, not all participants addressed all mapped topics. These differences were also visible when participants reported providing only deceptive information or a mix of truths and lies. While for embedded lies, talking about feelings was a recurrent topic, complete fabrications were reportedly more often linked to explanations or justifications. In the subsections below, we will discuss each of these findings and their relevance to daily deception research.

4.1. Content

For the most part, *feelings and opinions* were mentioned regardless of the veracity of the information provided. While being truthful about one's feelings and opinions is generally common, manipulating this information can be motivated by different reasons. Our thematic analysis of this matter revealed that participants tried to hide their true feelings, particularly through embedded lies. 92% of participants reported details of interactions in which they hid what they felt or thought, compared with 50% who reported telling complete lies about such information. On the one hand, people lie about their emotions and thoughts to protect others from being hurt. For instance, children can choose to lie to a stranger and say they enjoyed a disappointing gift if they understood the truth would upset them (Williams et al., 2013). Similarly, one participant from our study reported that *"I received a present I disliked, but I pretended to be surprised and very excited about it, because I didn't want the person who gifted it to be disappointed."* On the other hand, people can intentionally misreport their feelings and beliefs about certain individuals or situations to avoid losing face. In some situations, especially those related to professional life, speaking one's true mind is deemed less desirable, and thus, "adjusting" the truth becomes an acceptable option (Weiss & Feldman, 2006). For instance, one participant reported lying about enjoying a presentation (*I said I enjoyed a presentation despite that not being true.*), and another said they actually agreed with their conversation partner to avoid upsetting them (*I said I agreed with what they said, only to avoid a conflict.*). However, the often-overlooked topic of self-deception indicates that

people can tell self-oriented lies to maintain their own well-being and to conform to external social desirability pressures (Moldoveanu & Visu-Petra, 2025).

Similarly, while sometimes talking about **achievements and knowledge (or lack thereof)** reflects a sincere sense of pride and accomplishment (*I got a good grade in my exam, P22*), it can also be associated with deception, boasting, or exaggeration of one's abilities. This topic was not mentioned by all participants (83%) in their truthful encounters, and even less so in embedded (38%) and completely deceptive (21%) reports. For instance, one person reported an embedded lie where they overstated how much they worked on a given task (*I exaggerated the effort I put into finishing the allocated task.*). Talking about one's achievements is also a culturally driven topic, with research indicating that people take cultural norms into account when deciding whether to be truthful or lie about their achievements (Ma et al., 2026).

Moving to the topic of **plans and actions**, it was not addressed by all participants (50%) when providing complete lies, but more (71%) included it when reporting embedded lies. Participants reported instances where they mentioned having other plans than their real ones (*I said I would go to the pharmacy today, even though I had planned to go tomorrow. / No, I'm not upset we have to go somewhere this Saturday, even though I had work to do.*). These instances also overlapped with reportedly minimizing one's displeasure regarding certain situations (*No, I am not upset you forgot about our coffee date and postponed it.*) or to avoid potential confrontations with their conversation partner (*I told my mom I will come home early.*) or losing face (*I told my colleague I couldn't do much college work during my first year because of my nightshift. That wasn't actually true, but I didn't want them to think I was lazy [...]*).

However, while not all participants (73%) reported providing **explanations and reasons** even in their truthful recalls, this topic was reported by more than half of participants in instances where they were either completely deceptive (64%) or mixed truths and lies (79%). These instances overlap with planning, since more reports included justifications to explain why they cannot fulfill specific commitments (*I am busy, we cannot meet. P30/ I told her I cannot go shopping with her tomorrow because I have to finish my project, but actually I wasn't in the mood for that. P08*). A related finding comes from quantitative deception research, which indicates that when people use embedded lies, they tend to craft them around directly or vicariously experienced events and actions (Leins et al., 2013; Loconte & Kleinberg, 2025; Gnisci et al., 2010; Verigin et al., 2019). Thus, we could infer that people tend to report their lies around arguments that seem plausible.

Similar to the previous topic, *facts about people, events, or possessions* were not included by all participants (90%), not even in their truthful accounts. Less than half of the people involved in the current study told lies about facts such as complete fabrications or mixed with truths. These reports were sometimes phrased as compliments (*You look so much better without glasses. / My friend got herself a set of clip-on nails, and she seemed very excited about them. I told her I like the idea and cannot wait to see them, but I don't think they will look too good when they are glued on or the way she expects them to.*). Others related to situations where people wanted to save face (*I told them I forgot my health card, but I actually didn't know I needed it. / I told them I lost my job for other reasons.*).

4.2. Referent

The second broad topic we sought to identify in participants' daily reports pertained to the referent of the information. It could refer to the sender (a liar for deceptive information), the target, or another person not present in the conversation. A fourth subcategory related to references of objects, events, or places. As somewhat expected, all participants reported mentioning themselves in both truthful and deceptive interactions. They talked about themselves and how they dealt with different situations (*I felt bad telling them I couldn't finish the task, as promised, so I lied, saying I have problems with my laptop*) or what they liked or disliked (*I told my hairstylist I like that color*). Very few participants (36%) mentioned the target in their completely fabricated statements, but more (67%) were likely to do so in embedded lies. A similar situation was reported in instances where other people not present in the conversation were mentioned. Instead, more than 70% of the participants included references to objects, activities, or events in their deceptive daily interactions. These findings go in line with the idea that people generally report information relevant (and in relation to) themselves. Research on people's motivation to deceive found that younger people tend to lie for self-oriented reasons more often (Evans et al., 2025). This relates to the need for privacy or to fear of being judged by others, thus leading to an altered version of one's true feelings, opinions, likes and dislikes, and even plans or behaviors.

4.3. Limitations

Our research is not without limitations. Despite providing a generous number of individual reports, participants tended to be rather brief in their descriptions. This scarcity of detail could be due to the large number of daily

interactions they had to report, making them less likely to provide detailed accounts. Additionally, we cannot rule out the possibility that participants reported only partial information, even when discussing complete fabrications. While situations where people tell “bald-faced lies” can occur, most often, people mix truthful and deceptive details. One study found that, on average, people report a 3:1 truth-to-lie ratio (Loconte & Kleinberg, 2025). Thus, to maximize the quality of the collected data and to ensure participants won’t skip reporting, future research could limit itself to either qualitative questions or to asking participants to report only a few interactions.

Last but not least, a limitation of the current work is that, as with qualitative assessments, the coder’s subjective perspective can come into play. It is possible that, if we asked participants in an ulterior interview about their motives to lie, similar to Arcimowicz et al. (2015), some categories could be shifted or further detailed. Nevertheless, our findings provide preliminary qualitative data on what people discuss in their truthful, deceptive, and mixed interactions.

4.4. Conclusion

Circling back to Cicero’s quote, while people are not mandated to interact with others, they do so to share their feelings and experiences, keeping in mind both their personal communication goals and their partner’s. This research attempts to provide a preliminary perspective on the nuances of daily communication, which often reduces human experience to numbers. In line with Arcimowicz et al.’s (2015) sensible remark, qualitative research restores the individual agency and transforms the passive stance of participants into a lively and rounded human experience.

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Data availability

The data that support the findings of this study are not publicly available due to participant confidentiality but are available from the corresponding author on reasonable request.

Conflict of interest statement:

The authors declare no conflict of interest.

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Appendix 1. Daily Diary Form

Page 1

In order to access the diary, please generate your **PERSONAL CODE**.

Page 2

Please select how many interactions you have had throughout the day (up to this hour). (A *social interaction* represents any exchange of information between two or more people, lasting at least 5 minutes, and in which one person's behavior is a response to the behavior of the other person(s)).

Important! You can also include interactions that lasted less than 5 minutes and in which you transmitted one (or more) piece(s) of truthful and/or deceptive information. Social interactions can be face-to-face, by phone, via messages (SMS), or online (e-mail, WhatsApp, or through social networks like Facebook, Instagram, Snapchat).

In the case of emails and SMS/chat messages, you can consider the time spent writing that text.

For example: when talking to your mom on the phone; when texting your best friend; when meeting a friend for coffee; when sending an email to a professor or faculty staff member; when chatting with someone new at a party; when exchanging a few replies with an old friend on a Facebook post; when talking to the cashier at the checkout.)

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10

(Based on the number of interactions to be selected, an adequate number of interaction forms will be generated)

Page 3

For the following questions, please think about the ***[Interaction number]*** interaction you have had and try to remember as many details as you can, then select the answer you consider fitting the situation.

The interaction took place:

- ☐ Face-to-face
- ☐ Online (on an online platform, etc.)
- ☐ Via e-mail
- ☐ On the phone
- ☐ SMS/MMS

(if they selected "online", then the following question appeared)

The online interaction took place:

- ☐ On a platform allowing video streaming (ZOOM, Microsoft Teams, Google Meet, Discord, etc.)
- ☐ On an instant chat
- ☐ On a social media platform (Facebook, Instagram, Snapchat, TikTok, etc.)
- ☐ On a forum (reddit, 9gag, etc.)

The interaction lasted:

- ☐ Up to 5 minutes
- ☐ 5 – 15 minutes
- ☐ 16 – 30 minutes
- ☐ more than 30 minutes

In the interaction, there were involved:

- ☐ One person
- ☐ Two people
- ☐ More than two people

(if they selected "one person", then the first question below appeared; if they selected "two people" or "more than two people", then the second question below appeared instead)

The gender of the other person was:

- ☐ Feminine
- ☐ Masculine
- ☐ Other

If there were more than two people, they were:

- ☐ Only women
- ☐ Only men
- ☐ Both
- ☐ Other / I don't know

The person you have interacted with is:

- ☐ A close person (mother/father, sister/brother, wife/husband, life partner, a very close friend)
- ☐ A member of the extended family (grandmother/grandfather, aunt, uncle, niece, cousin, etc.)
- ☐ A close acquaintance (a former life partner, a work/university colleague, “someone I get along with”, flat mate/dorm room mate, etc.)
- ☐ A distant acquaintance (someone I know, landlord, neighbor, a stranger, etc.)

(if there were more partners involved, then the following question would appear instead)

The people you have interacted with are:

- ☐ Close persons (parents, siblings, wife/husband, very close friends)
- ☐ Members of the extended family (grandparents, aunts, uncles, nieces, cousins, etc.)
- ☐ Close acquaintances (former life partners, work/university colleagues, “people I get along with”, flat mates/dorm roommates, etc.)
- ☐ Distant acquaintances (people I know, landlords, neighbors, strangers, etc.)

How much time did you spend thinking about what to say?

- ☐ No time at all
- ☐ Minutes
- ☐ Hours
- ☐ Days
- ☐ Weeks

How relevant was the interaction for you:

1 - Superficial ... 9 - Extremely relevant

How would you describe the quality of the interaction?

1 - Very unpleasant ... 9 - Very pleasant

Page 4

During interaction number ***[Interaction number]***, did you provide one piece of TRUTHFUL information?

- ☐ Yes
- ☐ No

(If the answer was “yes”, the following question appeared. Otherwise, the participant jumped to the Deceptive section)

For the interaction number ***[Interaction number]***, please think about one TRUTHFUL piece of information you have provided throughout the discussion.

Remember: A truthful piece of information can be anything you've said and genuinely considered to be true. It can refer to feelings, thoughts, impressions, behaviors – yours or someone else's.

Example: you told your mother her new haircut is great, and you genuinely thought so; you told your teacher you were feeling fine today (and it was true); etc.)

Please try to remember as many details as you can. Even if you are not sure whether that information is genuine, we encourage you to write it anyway. However, there is no need to provide specific names, you can only use initials.

How much do you think you benefited from the truthful information you've provided?

1 - Not at all ... 9 - Very much

How much do you think the other person/people benefited from the truthful information you've provided?

1 - Not at all ... 9 - Very much

Page 5

During interaction number ***[Interaction number]*** did you provide one piece of DECEPTIVE information?

- ☐ Yes
- ☐ No

For the interaction number ***[Interaction number]***, please think about one DECEPTIVE piece of information you have provided throughout the discussion.

(Remember: deceptive information is something you don't personally consider to be true, but you've deliberately said to mislead someone else.

*It can be something as little as **a white lie** – you told someone you're fine, even though you're not feeling quite well – or **something more serious** – you told your teacher you didn't just Google that one answer on the test. It can be something you've said **to spare yourself** some trouble, or something you said **to protect another person** (perhaps to not hurt their feelings) – mom gets an awful haircut, but you tell her it's great. It can also be **something that's completely made-up**, or **something true to some extent**, but not entirely (you've told your mom you've eaten, but you didn't tell her it was instant soup and fast food... for the last 4 days).*

Please try to remember as many details as you can. Even if you're not sure if that information was deceptive, we encourage you to write it anyway. However, there is no need to provide specific names, you can only use initials.

How much do you think you benefited from the deceptive information you have provided?

1 - Not at all ... 9 - Very much

How much do you think the other person/people benefited from the deceptive information you have provided?

1 - Not at all ... 9 - Very much

How planned was the deceptive information you have provided?

1 - Not at all ... 9 - Completely

To what extent do you think your partner/s believed you?

1 - Not at all ... 9 - Completely

How serious do you think the consequences of your deceptive information would be if you were discovered?

1 - Not serious at all ... 9 – Very serious

the sequence [pages 3 to 5 from the form] repeats for as many interactions as needed

*At the end *I'm done for today* (submit button)*

Attachment Insecurity and Psychological Flexibility in Emergent Adulthood: The Mediating Role of Self-Compassion

Ionela-Vasilica-Andreea OLARU¹, Carmen COSTEA-BĂRLUȚIU^{2*} 

ABSTRACT. Attachment is a crucial component of development throughout life and attachment security is a resilience factor, contributing to adjustment to life challenges, as well as educational context. The current research aims to approach attachment dimensions, in relation to psychological flexibility and inflexibility and self-compassion, investigating a mediation model of self-compassion in the relationship between attachment avoidance and anxiety dimensions and psychological flexibility. The research also aims to collect data on the complex relationships between the three aforementioned constructs and their components, global self-compassion and its components, anxious and avoidant attachment. The research included 50 participants, a population of college students, who agreed to complete measures of anxiety and avoidance in attachment relationships, self-compassion, and psychological flexibility and inflexibility. Our results indicate significant correlations between attachment anxiety, self-compassion, and psychological flexibility and inflexibility. Two total mediation effects were found in the association between the attachment anxiety dimension and self as context and the attachment anxiety dimension and fusion, relationships mediated by self-compassion. Our results will be discussed in the light of the needs of emergent adults, in terms of both mental health and guidance towards healthy development in emergent adulthood.

Keywords: attachment anxiety, attachment avoidance, psychological flexibility, experiential avoidance, self-compassion

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1. INTRODUCTION

1.1. Attachment dimensions

Pioneers of attachment theory, John Bowlby and Mary Ainsworth revolutionized the view of the mother-child relationship, outlining both its essential role in survival and well-being in the first three years of life and the active maintenance of attachment throughout life, as manifested in thoughts, emotions and behaviors (Mikulincer, Gillath, & Shaver, 2002). The attachment involves reliance on the availability and responsiveness of the attachment figure who functions as a secure base for exploring the world (both physical environment and relationships with others, reflecting on one's own internal experiences), as well as a safe haven for times of distress, where the person can seek support, protection, and can be comforted (Bowlby, 1982).

In situations of distress, seeking the proximity of the 'more mature, stronger and wiser' person is the option chosen by most young children, depending on how they have been looked after by attachment figures in their family environment (Bakermans-Kranenburg & van IJzendoorn, 2016). Interpersonal experiences and the quality of care determine the formation of positive or negative internal working models. Consistent and constant care can lead to the development of a secure attachment so that in times of danger and distress the child seeks out the attachment figure both to receive comfort and reassurance and to learn to control negative emotions (Ainsworth, Blehar, Waters, & Wall, 1978). Such care generates positive representations, meaning that the self is considered as deserving love, protection, and support, while others are viewed as capable, effective, and available to provide love, protection, and support (Bowlby, 1973). Alternatively, children who have received low and inconsistent care usually develop an insecure attachment that is characterized by negative representations of self and others. When they feel in danger or distress, these children are either difficult for caregivers to reassure or they attempt to reassure themselves independently of their caregivers (Ainsworth et al., 1978).

Attachment style, as Ainsworth et al. (1978) emphasized, is partly based on the interaction with people in the child's early life, particularly how parents responded to the child's distress, but Bowlby fostered the idea that the nature of relationships with later attachment figures during lifetime can influence the security felt by individuals and ultimately the reconsideration of the dimensions of anxious and avoidant attachment. Following the application of the Stranger Situation, Ainsworth et al. identified four attachment styles: secure, anxious-resistant/ambivalent, avoidant, and Main & Solomon (1986) added the disorganized style. With time, the behavioral strategies within the attachment system and internal working models become more sophisticated and complex, similar to those found in adults (Simpson & Karantzas, 2018).

Bartholomew and Horowitz (1991) developed a model of adult attachment, by describing four combinations: abstract self-image seen in dichotomous, positive or negative terms (self as worthy or not of love and support), and abstract image of others seen in dichotomous, positive or negative terms (others as trustworthy and helpful, or untrustworthy and avoidant). The four adult attachment styles of this model are: secure, preoccupied, fearful, and avoidant.

1.2. Self-compassion

Neff (2003) outlines a definition of self-compassion, as a special manner of relating to oneself that implies approaching difficulties (personal limitations, mistakes, failures, facing difficult life situations with an external locus of control) in the way that the person would respond to a friend, through kindness, understanding, and support. Operationalizing the concept of self-compassion, Neff (2003) outlines three core elements that combine and interact to create a mindset: 1) a sense of shared humanity versus personal isolation, 2) mindfulness versus over-identification with painful emotions and cognitions, and 3) self-oriented kindness versus self-critical attitude.

According to research in the field, high levels of self-compassion are significantly correlated with low levels of anxiety, depression, and negative affect (Muris, Bongers, Schenning, Meesters, & Otgaar, 2022, Cowand, Amarsaikhan, Ricks, et al., 2024). A range of benefits, such as increased quality of social connectedness, higher levels of emotional intelligence, well-being and satisfaction in daily life, use of adaptive coping strategies to stress, increased motivation and performance in various activities, and functional dynamics in intimate relationships are also observed (Barnard & Curry, 2011 apud Williams, 2015), as well as positive impact on goal attainment, eating habits, and body image (Williams, 2015). Analyzing the literature in the field, one of the most consistent findings is the negative correlation between self-compassion and psychological distress (Neff, 2003) and psychopathology (Barnard & Curry, 2011). A number of studies also confirm the association between self-compassion and aspects of mental health: happiness, optimism, wisdom, curiosity, desire to explore, and personal initiative (Heffernan, Quinn Griffin, McNulty, & Fitzpatrick, 2010; Hollis-Walker & Colosimo, 2011; Neff, Rude, & Kirkpatrick, 2007) and support the tendency of individuals with higher levels of self-compassion not to ruminate or suppress negative thoughts and emotions (Neff, 2003; Neff, Kirkpatrick, & Rude, 2007). Several interventions in the field of mental health were developed, based on the concept of self-compassion. In one research, Neff & Germer (2013) developed and tested an 8-week intervention that targeted the improvement of self-compassion skills, applied in daily life. The research was conducted on a non-

clinical sample and proved that the increase in self-compassion and everyday satisfaction of participants was associated with a deceleration in anxiety and depression. Similarly, Smeets, Neff, Alberts & Peters (2014) found that a 3-session intervention led to a significant decrease in rumination behavior and an increase in optimism, self-compassion, and self-efficacy in students (Hayes, Lockard, Janis, & Locke, 2016).

1.3. Psychological flexibility and inflexibility

The basis of the Acceptance and Commitment Therapy (ACT) model of behavior change lies in psychological flexibility (acceptance, defusion, self as context, contact with the present moment, values, and committed action, as mentioned in Hayes, Luoma, Bond, Masuda, & Lillis, 2006). The concept was defined as a complex ability to connect with the here and now, as a human being in full consciousness, and to either persist in performing a behavior if its completion is conducive to achieving personal values or to modify the behavior if it is not aligned with important values (Hayes et al., 2006, apud Tyndall et. al., 2020). At the opposite pole is psychological inflexibility, with its components: experiential avoidance, fusion, self as content, lack of contact with the present moment, lack of contact with values, inaction, Hayes et. al., 2006), a term that defines a behavioral pattern represented by an excessive control of an individual's thoughts, emotions, and feelings, as well as a tendency towards avoidance of unpleasant internal experiences, which is detrimental to the person's effectiveness and valued actions (Levin et. al., 2014, apud Tyndall et. al., 2020). Renshaw (2018) argues that psychological flexibility fosters increasing and maintaining the mental health. In contrast, psychological inflexibility facilitates the development of mental health disorders and difficulties (Tyndall et. al., 2020).

The overall goal of ACT is the client's assimilation of psychological flexibility by internalizing the six interrelated processes, extended along a continuum, which forms the Hexaflex Model of psychological flexibility and inflexibility, in which the six processes are placed along the dimensions of acceptance and mindfulness, on one side, and engagement and behavioral change on the other side.

A study conducted by Salandé, Hawkins, & Raymond (2017) investigated the relationship between psychological flexibility, attachment style, and personality organization. The hypothesis that psychological flexibility is associated with secure attachment was confirmed. A negative correlation between psychological flexibility and anxious attachment is also confirmed. The hypothesis that avoidant attachment correlates negatively with psychological flexibility was not statistically significant.

1.4. Associations between attachment, self-compassion, and psychological flexibility

The secure attachment style generates interpersonal schemas that lead to the development of self-compassion (Gilbert & Procter, 2006; Neff & Bertevas, 2013, apud Beduna & Perrone-McGovern, 2019). Research by Raque-Bogdan, Ericson, Jackson, Martin, & Bryan (2011) identified a mediation effect of self-compassion in the relationship between attachment dimension and mental health. Therefore, high levels of anxiety and avoidance are associated with low levels of self-compassion. Neff & McGehee (2010) conducted a study that highlighted that individuals who come from environments where primary caregivers have been consistently helpful and loving, caring, develop the ability to relate to the self in a caring manner. Thus, there is a possibility that the way individuals relate to themselves in difficult times (personal failures, emotional distress) is shaped by their caregivers. Research results affirm a significant correlation between high levels of self-compassion and maternal support.

In turn, a negative correlation between anxious attachment and self-compassion was found in several studies. Individuals with an insecure-anxious attachment style tend to develop a negative self-model (Pietromonaco & Feldman Barrett, 2000), have a high level of self-criticism (barely managing to show compassion towards themselves, Cantazaro & Wei, 2010), a difficulty in identifying internal resources to generate self-compassion (seeking validation from external sources is a defining characteristic of anxious attachment style, Neff & McGehee, 2010) and a tendency to exaggerate their distress (immersing themselves in painful cognitions and feelings, ruminating on the idea that unpleasant experiences only happen to them, Mikulincer, Shaver, & Pereg, 2003).

The association between insecure-avoidant attachment and self-compassion is a complex one, as individuals scoring high on this attachment dimension can have either a positive or a negative perspective on themselves (Pietromonaco & Feldman Barrett, 2000). Mikulincer & Orbach (1995) argue that a positive self-model of these individuals may appear as a defensive mechanism of denial of hidden insecurity and is qualitatively different from the positive self-model observed in securely attached individuals. Alternatively, avoidant attachment causes individuals to compulsively rely on themselves as a means of survival. By setting high standards and achieving them, individuals validate their abilities to cope with difficult situations and minimize the risk of being rejected by others. Neff & McGehee (2010) interpret these individuals as having difficulty in maintaining a clear self-image. Therefore, this dimension of attachment can be positively, negatively, or insignificantly associated with self-compassion.

Dahl, Plumb, Stewart & Lundgren's (2009) research outlines how HEXAFLEX model processes directly influence self-compassion and compassion toward others. Therefore, self-compassion involves the ability to voluntarily experience difficult emotions; to mindfully observe self-evaluating, negative, and disapproving thoughts without allowing them to dominate behavior or the mindset; to engage in the process of achieving life goals with kindness and self-validation; and to flexibly shift perspective toward a broader, transcendent sense of self (Hayes, 2008, apud Neff & Tirsch, 2013).

The aim of the current research is to identify a possible mediating effect of self-compassion in the association between attachment dimensions and psychological flexibility. Following the review of the literature and research in the field, the question is whether we will find similar results on our Romanian sample, to those obtained internationally regarding the complex relationships between attachment dimension and self-compassion, psychological flexibility and self-compassion, and psychological flexibility and attachment in emerging adulthood.

The following research hypotheses were formulated:

(1) High levels of anxiety in the attachment relationship correlate significantly with low levels of self-compassion and psychological flexibility.

(2) High levels of avoidance in the attachment relationship correlate significantly with low levels of self-compassion and psychological flexibility.

(3) Higher levels of self-compassion associate with higher levels of psychological flexibility.

(4) Self-compassion statistically significantly mediates the relationship between attachment and psychological inflexibility.

2. METHOD

2.1. Participants

To gather the data, an online form was built on the Google platform and sent as a link to the participants. A convenience sample of 50 participants, emergent adults, enrolled at various universities in Cluj-Napoca, Iași, Bucharest (Romania), was selected and participated voluntarily, considering the following inclusion criteria: a. age between 19-29 years, b. current student status (Table 1).

Table 1. *Demographic characteristics of the sample*

Age	Minimum (years)	19
	Maximum (years)	28
	Mean (SD) (years)	22.74 (1.651)
Gender	Feminine (%)	74 %
	Masculine (%)	26 %
Background	Urban (%)	76 %
	Rural (%)	24 %
Relational status	In a romantic relationship (%)	56 %
	Single (%)	44 %
Educational level	BA studies (%)	84 %
	MA studies (%)	16 %
Occupation	Student (%)	42 %
	Student and part-time job (%)	10 %
	Student and full-time job (%)	48 %

2.2. Instruments and procedure

Three assessment instruments were used in the research which were translated and linguistically adapted for the purpose of the current investigation.

1. The Multidimensional Psychological Flexibility Inventory (MPFI) (Rolffs, Rogge, Wilson, 2018) was designed by Dr. Ron Rogge in collaboration with Dr. Kelly Wilson and Jaci Rolffs for the comprehensive assessment of psychological flexibility and inflexibility, according to the HEXAFLEX model. The instrument consists of 60 items assessing 12 dimensions, the first 6 representing psychological flexibility and the next 6 dimensions representing psychological inflexibility.

2. The Experiences in Close Relationships - Relationship Structures Questionnaire (ECR-RS) (Fraley, Heffernan, Vicary, & Brumbaugh, 2011) was designed in 2011 by R. Chris Fraley to assess attachment patterns in a variety of close relationships, based on the Experiences in Close Relationships-Revised inventory (ECR-R) (Fraley, Waller, & Brennan, 2000). The instrument consists of 9 items that are repeated to assess individual differences in relationships with parental figures (mother and father), with a partner in a romantic relationship, and with the best friend, thus totaling 36 items. The assessment of each relationship can be considered as an independent scale comprising two variables: anxious attachment (how much the person worries that he or she might be rejected or abandoned by the attachment figure) and avoidant attachment (strategies used to deactivate attachment needs). An overall score for anxiety and avoidance can be computed based on the answers.

3. The Self-Compassion Scale-Short Form (SCS-SF) (Raes, Pommier, Neff, Van Gucht, 2011) is the 12-item short version derived from the 26-item Self-Compassion Scale (SCS) constructed by Kristin Neff (2003) to assess self-compassion. By selecting 2 items from each of the 6 subscales, Raes et al. created the version we used. The authors found that the scores obtained with the short version significantly correlate with both the global score of the long version of the scale and the score obtained for each subscale. The SCS-SF measures the 6 main components of self-compassion and low self-compassion, in contrast: self-kindness vs self-judgment, common humanity vs isolation, mindfulness vs over-identification.

Participants were first presented with an informed consent form that included: purpose and initiators of the study, procedure, risks, confidentiality, safety and withdrawal from the study. At the end of the form, the participants were given the choice to tick a box if they wished to participate in the study. Statistical analyses were performed in SPSS 20.

3. RESULTS

The demographic variables did not account for statistically significant differences in our sample.

The Pearson correlation test is used to investigate the associations between attachment dimension, psychological flexibility, and self-compassion. Attachment anxiety dimension correlated strongly significantly at .01 with the components of self-compassion: self-criticism ($r = .536$), isolation ($r = .363$), and over-identification ($r = .431$), and negatively correlated with global self-compassion ($r = -.580$), kindness ($r = -.438$), and mindfulness ($r = -.485$). Therefore, a hyper-activation of the attachment system will be accompanied by high levels of the sense of isolation experienced by the individual, self-criticism, and an over-identification with negative emotions and thoughts. In our sample there were no statistically significant correlations between the attachment avoidance dimension and the components of self-compassion.

The negative correlation of the attachment anxiety dimension with the variable self as context ($r = -.358$, $p < .01$) indicates a difficulty for these individuals to free themselves from unhelpful negative self-evaluations. We also found a significant negative correlation between the attachment anxiety dimension and defusion ($r = -.239$, $p < .05$). Three significant negative correlations ($p < .05$) were found between the attachment avoidance dimension and committed action ($r = -.295$), present moment ($r = -.278$), and psychological flexibility ($r = -.261$). We identified a significant correlation at $p < .05$ between

the attachment anxiety dimension and the variable fusion ($r = .280$), as well as a strongly significant correlation at $p < .01$ with self as content ($r = .401$) and a correlation with the variable inaction ($r = .236$). In our sample, there are no statistically significant correlations between the attachment avoidance dimension and the components of psychological inflexibility.

We found significant correlations between the variable kindness and psychological flexibility ($r = .361$, $p < .01$) and its components, engaged action ($r = .288$, $p < .05$) and self as context ($r = .444$, $p < .01$), present moment ($r = .240$, $p < .05$), and defusion ($r = .269$, $p < .05$). An individual's tendency to be gentle, tolerant, and self-understanding is associated with higher levels of psychological flexibility, with individuals consistently performing actions in the service of achieving valued life goals and being successful in detaching from negative definitions and labels developed based on previous experiences. The variable self-criticism also correlated strongly significantly negatively with self as context ($r = -.418$, $p < .01$) and significantly negatively with psychological flexibility ($r = -.258$, $p < .05$). Thus, increased psychological flexibility is associated with an awareness of self-worth in situations of failure/limitations and a detachment from negative labeling that is associated with a low likelihood of self-criticism. The construct isolation correlated strongly significantly negatively with the psychological flexibility component self as context ($r = -.468$, $p < .01$). Therefore, a low level of isolation from others is associated with a deeper understanding of the human condition, an acceptance of imperfections, and an increased release from labels and narratives about the self that may cause the person to choose inaction. There was a significant correlation at .05 between the humanity and acceptance variables ($r = .287$). An increased sense of shared humanity tends to be associated with increased acceptance and understanding of personal limitations. Strongly significant correlations ($p < .01$) are obtained between the mindfulness and psychological flexibility variable ($r = .497$) and its components: defusion ($r = .425$) and self as context ($r = .592$). Significant correlations at .05 are also obtained with engaged action ($r = .307$), values ($r = .353$), contact with the present moment ($r = .329$), and acceptance ($r = .341$). High levels of the mindfulness variable are associated with high levels of the components of psychological flexibility. Thus, a mindful person will accept difficult situations, act in agreement with attaining the values and meaning of life, tend to be in touch with the experiences of the present moment, and tend to be able to perceive thoughts as sounds, words, and parts of speech, without getting caught in them. Two statistically significant negative correlations at .05 were found between over-identification and self as context ($r = -.327$) and defusion ($r = -.266$). Over-identification with negative thoughts and emotions does not allow for the observation of a broader, objective perspective of the

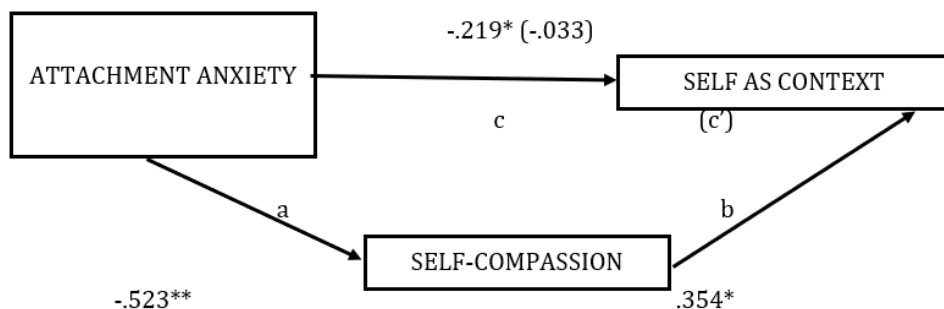
individual's life, taking into account both limitations and failings as well as resources and abilities. Therefore, a high level of over-identification will be accompanied by low levels of the component self as context, evading negative self-labeling will occur with difficulty. We obtained four significant correlations between global self-compassion and psychological flexibility ($r = .362, p < .01$), defusion ($r = .325, p < .05$), self as context ($r = .554, p < .01$) and values ($r = .248, p < .05$). Thus, we found that higher levels of global self-compassion tend to be associated with higher levels of psychological flexibility and more specifically, defusion, self as context, and values, with the individual being able to deal with negative thoughts, feelings, and psychological distress as products of the mind and act in the direction of achieving life goals according to personal values.

Negative correlations are identified between kindness and the components of psychological inflexibility: inaction ($r = -.359, p < .01$), fusion ($r = -.435, p < .01$), and self as content ($r = -.402, p < .01$). Self-criticism was significantly associated with self as content ($r = .362, p < .01$) and fusion ($r = .340, p < .01$). The construct self-criticism also positively correlates with lack of connection with the present moment ($r = .251, p < .05$). Thus, high levels of self-criticism are associated with high levels of cognitive fusion and definition of the person in terms of descriptions involving negative thoughts, feelings, and self-judgments, as well as a deficit of consciously living experiences. The self-compassion component defining humanity significantly negatively correlated with self as content ($r = -.243, p < .01$), demonstrating that the perception of shared humanity decelerates the process of accusing and defining an individual according to negative self-evaluations. Significant correlations are identified between the variable isolation and three of the components of psychological inflexibility: lack of contact with the present moment ($r = .307, p < .05$), fusion ($r = .311, p < .05$), and self as content ($r = .286, p < .05$), showing that high levels of isolation experienced by an individual will be associated with high levels of lack of contact with the present moment, fusion, and self as content. The person experiences their existence on autopilot, often arriving at negative evaluations and self-judgments in their isolation, integrating all these thoughts as part of reality, irrefutable truths, and finding it difficult to detach from unnecessary negative self-evaluations. We identify significant negative correlations between mindfulness and the components of psychological inflexibility: fusion ($r = -.475, p < .01$) and inaction ($r = -.337, p < .01$). Therefore, a high level of mindful thinking reflects an openness to the reality of the present moment (even in stressful situations) and a low level of cognitive fusion (avoidance of integrating negative emotions into existing reality) and inaction. There were significant correlations between over-identification and fusion ($r = .433, p < .01$), inaction ($r = .315, p < .05$), psychological inflexibility ($r = .341, p < .01$), self as content ($r = .353, p < .01$), and

experiential avoidance ($r = .303, p < .05$). A person with a high level of over-identification will show high levels of fusion with negative thoughts and emotions, difficulty taking action in pursuit of the meaning in life, an inflexibility in thinking, and the adoption of "flight" behaviors in the face of unpleasant feelings and thoughts. Four negative correlations are identified between global self-compassion and components of psychological inflexibility: fusion ($r = -.504, p < .01$), self as content ($r = -.411, p < .01$), and inaction ($r = -.360, p < .01$). The higher the level of global self-compassion, the lower the levels of fusion, inaction, and self as content. Thus, a self-tolerant person who accepts his or herself in totality (including personal failures and limitations) will with less difficulty be able to act in times of distress and not be defined by the labels received.

Given the correlations we found, we further tested a mediation model (Baron & Kenny, 1986, Hayes, 2013). The significance of the mediation effect was analyzed using the Sobel Test and the mediation model was performed using PROCESS function in SPSS. The initial hypothesis, that postulated a mediating role of self-compassion in the relationship between attachment anxiety dimension and psychological inflexibility was not confirmed, as no statistically significant mediating relationship was found. After analyzing the correlation matrix, a possible mediation in the relationship between the attachment anxiety dimension and self as context, a component of psychological flexibility, was investigated (Figure 1).

Figure 1. The complete mediation effect of self-compassion between attachment anxiety and self as context



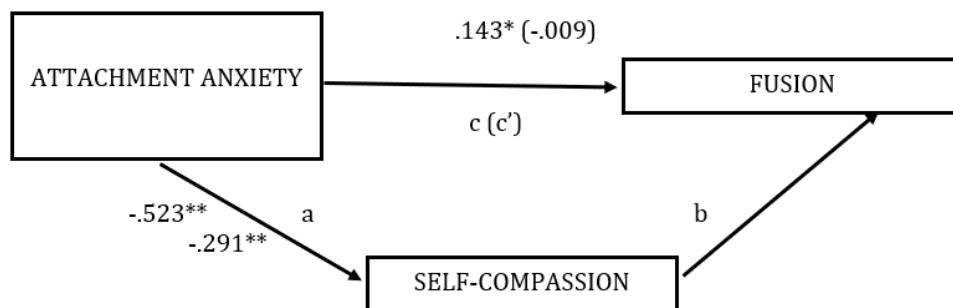
*. Significant at $p < .05$ (one-tailed) **. Significant at $p < .01$ (one-tailed)

The significance of the mediation effect is analyzed using the Sobel test. For this mediation relationship, the p-value is .004. As we can see in the figure above, there is a complete mediation relationship, as the direct effect ($c' = -.033$)

of the attachment anxiety on self as context, becomes non-significant when introducing self-compassion as mediator.

Further analysis of the correlation matrix analysis led us to test a possible mediation relationship between attachment anxiety dimension and fusion, a component of psychological inflexibility.

Figure 2. *The complete mediation effect of self-compassion between attachment anxiety and fusion*



*. Significant at $p < .05$ (one-tailed) **. Significant at $p < .01$ (one-tailed)

Following the SOBEL test, the p-value was .006, proving that the model was statistically significant. In figure 2, a complete mediation relationship can be inferred. The direct effect ($c' = -.009$) of attachment anxiety on fusion becomes non-significant when introducing self-compassion as a mediator.

4. CONCLUSIONS AND DISCUSSION

This research was initiated out of a desire to delve deeper into the attachment system and how its insecurity is experienced by young people in the emergent adulthood age range. The constructs of self-compassion and psychological flexibility and inflexibility, respectively, provided the framework of the study. The aim of the research, to identify a possible mediating effect of the self-compassion variable in the causal association between attachment anxiety dimension and psychological inflexibility was partially accomplished.

The complex relationships between the constructs under analysis (attachment anxiety, self-compassion, psychological flexibility, and the various components of psychological inflexibility) was mainly proven by the multiple correlations between the attachment dimension and self-compassion. The first

hypothesis that "High levels of anxiety in the attachment relationship correlate with low levels of self-compassion" was confirmed. Therefore, the more the person is characterized by the anxious dimension of attachment, the lower levels the person proves in self-oriented goodness, mindful thinking and overall self-compassion, as well as higher levels of self-criticism, isolation and over-identification, indicating that individuals with high attachment anxiety tend to struggle with self-compassion. Our results are consistent with those identified in the literature (Huang & Wu, 2024), showing that attachment insecurity is significantly correlated with lower levels of self-compassion.

We specifically identify strongly significant negative bivariate correlations between the attachment anxiety dimension and the psychological flexibility components self as context and defusion, which confirms the hypothesis ("Higher levels of anxiety in the attachment relationship correlate significantly with lower levels of psychological flexibility"). Therefore, a person with an anxious attachment will find it more difficult to observe their thoughts as mental productions that may not be true and may not allow them to organize/ restrict their behavior. This suggests that individuals with high attachment anxiety are more likely to experience cognitive fusion, difficulty engaging in value-driven actions, and challenges in maintaining perspective during distressing situations.

The second hypothesis ("Higher levels of avoidance in the attachment relationship correlate significantly with lower levels of psychological flexibility") was partially confirmed. Significant negative correlations were confirmed with engaged action, contact with the present moment and psychological flexibility as constructs. Therefore, a deactivation of the attachment system will be accompanied by low levels of engaged action, and psychological flexibility, making it difficult for the individual to act in the service of achieving important values in life. The person can be more likely to ruminate about past experiences or be distracted, to not be in touch with the experiences of the present moment.

Consistent with data from other studies (eg., Sagüés de la Maza, Moreno-Jiménez, & Blanco-Donoso, 2026, Calvo et al., 2022), statistically significant correlations were identified between attachment anxiety and self as content, fusion, and inaction, meaning that people with an anxious attachment are prone to integrate negative thoughts as existing in reality and to relate rigidly to the forms in which they describe themselves, being defined by these descriptions and mobilizing in actions with difficulty.

Third, the multiple correlations that may exist between psychological flexibility and inflexibility, respectively, and self-compassion were investigated targeting the following hypothesis ("Higher levels of self-compassion are associated with higher levels of psychological flexibility"). The research hypothesis was confirmed, there were statistically significant correlations at both global

and subscale-specific levels. Self-compassion, particularly the components of kindness, mindfulness, and global self-compassion, was found to be positively correlated with psychological flexibility, suggesting that individuals who demonstrate self-compassion are more likely to engage in behaviors that reflect psychological flexibility, such as accepting difficult emotions, acting in accordance with their values, and maintaining a broader perspective on life. Furthermore, high levels of mindfulness were associated with lower levels of cognitive fusion and inaction, suggesting that mindfulness can mitigate the negative effects of psychological inflexibility. Our results are similar to those from other studies (eg., Nas, Taytaş, & Vangölü, 2026, Sahinler, Dindar, & Koc, 2026).

The mediation model that was hypothesized, with self-compassion as a mediator in the relationship between attachment anxiety dimension and psychological inflexibility was partially confirmed regarding two components of the HEXAFLEX model: the self as context (psychological flexibility) and fusion (psychological inflexibility).

First, from the self as context perspective, individuals retain a sense of self by detaching from labels and unnecessary negative self-evaluations. This sense of self is related to self-esteem and sense of self-worth. Virginia Satir (1988) states that the development of a sense of self-worth is achieved in a supportive environment where individual differences are accepted and valued. Therefore, she emphasizes the importance of introjecting unconditional love and acceptance from parents, as the child grows into an adult who is able to both recognize personal qualities and limitations and accept them without judgment. Such upbringing predisposes the generation of positive schemas in which the self is perceived as worthy of love, care, and respect. In antithesis, low and inconsistent parental care produces a negative pattern of the self.

The mediating relationship shows that by modifying the level of self-compassion, the person is able to recognize the distress and suffering experienced in the present, learning to treat oneself with kindness and to see one's limitations as part of the human condition, thus producing an increase in self-worth.

Furthermore, the more the person is characterized by attachment anxiety, the more the person is prone to exhibit behaviors such as rumination, worrying, and fusion with negative, automatic thoughts. Integrating negative thoughts as existing in reality, important, true, and automatically following them can lead to restricting the individual's behavior and freedom to pursue valued directions in life. The mindfulness component implies openness to the reality of the present moment, counteracting the very human tendency to merge with negative, painful thoughts, and emotions. The mediation relationship

demonstrates that by modifying the level of self-compassion, in particular the mindfulness component, the relationship between the dimension of attachment anxiety and psychological inflexibility could be eliminated. Also, increasing self-compassion may help individuals with high attachment anxiety develop a more flexible sense of self.

As attachment insecurity is associated with difficulties in relationships, our results could have practical implications on the design of therapeutic interventions targeting the increase of self-compassion, with effects of psychological flexibility, favoring the development and maintenance of good mental health. Overall, these findings emphasize the importance of self-compassion and mindfulness in fostering psychological flexibility, especially for individuals with high attachment anxiety, and highlight the need for interventions that target these areas to improve mental health and well-being.

5. LIMITATIONS AND FUTURE DIRECTIONS

Several confounding variables (eg., involvement in a therapeutic process before participation in this research) could distort the associations we found. Another possible limitation could be that we did not have a large enough sample to perform a more in-depth analysis of the differences between attachment anxiety and avoidance in different relationships.

The lack of significant findings between the attachment avoidance dimension and the components of self-compassion and psychological flexibility is noteworthy. While this may reflect a true absence of relationship, it is also possible that the operationalization of attachment avoidance in this study did not capture its nuances or that the sample size was insufficient to detect smaller effects.

The study relies on self-report measures for assessing attachment, self-compassion, and psychological flexibility, which are susceptible to social desirability bias, recall bias, and individual differences in introspection. These biases could impact the accuracy of the data. Additionally, the use of a single measurement tool for each construct may not fully capture the complexity of these psychological dimensions, especially attachment, which can be multidimensional and context-dependent.

Although the study offers valuable insights through correlational analyses, this method does not allow for a full exploration of the mechanisms at play. Future research could benefit from using experimental or mixed-methods designs to explore the causal relationships and underlying processes in greater depth.

While the study provides valuable insights into the relationships between attachment anxiety, self-compassion, and psychological flexibility, its limitations suggest that further research, particularly with a longitudinal design,

more diverse samples, and alternative methods of measuring these constructs, would help to clarify and extend these findings. Additionally, exploring potential interventions to enhance psychological flexibility through self-compassion may offer practical implications for mental health interventions.

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Problem-Based Learning in Teaching English for Law Enforcement

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ABSTRACT. Problem-based learning (PBL) is a pedagogical approach used in second language acquisition to enable students to improve their critical thinking and social skills, while learning the target language in context by endeavoring to find solutions to real-life or job-related problems. In English language teaching (ELT), the PBL approach implies that students identify problems, design strategies, and also reflect on their resolution process, stages along which they interact with each other, thus further developing their language competencies. Our paper aims to showcase how this approach can be implemented in second language teaching in the context of law enforcement tertiary education.

Keywords: English as a Second Language (ESL), English as a Foreign Language (EFL), problem-based learning (PBL), Law Enforcement English (LEE), tertiary education

1. INTRODUCTION

What is Problem-based Learning?

Problem based learning is a student-centered, collaborative methodology, which requires learners to work in groups and construct the knowledge autonomously, while solving a presented problem. The aim of this educational method is to foster problem-solving skills through a self-regulated learning and cooperative skills. Students are given real world, intricate, complex tasks to find

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solutions for, while taking on the role of the owner of the situation. Thus, students learning in a PBL class will develop skills that are useful in real life. In this line of thought, some researchers mentioned that in a PBL classroom the students have the opportunity to improve their social skills as they are exposed to contexts where they can practice authentic communication (Larsson, 2001). Moreover, learners can benefit from improved critical thinking skills (Maulidia, et al., 2020), knowledge integration, group work skills (Mook et al., 2007), self-management skills (Fernandes, 2021), research ability (Dolmans, et al., 2002), knowledge transfer skills (Campos, 2017).

Problem-based learning is an approach that emerged in the late 1960s (Neufeld & Barrows, 1974) and, as an approach used in second language acquisition, it allows language students to learn both the target language and the content, while working either individually or in groups in order to understand and find potential solutions for real, open-ended problems they are presented with, problems which do not have a single solution (Ertmer, Lehman, Park, Cramer, & Grove, 2003).

Other authors view PBL as a “a collection of carefully constructed problems”, which is presented to a group of students, whose task is to “discuss these problems and produce tentative explanations for the phenomena” being described (Norman and Schmidt, 1992, p. 557). They also acknowledge that there are beneficial outcomes of the PBL approach for the students in terms of developing their problem-solving abilities, encouraging autonomous learning and motivating them to take interest in the course content, as well as improving their memory.

In an attempt to clarify what PBL is, there is another perspective in the literature which suggests that the characteristics of the PBL approach as an experiential strategy are: proposing and solving realistic problems, making use of prior knowledge, practicing logical and analytical thinking and using scientific methods in problem-solving, acquiring new knowledge in the process due to information sharing and exchanging (Walton and Mathews, 1989).

As opposed to traditional teaching, where the teacher takes the central role, usually by presenting concepts and rules first, PBL is an approach that relies on little or no teaching, the teacher being merely a facilitator in an educational context where students’ actual learning takes place while solving the problems that the teacher designs and proposes in class based on the topics included in the course syllabus of a particular semester of the academic year. Therefore, an essential aspect of PBL is that, unlike the traditional teaching approach, the problem to be solved is presented first and the content is learned while solving real life-like complex problems (Boud and Feletti, 1997).

In the PBL class, when the students are engaged in group work to solve authentic, real world problems, they have the opportunity not only to enhance

their content knowledge, but also to better their communicative and reasoning competencies. Thus, Watson (2001, p. 3) shows that in PBL, while working collaboratively with their colleagues to find solutions for authentic and complex problems, the students have the chance to enhance their content knowledge and develop a range of abilities such as problem-solving, communication, self-assessment and reasoning. Other advantages that the PBL class has for the students have been highlighted by Major and Palmer (2001, p. 5), who argue that the collection, the evaluation and synthesis of resources are among the skills students are most likely to improve in the process of finding a solution to an intricate problem. Thus, in a problem-based learning class, the process is of the utmost importance as students are actually learning throughout it. The students take initiative and control of their learning, while they become better at thinking critically, understanding, learning autonomously and working in collaboration with their peers (White, 1996).

The collaborative work of the students in the problem-solving approach may require some research in order to collect the information needed to come to the best possible solution to the problem at hand. For this purpose, they may need to access various resources or, if possible, discuss with experts in the field for a better grasp of the real-world problems. Nowadays, this endeavor is highly facilitated by the advancements in digital technology, which allow instant and easy access to a multitude of reading materials online (Evensen and Hmelo, 2000) on a personal computer or various digital portable devices. The availability of unlimited information on the Internet enables the teachers to take a step back in the PBL-based language teaching approach and gives the students the opportunity to be in charge of their own learning, as they have to work autonomously to reach a valid solution to a certain problem-solving scenario.

One might argue that PBL is another facet of the task-based learning approach. However, what differentiates the two is that in the PBL class the teacher relinquishes the role of content instructor in favor of the role of simple facilitator of the student's learning process by assigning and explaining the problem to be solved, bringing it closer to the course syllabus, arranging students in groups, giving feedback and eventually evaluating the task. In their groups, students discuss the problem after they have divided the research tasks amongst themselves and completed the collection of data from various sources in order to solve the often complex problem based in real-life situations and purposefully designed so as to stir students' curiosity and thus learn the content in a meaningful manner (Tan, 2003). In addition, due to PBL students are trained for dealing with real-life situations, being exposed in the learning context to a series of challenges and skills such as: collaborative work, self-regulated learning, interdisciplinary learning, communication with peers, problem-solving, critical thinking (Tan, 2003).

Although the PBL approach is said to rely on minimal or literally no teaching, when initiating a PBL class for the first time, teachers themselves may find the process of formulating the problems a bit overwhelming, for which reason they may feel the need to have a blend of content teaching and problem-solving scenarios. It was argued in the literature that in the beginning teachers will undertake a painstaking process of researching and creating the problems (Allen, Duch & Groh, 1996).

Therefore, in a case study, we will endeavor to illustrate how this approach can be implemented in the context of law enforcement second language teaching and learning, while simultaneously identifying both the advantages and disadvantages such a teaching strategy brings about in the English language class. Moreover, we will insert specific examples of tasks to demonstrate how the PBL process unfolds.

The Problem-Based Learning Process

As mentioned before, the PBL is a learner-oriented approach in education that offers learners the autonomy to access various knowledge and use different skills in solving problems by integrating theory and practice (Savery, 2006). There are certain pedagogical advantages that have been associated with PBL methodology, such as giving the students the opportunity to enhance their knowledge, teamwork, communication, leadership and reflection (Ansarian & Lin, 2018), therefore PBL has been implemented in various disciplines, including language education (Han, 2024; Lin, 2018).

Irrespective of the discipline that relies on the PBL strategy, in the PBL classroom the roles of both teachers and learners are distributed differently than in a more traditional type of formal learning environment. The teacher assumes the role of a facilitator in the students' learning, providing classroom activities that students have to solve and complete autonomously. The only involvement the teacher has in the learning process is to provide students suitable real-world problems to solve, to guide them in identifying the needed resources and materials, to offer guidance and feedback during the problem-solving process and assess the students' involvement and final solution, with the purpose of enabling them to improve their problem-solving abilities and their language, while practicing both productive and receptive language learning skills.

On the one hand, the PBL process is described in the literature taking into account the students' role (Butler, 2003) and it includes four main steps: introducing students to the problem, exploring what is known and unknown about the problem, finding potential solutions to the problems, reflecting on the effects of each solution and selecting the most feasible one. In fact, during the

PBL process, students have to unravel intricate, ill-structured problems, similar to real-world situations (Lee, 2020) without single solutions (Pretz et al., 2003) and they assume different tasks in the group to solve the problem at hand. In fact, they themselves decide the role each student is going to have in the group. After an exploration of the problem, they assign the tasks among the team members in order to deal with the problem and progress toward a solution. Through this exploration, students have the chance to evaluate the knowledge and skills they already possess and what they need more and, simultaneously, they learn how to deal with time management.

On the other hand, the teacher's role in a PBL approach is that of a mentor, a facilitator, or a coach and it is limited to pre-teaching and assessment of the students' performance in the activity. In fact, the teacher is in charge of the following steps: pre-teaching the language needed, introducing the problem, grouping students and providing resources, observing and supporting them in the process, follow up and assessing progress (Julie Mathews-Aydinli, 2007). Therefore, the teacher is responsible for designing and identifying a problem that should be so intricate and ill-structured so as to stimulate students to reflect on and make inquiries about it. The teacher's task is to construct the problem in such a way to be in alignment with the course content, but also new, unfamiliar and relevant to the work context.

Other perspectives on the PBL process also underline four stages including the students' roles, such as: problem definition, strategy design, strategy implementation and evaluation (Han, 2023, 2024). In the first step, students share knowledge to comprehend the problem and establish goals to be attained and procedures to be followed. In the second step, they design strategies by selecting or creating methods, whose value they evaluate using logical reasoning. In the third step, students implement strategies and evaluate outcomes in the light of the set goals. Through this process, students improve language and problem-solving skills (Han, 2023).

Benefits and Drawbacks of Problem-Based Learning

As a collaborative learner-centered approach, PBL encourages learners to work in teams with each other. This, in turn, creates an ideal context for learners to construct the required knowledge to tackle real-life scenarios.

The applicability of PBL in language teaching has been reported in the literature as bringing about positive outcomes, such as the improvement of learners' skills, especially their speaking ability (Azman and Shin, 2012). Similarly, other authors also concluded that there is a positive effect of PBL on the learners' linguistic and nonlinguistic development in terms of their interest and motivation

being improved simultaneously with their language proficiency (Kemaloglu-Er and Sahin, 2022). The improvement of the learners' life skills was also mentioned as a beneficial outcome of the language education based on PBL (Ghosheh Wahbeh et al., 2021).

When it comes to the benefits, recent research on second language acquisition has focused on PBL as a strategy that promotes valuable interactions in the second language learning settings. As PBL is oriented on real-world problems, the communication occurring in the class between students is more authentic than the interactions produced in role plays, for instance, and it is believed that such opportunities to use the second language in authentic communication lead to second language acquisition (Nakahama, Tyler, & Van Lier, 2001). Moreover, because the PBL approach focuses on students rather than the teachers during the learning process, it can also encourage students to become more independent learners, who will be able to use the knowledge learned and the skills developed in the classroom in their lives outside the school setting. (James, 2006).

Conversely, PBL was criticized as relying on a large number of students working together to solve the problem assigned, which could negatively influence the collaboration between students and the learning outcome because of the potentially pronounced cultural differences and personality traits in the groups of students (Frambach et al., 2012; Ramadhani et al., 2019). Contrary to this criticism, some theorists argued that since students are divided into smaller groups, the intercultural and individual differences are minimized (Fernandes, 2021).

Speaking of the difficulties involved in the successful implementation of PBL in the EFL context, one of them can be the limitation of the teachers' necessary knowledge and skills (Kassem, 2018) and their reluctance to give up the central role of information providers for that of facilitators (Dolmans et al., 2002). Another challenge is assessment. Researchers have agreed on the point that assessing a PBL is a difficult task. Thus, Vleuten and Schuwirth (2019) state that in a PBL class is challenging to design and implement a good test for measuring learners' knowledge. Another source of difficulty can be the students' attitudes toward PBL and their negative reaction to it (Shamsan & Syed, 2009) or the inability to design an appropriate problem (Rivera & González, 2019).

The literature reports some other factors that could also negatively affect the effectiveness of PBL (Chan, 2009). Some of the issues that deserve attention include time limitation, relevance of the designed scenario with the authentic use of the learning objective, teacher's role, and the quality of assessment (Chen & Fu, 2009). Other drawbacks of the PBL approach in second language learning might be that learners who speak the same first language may use their

mother tongue instead of English when working in groups on the assigned problem or that the PBL methodology may not be appropriate for beginner learners, who are not very proficient in English when it comes to speaking and reading skills.

Whatever the difficulties of implementing PBL in second language education might be, the benefits of the approach derive from the opportunity it offers for the students to exploit real-world relevant skills, on condition that the presented problems or scenarios consider all possible situations in the future and are practically applicable for students (Almeman and Alrebish, 2018).

2. CASE STUDY

Problem-Based Learning in Teaching English for Law Enforcement

The teaching context

In Romania, the organization in charge of the training of would-be commissioned law enforcement officers is the Police Academy, a public higher education institution, which operates under the coordination of both The Ministry of Education and The Ministry of Home Affairs, the latter being the sole beneficiary and future employer of its graduates. While being enrolled in the academic studies, the curriculum allows students to undergo a specialization in various strands of law enforcement such as police, border police, penitentiaries, gendarmerie and firefighters. Moreover, those who attend undergraduate programs of the Police Faculty usually further specialize in different police lines of work such as criminal investigations, fraud investigation, countering organized crime, forensic science, traffic police, public order, transport police, etc. Hence, due to the police-related content of the subjects included in the students' curriculum, a second language teacher needs to accommodate the second language learning syllabus with the specialized content of the other subjects in order to facilitate the students' acquisition of specialized police lexis and to help them improve their language skills.

Therefore, in such a context, we can speak of English for Law Enforcement (LEE) as a variety of English for a certain occupational purpose or a specific profession, which is the police officer's job. For further clarification, the over-arching concept of ELT (English Language Teaching) can be broken down in concepts such as EFL (English as a Foreign Language) or ESL (English as a Second Language), which, in turn, encompass ESP (English for Specific Purposes), a branch consisting of other two subcategories, which are: EAP (English for Academic Purposes) and EOP (English for Occupational Purposes). Therefore, as it refers to an occupational field, English for Law Enforcement (LEE) is a variety of ESP, embedded in EOP (Piellmuş, 2018, p. 569).

Problem-based learning tasks in an English for law enforcement class

As previously mentioned, an English language class at the Police Academy will focus on police-related topics in line with the prerequisites of the second language learning syllabus. Figures 1 and 2 showcase two of the problem-based learning tasks we presented our students in the classroom, which are focused on relevant, real-life, job-related situations. The first task (Figure 1) suggests three incidents police officers might encounter when they are on the job, for which students have to find solutions in terms of effective ways to handle the situations, while enforcing police powers and procedures. The students discuss in small groups of 4 or 5 and have to explain how they will take action in each situation, what police powers and/or procedures they will enforce and how. The second task (Figure 2) presents students with four different scenarios highlighting various criminals in the commission of a range of crimes. The students are required to solve each scenario by providing feasible methods of dealing with the criminals and handling the situations to a positive effect.

What needs mentioning is that most of our students are very proficient in English, their language competence varying from level B2 to level C1 across CEFR, with few exceptions, which renders the implementation of a PBL task suitable, as they possess the communicative ability to discuss police job-related problems.

In addition, they are also confident when it comes to the content the tasks focus on, because, as a rule, they undergo a specialization in various strands of policing and a training in roughly all branches of the law, as well as participate in regular practical training sessions at police stations. Therefore, to a certain degree, depending on the academic year they are enrolled in, the students possess both the specialized knowledge and the practical abilities to reflect on and find solutions for the job-related problems they are presented with in class.

In terms of procedure, when suggesting problem-based learning tasks to our students, we first arranged them in groups of 4 or 5 students with mixed communicative competence and then the students shared the solutions to their problem with the entire class. Thus, all groups have the opportunity to find various solutions to the problem, which they further discuss as a class and agree on the most effective one. Based on our classroom experience, distributing students in groups taking into account their different language abilities enables them to learn for their peers and further motivates them improve their language competence. Moreover, students tend to be more motivated to participate in solving the problem suggested due to the level of learning autonomy they have in the BPL framework.

Activity 1 - Problem-solving: Enforcing police powers and procedures

Here you have a table containing vocabulary related to police procedures. Make use of the words and phrases below to describe how you are going to handle the following three incidents:

- You are a police officer on night patrol. While walking the beat, you notice a silhouette of a man acting suspiciously in the parking lot in the area you are patrolling. It seems that the man is trying to force the door of a VW Passat CC open, because he is handling some kind of tool. When cautioned to stop, the man starts running.
- You are a police officer. You have received information that a man driving a silver-grey BMW with foreign number plates, who is suspected of transporting a drug shipment, is going to enter your city.
- Two youngsters start fist-fighting near a bus stop packed with citizens waiting for their buses. You are called at the scene by one of the passers-by. When you arrive at the scene, the fight is still in progress. Suddenly one of the young men takes out a knife and tries to attack the other man with it. On being summoned to stop, the man with the knife attempts to flee.

Police procedures	Măsuri polițienești
police warning to warn	somația a soma; a avertiza
police stop person stops to stop	interceptarea interceptarea persoanelor a intercepta
asking for ID/showing one's ID to ask for ID/ to show one's ID to establish the identity (of a person) to refuse to show one's ID refusal to show one's ID	legitimarea a legitima/a se legitima a stabili identitatea (unei persoane) a refuza legitimarea refuzul de a se legitima
search person search body search/pat-down search intimate body search luggage search personal belongings house/residence search vehicle search to have the power to stop and search	controlul controlul persoanei control corporal/ controlul persoanei control corporal amănunțit controlul bagajelor efecte personale controlul la domiciliu controlul vehiculelor a avea autoritatea de a intercepta și controla
restraining (a person) to restrain handcuffs to handcuff handcuff restraint tear gas police baton/ night stick	imobilizarea (unei persoane) a imobiliza cătușe a încătușa imobilizare prin încătușare gaze lacrimogene bastonul din dotare
chasing a person/ suspect to chase a suspect apprehension of a suspect to apprehend a suspect foot chase car/vehicle chase	urmărirea unei persoane/unui suspect a urmări un suspect prinderea unui suspect a prinde un suspect urmărirea pe jos urmărirea cu autovehiculul
inviting a suspect to come to the police station to invite a suspect to come to the police station escorting the suspect to the police station to escort the suspect to the police station	invitarea suspectului la sediul poliției a invita suspectul la sediul poliției conducerea suspectului la sediul poliției a conduce suspectul la sediul poliției
detaining/ arresting a suspect to detain/ to arrest a suspect questioning a suspect to question a suspect	reținerea/arestarea unui suspect a reține/a aresta un suspect interogarea/interpelarea unui suspect a cerceta/ a interoga/ a interpela un suspect

Fig. 1. Problem-based learning task 1 (Pielmuș, 2012, pp. 99-100)

Activity 2 – Problem-solving: Dealing with criminals

Imagine you are going to take part in a police officers' recruitment process. One of the tests that you will be required to pass is participating in a police officer role. You will be given several police tasks to perform so as your ability to deal with the situation be assessed.

Work in groups, discuss how you would handle the police officer's duties effectively and describe your solution for each scenario (*Scenario 1*: police officer vs. hostage taker; *Scenario 2*: police officer vs. the abusive husband; *Scenario 3*: police officer vs. suspicious man; *Scenario 4*: police officer vs. law-breaking driver).

Scenario 1	Scenario 2	Scenario 3	Scenario 4
You are a police officer on duty who receives the information that a hold-up is taking place at a local bank and several civilians have been taken hostages. Suspects are believed to be armed and dangerous. You are sent to the scene to deal with the situation.	An emergency call is made at the police station and you are sent to settle a domestic dispute. As a result of alcohol abuse, the husband allegedly beat up his wife and apparently tried to forcefully facilitate sexual intercourse with the latter.	You are a police officer on night patrol and you notice a suspicious person lurking in a parking lot in the neighbourhood. The suspicious man is also carrying a bag in his hand and seems most attracted by a parked BMW, C Series.	You are a traffic police officer and you are on duty in the central area of the city. You are ensuring the traffic flow when you suddenly notice a motor vehicle driver driving on the red light, while failing to yield the crossing to pedestrians at a road crossing.

Fig. 2. Problem-based learning task 2 (Pielmuş, 2012, p. 30)

3. CONCLUSIONS

Problem-based learning is an approach that has certain advantages in adult second language education. As our experience of implementing PBL in teaching English as a second language showed, the approach has not only linguistic, but also nonlinguistic benefits. The linguistic benefits of the PBL approach arise from the opportunity the students have to exercise their communicative competence in the second language in their interactions with their peers, while the nonlinguistic benefits consist in the outcomes PBL brings about in terms of enhancing learners' interest and motivation and encouraging their learning autonomy, as well as enabling them to transfer the learning outside the classroom.

However, it is only reasonable to acknowledge that a transition from a traditional-based class to the PBL approach might meet a certain degree of resistance from students, teachers and administrators alike. The students, who have only been exposed to traditional learning settings, are most likely to expect their classes to follow the same pattern, and teachers, who are forced to meet the constraints imposed by variables such as syllabus and time, may find the process of designing problem-solving tasks rather challenging. Based on our classroom experience, even if students initially showed some reluctance to work with the PBL approach, they later on became motivated. On the other hand, as teachers we should be inspired to create more complex problems for the students to solve due to the creative opportunities offered by the PBL methodology. Although there are inherent difficulties the teachers and students may encounter in either designing or solving a PBL task, it's worth noting that the benefits the students usually get from working with this approach outweigh the difficulties. Among the positive outcomes of implementing the PBL approach in an ESL class there are: improved second language communication, critical thinking, course content acquisition.

In addition, our PBL classroom experience led us to the conclusions of the majority of the research studies in the field that assert that the PBL approach implemented in different educational settings fosters a range of skills in certain areas. Thus, we found that PBL has an essential role not only in the development of the learners' cognitive ability and their reflective thinking, in the enhancement of their knowledge and encouragement of autonomous learning, but also in the improvement of their research and social skills, as well as in the expansion of their learning beyond the classroom into the real-world. What's more, the research undertaken by the students in a PBL class in order to solve a presented problem, including reading and listening to various materials or watching audiovisual resources in English, had - to a certain extent - an impact on the development of the learners' language skills, especially the communicative competence.

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Shame, Self-Compassion, and Self-Esteem as Correlates of Depression and Anxiety Symptoms: The Role of Emotion Regulation

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ABSTRACT. Background: Shame, self-esteem, and cognitive emotion regulation strategies have been consistently linked to anxiety and depressive symptoms. Shame and low self-esteem are considered risk factors, whereas self-compassion and adaptive strategies act as protective factors. This study examined the mediating role of self-compassion in the relationship between shame and symptoms of depression and anxiety. **Methods:** An online survey was conducted with 201 ethnic Hungarian participants from Romania. Standardized measures were administered to assess shame, self-compassion, self-esteem, stress, cognitive emotion regulation, and depressive and anxiety symptoms. Mediation analyses were performed to test the hypothesized indirect effects. **Results:** Shame significantly predicted lower levels of self-compassion, which in turn mediated the relationship between shame and depressive symptoms. No mediation was found for anxiety symptoms. Stress emerged as a strong predictor of both depression and anxiety, while self-esteem predicted depressive symptoms only. Maladaptive regulation strategies increased the explanatory power of the models, whereas self-blame was not a significant predictor. **Conclusions:** The findings suggest that self-compassion may be associated with a reduced relationship between shame and depressive symptoms. Strengthening self-compassion and self-esteem, while reducing maladaptive regulation strategies and improving stress management, may inform targeted clinical interventions.

Keywords: shame, self-compassion, self-esteem, cognitive emotion regulation, anxiety, depressive symptoms

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ZUSAMMENFASSUNG. Hintergrund: Scham, Selbstwertgefühl und kognitive Strategien der Emotionsregulation stehen in einem konsistenten Zusammenhang mit Angst- und Depressionssymptomen. Scham und geringes Selbstwertgefühl gelten als Risikofaktoren, während Selbstmitgefühl und adaptive Strategien als Schutzfaktoren wirken. Die vorliegende Studie untersuchte die vermittelnde Rolle von Selbstmitgefühl in der Beziehung zwischen Scham und depressiven sowie Angstsymptomen. **Methoden:** Eine Online-Befragung wurde mit 201 ethnischen ungarischen Teilnehmer*innen aus Rumänien durchgeführt. Standardisierte Instrumente erfassten Scham, Selbstmitgefühl, Selbstwertgefühl, Stress, kognitive Emotionsregulation sowie depressive und Angstsymptome. Zur Prüfung der hypothesierten indirekten Effekte wurden Mediationsanalysen durchgeführt. **Ergebnisse:** Scham sagte signifikant geringere Werte des Selbstmitgefühls voraus, welches wiederum die Beziehung zwischen Scham und depressiven Symptomen vermittelte. Für Angstsymptome konnte keine Mediationswirkung festgestellt werden. Stress erwies sich als starker Prädiktor sowohl für Depression als auch für Angst, während Selbstwertgefühl nur depressive Symptome vorhersagte. Maladaptive Regulationsstrategien erhöhten die Erklärungsleistung der Modelle, während Selbstvorwürfe keinen signifikanten Prädiktor darstellten. **Schlussfolgerungen:** Die Ergebnisse deuten darauf hin, dass Selbstmitgefühl den Einfluss von Scham auf depressive Symptome spezifisch abmildert, nicht jedoch auf Angstsymptome. Die Förderung von Selbstmitgefühl und Selbstwertgefühl sowie die Reduktion maladaptiver Regulationsstrategien und die Verbesserung des Stressmanagements könnten gezielte klinische Interventionen unterstützen.

Schlüsselwörter: Scham, Selbstmitgefühl, Selbstwertgefühl, kognitive Emotionsregulation, Angst, depressive Symptome

INTRODUCTION

Mental health has become one of the most pressing societal issues in today's fast-paced and performance-oriented world. Anxiety and depression are increasingly prevalent, particularly among young adults aged 18–30, significantly impairing quality of life and psychological well-being. Constant pressure to succeed, the influence of social media, and both internal and external expectations contribute to declining self-esteem, increased shame, and elevated psychological distress. In response, self-compassion and self-acceptance have gained attention as potential protective factors against psychopathology.

Globally, approximately one-fifth of the population suffers from anxiety or depressive disorders (Jacobson & Newman, 2017), with both conditions appearing early and frequently in adolescence. Prevalence rates vary widely:

anxiety affects 1.9–23.8% of the population and depression 0.2–12.9% (Bitsko et al., 2018), with significantly higher rates observed among women (WHO, 2017). Lifetime prevalence of anxiety disorders ranges from 13.6% to 28.8%, while major depressive disorder (MDD) ranges from 6% to 25% (Kessler & Wang, 2009; Hasin et al., 2018). Given their early onset and persistent course, anxiety and depressive disorders pose a substantial burden on public health.

Vulnerability or risk factors, including neurobiological (e.g., genetic predispositions, neurotransmitter imbalances, brain function anomalies, and cortisol dysregulation), psychological (e.g., high neuroticism, maladaptive schemas, self-criticism), and social elements (e.g., low socioeconomic status, insufficient social support)—have been shown to intensify the relationship between stressors and the development of depression and anxiety (Ni, 2022; Walker & Diforio, 1997). Feelings of hopelessness and self-blame significantly increase the risk of chronic and severe depressive episodes (Campbell et al., 1996). Blatt and Zuroff (1994) proposed a model that identifies two personality styles: dependent and self-critical, that are particularly vulnerable to depression due to their heightened sensitivity to interpersonal stressors. When individuals with these predispositions encounter stress, it may activate personal vulnerabilities and exacerbate depressive symptoms (Dozois, 2012; Ingersoll, 2010). In addition, adverse childhood experiences (Ngin et al., 2018), inadequate family support (Liu et al., 2021), and family dysfunction (Li et al., 2021) have been associated with a significantly increased risk for developing depression. While numerous risk factors contribute to the onset of anxiety and depression, it is equally important to highlight the role of psychological protective factors.

Self-Compassion: Definition, Components, and Psychological Effects

One such factor is self-compassion, which has been shown to buffer against the development of psychopathology. Self-compassion entails extending kindness and understanding to oneself in times of suffering, much as one would toward a close friend facing similar difficulties (Neff & Knox, 2020; Terry & Leary, 2011). Rather than avoiding pain or denying personal shortcomings, individuals practicing self-compassion remain open to their experiences with acceptance and a nonjudgmental attitude, viewing these experiences as part of the broader shared human condition, which can help reduce emotional distress (Luo et al., 2019; Neff & Lamb, 2009). This inward-directed compassion applies to suffering caused by external circumstances as well as one's own perceived failures, promoting resilience and healing.

According to Neff (2011), self-compassion consists of three interrelated components that function synergistically to foster emotional resilience and psychological well-being. The first is self-kindness, which involves responding to one's own suffering, failures, or shortcomings with warmth, understanding, and patience, rather than engaging in harsh self-criticism or judgment. The second is the recognition of common humanity, referring to the understanding that imperfection, struggle, and emotional pain are part of the shared human experience, thereby reducing feelings of isolation. The third component is mindfulness, which entails maintaining balanced and non-reactive awareness of negative emotions, allowing individuals to acknowledge their distress without either suppressing or over-identifying with it. Together, these dimensions form the foundation of a compassionate stance toward the self, promoting adaptive coping in the face of psychological distress.

The language of self-compassion is emotionally supportive and tolerant, particularly in the face of personal failings (Neff, 2011; Allen & Leary, 2010; Neff & Knox, 2020). The common humanity component helps contextualize personal suffering within the broader spectrum of human imperfection, thereby reducing feelings of isolation. Mindfulness facilitates a clear and balanced perception of one's emotional state, allowing for full experiential openness without ruminative entanglement or emotional avoidance (Neff & Lamb, 2009; Luo et al., 2019).

Research has demonstrated that self-compassion promotes effective self-regulation of health behaviors (Terry & Leary, 2011), enhances psychological and physical well-being (Hall et al., 2013), and reduces stress, self-blame, and cortisol levels (Germer & Neff, 2013). It also activates the caregiving system and promotes oxytocin release (Gilbert & Procter, 2006).

As a protective mechanism in the face of trauma, self-compassion supports emotion regulation (Vettese et al., 2011), facilitates more accurate self-appraisal, and promotes adaptive coping strategies (MacBeth & Gumley, 2012). Empirical evidence also shows a significant negative correlation between self-compassion and symptoms of social anxiety (Gill et al., 2018), generalized anxiety, and depression (Muris et al., 2015; Krieger et al., 2013). Moreover, self-compassion has been found to moderate the association between shame and psychological distress, mitigating the impact of internalized negative self-evaluations (Zhang et al., 2018).

Self-Compassion and emotion regulation

Self-compassion is closely linked to cognitive Self-compassion has been linked to emotion regulation strategies, with higher levels of self-compassion associated with reduced reliance on cognitive avoidance (Gill et al., 2018).

Emotion regulation refers to the processes by which individuals influence their emotional experiences and expressions in response to environmental demands. Although emotions are experienced at the individual level, emotion regulation encompasses broader mechanisms, including the management of one's social environment.

Cognitive emotion regulation specifically involves mental responses to emotion-eliciting events, which can operate consciously or unconsciously (Kamalinasab & Mohammadkhani, 2018). It encompasses attentional and cognitive processes aimed at modulating the onset, valence, intensity, and duration of emotional responses (Miklósi, 2015). Emotion regulation more broadly includes both intrinsic and extrinsic processes that support the monitoring, evaluation, and modification of emotional reactions (Kövesdi, 2018). According to Gross and John (2003), it entails the use of contextually appropriate cognitive and behavioral strategies, which can be organized into five sequential stages: situation selection, situation modification, attentional deployment, cognitive appraisal, and response modulation (Fernandes et al., 2021).

Cognitive emotion regulation occurs primarily through mental processes and is distinct from behavioral regulation strategies (Domaradzka & Fajkowska, 2018), influencing the quality, intensity, and duration of emotional experiences (Mónika et al., 2011). These strategies are commonly classified as adaptive or maladaptive: adaptive strategies facilitate effective adjustment and emotional control, whereas maladaptive strategies contribute to the persistence and exacerbation of pathological emotional responses to stress (Mónika et al., 2011; Kamalinasab & Mohammadkhani, 2018).

Importantly, self-compassion has been shown to reduce anxiety and depression by alleviating perceived stress (Luo et al., 2019) and is positively associated with the use of adaptive cognitive emotion regulation strategies, while inversely related to maladaptive ones (Kamalinasab & Mohammadkhani, 2018). Specifically, self-compassion predicts greater engagement in positive refocusing, planning, cognitive reappraisal, and perspective-taking, alongside reductions in self-blame, rumination, and externalizing blame (Kamalinasab & Mohammadkhani, 2018).

The Role of Maladaptive Cognitive Emotion Regulation Strategies in Anxiety and Depression

According to Fernandes, Newton, and Essau (2021), both trait and state anxiety predict the use of emotion regulation strategies, including suppression and reappraisal, as well as internalizing problems, and are linked to response inhibition. Individuals experiencing anxiety tend to rely more on maladaptive

emotion regulation strategies than on adaptive ones. Similarly, anhedonic depression is primarily influenced by negative affectivity and difficulties in emotional regulation (Vujanovic et al., 2007).

Research indicates that individuals who employ reappraisal experience significantly higher positive emotions and fewer negative emotions compared to those who rely on suppression, who are more prone to negative affect and reduced positive affect. Anxiety has been shown to hinder the development of effective emotion regulation strategies, as anxious individuals often resort to avoidant mechanisms such as suppression, making it challenging to reappraise negative situations effectively (Cisler & Koster, 2010).

Emotion regulation is closely linked to anxiety, with anxious individuals more frequently employing suppression as a regulatory strategy (Fernandes et al., 2021). Maladaptive cognitive emotion regulation strategies, including rumination and self-blame, increase the risk of developing both anxiety and depression across adolescent and adult populations. Conversely, positive reappraisal is associated with fewer symptoms of these disorders (Garnefski et al., 2002).

Several studies have consistently demonstrated strong associations between maladaptive strategies—particularly rumination, self-blame, and catastrophizing—and symptoms of anxiety and depression (Mónika et al., 2011; Cisler et al., 2009; Domaradzka & Fajkowska, 2018). In contrast, adaptive strategies such as positive reappraisal, planning, and positive refocusing serve a protective function and are correlated with reduced symptomatology (Garnefski et al., 2004; Wang et al., 2013; Min et al., 2013; Garnefski & Kraaij, 2007).

Shame, Self-Esteem, and Their Roles in Anxiety and Depression

Shame plays a pivotal role in the emergence of anxiety and depressive symptoms. It is a complex, self-conscious, and socially oriented emotion rooted in negative self-evaluation, feelings of rejection, and anxiety related to potential loss of relational bonds (Callow et al., 2021; Brown, 2006; Cunha et al., 2021). Shame targets the entire self, often eliciting feelings of worthlessness, avoidance, and social withdrawal (Bastin et al., 2016; Cunha et al., 2021), while also serving a protective function by signaling potential humiliation and threats to social connections, thereby encouraging adherence to social norms (MacGinley et al., 2019; Cunha et al., 2021). Self-conscious emotions such as shame arise from advanced cognitive processing and play a crucial role in maintaining social relationships (Kim et al., 2011; Cunha et al., 2021).

From a biopsychosocial and evolutionary perspective, shame manifests both externally—through perceived judgment by others—and internally—through self-criticism (Gilbert, 2003, 2009). Internal shame centers on perceived personal flaws, whereas external shame relates to social rejection, with the two forms often co-occurring as individuals internalize negative external evaluations (Cunha et al., 2021). Shame is commonly categorized into four domains: inferiority, isolation, worthlessness, and fear of criticism (Fekih-Romdhane et al., 2023). Importantly, shame differs from guilt: shame involves a negative evaluation of the global self, whereas guilt pertains to specific behaviors (Câdea & Szentagotai-Tătar, 2018). Shame is characterized by inward focus, stable attributions, and avoidance behaviors, whereas guilt promotes outward focus, empathy, and reparative actions (Miceli & Castelfranchi, 2018; Kim et al., 2011; Câdea & Szentagotai-Tătar, 2018). Overall, shame primarily impacts personal identity, while guilt concerns relational damage (Baumeister et al., 1994; Keltner & Buswell, 1997).

Self-esteem—defined by Rosenberg (1965) as an individual's favorable or unfavorable attitude toward oneself—acts as a cognitive counterpart to shame. High self-esteem reflects a sense of worthiness without implying superiority over others (Sowislo & Orth, 2013). Self-esteem can be conceptualized globally, as an overall self-evaluation, or specifically, across certain domains, encompassing competence and worthiness (Komlósi, 2007; Ni, 2022; Cast & Burke, 2002). Individuals with low self-esteem often employ self-protective strategies to avoid shame, whereas those with high self-esteem emphasize personal strengths through positive self-comparisons (Cunha et al., 2021). Although overlapping, shame is an emotional experience, while self-esteem is a cognitive evaluation; shame involves a desire for invisibility, whereas self-esteem relates to positive visibility and acceptance (Ni, 2022).

Empirical evidence links traumatic shame memories with increased depressive symptoms (Steindl et al., 2018) and social or generalized anxiety disorder symptoms (Fergus et al., 2010). Shame is strongly associated with anxiety, depression, stress, and various anxiety disorders (Callow et al., 2021; Cunha et al., 2021), and shame proneness can predict depressive symptomatology (De Rubeis & Hollestein, 2009; Câdea & Szentagotai, 2013). Conversely, self-esteem and self-efficacy are negatively correlated with anxiety and depression and serve as protective factors that enhance psychological resilience (Muris et al., 2015; Sowislo & Orth, 2013). Low self-esteem contributes to depression in line with the diathesis-stress model, but can also result from depressive episodes according to the vulnerability model (Sowislo & Orth, 2013). Furthermore, self-esteem mediates the relationship between maladaptive perfectionism and depression (Dorevitch et al., 2020) and modulates the interplay between stress, depression, and anxiety (Ni, 2022).

OBJECTIVES

The primary aim of the present study was to examine the associations between shame, self-compassion, self-esteem, perceived stress, and cognitive emotion regulation strategies in relation to symptoms of depression and anxiety.

In addition, the study explored whether self-compassion and maladaptive emotion regulation strategies were statistically associated with the relationship between shame and psychological symptoms. Finally, the study sought to explore the practical implications of the findings by identifying factors that may contribute to the reduction of anxiety and depressive symptoms, thereby informing the development of more effective therapeutic and intervention strategies.

HYPOTHESES

H1: Shame is a significant negative predictor of self-compassion.

H2: Self-compassion mediates the relationship between shame and anxiety as well as depressive symptoms.

H3: Low self-esteem, perceived stress, and self-blame predict higher levels of depressive and anxiety symptoms.

H4: Cognitive emotion regulation strategies mediate the effects of self-compassion, shame, and self-esteem on anxiety and depressive symptoms.

POWER AND SAMPLE SIZE

G*Power software for linear regression (total number of predictors 1–3) was used to perform an a priori power analysis, yielding a statistical power of .80 and a p value of .05. According to the findings, $n = 55\text{--}77$ was the necessary sample size for a medium effect size ($f^2 = 0.15$), and $n = 395\text{--}550$ was needed for a small effect size ($f^2 = 0.02$). The sample size ($N = 201$) in the study was adequate for identifying medium effect sizes.

Participants

The study included 201 Hungarian-speaking participants from Romania, aged 18 to 67 years ($M = 29.25$, $SD = 11.12$). The sample comprised 141 young adults (18–29 years), 57 middle-aged adults (30–57 years), and 3 elderly individuals (63–67 years). The majority were female (164 women, 37 men). Educational backgrounds varied: most had completed a bachelor's degree ($n = 82$), secondary education ($n = 74$), or a master's degree ($n = 23$), while smaller groups had completed primary education ($n = 3$), vocational training ($n = 16$), or doctoral studies ($n = 3$). Regarding marital status, 60 participants were single,

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71 in a relationship, 47 married, 16 cohabiting, 6 divorced, and 1 widowed. Participants resided in villages or small communities (n = 96), the capital city (n = 20), small towns (n = 38), or cities/county seats (n = 47) (*see Table 1*).

Table 1. *Sociodemographic characteristic*

Basic characteristics	Full sample	
	N	%
Categories of age groups		
Young	141	70.1
Older	3	1.5
Middle-aged	57	28.4
Gender		
Male	37	18.4
Female	164	81.6
Educational attainment		
Elementary school (grades 5–8)	3	1.5
Vocational school	16	8
High school diploma	74	36.8
College/University – Bachelor’s degree	82	40.8
College/University – Master’s degree	23	11.4
College/University – Doctoral degree	3	1.5
Marital status		
Married	47	23.4
In a relationship	71	35.3
Single	60	29.9
Cohabiting	16	8
Divorced	6	3
Widowed	1	.5
Place of residence		
Village / Small town	96	47.8
Town	38	18.9
City / County seat	47	23.4
Capital city	20	10

Note. N = 201. Mean age was 29.25, SD = 11.12

Instruments

Socio-demographic Questionnaire

The socio-demographic questionnaire was developed based on a comprehensive review of existing literature to ensure the relevance of demographic variables to the study's aims. Variables assessed included age, gender, educational attainment, marital status, and place of residence. These factors were included due to their established links with mental health outcomes: age influences emotion regulation and coping effectiveness; gender affects emotional responses and social attitudes; educational attainment relates to psychological awareness and coping styles; marital status impacts social support availability; and urban versus rural residence involves differing mental health risk factors (e.g., Bluth & Blanton, 2013; Charles, 2010; Neff, 2011; Halpern-Manners et al., 2016; Umberson & Karas Montez, 2010; Pee et al., 2010).

External and Internal Shame Scale (EISS)

Shame was measured using an 8-item self-report questionnaire developed by Ferreira et al. (2020). A Hungarian translation was created by the researchers for this study, as no prior adaptation existed. The EISS assesses external, internal, and global shame, with higher scores reflecting greater shame experiences. Responses are rated on a 5-point Likert scale (0 = never to 4 = always). The original scale demonstrated high reliability ($\alpha = .89$); in the present study, reliability was good ($\alpha = .82$) (see Table 2).

Rosenberg Self-Esteem Scale (RSE)

Global self-esteem was measured by the Rosenberg Self-Esteem Scale (Rosenberg, 1965), a 10-item self-report tool widely used across populations. Participants rated statements reflecting self-acceptance and self-evaluation on a 4-point Likert scale (1 = strongly disagree to 4 = strongly agree). The scale includes five positively worded and five negatively worded (reverse-scored) items. The original scale demonstrated high reliability ($\alpha = .85$), with retest reliability of .88 over two weeks. In this study, reliability was good ($\alpha = .89$); subscales for negative and positive self-esteem showed $\alpha = .84$ and $\alpha = .85$, respectively. The Hungarian translation by Horváth et al. (2021) was used (see Table 2).

Self-Compassion Scale – Hungarian Version (SCS-H)

Self-compassion was assessed using the Hungarian adaptation of the Self-Compassion Scale (Neff, 2003; Horváth et al., 2021), a 26-item questionnaire.

Respondents rated how they treat themselves in difficult situations on a 5-point Likert scale (1 = almost never to 5 = almost always). The original scale showed excellent reliability ($\alpha = .93$), with $\alpha = .91$ in this study. It includes six subscales: self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identification; the negative subscales were reverse-scored. Subscale reliabilities ranged from $\alpha = .66$ (mindfulness) to $\alpha = .84$ (self-kindness) in the current sample (see Table 2).

Depression, Anxiety, and Stress Scales (DASS-21)

Depression, anxiety, and stress symptoms were measured with the Hungarian version of the shortened DASS-21 (Lovibond & Lovibond, 1995; Horváth et al., 2021). Participants rated how much each statement applied to them over the past week on a 4-point scale (0 = did not apply to me at all to 3 = applied to me most of the time). The original scale demonstrated excellent reliability ($\alpha = .95$); in this study, $\alpha = .92$. The instrument includes three subscales—depression ($\alpha = .86$), anxiety ($\alpha = .85$), and stress ($\alpha = .80$)—all showing good reliability. No items were reverse scored (see Table 2).

Cognitive Emotion Regulation Questionnaire (CERQ)

Cognitive emotion regulation strategies were assessed with the Hungarian version of the CERQ, a 36-item self-report instrument (Garnefski et al., 2001; Miklósi et al., 2011). Participants responded on a Likert scale to nine subscales: self-blame, acceptance, rumination, positive refocusing, planning, positive reappraisal, putting into perspective, catastrophizing, and blaming others. The original CERQ had high reliability ($\alpha = .93$), with the Hungarian adaptation showing $\alpha = .80$. In this study, the overall scale reliability was good ($\alpha = .85$). Subscale reliabilities in the current sample ranged from $\alpha = .61$ (acceptance) to $\alpha = .88$ (positive refocusing). All subscale reliability coefficients are detailed in Table 2.

Table 2. *Psychometric properties of the scales used in the study*

Scale	M	SD	Range	Cronbach's α
Shame scale (EISS)	11.07	5.599	26	.82
Self-esteem scale (RSE)	29.28	6.626	26	.89
Negative self-esteem	13.557	4.072	15	.84
Positive self-esteem	15.726	3.127	12	.85

Scale	M	SD	Range	Cronbach's α
Self-compassion scale (SCS-H)	76.48	17.202	82	.91
Self-kindness	14.730	4.447	19	.84
Self-judgment	14.05	4.727	20	.83
Common humanity	12.12	3.673	16	.79
Isolation	11.55	3.717	16	.74
Mindfulness	12.82	3.129	16	.66
Over-identification	11.20	3.591	15	.69
Depression, Anxiety, and Stress Scale (DASS-21)	25.218	13.435	61	.92
Depression	7.15	5.183	21	.86
Anxiety	7.66	5.501	21	.85
Stress	10.41	4.812	20	.80
Cognitive Emotion Regulation Strategies Scale (CERQ)	114.38	16.515	118	.85
Self-blame	12.89	3.306	16	.73
Acceptance	13.77	3.005	14	.61
Rumination	14.28	3.645	16	.81
Positive refocusing	11.57	4.069	16	.88
Planning	14.97	3.122	16	.75
Positive reappraisal	14.67	3.854	16	.86
Putting into perspective	13.40	3.808	16	.79
Catastrophizing	10.17	3.687	14	.72
Other-blame	8.68	3.225	13	.81

Research Design

This study employed a correlational research design, as its primary objective was to explore the relationships among various psychological constructs without manipulating any variables or implementing experimental interventions. The research followed a descriptive, quantitative approach, relying on questionnaire-based data collection and statistical analyses to investigate the effects of shame, self-esteem, self-compassion, and cognitive emotion regulation strategies on symptoms of anxiety and depression.

A cross-sectional, single-measurement design was used, wherein all participants were assessed at one point in time. The study did not involve any longitudinal tracking or pre/post measurements. The key variables examined in this research included:

- Predictor variables: shame, self-esteem, self-compassion, and cognitive emotion regulation strategies
- Outcome variables: symptoms of anxiety and depression

This design was chosen to provide a comprehensive snapshot of the associations between the selected variables within the given population.

PROCEDURE

Participants were recruited through a convenience sampling method. Data collection was conducted between November 2024 and April 2025. The battery of questionnaires—including the External and Internal Shame Scale (EISS), Rosenberg Self-Esteem Scale (RSE), Self-Compassion Scale – Hungarian version (SCS-H), Depression, Anxiety, and Stress Scale (DASS-21), and the Cognitive Emotion Regulation Questionnaire (CERQ)—was administered online using Google Forms.

The survey link was distributed via social media platforms (e.g., Facebook, Instagram), university groups, and personal networks. Prior to completing the questionnaires, participants were presented with a brief description of the study's purpose, details about data confidentiality, and were asked to provide informed consent.

Participation was voluntary and anonymous, and respondents were informed that they could withdraw at any time without consequences. Completing the entire survey required approximately 15 minutes. The research adhered to the ethical guidelines established by the Master's Degree program in Clinical Psychology at Babeş-Bolyai University and the Code of Ethics of the Romanian College of Psychologists.

Data Processing Procedures

Prior to conducting statistical analyses, a data cleaning process was undertaken to check for missing values and outliers. All responses were complete and valid, and no missing or extreme values were detected; therefore, no participants were excluded from the final dataset.

All statistical analyses were conducted using IBM SPSS Statistics version 25.0 (IBM Corporation, Armonk, NY). Internal consistency reliability was assessed via Cronbach's alpha coefficients for each scale and subscale (see Table 2).

Prior to the main analyses, the dataset was screened to ensure the assumptions of normality, linearity, multicollinearity, homoscedasticity, and autocorrelation were met. Histograms, P-P plots, and the Durbin-Watson statistic supported the fulfillment of these assumptions. Additionally, the distribution of

data was evaluated through skewness and kurtosis values, which fell within the acceptable range of -1 to $+1$, indicating approximate normality. The Shapiro-Wilk or Kolmogorov-Smirnov tests were also considered for assessing normality, with non-significant results interpreted as evidence of a normal distribution (Pallant, 2016). Outliers were examined via robust score analysis, and listwise deletion was used to handle any missing data (Tabachnick & Fidell, 2013).

Descriptive statistics (means, standard deviations, and percentages) were calculated for all relevant variables. Percentages were used to report categorical variables (see Table 1). The threshold for statistical significance was set at $p < .05$.

To test the study hypotheses, the following statistical procedures were applied:

1. Hypothesis 1: A linear regression analysis was performed to test whether shame (independent variable) significantly predicted self-compassion (dependent variable). Regression assumptions were checked and fulfilled, and outliers were excluded (Pallant, 2016).
2. Hypothesis 2: A mediation analysis was conducted to examine whether self-compassion mediates the relationship between shame (independent variable) and symptoms of anxiety and depression (dependent variables). Assumptions for mediation were assessed: (a) a significant relationship between the independent and dependent variables, (b) a significant relationship between the independent variable and the mediator, (c) a significant relationship between the mediator and the dependent variables (controlling for the independent variable), and (d) a reduction in the strength of the independent–dependent variable relationship when the mediator was included (Pallant, 2016).
3. Hypothesis 3: A multiple linear regression analysis was conducted with self-esteem, stress, and self-blame as independent variables, and depressive and anxiety symptoms as dependent variables. Assumptions of linearity and the absence of outliers were checked and satisfied.
4. Hypothesis 4: A hierarchical mediation analysis was performed to test whether maladaptive cognitive emotion regulation strategies mediated the effects of self-compassion, shame, and self-esteem (independent variables) on anxiety and depressive symptoms (dependent variables). Mediation assumptions were again tested and fulfilled (Pallant, 2016).

Given the relatively large standard deviations observed for certain variables (e.g., shame and depressive symptoms), additional diagnostic checks were conducted to evaluate potential violations of regression assumptions. Visual inspection of histograms and P–P plots suggested approximately normal distributions, and skewness and kurtosis values fell within the acceptable range

(-1 to +1). Furthermore, no influential outliers were identified based on standardized residuals and leverage statistics. These results indicate that the variability in the data reflects natural heterogeneity within the sample rather than violations of statistical assumptions.

All research procedures were conducted in accordance with the ethical standards of the 1975 Helsinki Declaration, as revised in 2000. The study complied with established ethical norms for psychological research, and participants provided informed consent before participating.

RESULTS

The Relationship Between Shame and Self-Compassion

A linear regression analysis was conducted to examine whether shame was significantly associated with lower levels of self-compassion. The overall model was statistically significant, $F(1, 199) = 108.75$, $p < .001$, with an R^2 of .353. This indicates that shame accounted for approximately 35.3% of the variance in self-compassion. The regression equation was: $\text{Self-Compassion} = 96.709 - 1.826 \times \text{Shame}$. This means that for each one-unit increase in shame, the predicted level of self-compassion decreased by approximately 1.826 units. Therefore, shame emerged as a significant negative predictor of self-compassion (see Table 3).

Table 3. *The Relationship Between Shame and Self-Compassion*

Variable	Model 1		
	B	β	SE
Constant	96.70**		2.17
Shame	-1.826**	-.594	.17
R^2	.353		

* $p < .05$, ** $p < .01$

The Mediating Role of Self-Compassion Between Shame and Anxiety and Depressive Symptoms

First, a simple linear regression was conducted to examine the effect of shame on depressive symptoms. The model was significant, $F(1, 199) = 77.43$, $p < .001$, with an R^2 of .280, indicating that shame explained 28.0% of the variance in depressive symptoms. The regression equation was: $\text{Depression} = 1.729 + 0.490 \times \text{Shame}$. Thus, higher levels of shame were significantly associated with increased depressive symptoms (see Table 4).

Table 4. *The Mediating Role of Self-Compassion Between Shame and Anxiety and Depressive Symptoms*

Variable	Model 1		
	B	β	SE
Constant	1.72*		.69
Shame	.490**	.529	.05
R²	.280		

Shame as a Predictor of Anxiety

Similarly, a linear regression was performed to assess the relationship between shame and anxiety symptoms. The model was significant, $F(1, 199) = 20.49$, $p < .001$, with an R^2 of .093. This suggests that shame accounted for 9.3% of the variance in anxiety symptoms. The regression equation was: Anxiety = $4.332 + 0.300 \times \text{Shame}$. Therefore, shame also significantly predicted anxiety symptoms, though the effect was smaller compared to depression (see Table 5).

Table 5. *Shame as a Predictor of Anxiety*

Variable	Model 1		
	B	β	SE
Constant	4.33**		.82
Shame	.300**	.306	.06
R ²	.093		

* $p < .05$, ** $p < .01$

To establish mediation, a regression was conducted to confirm the association between shame and self-compassion. As reported earlier, the model was significant ($F(1, 199) = 108.75$, $p < .001$, $R^2 = .353$), confirming that shame is a strong negative predictor of self-compassion (see Table 6).

Table 6. *Shame as a Predictor of Self-Compassion*

Variable	Model 1		
	B	β	SE
Constant	96.70**		2.17
Shame	-1.82**	-.594	.17
R²	.353		

* $p < .05$, ** $p < .01$

Mediation Analysis: Self-Compassion as a Mediator

A hierarchical regression analysis was used to test the mediating effect of self-compassion on the relationship between shame and depressive symptoms. In the first model, shame was a significant predictor of depression, $F(1, 199) = 77.43, p < .001, R^2 = .280$.

In the second model, self-compassion was added. The model remained significant, $F(2, 198) = 59.44, p < .001$, and R^2 increased to .375. The change in R^2 ($\Delta R^2 = .095$) was statistically significant, $F_{\text{change}} = 30.12, p < .001$, indicating that self-compassion accounted for an additional 9.5% of the variance in depressive symptoms.

Notably, in this model, self-compassion significantly predicted depression ($\beta = -.383, p < .001$), while shame's effect was reduced, supporting partial mediation (see Table 7).

Table 7. *Shame as a Predictor of Self-Compassion*

Variable	Model 1			Model 2		
	B	β	SE	B	β	SE
Constant	1.79*		.69	12.90**		2.13
Shame	.490**	.529	.05	.279**	.301	.06
Self-compassion				-.116**	-.383	.02
R^2	.280			.375		
ΔR^2				.095		

* $p < .05$, ** $p < .01$

A similar hierarchical regression was performed with anxiety as the dependent variable. In the first model, shame significantly predicted anxiety, $F(1, 199) = 20.49, p < .001, R^2 = .093$.

In the second model, the addition of self-compassion slightly improved the model, $F(2, 198) = 13.67$, but the increase in explained variance ($\Delta R^2 = .028$) was not statistically significant, $F_{\text{change}} = 6.30, p = .013, p > .05$. Self-compassion did not significantly predict anxiety symptoms when controlling for shame ($\beta = .208, p = .013$), and shame remained a significant predictor. These results suggest that self-compassion does not significantly mediate the relationship between shame and anxiety (see Table 8).

Table 8. *Self-compassion does not significantly mediate the relationship between shame and anxiety*

Variable	Model 1			Model 2		
	B	β	SE	B	β	SE
Constant	4.33**		.82	10.76**		2.68
Shame	.300**	.306	.06	.179*	.182	.08
Self-compassion				-.067*	-.208	.02
R²	.093			.121		
ΔR^2				.028		

* $p < .05$, ** $p < .01$

The Role of Self-Esteem, Perceived Stress, and Self-Blame in Depressive and Anxiety Symptoms

A multiple regression analysis was conducted to assess the predictive value of self-esteem, perceived stress, and self-blame on depressive symptoms. The overall model was significant, $F(3, 197) = 91.24, p < .001$, and accounted for approximately 58.2% of the variance in depressive symptoms ($R^2 = .582$). Self-esteem was a significant negative predictor of depressive symptoms ($B = -.356, \beta = -.455, p < .001$), indicating that higher self-esteem is associated with lower depressive symptoms. Perceived stress was a significant positive predictor ($B = .480, \beta = .446, p < .001$), suggesting that greater stress levels are associated with higher depressive symptoms. Self-blame, however, was not a significant predictor ($B = .008, \beta = .005, p > .001$). Similarly, overall cognitive emotion regulation strategies were not significant predictors of depressive symptoms ($B = -.001, \beta = -.003, p > .001$) (see Table 9).

Table 9. *The Role of Self-Esteem, Perceived Stress, and Self-Blame in Depressive Symptoms*

Variable	Model 1		
	B	β	SE
Constant	12.48**		2.08
Self-esteem	-.356**	-.455	.04
Stress	.480**	.446	.05
Self-blame	.008	.005	.08
Cognitive emotion regulation strategies	-.001	-.003	.01
R²	.582		

* $p < .05$, ** $p < .01$

When predicting anxiety symptoms using the same set of predictors, the overall model was also significant, $F(3, 197) = 42.91, p < .001$, explaining 39.5% of the variance in anxiety ($R^2 = .395$). Perceived stress was again a significant positive predictor ($B = .692, \beta = .605, p < .001$). In contrast, self-esteem ($B = -.054, \beta = -.065, p > .001$) and self-blame ($B = -.029, \beta = -.017, p > .001$) were not significant predictors. Overall cognitive emotion regulation strategies were also non-significant ($B = .025, \beta = .075, p > .001$) (see Table 10).

Table 10. *The Role of Self-Esteem, Perceived Stress, and Self-Blame in Anxiety Symptoms*

Variable	Model 1		
	B	β	SE
Constant	2.41		2.66
Self-esteem	-.054	-.065	.05
Stress	.692**	.605	.07
Self-blame	-.029	-.017	.10
Cognitive emotion regulation strategies	.025	.075	.01
R²	.395		

* $p < .05$, ** $p < .01$

Mediating Role of Maladaptive Cognitive Emotion Regulation Strategies

A multiple regression analysis was conducted to examine whether self-compassion, shame, and self-esteem predicted maladaptive emotion regulation strategies. The model was significant, $F(3, 197) = 19.61, p < .001$, explaining 23.0% of the variance ($R^2 = .230$). However, none of the predictors had statistically significant effects: Self-compassion: $B = -.050, \beta = -.088, p > .001$; Shame: $B = .303, \beta = .173, p > .001$; Self-esteem: $B = -.397, \beta = -.268, p > .001$

In the first step, a regression model including self-compassion, shame, and self-esteem significantly predicted anxiety, $F(3, 197) = 9.19, p < .001$, accounting for 12.3% of the variance ($R^2 = .123$).

In the second step, maladaptive emotion regulation strategies were added to the model. The revised model remained significant, $F(4, 196) = 11.76, p < .001$, and the explained variance increased to 19.4% ($R^2 = .194$), with a statistically significant change in variance ($\Delta R^2 = .071$), $F_{\text{change}} = 17.21, p < .001$. Maladaptive strategies were significant predictors ($B = .170, \beta = .303, p < .001$), while self-compassion, shame, and self-esteem lost their predictive power, indicating that maladaptive emotion regulation may mediate their effects (see Table 11).

Table 11. *Mediating Role of Maladaptive Cognitive Emotion Regulation Strategies*

Variable	Model 1			Model 2		
	B	β	SE	B	β	SE
Constant	11.82**		3.25	1.94		3.93
Self-compassion	-.054	-.169	.034	-.045*	-.142	.033
Shame	.152	.155	.094	.101	.102	.091
Self-esteem	-.059	-.071	.102	.009	.010	.100
Maladaptive emotion regulation strategies				.170**	.303	.041
R²	.123			.194		
ΔR^2				.071		

* $p < .05$, ** $p < .01$

In the hierarchical regression analysis predicting depressive symptoms, the initial model—comprising self-compassion, shame, and self-esteem as predictors—was statistically significant, $F(3, 197) = 50.38, p < .001$, and explained 43.4% of the variance in depressive symptoms ($R^2 = .434$). In the second step, maladaptive cognitive emotion regulation strategies were added to the model. This extended model also proved to be significant, with the explained variance increasing to 49.0% ($R^2 = .490$). The change in explained variance was statistically significant ($\Delta R^2 = .056$), $F_{\text{change}} = 21.64, p < .001$, indicating that the inclusion of maladaptive strategies significantly improved the model.

Maladaptive cognitive emotion regulation strategies were found to be significant positive predictors of depressive symptoms ($B = .143, \beta = .270, p < .001$). While self-esteem remained a significant predictor in the extended model, both self-compassion and shame lost their predictive significance after the inclusion of maladaptive strategies. This pattern suggests a partial mediating role of maladaptive cognitive emotion regulation strategies in the relationship between self-compassion, shame, and depressive symptoms (see Table 12).

Table 12. *Mediating Role of Maladaptive Cognitive Emotion Regulation Strategies*

Variable	Model 1			Model 2		
	B	β	SE	B	β	SE
Constant	19.19**		2.46	10.89**		2.94
Self-compassion	-.040	-.134	.026	-.033	-.110	.025
Shame	.120	.130	.071	.077	.083	.068

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Variable	Model 1			Model 2		
Self-esteem	-.351**	-.449	.078	-.295**	-.377	.075
Maladaptive emotion regulation strategies				.143**	.270	.031
R²	.434			.490		
ΔR²				.056		

*p<.5, **p<.01

CONCLUSIONS

The present study examined the relationships among shame, self-compassion, self-esteem, stress, and emotion regulation strategies in association with symptoms of depression and anxiety. Consistent with previous literature, the results indicated that shame was significantly and negatively associated with self-compassion. Individuals with higher levels of shame were less likely to exhibit kindness toward themselves, recognize shared human experiences, or maintain mindful awareness. Instead, they appeared more prone to self-criticism, feelings of isolation, and over-identification with negative emotions. These findings align with the conceptualization of shame as a self-focused, socially evaluative emotion that can undermine self-acceptance and compassion (Kim et al., 2011). This inverse relationship between shame and self-compassion is consistent with earlier findings (Barnard & Curry, 2011; Mosewich et al., 2011; Sedighimornani et al., 2019; Callow et al., 2021) and further highlights the potential protective role of self-compassion in relation to the maladaptive aspects of shame.

Self-compassion also emerged as a partial mediator in the relationship between shame and depressive symptoms, but not anxiety. This finding suggests that the association between shame and depressive symptoms may be partly explained by lower levels of self-compassion. This pattern is consistent with the Shame–Self-Criticism–Depression model (Gilbert & Irons, 2009), which proposes that internalized shame may contribute to depressive symptoms through increased self-criticism and negative self-evaluation. In contrast, no significant mediating effect of self-compassion was observed in the relationship between shame and anxiety. Although shame was positively associated with anxiety, the absence of a mediating effect suggests that different psychological processes may be involved. This interpretation is broadly consistent with theoretical models of social anxiety that emphasize fear of social rejection and external shame as important factors (Clark & Wells, 1995; Heimberg et al., 2010). Thus, self-compassion may be particularly relevant in psychological difficulties characterized by internalized shame and self-critical tendencies, such as depression.

In line with previous studies, self-compassion was negatively associated with depressive symptoms, supporting its potential role as a protective psychological factor (Steindl et al., 2018; Zhang et al., 2018). Interventions aimed at increasing self-compassion—especially those grounded in mindfulness practices, such as loving-kindness meditation (METTA)—may therefore be beneficial in reducing shame and depressive symptoms (Sedighimornani et al., 2019).

Regarding other variables included in the model, perceived stress showed strong associations with both depressive and anxiety symptoms, suggesting that stress may be relevant across different forms of psychological distress. Low self-esteem, however, was significantly associated only with depressive symptoms. This finding is consistent with the vulnerability model proposed by Sowislo and Orth (2013), which suggests that lower self-esteem may contribute to the development of depressive symptoms, while its relationship with anxiety tends to be weaker and more context-dependent. Longitudinal studies have also indicated that lower self-esteem may precede depressive symptoms over time (Orth et al., 2008, 2009). Despite its relevance in cognitive vulnerability models of anxiety (Clark & Beck, 2010), self-esteem did not show a significant association with anxiety symptoms in the present study.

Self-blame, contrary to expectations, was not significantly associated with either depressive or anxiety symptoms. Although previous studies have linked self-blame to psychological distress (Else-Quest et al., 2009; Jannati et al., 2020), its direct association in the current model was minimal. This finding may indicate that indirect pathways or interaction effects are more relevant than direct associations in explaining the relationship between self-blame and psychological symptoms.

Maladaptive cognitive emotion regulation strategies—such as rumination, suppression, and catastrophizing—were significantly associated with both depressive and anxiety symptoms. These findings are consistent with previous meta-analytic evidence indicating that maladaptive strategies are related to increased psychological vulnerability, whereas adaptive strategies (e.g., reappraisal, acceptance, and problem-solving) are generally associated with better psychological adjustment (Aldao et al., 2010; Schäfer et al., 2016). However, in the present study, acceptance did not emerge as a significant factor, which may reflect differences in operationalization or characteristics of the specific sample.

The role of maladaptive emotion regulation strategies was further supported by the hierarchical regression analyses. When these strategies were added to the predictive models for both depression and anxiety, they significantly increased the explained variance, indicating that they accounted for additional variability in psychological symptoms. For depressive symptoms, maladaptive strategies partially mediated the associations between shame, self-esteem, and

depression. In this model, self-esteem remained a significant variable, whereas the associations involving self-compassion and shame were attenuated, suggesting that maladaptive emotion regulation strategies may partly explain how these variables are linked to depressive symptoms.

Previous neurobiological research suggests that maladaptive emotion regulation strategies may be associated with heightened amygdala activity and reduced prefrontal control (Etkin et al., 2015). However, the present study relied exclusively on self-report measures and therefore cannot directly assess underlying neurobiological mechanisms. In contrast, strategies such as cognitive reappraisal have been linked to greater emotional well-being, stronger social support, and more adaptive psychological outcomes (Gross & John, 2003). Suppression, on the other hand, has been associated with increased emotional distress, reduced interpersonal support, and elevated risk of depressive symptoms.

Taken together, the findings highlight the potential importance of maladaptive emotion regulation strategies, self-compassion, and self-esteem in relation to depressive and anxiety symptoms. These variables may represent relevant targets for psychological interventions and prevention programs aimed at reducing psychological distress. In particular, interventions that promote adaptive emotion regulation and foster self-compassion and healthy self-evaluation may contribute to improved emotional well-being.

Limitations and Future Directions

Despite its contributions, the present study has several limitations that should be acknowledged. First, the use of convenience sampling limits the generalizability of the findings. Participants were recruited from populations accessible to the researchers, resulting in a non-representative sample. This limitation is further compounded by the predominance of female participants, which may influence the results and reduce their applicability to broader populations, including males or gender-diverse individuals.

Second, the reliance on self-report questionnaires introduces the possibility of response biases, including social desirability and inaccuracies in self-perception. Although self-report instruments are widely used and well validated in psychological research, they may not fully capture objective psychological processes.

Another limitation concerns the cross-sectional design of the study, which does not allow conclusions about causal relationships between variables. While associations among the studied constructs can be identified, the temporal or directional nature of these relationships cannot be determined. Future studies employing longitudinal or experimental designs would provide stronger evidence regarding potential causal mechanisms.

Additionally, cognitive emotion regulation strategies were examined in aggregated form, which may have obscured the specific contributions of individual strategies. Although composite scores offer a useful overview, analyzing individual strategies separately could reveal more nuanced associations with depressive and anxiety symptoms.

Further methodological limitations relate to the online administration of the survey. Participation was restricted to individuals with sufficient internet access and digital literacy, which may have excluded certain demographic groups. Moreover, environmental conditions during survey completion (e.g., distractions or lack of privacy) could not be controlled and may have influenced response quality.

Future research could address these limitations in several ways. Employing more diverse and representative sampling strategies, as well as achieving greater gender balance, would improve the generalizability of findings. Comparing clinical and non-clinical populations could also provide valuable insight into how these psychological variables operate across different levels of symptom severity.

Longitudinal designs would allow researchers to examine changes in psychological variables over time and clarify the direction of relationships observed in the present study. Experimental approaches, including randomized controlled trials evaluating self-compassion-based interventions, may also help determine whether enhancing self-compassion or improving emotion regulation leads to reductions in psychological distress.

Further research may benefit from examining individual cognitive emotion regulation strategies separately rather than relying solely on composite measures. In addition, incorporating variables such as childhood trauma—an established risk factor for emotional disorders (Hopfinger et al., 2016; Hovens et al., 2015)—or social support, which has been shown to play a protective role (Tartaro et al., 2024), could provide a more comprehensive understanding of the factors contributing to anxiety and depressive symptoms.

Finally, the development and empirical evaluation of psychological interventions aimed at enhancing self-compassion and adaptive emotion regulation may represent promising directions for future research. Such interventions could offer practical implications for improving mental health outcomes, particularly among individuals vulnerable to depressive and anxiety symptoms.

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Data availability Statement

The information needed to reproduce all of the reported results is available at <https://figshare.com/s/6780ae0780bc98932461>

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From Emotions to Achievement: The Role of Cognitive Control and Teacher Support in Academic Performance

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ABSTRACT. This study explores the impact of emotions such as interest, joy, anger, and fear on high school students' academic achievement, focusing on the mediating role of cognitive control and the moderating effect of perceived social support. Based on educational psychology theories concerning emotion and motivation, the research investigates how positive and negative emotional states—such as interest and joy, alongside anger and fear—affect students' cognitive control abilities, which in turn influence their academic performance. The study also examines how support from teachers can buffer the negative effects of emotions like anger and fear on cognitive control. The findings reveal a dual pathway through which emotions impact academic performance: directly, by disrupting cognitive processes, and indirectly, by reducing cognitive control. Moreover, the results indicate that higher levels of perceived social support enhance students' ability to maintain cognitive control despite the presence of negative emotions. These insights underscore the significance of fostering supportive educational environments and implementing strategies that boost both cognitive control and emotional well-being. The study provides valuable implications for educators, school psychologists, and policymakers focused on improving academic outcomes by promoting emotional resilience and enhancing students' cognitive capabilities.

Keywords: negative emotions, cognitive control, academic performance, perceived social support, high school students

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1. INTRODUCTION

In recent decades, research has increasingly focused on understanding how cognitive control influences learning processes and academic performance. Cognitive control, encompassing abilities such as attention regulation, working memory, and inhibitory control, plays a pivotal role in managing emotions and behaviors, which are essential for academic success. Understanding the interplay between cognitive control and emotions provides valuable insights into optimizing educational outcomes. Recent studies have highlighted the bidirectional relationship between cognitive control and emotional regulation. For instance, research by Soltani, Nezhad and Delroba (2024) found a significant relationship between executive functions, emotion regulation, and academic achievement among students. Similarly, findings by Camacho-Morles et al. (2021) suggest that positive activating emotions, such as enjoyment and hope, can enhance academic outcomes by promoting engagement and motivation. Furthermore, individual differences in cognitive control processes, such as working memory updating, response inhibition, and set shifting, have been shown to impact emotion regulation strategies. A study by Yakimova, Maintenant, and Taillandier-Schmitt (2020) examined how positive and negative emotions influence cognitive performance in secondary schools, highlighting the role of emotion regulation in academic contexts. These findings suggest that enhancing cognitive control can improve emotion regulation, thereby supporting academic performance.

The Influence of Positive and Negative Emotions on Academic Performance

Emotions play a pivotal role in shaping students' academic journeys, influencing their motivation, engagement, and overall performance. Positive emotions such as interest and joy, which were specifically chosen for this study, have been consistently linked to enhanced learning experiences and academic success. For example, research by Pekrun et al. (2017) demonstrated that positive emotions not only predict subsequent academic achievement but are also reinforced by it, highlighting a reciprocal relationship. Similarly, recent studies have confirmed the beneficial effects of positive emotions on academic performance, with positive emotions fostering creativity and problem-solving abilities (Fredrickson, 2009; Isen, 2017).

Conversely, negative emotions such as anger and fear, which were also included in this study, can impede academic progress. A study involving medical students revealed that negative emotions were inversely related to academic performance, underscoring the detrimental effects of such feelings on learning outcomes (LeBlanc, 2017). Likewise, research by Arsenio and Loria

(2014) found that adolescents' negative academic affect and disengaged coping strategies were associated with lower GPAs, emphasizing the negative impact of unmanaged negative emotions. Recent work by O'Reilly et al. (2020) has also emphasized the significant negative impact of chronic stress on cognitive performance and academic outcomes, highlighting the importance of emotional regulation strategies in academic settings.

The interplay between positive and negative emotions further complicates this dynamic. While positive emotions like interest and joy can enhance cognitive functions such as attention and memory (Kool, 2018), negative emotions such as anger and fear may disrupt these processes, leading to decreased academic engagement (Zeidner et al., 2019). This complex relationship suggests that fostering emotional well-being is crucial for optimizing academic performance. Integrating emotional intelligence training and coping strategies into educational curricula could be beneficial in this regard (Goleman, 2018).

Moreover, individual differences in emotional regulation abilities can influence how students experience and respond to academic challenges. Students with higher emotional intelligence are better equipped to manage stress and maintain motivation, leading to improved academic outcomes (Brackett et al., 2019). This highlights the importance of not only addressing the emotional climates of educational settings but also promoting individual skills in emotional regulation.

In summary, both positive and negative emotions significantly influence academic performance through their effects on motivation, engagement, and cognitive processes. Recognizing and addressing the emotional dimensions of learning can lead to more effective educational practices and better student outcomes.

Cognitive Control as a Mediator of Emotional Influence on Academic Performance

Building upon the foundational understanding of how emotions shape academic performance, it becomes evident that emotional experiences do not act in isolation but are intertwined with cognitive mechanisms that enable or hinder academic success. One such mechanism, cognitive control, has gained increasing attention in recent years as a critical factor in managing the impact of emotional states on learning outcomes (Dreisbach & Fischer, 2022). Cognitive control and emotional regulation, though distinct, are deeply interconnected; both influences how students interpret challenges, manage stressors, and sustain academic effort in the face of adversity.

In this study, we specifically focus on two dimensions of cognitive control: *Shift*, which assesses the ability to transition between activities or thoughts, and

Emotional Control, which measures the ability to regulate emotional responses. These dimensions are central to understanding how students adapt their cognitive strategies in response to emotional challenges. Research has shown that the ability to shift attention and regulate emotional responses is crucial in academic settings, as these skills allow students to better manage disruptions and maintain focus (Diamond, 2013; Ochsner & Gross, 2005). Cognitive control, particularly in the form of Shift and Emotional Control, allows students to maintain performance even when faced with intense emotional states, such as anger or fear, that could otherwise impair learning.

Research in cognitive-affective neuroscience indicates that executive functions involved in cognitive control, such as inhibition and task-switching, are often mobilized in contexts of emotional conflict (Ochsner & Gross, 2005; Schmeichel, 2018). This perspective aligns with integrative frameworks, such as the Emotion-Cognition Interaction Model (Pessoa, 2008), which propose that cognitive control mediates the influence of affective stimuli on behavior, particularly in learning environments. In this framework, cognitive control serves as a mediator, enabling students to regulate their emotions and manage the cognitive demands of learning tasks effectively, especially in emotionally charged situations.

Understanding the dynamics of cognitive control offers a more nuanced perspective on how students cope with the emotional demands of academic life. Cognitive control helps students navigate the emotional turbulence that often accompanies learning, particularly in high-stakes or stressful academic situations (Diamond, 2013). This shift in focus—from emotion as a direct influencer of learning to cognitive control as a regulatory buffer—highlights the need for educational interventions that target both emotional and executive functioning. Such interventions can help students better manage their emotions and optimize their cognitive resources, leading to improved academic outcomes.

Considering this, the role of cognitive control in mediating emotional responses illustrates its central importance in academic performance. While emotions inevitably affect learning, students' ability to exert control over these emotions through cognitive control mechanisms, specifically Shift and Emotional Control, can mitigate their adverse impact and support sustained academic effort.

Social Support as a Contextual Moderator of Emotional Impact

Considering the role of cognitive control, it is equally important to explore the interaction between cognitive control and other external factors, such as social support, which also plays a significant role in academic success. While cognitive control is essential in regulating emotional responses and maintaining focus, the presence of a supportive social network can further

buffer the negative impact of emotions on learning. In this study, we specifically focus on teacher support as a form of social support, recognizing the unique and influential role that teachers play in students' emotional and academic development. Teacher support can help buffer the effects of both positive and negative emotions, particularly in challenging academic environments. In this context, teacher support acts as a moderator of the relationship between emotions and academic performance.

Research indicates that higher levels of perceived teacher support are associated with better cognitive functioning and enhanced emotional regulation (Gonzalez et al., 2020). This finding is consistent with studies showing that teacher support can help students manage stress, enhance motivation, and maintain focus, which in turn supports academic achievement (Wentzel, 2009; Rimm-Kaufman & Sandilos, 2016). Furthermore, teacher support has been shown to play a protective role, particularly in mitigating the adverse effects of negative emotions, such as anger and fear, on cognitive performance. This protective effect suggests that teacher support amplifies the positive impact of cognitive control on academic performance and helps students navigate emotional challenges more effectively.

Moreover, the role of teacher support as a moderator is crucial because it influences how cognitive control and emotional regulation are expressed in real-life academic settings. For example, students with higher levels of teacher support are better equipped to manage stress and negative emotions, which can otherwise overwhelm their cognitive resources (Koukouvelas et al., 2016). Teacher support provides emotional validation, encouragement, and guidance, which enable students to remain focused and overcome challenges more effectively. This highlights the importance of fostering strong teacher-student relationships within educational environments, as teachers not only help students cope with emotional challenges but also enhance their cognitive control abilities, ultimately leading to better academic outcomes.

Conclusion and Hypotheses

Taken together, the integration of emotional, cognitive, and social dimensions underscores the value of a holistic approach to academic performance. The subsequent section delves into the role of cognitive control as a pivotal mechanism for adapting to academic stressors, exploring how it interacts with perceived social support, self-assessment accuracy, and locus of control.

Based on the preceding discussion, the following hypotheses are proposed to examine the intricate relationships between cognitive control, negative emotions, and academic performance:

- H1: Higher cognitive control (specifically in the subdimensions of Shift and Emotional Regulation) is associated with better academic performance, as individuals with stronger cognitive control can more effectively manage academic demands and regulate their emotions, leading to higher achievement.
- H2: Negative emotions (specifically anger and fear) adversely affect academic performance, with higher levels of negative emotionality leading to reduced focus and engagement in academic tasks, ultimately hindering achievement.
- H3: Cognitive control moderates the impact of negative emotions on academic performance, such that individuals with stronger cognitive control experience a weaker negative impact of these emotions on their academic outcomes.
- H4: Perceived teacher support moderates the relationship between cognitive control and academic performance. Students who receive greater teacher support are better able to leverage their cognitive control abilities, particularly in emotionally challenging situations, resulting in enhanced academic performance. These hypotheses aim to examine the intricate interactions between cognitive control, negative emotions, and academic performance, while also considering the potential moderating effect of social support. Exploring these relationships offers valuable insights into how emotional and cognitive factors combine to influence academic success.

2. METHODOLOGY

Participants

This study involved high school students from the Cluj-Napoca area in Romania, with a total of 200 students participating. Their ages ranged from 15 to 18 years. A stratified random sampling method was used to ensure a diverse representation based on gender, socioeconomic background, and academic performance. Among the 221 students originally selected, 90 were male and 131 were female, with an average age of 16.5 years. The participants were enrolled in both public and private high schools, with 84% from public schools and 16% from private institutions. Prior to participation, informed consent was obtained from both the students and their legal guardians. Students with known mental health issues or learning disabilities were excluded to maintain sample homogeneity in terms of cognitive and emotional functioning.

Measures

Emotional Experiences

To assess emotional experiences, the study employed the Differential Emotions Scale (DES) developed by Izard (1997). This 30-item self-report questionnaire evaluates ten fundamental emotions: interest, joy, surprise, sadness, anger, disgust, contempt, fear, shame/shyness, and guilt. Participants were asked to rate the frequency with which they experienced each emotion in the past week on a 5-point Likert scale, ranging from 0 (“never”) to 4 (“very often”). The study specifically focused on the subscales measuring interest, joy, anger, and fear due to their relevance in educational contexts. The DES has shown strong internal consistency, with Cronbach’s alpha values between 0.70 and 0.90 for various subscales. Additionally, factor analyses confirm the construct validity of the scale by showing the distinctiveness of each emotion.

Cognitive Control

Cognitive control was assessed using the Behavior Rating Inventory of Executive Function, Second Edition (BRIEF-2) developed by Gioia et al. (2015). This tool evaluates executive function behaviors, particularly emotional regulation. For the purposes of this study, the Emotional Regulation Index, which includes two subscales - Shift (assessing the ability to transition between activities or thoughts) and Emotional Control (measuring the ability to regulate emotional responses) - was used. The BRIEF-2 is a widely recognized instrument for evaluating executive function in children and adolescents, aged 5 to 18 years. In this study, the self-report version was employed, allowing participants to assess their own emotional regulation abilities. The BRIEF-2 has demonstrated strong psychometric properties, including high internal consistency (Cronbach’s alpha above 0.85) and test-retest reliability, making it a trustworthy tool for assessing cognitive control in educational settings.

Social Support

In the present study, the Multidimensional Scale of Perceived Social Support (MSPSS), developed by Zimet et al. (1988), was adapted to measure perceived social support specifically in the context of teacher support. While the original scale assesses support from three sources -family, friends, and other significant individuals - the current study focused only on the subscale related to “significant individuals,” with a particular emphasis on the role of teachers. To align with the objectives of the study, the items related to family

and friends were excluded, and only the items that could be directly associated with the support provided by teachers were retained. Participants rated their perception of teacher support using the same 7-point Likert scale (ranging from 1, “strongly disagree,” to 7, “strongly agree”). The scores derived from these items reflected the participants’ sense of emotional, academic, and motivational support they received from their teachers.

By focusing solely on teacher support, we were able to examine the specific influence of educators on students’ emotional experiences and cognitive control. This adaptation ensured that the scale was directly relevant to the study’s focus on how teacher support interacts with students’ emotions and academic performance. The modified version of the MSPSS retained the scale’s strong psychometric properties, including its excellent internal consistency (Cronbach’s alpha in the range of 0.88 to 0.92) and its demonstrated validity in previous research. This approach allowed us to tailor the MSPSS to better fit the educational context of the study while maintaining the integrity of the original scale’s reliability and validity.

Academic Performance

Academic performance in this study was measured through two variables: annual grade averages and scores on the high school entrance examination. Participants’ grade averages for the current academic year were collected from school records, and their scores on the high school entrance examination were obtained with consent from the participating students. These two measures were combined to form a cumulative academic average, which served as the dependent variable in the study. This approach provided a comprehensive measure of academic performance, reflecting both ongoing academic achievement and performance on an important standardized test.

Research Design

This study employed a predictive, correlational, cross-sectional, quantitative, and non-experimental design to examine the relationships between emotions, cognitive control, social support, and academic performance. Data were collected at the end of the academic year, allowing for a comprehensive assessment of academic performance alongside concurrent measures of emotions (predictor variable), cognitive control (criterion variable), and social support (moderator variable).

The predictor variable—emotions—was assessed using the Differential Emotions Scale (DES). Specifically, the subscales measuring interest, joy, anger, and fear were utilized to capture the range of emotional experiences relevant to the study’s focus on academic performance.

The criterion variable—cognitive control—was assessed through the Behavior Rating Inventory of Executive Function (BRIEF-2), with particular emphasis on the Shift and Emotional Control subscales, which measure the flexibility and emotional regulation crucial for academic success.

The moderator variable—perceived social support—was evaluated using the Multidimensional Scale of Perceived Social Support (MSPSS), which assesses the perceived support students receive from their family, friends, and other significant social figures.

Statistical Analysis

Data analysis was performed using SPSS version 27.0. Descriptive statistics were first computed for all variables to understand the distribution of scores. Pearson's correlations were conducted to explore the relationships between emotions, cognitive control, social support, and academic performance. Additionally, regression analyses were performed to test the predictive power of emotions and cognitive control on academic performance, as well as the moderating effect of social support. Specifically, a hierarchical multiple regression analysis was used to examine the interaction effects between social support and emotional regulation on academic outcomes. The results will provide insights into how emotional and cognitive factors contribute to students' academic performance, as well as the potential role of social support in moderating these relationships.

The results from the correlation Table 1 reveal several important relationships between emotional states, cognitive control, and academic performance, as indicated by the correlation coefficients (r values).

Firstly, positive emotions such as Interest and Joy exhibit moderate positive correlations with academic performance ($r = 0.40$ for Interest and $r = 0.42$ for Joy), suggesting that students who experience these emotions tend to perform better academically. These positive emotions are also positively correlated with Teacher Support ($r = 0.35$ for Interest and $r = 0.26$ for Joy), indicating that students who feel more engaged and joyful in their studies are likely to benefit from stronger relationships with their teachers, which in turn can contribute to better academic outcomes.

The Bravais-Pearson correlation matrix, displayed in Table 1, highlights the relationships between variables.

Table 1. *Correlation Matrix for Positive Emotions, Negative Emotions, Cognitive Control, Teacher Support, and Academic Performance*

	Interest	Joy	Anger	Fear	Shift	Emotional Regulation	Teacher Support
Interest	-						
Joy	.43	-					
Anger	-.24	-.16	-				
Fear	-.38	-.52	.56	-			
Shift	.32	.23	-.26		-		
Emotional Regulation	.23	.14	-.17	-.23	.38	-	
Teacher Support	.35	.26	-.31	-.29	.25	.22	-
Academic Performance	.40	.42	-.35	-.42	.48	.45	.50

On the other hand, negative emotions such as Anger and Fear are negatively correlated with academic performance ($r = -0.35$ for Anger and $r = -0.42$ for Fear), reinforcing the idea that emotions like frustration and anxiety can hinder academic success. These negative emotions also show negative correlations with Teacher Support ($r = -0.31$ for Anger and $r = -0.29$ for Fear), suggesting that students who struggle with anger or fear may find it harder to form supportive relationships with teachers, potentially exacerbating the challenges they face academically.

In terms of cognitive control, both Shift ($r = 0.32$ for Interest, $r = 0.23$ for Joy) and Emotional Regulation ($r = 0.23$ for Interest, $r = 0.14$ for Joy) play important roles. Shift is positively correlated with Interest and Joy, indicating that students who feel more engaged and joyful are also better at adapting to changing academic tasks. Furthermore, Emotional Regulation is positively correlated with academic performance ($r = 0.45$), suggesting that students who manage their emotions effectively are better positioned to succeed in academic settings.

Finally, Teacher Support is a crucial factor in enhancing academic performance ($r = 0.50$). The positive correlations with both positive emotions and cognitive control emphasize the importance of supportive teacher-student relationships in fostering emotional well-being and academic success. Conversely, the negative correlations with negative emotions highlight how teacher support can mitigate the detrimental effects of emotional struggles.

In conclusion, these results underscore the importance of fostering positive emotions, improving emotional regulation, and ensuring strong teacher support in promoting better academic outcomes, while addressing the negative impact of emotions like anger and fear.

Mediation Analysis for the Relationship Between Positive and Negative Emotions, Cognitive Control, and Academic Performance

The mediation analysis explores how positive emotions, negative emotions, and cognitive control impact academic performance, with significant findings that suggest both direct and indirect effects. Firstly, positive emotions (such as interest and joy) were found to have a significant positive effect on cognitive control (Shift), with a coefficient of 0.32 ($p < 0.01$). This means that students with higher levels of positive emotions are better able to manage cognitive flexibility and regulate their thoughts. Furthermore, cognitive control was positively related to academic performance, as indicated by a coefficient of 0.48 ($p < 0.01$), suggesting that students with greater cognitive control tend to perform better academically. Additionally, positive emotions were directly associated with academic performance, as shown by a coefficient of 0.40 ($p < 0.01$), highlighting the importance of emotional well-being in academic success.

For negative emotions (such as anger and fear), the analysis revealed a negative impact on both cognitive control and academic performance. Negative emotions were significantly associated with lower levels of cognitive control ($\beta = -0.26$, $p < 0.05$), indicating that students who experience higher levels of negative emotions tend to have difficulties regulating their thoughts and behaviors. Furthermore, negative emotions directly influenced academic performance, with a negative coefficient of -0.35 ($p < 0.01$), implying that emotional distress negatively affects academic outcomes. Importantly, both positive and negative emotions had indirect effects on academic performance through cognitive control. The indirect effect of positive emotions on academic performance through cognitive control was positive and significant ($\beta = 0.15$, 95% CI [0.05, 0.25]), while the indirect effect of negative emotions was negative ($\beta = -0.12$, 95% CI [-0.20, -0.03]). These findings suggest that cognitive control plays a critical role in mediating the relationship between emotions and academic performance, with positive emotions enhancing and negative emotions hindering students' academic success.

Moderation Analysis for the Relationship Between Emotions, Cognitive Control, Teacher Support, and Academic Performance

The moderation analysis examines the role of teacher support in moderating the relationships between emotions (positive and negative), cognitive control, and academic performance. Teacher support was found to significantly moderate these

relationships, acting as a buffer against the negative effects of negative emotions and enhancing the positive effects of positive emotions.

For positive emotions, the moderation analysis revealed that teacher support strengthens the positive relationship between positive emotions and cognitive control. The interaction term for teacher support $\times$ positive emotions $\rightarrow$ cognitive control was significant ($\beta = 0.25$, $p < 0.01$), meaning that students who receive higher levels of teacher support benefit more from their positive emotions in terms of improving cognitive control. This suggests that teacher support enhances the ability of students to regulate their thoughts and behaviors when they experience positive emotions.

Table 2. *Moderation Analysis for the Relationship Between Positive and Negative Emotions, Cognitive Control, Teacher Support, and Academic Performance*

Path	Coefficient (β)	Standard Error	t	p-value
a-path: Positive Emotions $\rightarrow$ Cognitive Control (Shift)	0.32	0.10	3.20	.00
b-path: Cognitive Control (Shift) $\rightarrow$ Academic Performance	0.48	0.12	4.00	.00
c-path: Positive Emotions $\rightarrow$ Academic Performance	0.40	0.09	4.44	.00
Interaction (Teacher Support $\times$ Positive Emotions $\rightarrow$ Cognitive Control)	0.25	0.10	2.50	.01
a-path: Negative Emotions $\rightarrow$ Cognitive Control (Shift)	-0.26	0.11	-2.36	.02
b-path: Cognitive Control (Shift) $\rightarrow$ Academic Performance	0.48	0.12	4.00	.00
c-path: Negative Emotions $\rightarrow$ Academic Performance	-0.35	0.10	-3.50	.00
Interaction (Teacher Support $\times$ Negative Emotions $\rightarrow$ Cognitive Control)	0.25	0.09	2.78	.01
Interaction (Teacher Support $\times$ Cognitive Control $\rightarrow$ Academic Performance)	0.22	0.08	2.75	.01
Indirect Effect (Positive Emotions $\rightarrow$ Cognitive Control $\rightarrow$ Academic Performance)	0.15			
Confidence Interval (Positive Emotions $\rightarrow$ Cognitive Control $\rightarrow$ Academic Performance)	[0.05, 0.25]			
Indirect Effect (Negative Emotions $\rightarrow$ Cognitive Control $\rightarrow$ Academic Performance)	-0.12			
Confidence Interval (Negative Emotions $\rightarrow$ Cognitive Control $\rightarrow$ Academic Performance)	[-0.20, -0.03]			
R-squared	0.42			

Similarly, teacher support moderated the negative effects of negative emotions on cognitive control. The moderation effect was significant ($\beta = 0.25$, $p < 0.01$), showing that teacher support helps mitigate the detrimental impact

of negative emotions, allowing students to maintain better cognitive control despite their emotional challenges.

Furthermore, teacher support was found to significantly influence academic performance through its interaction with cognitive control. The interaction term for teacher support $\times$ cognitive control $\rightarrow$ academic performance was significant ($\beta = 0.22$, $p < 0.01$), indicating that teacher support strengthens the relationship between cognitive control and academic performance, enhancing the impact of cognitive control on academic outcomes.

Overall, the moderation analysis highlights that teacher support plays a crucial role in enhancing the positive effects of positive emotions on cognitive control and mitigating the negative effects of negative emotions on cognitive control. In addition, teacher support strengthens the relationship between cognitive control and academic performance, underscoring the importance of supportive teacher-student relationships in fostering academic success.

These analyses collectively emphasize the significance of emotional and social support in shaping students' cognitive and academic outcomes. Positive emotions enhance cognitive control and academic performance, while negative emotions have the opposite effect. However, the role of teacher support is paramount, as it not only helps students regulate their emotional experiences but also boosts their cognitive abilities, ultimately contributing to better academic achievement.

DISCUSSION

The aim of this study was to explore how positive emotions, such as interest and joy, and negative emotions, including anger and fear, impact cognitive control and academic performance among high school students. The findings supported all the proposed hypotheses, emphasizing the intricate interactions between these factors. The results underscore the crucial influence of cognitive control and teacher support in determining academic success.

Positive Emotions (Interest, Joy) and Academic Performance

Our findings underscore the significant role of positive emotions, particularly interest and joy, in enhancing academic performance. Interest has been shown to foster greater engagement with academic content, motivating students to explore and learn more effectively. When students are interested in the subject matter, they tend to dedicate more time and effort to their studies, which leads to improved academic outcomes. Similarly, joy contributes to

students' overall well-being, creating a positive emotional environment that encourages persistence and resilience in the face of academic challenges. Previous research has shown that positive emotions improve cognitive functions such as attention and memory, which are critical for academic success (Isen, 2000). In this study, students who reported experiencing higher levels of interest and joy in their academic work tended to perform better, as they were more motivated and engaged in the learning process. These findings align with the literature suggesting that positive emotions are essential for fostering intrinsic motivation, which is key to achieving long-term academic success (Diener et al., 2009). Thus, promoting positive emotions like interest and joy in educational settings can be a valuable strategy to enhance students' academic performance.

Negative Emotions (Anger, Fear) and Cognitive Control

The first hypothesis proposed that negative emotions, such as anger and fear, would reduce cognitive control. Our findings strongly support this hypothesis. Negative emotions like anger and fear are disruptive to cognitive processes, as they trigger physiological responses that impair attention, memory, and self-regulation. Anger can lead to impulsive behavior and distractibility, making it difficult for students to maintain focus during academic tasks. Similarly, fear often induces anxiety, which interferes with students' ability to concentrate and plan effectively. These negative emotional states undermine cognitive control by overwhelming the brain's executive functions, particularly in areas such as attention shifting and inhibition (Davidovich et al., 2016). Our results align with prior studies showing that adolescents experiencing negative emotions struggle with cognitive flexibility and attentional control, which are essential for academic achievement (Linnenbrink & Pintrich, 2003). Furthermore, fear and anger can lead to emotional dysregulation, making it even harder for students to manage their thoughts and actions during academic tasks. These findings highlight the need for interventions focused on helping students manage negative emotions to improve cognitive control and, by extension, academic performance.

Cognitive Control and Academic Performance

The second hypothesis suggested that cognitive control would be positively related to academic performance, and our findings support this hypothesis. Cognitive control, particularly its two dimensions - shift and emotional regulation—is critical for managing academic demands. Shift refers to the ability to adjust one's focus between different tasks or respond flexibly to changing situations, while emotional regulation involves the ability to manage one's emotions, especially in challenging

academic contexts. Our results suggest that students with higher levels of cognitive control—both in shifting attention and regulating their emotions—tend to perform better academically. These students are better able to stay focused on their work, adapt to changes in academic tasks, and regulate their emotional responses to stress, all of which contribute to enhanced academic performance (Bandura et al., 1996; Theobald, 2021). Students with strong cognitive control are more likely to use self-regulated learning strategies, such as goal-setting, time management, and planning, which further support academic achievement (Theobald, 2021). Moreover, the ability to regulate emotions, particularly in response to stress or setbacks, is crucial in maintaining focus and perseverance, which directly affect academic outcomes. Our study confirmed that cognitive control plays a significant role in improving academic performance by enabling students to manage both cognitive and emotional demands effectively.

Mediating Role of Cognitive Control

Our study also investigated whether cognitive control mediates the relationship between negative emotions (anger, fear) and academic performance. The analysis showed that cognitive control partially mediates this relationship. In other words, negative emotions such as anger and fear directly reduce cognitive control, which in turn negatively impacts academic performance. This mediating effect suggests that cognitive control can buffer the negative impact of emotions on academic outcomes. For students who experience high levels of anger or fear, improving their cognitive control could mitigate the adverse effects of these emotions on their academic performance. This is consistent with research suggesting that enhancing cognitive control can protect students from the negative consequences of emotional distress on academic achievement (Davis et al., 2019). Therefore, interventions aimed at improving cognitive control, such as mindfulness training or executive function exercises, could be particularly effective in reducing the detrimental effects of negative emotions and improving academic outcomes.

The Moderating Influence of Teacher Support

This study also examined the moderating influence of teacher support in the relationships between emotions, cognitive control, and academic performance. The results indicate that teacher support significantly mitigates the negative impact of negative emotions, such as anger and fear, on both cognitive control and academic performance. Students who experience negative emotions but receive strong support from their teachers tend to perform better academically compared to those who lack such support. This aligns with previous

research indicating that teacher support fosters better emotional regulation and coping skills, which in turn improves cognitive control and academic performance (Silvia et al., 2021). Teachers can offer emotional validation, encouragement, and guidance, which help students manage negative emotions and remain focused on their academic objectives. Additionally, teacher support was found to enhance the positive effects of positive emotions like interest and joy on cognitive control. When students feel supported by their teachers, their positive emotions more effectively contribute to improved cognitive control, leading to better academic outcomes. These results highlight the crucial role of nurturing positive and supportive teacher-student relationships, as they foster emotional well-being and academic achievement. Teachers are pivotal in helping students regulate their emotions, build cognitive control, and navigate academic challenges with greater success.

Practical Implications

Our study offers several important practical implications for educators, parents, and policymakers aiming to improve students' academic outcomes and emotional well-being. The findings highlight the critical role that positive emotions (interest and joy), negative emotions (anger and fear), and cognitive control play in academic performance, emphasizing the need for targeted interventions and strategies that address these factors.

One primary implication is the importance of fostering and maintaining cognitive control throughout students' educational journey. As academic challenges become more complex, negative emotions, such as anger and fear, can emerge, potentially diminishing students' motivation and undermining their academic performance. Strengthening cognitive control, particularly through emotional regulation and attentional focus, is essential for students to manage these emotions and maintain high academic standards. Educators can support this by implementing strategies that promote self-regulation, such as goal-setting, time-management practices, and stress-coping mechanisms. By enhancing cognitive control, students will be better equipped to overcome emotional barriers and achieve academic success, particularly those who may be more prone to negative emotions. Thus, fostering a classroom environment that emphasizes the development of cognitive control and emotional regulation skills can significantly benefit students' academic performance.

Another critical implication relates to the emotional challenges faced by adolescents, who often experience heightened emotional responses due to physical, cognitive, and social changes. The adolescent years are particularly marked by significant emotional fluctuations, which can have a considerable impact on student's ability to focus and regulate their behavior. Given the

emotional complexity of this developmental stage, educators must provide both academic guidance and emotional support to help students manage negative emotions like anger and fear. Teaching emotional regulation strategies, such as mindfulness techniques or emotional awareness exercises, should become an integral part of the curriculum to help students manage their emotions effectively. Furthermore, creating a supportive and empathetic classroom environment will enable students to feel more secure and confident in their ability to handle academic challenges. When students feel that their emotions are understood and validated, they are more likely to manage academic stress and perform better academically.

A significant finding from this study is the moderating role of teacher support in the relationship between emotions and academic performance. Teacher support plays a crucial role in helping students manage the effects of negative emotions such as anger and fear, as well as enhancing the positive influence of positive emotions like interest and joy. Students who experience strong teacher support are better able to regulate their emotions, which improves their cognitive control and, consequently, their academic performance. Teachers can facilitate this by offering guidance, encouragement, and emotional validation, which are essential for helping students cope with emotional difficulties. In addition to academic support, teachers who create emotionally supportive environments help students thrive both academically and emotionally. By fostering strong teacher-student relationships built on trust and understanding, educators can significantly improve students' ability to manage emotions and perform well academically.

Considering these findings, educational institutions and policymakers must prioritize students' mental health and emotional well-being. Academic pressures, coupled with negative emotions like fear and anger, can hinder students' overall academic experience and success. Schools should implement comprehensive mental health programs that focus on emotional regulation, stress management, and coping strategies. These programs can help students navigate the emotional complexities of academic life and improve their ability to perform under pressure. In addition, cultivating a school culture that values emotional well-being as equally important as academic achievement will contribute to a more balanced and supportive environment for students. By integrating emotional support into the educational experience, schools can create a more conducive environment for academic success.

In summary, the practical implications of our study suggest that promoting emotional regulation, enhancing cognitive control, and leveraging teacher support are critical factors for fostering academic success in students. Addressing these aspects can help students overcome negative emotions and develop the resilience needed to excel in both their academic and personal lives.

Limitations and Future Directions

Our study has several limitations that should be considered when interpreting the findings and suggesting future research directions.

First, the cross-sectional design of our study limits our ability to capture changes over time, thus restricting our ability to infer causal relationships between the variables. Longitudinal studies would be more effective in tracking how positive emotions (interest, joy), negative emotions (anger, fear), cognitive control, and academic performance evolve. This would provide a more nuanced understanding of how these variables interact in the long term and their causal influence on academic outcomes.

Another limitation concerns the sample composition, which was limited to high school students in the 10th and 11th grades. As a result, the findings may not be representative of students in other grade levels, and the conclusions may not apply to the broader high school population. Future studies could include participants from 9th and 12th grades to ensure that the results reflect the diversity of students' academic experiences across grade levels. This would improve the generalizability of the findings to a wider age range.

Additionally, the self-report measures used in our study are subject to common method variance, which may impact the validity of the results. Participants may have provided socially desirable responses or misinterpreted the items on the questionnaires, leading to potential biases in the data. Although we adapted the instruments to ensure clarity, future studies should consider using multi-method approaches, such as behavioral observations or peer ratings, to supplement self-reports and strengthen the reliability of the findings.

Our study also focused on global scores for the variables involved, without delving into the individual components of each factor. Future research could provide a more detailed analysis by examining how specific dimensions of negative emotions (anger, fear) influence cognitive control and academic performance. It would be valuable to explore how particular aspects of positive emotions (interest, joy) and teacher support interact with these emotions to affect cognitive and academic outcomes. While psychological resilience was discussed in the study, it was not explicitly analyzed as a mediating or moderating variable. Given the potential role of resilience in buffering the effects of negative emotions on cognitive control and academic performance, future studies should examine how resilience may interact with these variables. Understanding the role of resilience could provide further insight into how students cope with emotional challenges and maintain their academic performance under stress.

Finally, while our study offers valuable insights into the relationships between emotions, cognitive control, and academic performance, addressing these limitations in future research will help refine our understanding of how

these factors interact. Expanding on these findings through longitudinal studies, multi-method approaches, and exploring additional factors like psychological resilience will further enhance the development of interventions aimed at supporting students' emotional and academic success.

3. CONCLUSION

In conclusion, this study emphasizes the significant role of positive emotions (Interest and Joy) in enhancing academic performance, as they are positively correlated with better cognitive control and teacher support. Conversely, negative emotions (Anger and Fear) negatively impact both cognitive control and academic performance, highlighting the importance of managing these emotions. Teacher support was found to buffer the negative effects of negative emotions while promoting better academic outcomes. Furthermore, emotional regulation plays a crucial role in academic success, suggesting that students who can regulate their emotions perform better academically. These findings underline the importance of fostering positive emotional experiences in students, as well as providing support systems that help mitigate the impact of negative emotions. Promoting emotional well-being alongside cognitive development can be key to improving academic outcomes. Moreover, interventions targeting both emotional and cognitive control could be beneficial in educational settings.

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Social Incompetence of Learners with Insecure Attachment Styles: A Multiple Case Study of Three Secondary Schools in South Africa

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ABSTRACT. The study aimed to examine social incompetence of learners with insecure attachment styles in three secondary schools in South Africa. The study employed a multiple case-study research design. The sampling frame comprised 27 participants, including 6 life orientation teachers, 18 grade 10 learners, and 3 deputy principals from 3 specifically chosen secondary schools in the Sedibeng West district. Data collection for this study involved the utilization of open semi-structured interviews. The data obtained from semi-structured interviews was evaluated thematically, using research questions as a framework. The results indicated that learners with social incompetence exhibited low self-esteem, antisocial behaviours, aggressive behaviours, poor anger control, poor interpersonal skills, lack of emotional competence, and external locus of control. The study recommends that parents should be trained on best parenting programs and increase awareness in the community on secure homes.

Keywords: social incompetence, learners, insecure attachment styles, secondary schools, south Africa

1. INTRODUCTION

The notion of attachment is crucial in the development of humans, and its theory has been recognized and validated as a diagnostic tool for persons of all ages, from infancy to adulthood. Attachment explores the initial emotional

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connections between children and their caregivers, which have a significant and lasting impact on their lives. This study presented many categories of attachment styles, demonstrating how attachment develops over time and how children's positive and bad experiences impact them psychologically. The initial classification or kind is referred to as secure attachment, which was the intended representation or ultimate objective of this study. Karakose and Ledermann (2026) reiterate that anxious attachment explained more variance in anxiety than in depression, whereas avoidant attachment explained more variance in depression. Secure attachment refers to the emotional bond that children have with their caregivers, where they depend on their caregivers to display signs of distress when separated and happiness when reunited. Sekowski and Gambin (2025) argues that generalized insecure profile had higher levels of depressive symptoms than all other groups and a higher level of suicidality than the secure group.

Despite the child's distress, they have confidence that the caregiver will come back. Securely linked youngsters, when experiencing fear, feel at ease seeking comfort and reassurance from their caregivers. These children mature into individuals who possess self-assurance and self-reliance. The insecure attachments patterns can be categorized as disorganized, ambivalent, and avoidant attachment. Mirarchi, et al., (2026) argues that attachment avoidance played a more important role than attachment anxiety in explaining the degree of psychopathic traits. Children with disorganized attachment exhibit a perplexing combination of behaviours, appearing bewildered, distressed, or perplexed. Sagone, et al., (2023) argues that attachment styles are associated with discomfort with closeness, relationships as secondary, and avoidance. In such instances, parents might function as both a source of solace and anxiety, resulting in disordered conduct. These children develop lower self-confidence as they mature. This dimension pertains to worry and measures the extent to which an individual is concerned that a person they are attached to will not be accessible or sufficiently responsive during times of necessity (Bergin & Bergin, 2009). Mandell (2024) emphasised the importance of interventions, ongoing monitoring, and building connections between quiet students and their school community to enhance and promote academic success.

The ambivalent attachment pertains to youngsters who experience significant discomfort when a parent departs. The ambivalent attachment type is linked to parents or guardians who are inaccessible. Momeñe, et al., (2024) provides preliminary evidence that rejection of negative emotional experiences may play an important role in the relationship between insecure dismissing attachment style and emotional dependence on an individual's partner. Due to the lack of stable parental availability, these children are unable to rely on their primary caregiver for support when they require it. Lastly, individuals with an

avoidant attachment style tend to exhibit indifference towards both their parents or caregivers and strangers, displaying no discernible preference between them. Srivastava, et al., (2026) showed that secure attachment style increased sociocultural adaptation, whereas insecure attachment styles decreased it among international students in the host country. The development of this attachment type may be attributed to caregivers who have exhibited abusive or negligent behaviours (Brennan, Clark & Shaver, 1998). Sancho, et al., (2025) reinforce the link established between secure attachment and superior cognitive performance, aligning with previous research on emotional regulation and cognitive development in adolescence. Moreover, individuals with avoidant attachment tend to exhibit avoidance behaviour towards their parents or caregivers, displaying no discernible preference between a caregiver and a stranger. The avoidant attachment style may arise because of caregivers who have been abusive or neglectful. Children who get punishment for depending on a caregiver will develop a tendency to refrain from seeking assistance in subsequent situations. The component of avoidance refers to the level at which the kid lacks faith in the caregiver's intentions and makes efforts to retain independence and emotional detachment from them (Mikulincer, Shaver, Sapir-Lavid & Avihou-Kanza, 2009). Cecen and Ündar (2026) showed that childhood emotional abuse was positively associated with both attachment anxiety and avoidance and negatively associated with self-satisfaction.

The Curriculum and Assessment Policy Statement (CAPS) for Life Orientation states that the topic focuses on developing the skills, information, and values necessary for the personal, social, intellectual, emotional, and physical growth of learners. The topic leads and prepares learners for life, its possibilities, and educates them for meaningful and effective living in a dynamic and evolving society. It fosters self-motivation and instructs learners in the use of goal planning, problem-solving, and decision-making processes, so preparing them for the Fourth Industrial Revolution and developing their 21st Century abilities. These help to promote personal development as part of an endeavour to establish a democratic society and enhance the overall quality of life. The Department of Basic Education (2011) states that learners are given guidance to reach their maximum capabilities and are given chances to make well-informed decisions about their personal and environmental health, educational prospects, and future vocations. In addition, Life Orientation includes a 10% component of physical activity, which is advantageous in this context since it allows teachers to assess students' interactive and social abilities. Furthermore, the Life Orientation learning area provides learners with essential life skills, such as psychosocial and interpersonal skills, to empower them in making well-informed decisions, self-management, and improved communication. The objective is to exert a good impact on learners and their surroundings, enabling them to live a fruitful and

efficient life (Mampane 2010). Lewis, et al., (2025) reported that higher levels of insecure attachment confer vulnerability for depression following conflict, whereas more secure romantic attachment attenuates the effects of violence exposure.

Recent research conducted in South Africa has revealed that attachment types exert a substantial influence on several elements of learners' life, both within and outside of the school environment. Zaidman-Mograbi et al., (2020) conducted a study in South Africa that highlighted the need of taking local settings into account when examining attachment and maternal sensitivity. Similarly, a study conducted by Thandiswa et al., (2022) in South Africa found a substantial positive link between love types and attachment behaviour. In a study conducted in South Africa, Ebere et al., (2022) proposed that there is a positive correlation between parent-child attachment and both self-efficacy and social skills. A recent study conducted by Schuitmaker et al., (2023) in South Africa emphasized the significance of considering the potential influence of insecure attachment styles on post-traumatic growth. Dugan, et al., (2026) suggest that early experiences with caregivers play a foundational and enduring role in people's attachment-related functioning. This understanding could be valuable in guiding the treatment of individuals who have experienced trauma. Although there have been new efforts to study attachment, there is a lack of literature on social competency and how schools might serve as solid grounds for students with unfavourable attachments.

Attachment Theory

Higgenbotham (2016) suggests that attachment theory serves as a unifying framework for integrating many psychological theories that contribute to study and practice in the field of psychology. The theory provides a complete explanation for cognitive processes, relationship dynamics, and systemic circumstances that influence human behaviour. It aids in comprehending many phenomena such as behaviour, dealing with interpersonal stressors, resolving conflicts, and overall psychological adaptation. Attachment theory was primarily formulated by John Bowlby (1969), who provided the framework for the theory. This framework comprises various attachment styles that illustrate the development of attachment over time and the impact of positive and negative experiences on children's psychological well-being. Children with anxious attachment show a lot of different behaviours that make them look like they are lost, having trouble, or not sure what to do. Caregivers likely act in different ways at different times because there isn't a clear pattern of connections. Parents may be both a source of comfort and fear for this child, which can make

them act crazily. People worry a lot that an attachment figure won't be there for them or help them when they need it (Bergin & Bergin, 2009). In the disorganized attachment style, children exhibit chaos, resulting in heightened distress when a parent departs. The disordered attachment style, although not widely favoured, is frequently associated with parents or guardians who are inaccessible. Due to the inconsistent availability of their parents, these children cannot rely on their primary caregiver to be present when they require assistance. Lastly, the avoidant attachment style posits that children with this form of attachment actively evade or steer clear of their parents or caregivers, and do not display any discernible preference between a caregiver and an unfamiliar individual. The component of avoidance demonstrates the child's lack of confidence in the caregiver and desire to maintain independence and emotional distance from them (Mikulincer, Shaver, Sapir-Lavid & Avihou-Kanza, 2009).

Literature Review

According to Park and Schepp (2015), vulnerability is the condition of being prone to stress and anxiety, which can negatively impact a person's physical, mental, and social health. Therefore, many previous studies have focused on children from families where parents experience both depression and drinking. These research consistently show a connection between parental alcohol misuse and negative social outcomes in these children. Studies have shown that children of adults with alcoholism have a higher likelihood of experiencing externalizing problems, such as hyperactivity and aggressiveness, as well as internalizing difficulties, such as low self-esteem and increased feelings of despair (Park & Schepp, 2015). According to Libusi's (2020) research conducted in Kenya, families with alcohol dependency often create a harmful and chaotic home environment. This environment is characterized by unhappy parents, increased levels of antisocial behaviour, and occurrences of domestic violence. The traits can directly or indirectly lead to the development of externalizing tendencies in children from households with alcoholic family members. Parentification is a common phenomenon in South African townships, when children take on adult responsibilities due to their parents' insufficient functioning, such as in cases of parental alcoholism (Masiran, et al., 2023). The concept refers to the shift of responsibilities within a family, namely among young individuals who take on parental tasks such as domestic chores and looking after younger siblings. Offspring of individuals with alcohol dependency bear the responsibility of completing parental duties within their houses (Libusi, 2020). The obligations include taking care of parents and siblings who have alcohol addiction, which can have negative impacts on their emotional and social development, such as reduced self-esteem, isolation from social activities, and emotional turmoil (Park & Schepp, 2015).

Fernandes et al., (2020) found that early childhood insecure attachment can have wide-ranging effects on an individual's social competence, impacting various aspects of their social and emotional development. The findings indicated that insecurely attached learners exhibit social incompetence, which is characterized by several hurdles. These learners may struggle to trust others during social interactions. They may have experienced inconsistent caregiving, leading to difficulties in relying on others for help and forming meaningful relationships, and they may also have heightened anxiety in social situations. Finally, those who feel anxious about being rejected or abandoned may struggle to engage with their peers or form positive relationships (Sprenger, 2020). Individuals who have insecure attachment styles, particularly those with anxious-avoidant attachments, may exhibit a strong inclination to completely avoid social interactions. They may feel anxious about receiving negative responses or lack knowledge of effective ways to express their emotions. These challenges can impede their ability to form meaningful relationships with others (Maalouf, 2022). At times, individuals with insecure attachments may face challenges when it comes to showing empathy and understanding others' perspectives. Some individuals with insecure attachment styles may excessively seek reassurance and approval from others, relying on external sources to feel secure (Evraire, Dozois & Wilde, 2022). Insufficient establishment of a secure base during initial attachment experiences can have a detrimental effect on individuals' ability to navigate social demands (Girme, et al., 2021). In a study conducted by Alfred and Hillar (2021) in Ghana, youths displayed moderate levels of social competence in social contexts. Data collection was conducted only using a questionnaire, employing a descriptive survey design. In South Africa, Nwafor, Ibeagha, Anazonwu, and Obi-Nwosu (2020) found that the impact of family competence on bullying, mediated by callousness and lack of emotion, was significant.

Most recently, Sezer and Gürtepe (2025) study revealed a moderate negative correlation between attachment to mothers and risky behaviours, while a weaker negative correlation was observed between attachment to fathers and risky behaviours. Muñoz-Pradas, et al., (2025) study reported on the existence of a statistically significant relationship between the social skills variable and Attachment corresponding to subjects with good abilities to express feelings and comfort with relationships. Alexander, et al., (2024) indicated that children with disorders are significantly less likely to develop a secure attachment and significantly more likely to develop a disorganized attachment than children without disorders. Sezer and Gürtepe (2025) revealed a moderate negative correlation between attachment to mothers and risky behaviours, while a weaker negative correlation was observed between attachment to fathers and risky behaviours. Szeifert, et al., (2025) reported that higher levels of secure attachment style predicted a lower risk of suicide attempt, and that, secure attachment style significantly mediated

part of the total effect of early traumatization severity on suicidal behaviour. Brunssen and Kastrup (2026) reported that interactions are strained by perceptual discrepancies, one concerning what counts as just and the other whose reality is recognised.

The above reviewed studies solely utilized questionnaires and surveys for data collection, it lacked qualitative data. Thus, the current study employed semi-structured interviews to provide in-depth findings to address the research gaps identified in the earlier study.

Aim of the study

This study examined the social incompetence of learners with insecure attachment styles in three secondary schools in South Africa. The study hopes to provide recommendations for learners with insecure attachments in secondary schools.

2. METHODS

Research Design

The study employed a multiple case-study research design. According to Yin (2009), a multi-case study is a more effective approach for investigating a subject that involves multiple cases, components, or members. The utilization of a multiple case-study research design was pertinent to this investigation due to its capacity to enable the researcher to gather a greater amount of data that would be challenging to get through other designs. Utilizing multiple case studies enables the researcher to comprehensively understand concepts and generate information that may be utilized for future hypothesis development.

Sample Size & Sampling Procedure

The sampling frame comprised 27 participants, including 6 life orientation teachers, 18 grade 10 learners, and 3 deputy principals from 3 specifically chosen secondary schools in the Sedibeng West district. Six Life-Orientation teachers, two from each school, were chosen using purposive sampling technique. The criteria for selecting teachers required a minimum of 3 years of teaching experience, preferably within the same school or in general. The choice of the 6 teachers was made using purposive sampling technique, based on the belief that Life-Orientation teachers have a significant impact on the overall development of students. A purposive sample strategy was used to sample the participants from each school.

Data Collection Methods

Data collection for this study involved the utilization of open semi-structured interviews. Data from deputy principals and teachers were collected using semi-structured interviews. Walliman (2009) asserts that semi-structured interviews are a versatile instrument that can provide a more comprehensive and abundant dataset compared to other methods of data collection. Semi-structured interviews enable researchers to gain a perspective on the world through the participants' eyes and provide interviewers with an opportunity to express their perspectives (Cohen et al., 2011). According to McMillan (2012), semi-structured interviews are characterized by their flexibility and the use of clear questions to get insight into participants' perceptions and to examine themes in a thorough and detailed manner. The research commenced with receiving ethical clearance from the University of the Witwatersrand Human Research Ethics Committee, followed by obtaining authorization from the Gauteng Department of Education and the school principals. The duration of the interview sessions for each research participant ranged from 35 to 45 minutes. This allowed for thorough questioning and provided participants with the chance to ask clarifying questions when needed.

Data Analysis

The data obtained from semi-structured interviews was evaluated thematically, using research questions as a framework (Cohen et al., 2011). Thematic analysis involves the process of recognizing and evaluating patterns of significance derived from collected data. The process of thematic analysis consists of several stages, including becoming acquainted with the data, coding, generating and searching for themes, reviewing the themes, defining the themes, and producing the final report. Themes were derived from both emic and etic data, wherein phrases, comparable reactions, and noteworthy events were recognized and categorized into specific categories. Emic data analysis involves the examination and interpretation of information provided by individuals in their own language, actions, and explanations.

3. FINDINGS

The findings of this study revealed several social incompetence of insecurely attached learners. The results indicated that the themes on social incompetence among learners include low self-esteem, antisocial behaviours, aggressive behaviours, poor anger control, poor interpersonal skills, lack of emotional competence, external locus of control and this theme discussed the above in depth.

Theme 1: Low self-esteem

The interview results from learner participants revealed that they fear rejection and being humiliated by others. Learner participant 7 and 9 revealed that they struggle to manage their feelings, and they fail to adapt well around others without feeling like they have lost who they are. The interview excerpts are reported below: *"I am always kind toward my schoolmates, but sometimes I keep silent to avoid being humiliated by other learners and I fear rejected by others."* (Learner participant, 7). *"I am friendly to my classmates but at the same time I tolerate them even though they say personal things about me. I tolerate their nasty words. I smile but sometimes it's hard. Fear rejection."* (Learner participant, 9).

Similarly, learner 5 and 10 also showed that they are still working on their social incompetence and were aware of their short-coming:

"I would describe my social skills as a chameleon because I would adapt to how a person feels but a certain time it makes me feel like I am losing all sense of who I am, but I try to manage my anger through meditation but sometimes I feel like meditation is making it worse. I just fear rejection." (Learner participant, 5)

"I would say I am the type to get along with everyone, I always avoid conflict in any situation, but sometimes it is difficult to socialize with others because they just hate me for being me. I am not the kind of person to get angry at someone because I just feel like it is a waste of time and energy as it makes me anxious. But I desire to improve my attitude." (Learner participant, 10)

In addition, two deputy principals claimed that insecure learners fail to fully trust in themselves and lack confidence. They both concur that these learners are easily intimidated by others. The interview excerpts can be seen below: *"Lastly, anxious children cannot appreciate and compliment others for doing well, and they show high levels of low self-esteem as they are also easily intimidated by others"* (Deputy principal participant, 2). This is what deputy principal had to say:

"They cannot express themselves fluently in the language of teaching and learning. They are easily intimidated by their counter parts in private and former model C schools. This affect their self-esteem. At grade 10 they are prone to succumb to peer pressure. They are likely to smoke drugs due to friends. There's self-doubt and lack of confidence. They do not have a backbone to say no, for fear of being rejected or labelled as cowards." (Deputy principal participant, 1)

The findings from the interview excerpts above indicate the underlying issues of why insecure learners struggle with low self-esteem which is represented in fear of rejection and intimidation. They fail to be confident because of shame and they are afraid of not being liked, being abandoned and not fitting in. In conclusion, the feelings of shame and rejection contribute to learners having difficulties with self-esteem and how they view themselves.

Theme 2: Antisocial behaviours

The findings from research revealed that insecure learners experience antisocial behaviours such as excessive anger issues and violence. Two teacher participants believed that anxious learners are more likely to be involved in fights and show withdrawal symptoms. The interview excerpts from teacher 1 and 5 reported that and I quote, *“Anxious learners neglect taking place in social activities. And learners from struggling backgrounds are the ones who are fighting at school, performing badly and learners from money households perform better.”* (Teacher participant, 1). *“Insecure will have withdrawal symptoms from interactions and do not engage with schoolwork but fights. However, I do try to support any child that struggles academically despite their backgrounds.”* (Teacher participant, 5).

Furthermore, learner 13 claimed that they can be violent to others as a result of failing to resolve issues.

“My social skills are a bit fine. I can make friends, but I cannot build very good long-term relationships. My anger issues need some fixing as I can be violent sometimes but I am getting help to fix my issues as an introvert I would say that it is very difficult to make friends so hopefully the few friends I have are for life. Some people say I am insecure.” (Learner participant, 13)

From the interview excerpts above, antisocial behaviours are seen in insecure learners being involved in fights and harming others. The research findings revealed that learners do struggle with antisocial behaviours which have labelled them as social incompetent.

Theme 3: Aggressive behaviours

The interview results from one teacher revealed that aggressive behaviours are evident in insecure middle adolescents and these learners are very hard on themselves and others, rude and attack others with unkind words, targeting to hurt them. The interview excerpt is reported as follows:

"Insecure learners are usually shy, dismissive, aggressive and when they struggle with an activity, they would make noise, or be rude rather than asking for help. Learners who do not have faith in themselves tend to look down upon themselves and rejoice when confident people show weakness. And sometimes attack them with words. These are learners who are sometimes hard on themselves others as well. It is almost a work in progress as some learners are still shy to speak up and others do not want to work with others. Learners who are dismissive and anxious are usually rude, aggressive, violent and unkind." (Teacher participant, 6)

According to the conclusions that were derived from the excerpt from the interview that was shown earlier, certain teenagers who exhibit violent behaviours demonstrate a battle with their surroundings and project aggressiveness towards other people. Additionally, it is obvious that anger is frequently accompanied with aggressive action tendencies, such as the want to yell, the desire to hit someone, and the desire to damage someone. In conclusion, violent behaviour is a sign of a multitude of underlying issues, and it also indicates that the individual lacks confidence in themselves because of it. Therefore, it is possible to draw the conclusion that one of the factors that contributes to a learner's lack of social competence is its tendency to engage in aggressive behaviours, which are occasionally acquired from the learner's home environment.

Theme 4: Poor anger control

The interview findings revealed that some learners are affected by poor anger management that results to them being violent and dangerous towards others. Learner participant 11 claimed that they cannot control their anger, and it emerges from somewhere,

"When it comes to socializing with other children, I tend to be shy and be quite around people that I don't know or get along with. I don't know why this happens, but it has become normal to me. Yes, I have anger issues but I can't control it because I snap from somewhere. I just do things that are dangerous, and I can also put some people around me in danger. Sometimes when I feel like I'm about to snap I just keep quiet and walk away from the things that makes me mad or cause me to be anxious, but it is hard." (Learner participant, 11).

Teacher participant 4 argued that disorganised learners show lots of anger in the classroom and this is translated into fights and disrespect. The interview excerpt can be seen below:

“Disorganized learners in my class refuse to answer some questions during a lesson and show anger to other learners and fight a lot. Social incompetent learners have low social skills and are mostly involved in fights with other learners and they don’t do their work and assignments. Learners who come from broken families, show low social skills, self-awareness they can’t communicate well in a group. They show disrespect for others.” (Teacher participant, 4)

As a result of the data shown above, adolescents are required to acquire the ability to manage their anger from their parents because it is expected of them that they would demonstrate good social skills at school. Those students who have difficulty controlling their anger have inferior social skills, which has a negative impact on their social development. It is also clear that students who have difficulty controlling their anger are unable to get along with others, which makes it difficult for them to respect other people and to become involved in conflicts.

Theme 5: Poor interpersonal skills

The research findings from the interviews revealed that disorganised learners possess poor interpersonal skills. They fail to communicate to others and build friendships. Learner participant 15, claimed that they generally do not talk to other people as they find it hard to communicate effectively. And teacher participant 2 and 4 claimed that learners with poor interpersonal skills tend to not participate in group activities. The interview excerpts are reported below:

“My social skills such as speaking to others are not good at all it is not easy for me to make friends. I sometimes try to manage my anger, I try with all means to manage my cool and with socializing with people but not too much because it is hard for me to talk to people.” (Learner participant, 15)

“An anxious and disorganized learner hardly participates in group activities in class, and mostly isolates themselves. A social incompetent learner tends to have difficulties with being social and getting along with other learners, has problems adapting to situations and communicating.” (Teacher participant, 2)

“Insecure anxious learners are reserved and do not participate in anything happening in the classroom and also you can differentiate using their results. Results kill their moral because already they are insecure so when things do not go according to plan, anxious learners would not be able to function in a group, they are more reserved when you place them in the group.” (Teacher participant, 4)

It is clear from the three interview snippets that were presented above that learners who are insecure have not yet have established abilities in the area of excellent interpersonal communication. In most cases, this is observed when people are grouped together for a task. The inability to speak, communicate, or form friendships with other people is the first problem that has been discovered, and it has a direct impact on one's ability to interact with other people. It is possible to draw the conclusion that a lack of interpersonal skills is a contributing factor to social incompetence. These students have been socially excluded from speaking with others or participating in group activities, and they have isolated themselves.

Theme 6: Lack of emotional competence

Based on the outcomes of the interviews, it was discovered that learners who are insecure lack emotional competence. One of the participants, who was a deputy principal, stated that students are unable to effectively manage their feelings since they do not have the opportunity to practice this skill at home. *"Insecure learners lack respect since respect is never shown to them from home. Some cannot express the feelings of love and do not know how to deal with their emotions as this is none existence at home."* (Deputy principal participant, 2).

The issue that most learners who are insecure confront is brought to light in the excerpt from the interview that was just shown. The inability of children to communicate and interpret their feelings is a consequence of their lack of emotional competence. Even though they are in love, they have a negative reaction because they have not learned to comprehend what they are experiencing. It is possible to draw the conclusion that youngsters who are lacking in emotional competence would also be unable to comprehend the feelings of other people, which would lead to social incompetence as well.

Theme 7: External locus of control

The results provided a more in-depth analysis of the process of peer influence in the socialization and personal development of adolescents. It was stated by a deputy principal participant that students in the tenth grade do not make their own decisions or make efforts to develop themselves; rather, they largely rely on their friends, which hurts their grades. Following is a report of the excerpt from the interview:

"They listen more to their friends and peers more than they'd listen to their parents. They value the friends' opinions more than that of teachers and parents. There is mostly high failure rate in grade 10 than in other grades because of lack of social competencies. They are unable to adapt to the FET phase as they just came out of the senior phase. They are in the process of discovering who they are. They are expected to choose subjects which will affect their entire lives at a stage where they are unsure of themselves." (Deputy principal participant, 1)

In addition teacher participant 4, also believed that insecure learners fail to deal with peer pressure and blame others for their circumstance. The interview excerpts is reported below:

"Socially I wouldn't say insecure learners are competent because if they don't yet know how to deal with peer pressure and blame others for their failure, they are not yet socially competent because a socially competent learner would know where to draw the line. They are in competition with their friends and they are not mindful that they are from different backgrounds." (Teacher participant, 4)

According to the interview excerpts presented above, adolescents are subjected to the pressure of conforming their thoughts and actions to specific guidelines that have been prescribed by their peers. Furthermore, they are afflicted with the negative characteristics of freely giving control to others to receive assurance, acceptance, and validity, which in turn causes them to avoid taking responsibility for their actions.

4. DISCUSSION

The study findings revealed that learners with insecure attachment patterns exhibited social incompetence. The findings revealed that these individuals displayed social incompetence among learners include low self-esteem, antisocial behaviours, aggressive behaviours, poor anger control, poor interpersonal skills, lack of emotional competence, external locus of control. These findings align with the Rubin and Chronis-Tuscano, (2021), which identified various signs and factors associated with social incompetence. One of the primary factors identified in the study was a lack of self-confidence. The findings indicated that learners had a deficiency in self-assurance and were unable to have faith in their own abilities. These learners experienced feelings of guilt and fear due to concerns about social acceptance, abandonment, and

fitting in. The findings determined that the emotions of guilt and rejection are factors that contribute to learners experiencing challenges with their self-esteem. The findings corroborated those of Bergin and Bergin (2009), which suggested that those with insecure attachment styles are more prone to experiencing anxiety or terror in response to routine events or daily activities. Individuals with an anxious/ambivalent attachment type often feel nervous about being abandoned and have doubts about the reliability of their caregivers and others in their lives. Furthermore, Hong and Park (2012) contended that children with low self-esteem may experience apprehension about the reliable satisfaction of their needs, leading to an intensified emotional reaction due to their heightened sensitivity to perceived risks of being rejected or abandoned (Mikulincer & Shaver, 2010). Muñoz-Pradas, et al., (2025) study reported on the existence of a statistically significant relationship between the social skills variable and Attachment corresponding to subjects with good abilities to express feelings and comfort with relationships. This finding implies that schools should promote mental health assistance by offering access to counselling or therapy sessions and by educating staff on how to support children with low self-esteem.

The findings revealed instances of deviant behaviour, including physical altercations, emotional outbursts, defiance, theft, and dishonesty. These learners exhibit a high degree of self-criticism and are also prone to being disrespectful and verbally aggressive towards others, intentionally seeking to do harm. These findings align with Harber's (2001) assertion that schools in South Africa have been impacted by violence, leading to the upbringing of children in insecure circumstances and their subsequent engagement in aggressive behaviour towards others. Furthermore, Wray (2015) argued that external stressors, such as precarious housing or community violence, might have an impact on the strength of the bonds between parents and children, potentially resulting in insecure attachment. Furthermore, the third component identified in the study findings was poor anger control exhibited by learners with an insecure attachment style. The study findings indicated that anger frequently co-occurred with aggressive behavioural inclinations, such as a proclivity to vocally express anger, a desire to physically strike someone, and a wish to cause harm to someone. This finding aligns with the research conducted by Girme et al. (2021), which suggests that persons with insecure attachment styles may experience challenges in effectively managing disputes and may be more prone to expressing anger. Insecure youngsters may face challenges in effectively communicating their demands, engaging in productive negotiations, and finding mutually beneficial solutions in social situations (Wray, 2015). Sezer and Gürtepe (2025) revealed a moderate negative correlation between attachment to mothers and

risky behaviours, while a weaker negative correlation was observed between attachment to fathers and risky behaviours. Szeifert, et al., (2025) reported that higher levels of secure attachment style predicted a lower risk of suicide attempt, and that, secure attachment style significantly mediated part of the total effect of early traumatization severity on suicidal behaviour.

Based on the findings, it was seen that learners were unsuccessful in their ability to communicate with people and establish friendships. These findings were in line with other sources of information on insecure attachment types. In agreement, Park and Schepp (2015) found that insecure attachment patterns can have negative consequences on individuals' emotional and social development. These consequences include reduced self-perception, isolation from social interactions, and emotional turmoil. Likewise, those lacking interpersonal skills may feel anxious about being rejected or abandoned, making it challenging for them to engage comfortably with their peers or form positive relationships (Sprenger, 2020). Furthermore, Maalouf (2022) found that individuals who have insecure attachment styles, particularly those with anxious-avoidant attachments, tend to actively avoid social interactions out of fear of rejection or disappointment. This avoidance can hinder the development of their social skills. The implication of this finding is that Life- Orientation teachers should champion for peer mediation programs, which can provide learners with the skills to effectively resolve disagreements and navigate relationships. In addition, the findings uncovered a lack of emotional competence among learners with insecure attachment, because learners struggle to effectively manage negative emotions. According to Maalouf (2022), individuals with insecure attachment may face difficulties in effectively expressing their needs and emotions. Similarly, Evraire, Dozois and Wilde (2022) found that those with insecure attachments encounter challenges when it comes to displaying empathy and participating in perspective-taking. Brunssen and Kastrup (2026) reported that interactions are strained by perceptual discrepancies, one concerning what counts as just and the other whose reality is recognised.

The final component identified in the study findings was an external locus of control. The study findings elucidated the mechanism of peer influence on the socialization and personal growth of adolescents. Research findings suggest that individuals with an insecure attachment style face difficulties in making independent decisions and tend to excessively depend on their peers. Based on the findings, it was concluded that insecure learners struggle to handle peer pressure and tend to attribute their circumstances to others, rather than taking responsibility for their own actions. This finding is consistent with Spokas and Heimberg (2009), which concluded that having an external locus of control can have negative consequences. In a similar vein, Evraire, Dozois and Wilde (2022)

discovered that persons with insecure attachment styles may have a proclivity for seeking excessive reassurance and praise from others, relying on external sources to establish a sense of security. To put it simply, individuals who have insecure attachment may exhibit less social resilience, struggle to bounce back from social challenges or setbacks, and their lack of a strong foundation in early attachment experiences might affect their ability to cope with social pressures (Girme, et al., 2021). Sezer and Gürtepe (2025) study revealed a moderate negative correlation between attachment to mothers and risky behaviours, while a weaker negative correlation was observed between attachment to fathers and risky behaviours. The implication of this finding is that teachers have the potential to create parenting programs or raise awareness in the community. These initiatives can equip parents with good bonding practices, leading to improved development and emotional security in their children.

5. CONCLUSION & RECOMMENDATION

The study concludes that insecure attachment styles have a major impact on social ineptitude, because the findings revealed a deficiency in self-assurance among learners who had unstable attachments. Most learners exhibited a lack of self-assurance and were unable to trust in their own talents. The findings determined that the primary factors contributing to low self-esteem in insecure learners are their apprehension of rejection and intimidation, which are associated with their attachment styles. According to the research, these learners felt shame and dread because they were worried about being accepted by others, being abandoned, and fitting in. As a result, they were unsuccessful in developing their social skills. Moreover, the study revealed a robust link between antisocial behaviour and aggressive behaviour. The findings revealed that some learners resorted to violence in order to deal with their difficulties at school. The research findings indicate that learners who struggle with antisocial behaviours have a deficiency in social competency and display behaviour patterns acquired from their family environment. In addition, the study concludes that learners with an insecure attachment style displayed poor anger management, which was identified as the third component of social incompetence. The study findings indicated a strong correlation between rage and aggressive behavioural tendencies. Thus, it was determined that these learners displayed a substantial level of anger in the classroom, resulting in physical fights and a disregard for authority. According to the findings, a lack of control over anger was identified as the main cause of inadequate interpersonal skills, which negatively affects social development and hampers the learners' ability to form positive relationships with others.

The study also concludes that a significant number of learners who have inadequate social skills tend to seclude themselves and encounter difficulties in communicating effectively. Furthermore, the qualitative inquiry revealed a deficiency in emotional competence among learners who have insecure attachment. Research indicates that learners encounter difficulties in properly regulating negative emotions. The study found that learners with emotional ineptitude exhibit a propensity to reject people and a lack of understanding of others' emotions.

In conclusion, the study argues that an external locus of control has a notable impact on social ineptitude. The study further concludes that persons who have an insecure attachment style have challenges when it comes to making autonomous decisions and have a tendency to too rely on their peers. The study found that there is an inverse relationship between peer pressure and social ineptitude in the chosen township schools. The study revealed that many learners had a tendency to explain their circumstances to external factors, rather than accepting responsibility for their own acts. The study recommends that train parents on best parenting programs and increase awareness in the community on secure homes. This would provide parents with effective bonding techniques that may improve development and emotional security in avoidant-dismissive children and rectify their unpleasant experiences.

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The Relationship Between Individual Factors and Critical Thinking: A Multidimensional Approach

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ABSTRACT. Critical thinking has received increasing attention in recent years with the aim of eliminating the shortcomings of traditional education. Numerous interventions and programmes have been created to develop this skill, which is a significant factor in students' educability, academic performance.

In spite of the rising attention, a much smaller proportion of research on critical thinking examines factors outside the classroom that nevertheless contribute significantly to critical thinking skills.

The aim of our research is to examine critical thinking dispositions and the factors that influence them, with a particular focus on conformity, religious beliefs, impulsivity and negative life events.

The research questions we formulated are as follows: Do conformity and impulsivity predict critical thinking dispositions? How do religious beliefs and negative life events predict critical thinking dispositions?

The research strategy is quantitative, predictive research, and the target population is Hungarian-speaking psychology and special education students at Babeş-Bolyai University. A non-probability, quota sampling procedure was used.

According to the results of the research, impulsivity ($p < .001$) and conformity ($p < .001$) predict lower critical thinking dispositions, while experiencing negative life ($p < .001$) events predict higher critical thinking dispositions. Religious beliefs ($p = 0.309$) did not show a significant correlation with critical thinking dispositions.

Keywords: critical thinking, conformity, religious beliefs, impulsivity, negative life events

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1. INTRODUCTION

One of the greatest shortcomings of modern education is said to be the difficulty or lack of teaching critical thinking skills, which has been the subject of numerous studies and research projects with varying results in recent years. Paul (1992) points out that traditional school education does not encourage the development of higher-level thinking skills, such as critical thinking. Paul explains that knowledge coincides with thinking, especially effective or critical thinking. However, traditional school education, which emphasises content comprehension, is designed as if the use of memory were equivalent to knowledge. This type of lower-level learning occurs only through rote learning or association, and as a result, students memorise material without understanding its logic.

The aim of teaching critical thinking skills is to develop thinking in different fields of science and thus ensure its application in life. The traditional education system appears to be highly effective in terms of imparting subject-specific information, but it often fails to teach students how to think critically about a given topic. In the words of Donald Norman (1980), "It is strange that we expect students to learn, but rarely teach them how to learn."

Many who work in the field of critical thinking regretfully note that critical thinking skills are weak among most educated adults and children. For example, Halpern (1998) refers to research in the field of psychology and concludes that many adults, if not most, are unable to think critically in many situations. Kennedy et al. (1991) and Van Gelder (2005) also concluded that many adults lack basic reasoning skills. This tendency leads people to jump to the first explanation that seems intuitively reasonable without thoroughly examining alternative possibilities, a phenomenon that Perkins, Allen, and Hafner (1983) called "reasonable-seeming epistemology."

By investigating this specific combination of variables, this study addresses a distinct and underexplored gap in the literature. While the scarcity of prior research inherently limits direct comparative grounding, this novelty allows us to offer unique empirical insights into critical thinking.

1.1 Definition of critical thinking

The increased focus on critical thinking is a significant result of the philosophy of education movement that originated in the United States at the end of the 20th century. As a result, several approaches to critical thinking have emerged, and different disciplines and professionals have used different definitions to describe critical thinking (Lai, 2011).

The definition of critical thinking from a cognitive psychological approach is as follows: "Examining both sides of an issue, being open to new evidence that may challenge our ideas, arguing dispassionately, expecting claims to be supported by evidence, drawing conclusions from available facts, problem solving, and so on." (Willingham, 2007).

1.2 The role of personal factors in critical thinking

Critical thinking is influenced by numerous personal factors, just as critical thinking skills can have a significant impact on many aspects of our lives. Critical thinkers examine problems, ask questions, formulate new answers that challenge the status quo, oppose dogmas and doctrines, and often wield greater power in society than their numbers would suggest. It is possible that a functioning society or culture can tolerate only a small number of critical thinkers and that the acquisition, internalisation and practice of scientific and critical thinking are not encouraged (Schafersman, 1991).

Most people follow authority, therefore do not think independently. They tend to think in a desire-driven, hopeful and emotional way. This is why most people do not think critically (Schafersman, 1991).

In Halpern's interpretation (1998), improvements in critical thinking, if they occur at all, are slow and gradual, and he warns that it is not worth expecting dramatic improvements in critical thinking over time, even with educational interventions.

For this reason, the relationship between critical thinking skills and individual factors may be significant in terms of the success of educational approaches and programmes.

1.3 The relationship between critical thinking and conformity

The concept of conformity was defined by Asch (1956), who examined how people tend to align their opinions with those of the majority. According to research, there are two main mechanisms of conformity: normative influence and informational influence (Deutsch & Gerard, 1955). Normative influence describes the motivation of individuals to conform to group norms in order to cooperate with others and be accepted by the group. Informational influence refers to people using the opinions or behaviour of others as a guide when they are uncertain about something or unsure of what the right decision is, believing that the group understands better the given situation.

Conformity and global thinking styles are two interesting psychological concepts that have a significant impact on individuals between the ages of 18 and 25. This stage of life presents many challenges and opportunities as young adults enter adulthood. During this critical period, individuals are under increased

pressure to conform to social norms, expectations, and peer influences, while their cognitive abilities are also developing, allowing them to process information in a more comprehensive and sophisticated manner (Milan et al., 2023). The interaction between conformity and comprehensive thinking can have a significant impact on personal development, decision-making and identity formation. Peer pressure and social expectations can pose a challenge to the development of independent thinking, which can hinder the emergence of diverse perspectives among young adults (Milan et al., 2023).

Teaching critical thinking in the classroom builds on a rich historical and philosophical tradition – the Socratic method or *elenchos* (Owens, 2007). "The purpose of *elenctic* questioning is not only to prepare students to passively supplement their existing knowledge, but also to actively seek new learning experiences" (Paraskevas & Wickens, 2003).

Research examining the effectiveness of neo-Socratic teaching pedagogies has shown that many of them promote productive learning outcomes in disciplines as diverse as physics (Hake, 1998), political science (Kenski & Kenski, 1975), medicine (Huang, 2005), economics (Benzing & Christ, 1997), and adult vocational training (Paraskevas & Wickens, 2003).

Giancarlo and Facione (2001) examined critical thinking tendencies among university students and found that students who had developed critical thinking skills in one area tended to apply them in other areas as well. These findings suggest that critical analysis in the classroom can promote the development of critical thinking, rigorous analysis, and creative problem solving in other areas as well.

Proponents of critical thinking hope that this skill will develop conceptual analysis, clarification of arguments, and critical evaluation, ultimately contributing to informed, rational, and tolerant decision-making in a democratic society. However, Milan and colleagues (2023) caution that overemphasising critical thinking can lead to a one-sided approach in which students may believe that this is the only valid way to understand reality. This absolutism can stifle creativity, discourage speculative thinking, and result in intolerance towards alternative modes of expression and methods of acquiring knowledge.

1.4 The relationship between critical thinking and religiosity

The definition of religiosity itself poses a challenge for experts. Schnitker and Emmons' theory, interpreting religion as a search for meaning in our lives affects three psychological areas: motivation, cognition and social relationships (Emmons & Paloutzian, 2003). The cognitive aspects are related to God and purposefulness, the motivational aspects to the need for control, and the search for religious meaning is also woven into social communities (Emmons & Paloutzian, 2003).

Precisely because of the high degree of subjectivity of the concept, the terms religious beliefs or religiosity are used less and less in modern clinical psychology, with the term spirituality being used instead, as this concept better reflects the role of personal, subjective beliefs (Argyle, 2005).

To date, there has been little scientific research on the relationship between critical thinking and religious beliefs, but there are numerous studies examining the relationship between various paranormal beliefs, pseudoscientific beliefs, and conspiracy theories. In many cases, these studies also mention traditional religious beliefs as a dependent variable (Dyer & Hall, 2019; Wilson, 2018).

James A. Wilson (2018) examined changes in paranormal beliefs and religiosity as a result of a programme designed to develop critical thinking. They developed a number of belief surveys to measure how much control a person feels they have over their life, how willing they are to apply magical thinking, or how open they are to accepting topics based purely on belief. For example, how much someone feels that they control their own destiny (internal control) as opposed to how much they are at the mercy of external forces (external control, control situation); whether someone interprets random events as if they were directly related to them (referential thinking).

The critical thinking skills development programme appeared to cause a significant decrease in participants' paranormal and pseudoscientific beliefs, but interestingly, there was also a demonstrable change in traditional religious beliefs, namely a decrease in participants' convictions (Wilson, 2018). Participants' belief in their religious convictions showed an average decline of 16.8% (Wilson, 2018).

At the same time, research in the field of religious education puts critical thinking and students' personal beliefs in a different perspective. According to this, critical thinking skills do not necessarily have to refute students' personal religious beliefs; in fact, religious education can even develop critical thinking skills (Dyer & Hall, 2019).

To this day, it remains a challenge to develop an integrative education system that would be capable of developing scientific thinking as well as personal convictions (Dyer & Hall, 2019). Among the attempts to develop such educational models, the DBUS learning model stands out as an integrative discovery model based on the integration of the unity of science. Through this learning model, students are able to develop their learning skills constructively and meaningfully, thereby shaping their thinking skills and personal convictions (Khasanah et al., 2019).

Critical thinking is essential for the moral development of citizens in democratic, multicultural and pluralistic societies, as the discussion of different epistemological and normative assumptions requires citizens to listen to each other and develop reflective civic and inclusive civic discourse (Jarmer, 2024).

Teaching must be objective, neutral and critical, which means that it must neither promote nor condemn religions or worldviews (Jarmer, 2024). This does not mean that religious education cannot be affirming or critical. For example the general aim of Norwegian religious education is to approach religion from a wide range of academic perspectives, from internal viewpoints to critical, external viewpoints. According to Bråten and Skeie (2020), another goal of religious education is to develop a critical understanding of religion as a diverse and multidimensional phenomenon and to develop cultural competence that enables students to become competent citizens in a democracy operating in a pluralistic society.

1.5 The relationship between critical thinking and negative life events

Few studies have examined the relationship between critical thinking and real-life behaviour, so further empirical data is needed to gain a more accurate understanding of how critical thinking also influences everyday decisions and challenges. However, if critical thinking does indeed influence the outcomes of everyday decisions and actions, then this effect may also depend on individual characteristics, such as age or educational attainment.

According to Howenstein, Bilodeau, Brogna and Good (1996), the number of years spent in school is a significant factor in the development of critical thinking. Butler (2012) supports this correlation with data: in his research, years of education – rather than age – were the best predictors of critical thinking. However, these results may only reflect individual differences and are not necessarily the consequences of life events or outcomes, so they should be interpreted with caution.

In reality, people do not systematically analyse and evaluate all available information before making every decision (Ajzen, 2011). Behaviour can be the result of conscious processes, but it can also be the product of automatic mechanisms in which the individual is not necessarily conscious (Wood, Quinn & Kashy, 2002). According to Daniel Kahneman's (2011) theory, there are two types of thinking: the first is intuitive, rapid thinking, which we use in routine situations, and the second is logical, deliberate thinking, which we use mainly in new situations and when making important decisions.

University students' decisions, as well as the skills and willingness with which they consider them, can be well understood based on the Reflective Judgment Model (RJM) developed by King and Kitchener (2004). This model is similar to models of critical thinking and assumes that cognitive processes undergo development, so that reasoning becomes increasingly complex by the end of adolescence and into adulthood. An individual's assumptions about their beliefs and knowledge change, gradually enabling them to consider less clear-

cut problems, ambiguous questions and complex dilemmas. This development moves from dualistic (black-and-white) thinking to a relativistic (more nuanced, 'grey area') approach, with the individual able to apply one or the other depending on the situation. Most university students are at the fourth stage of cognitive development, the so-called "quasi-reflective reasoning" level (King & Kitchener, 2004). At this level the nature and verification of knowledge is still personal and situation-dependent.

In their research, Franco et al. (2017) identified four clusters among university students based on critical thinking and the negative consequences of everyday life. The first is the reflective group: these students adapt well to university life and experience few negative consequences. The second, the risk-taking group: these students are prone to impulsive and risky behaviour. They are also characterised by academic negligence, such as absenteeism and cheating on exams. The third group, the "lost in transition" group: these students have difficulty adjusting to university life. They generally have difficulty adjusting to university requirements, which also has a negative impact on their academic performance. The fourth group is the mature group: these older students tend to be careless with their finances and possessions. Most of them work and have to balance their university studies with other commitments.

According to their findings, age is an important factor in the first and fourth clusters, as the older a student is, the more likely they are to neglect their personal belongings and finances and make rash decisions, while not showing a lack of impulse control or neglecting their health. At the same time, these characteristics do not lead these students to neglect their studies. Furthermore, an unimportant factor in the third and fourth clusters, i.e. male students, are those who face greater difficulties in transitioning to university and have not yet adapted to the new requirements of higher education. Negative consequences are more common among male students in their everyday lives, such as poor time management, neglect of their health, and carelessness with their personal belongings and finances. As a result, their academic life also appears to be somewhat neglected. Last but not least, hypothesis testing skills are strongly related to the second cluster, i.e. students who excel at formulating and testing hypotheses and apply an empirical approach to their everyday decisions are more prone to risk-taking. These students are not yet able to control their impulses, so they may engage in risky behaviour. Conversely, students who excel at analysing arguments are less likely to belong to the second cluster (Franco et al., 2017).

According to the meaning-making model, negative life events (stress, trauma, etc.) often create a profound discrepancy between an individual's core beliefs and the appraised meaning of the stressor (Park, 2010). This discrepancy generates psychological distress, which functions as a primary drive for meaning-

making efforts. Crucially, when an event cannot be assimilated into existing beliefs, individuals must engage in accommodation—a deliberate cognitive process of restructuring their core beliefs, allowing their reorientation to more promising goals and thus promoting better adjustment (Park, 2010).

These positive changes share the common factor of struggling with adversity, hence we refer to them collectively as adversarial growth (Linley & Joseph, 2004). It is through this process of struggling with adversity that changes may arise that propel the individual to a higher level of functioning than that which existed prior to the event (Linley & Joseph, 2004). These positive changes have been labelled posttraumatic growth, stress-related growth, perceived benefits, thriving, blessings, positive by-products, positive adjustment, and positive adaptation. In this process, the development of critical thinking skills might be a key element in reevaluating the existing situation.

1.6 The relationship between critical thinking and impulsivity

Impulsivity is a central element of human cognition and behaviour. Controlling external stimuli, thoughts or response tendencies requires factors that have a wide-ranging impact on our everyday lives, cognition and behaviour (Stahl et al., 2014). For example, when driving to work in the morning, we may be exposed to a number of external influences, such as a phone call, that can distract us from getting to work safely.

Recent theoretical and empirical research on impulsivity, impulse control, and inhibitory function suggests that there are at least three main components of interference control (Stahl et al., 2014). Goal-directed behaviour can be disrupted by stimuli in the environment, stimulus representations stored in memory, or tendencies to activate involuntary or dominant responses (Stahl et al., 2014). Controlling interference due to external stimuli, internal representations, and response tendencies is a fundamental part of impulse control and is closely related to motivational processes (Nigg, 2000), such as delayed gratification (Mischel et al., 2011). Impulse control can be understood as the set of processes that enable individuals to set a long-term goal system and to maintain and achieve these goals without being interrupted by interfering impulses (Stahl et al., 2014).

However, how does all this relate to critical thinking? Some studies have compared certain differences between impulsive and reflective thinkers (Kruijt et al., 2022). Impulsive people are characterised by more impulsive thinking, which leads to quick and sometimes inaccurate decisions, so we can assume that they use critical thinking skills less frequently (Baron, 2019). In contrast, reflective thinkers carefully gather information and evaluate their actions (Kruijt et al., 2022). This active, open-minded thinking allows them to better evaluate information (Baron, 2019).

However, certain studies comparing people prone to impulsive and reflective thinking styles in terms of their critical evaluation of various social media content failed to show any significant results between the two groups, thus concluding that impulsive people do not have lower critical thinking skills (Kruijt et al., 2022).

Research conducted among students shows different results (Kertiyanı & Sarjana, 2022). In this research, cognitive style referred to reflective and impulsive cognitive styles. Reflective students use an analytical process and have cognitive maturity. They tend to answer questions slowly but carefully, and their answers are usually correct. In contrast, impulsive students are those who solve questions quickly but with less accuracy, and their answers are often incorrect (Kertiyanı & Sarjana, 2022).

Another study examining prospective natural scientists showed that there was no significant difference in critical thinking levels between different cognitive styles, but at the same time, no one from any group produced the highest level of critical thinking. (Vranic et al. 2019) (Yasir & Dwiyanı, 2023). However, reflective science teacher candidates have a higher level of critical thinking than impulsive teacher candidates in ethnoscience learning, although the differences are not significant (Yasir & Dwiyanı, 2023).

Impulsivity has also been linked to constructive thinking, which, although a different process, is closely related to critical thinking and they complement each other. Both play an important role in problem solving, decision making and information evaluation (Urban et al., 2015). This ability, a personality trait, shapes emotional and rational attitudes to changing circumstances. It is based on sensitivity and openness to change, which improves the chances of successful adaptation (Epstein & Meier, 1989).

In adolescents with conduct disorder, it was observed that this way of thinking was less prevalent and that inflexible, black-and-white thinking and superstition were much more characteristic of them (Urban et al., 2015). This may be due to the fact that impulsivity or a lack of sustained attention (i.e., poor behavioural control responses) causes people to form strong personal convictions, such as not daring to talk about something they really want because they fear it may prevent it from happening (Urban et al., 2015).

2. OBJECTIVE

The aim of our research is to examine the personal dispositions described above in relation to critical thinking, thereby contributing to a deeper understanding of the topic and potentially identifying some areas that, if taken into account by

professionals, could lead to better critical thinking skills. In our research, we seek to answer whether conformity and impulsivity predict a lower critical thinking disposition, while religious beliefs and negative life events predict a higher critical thinking disposition.

3. HYPOTHESES

H1. Higher levels of conformity and impulsivity predict lower critical thinking dispositions.

First and foremost, conformity – according to Asch (1956) – refers to the tendency to align oneself with the majority opinion, often at the expense of individual autonomous thinking. Deutsch and Gerard (1955) also pointed out that both normative and informational influence can encourage individuals to accept the opinions of others without critically evaluating them. Young adults are particularly sensitive to this pressure (Milan et al., 2023), as their identity and independent thinking skills are still developing.

Furthermore, Kerry S. Walters (1987) emphasises that intellectual conformity poses a threat to critical thinking, as uncritical conformity leads to passive acceptance of existing knowledge rather than active pursuit of new knowledge. All of this is consistent with our findings, which show that higher conformity is associated with a lower propensity for critical thinking.

Secondly, impulsivity, as a lack of behavioural inhibition, is associated with forms of behaviour that are often incompatible with long-term goals (Stahl et al., 2014). Impulsive people tend to make quick, often inaccurate decisions and weigh information less carefully (Baron, 2019). In contrast, individuals who are prone to reflective thinking process information more thoroughly and are more analytical (Kruijt et al., 2022). This is also evident, for example, in the recognition of fake news: impulsive thinkers are more likely to be misled, while reflective thinkers are more effective at identifying it (Pennycook & Rand, 2021; Batailler et al., 2022).

However, the evidence is not entirely clear. Some studies have found no significant difference in critical thinking between people with impulsive and reflective cognitive styles (Kruijt et al., 2022), especially in certain contexts, such as evaluating social media content. In the school environment, however (Kertiyani & Sarjana, 2022), impulsive style was a disadvantage in critical thinking, but with appropriate educational strategies (e.g., PDEODE), this disadvantage could be reduced.

H2. Religiosity and experiencing negative life events predict a higher critical thinking disposition.

First, the relationship between religious beliefs and critical thinking is complex, but research by Wilson (2018) and Dyer & Hall (2019) show that programmes designed to develop critical thinking, even if not directly targeting religious beliefs, resulted in a significant decrease in participants' religious beliefs. Religious students also typically scored higher on psychological characteristics such as magical ideation, referential thinking, or absorption.

At the same time, research by Dyer and Hall (2019), among others, points out that certain types of religious education can develop critical thinking, especially if it is multi- perspective, reflective, and artificially based interpretations. For example, some studies have shown that children's development from more religious families was also positively influenced when they were able to discuss religious topics with their parents, which can lead to the development of prosocial behaviours and skills and build bridges between generations (Bartkowski et al., 2008). At the same time, there are also findings that show that while fundamentalist religions correlate negatively with openness, which is an important subscale of critical thinking, religions that emphasise acceptance correlate positively with it (Baron et al., 2008).

A recent study confirmed that students who engage more in spiritual and religious activities reported a significantly higher mean score in stress reduction compared to those who engage less (Orekoya, 2025). The study found that religious coping strategies are more impactful than other methods for stress reduction among undergraduates, reinforcing the descriptive results. Under reduced stress students can perform better, while they can further develop their thinking skills, such as their critical thinking skills.

Secondly, although the relationship between critical thinking and the experience of negative life events has been little explored, some findings suggest that individual life experiences, especially those with negative consequences, often require cognitive restructuring, during which individuals must re-evaluate their own experiences, beliefs and decisions. In many cases, this process promotes the development of deeper reflective thinking, which is the basis of critical thinking (King & Kitchener, 2004). Furthermore, according to research by Franco et al. (2017), it has been observed among university students that groups who have faced more negative everyday life events were more inclined to restructure their cognitive patterns and thus show improvement in certain aspects of critical thinking, especially when these experiences were processed through reflection.

According to Parks (2010) the discrepancy between core beliefs and the appraised meaning of the stressor creates psychological distress which functions as a primary drive for meaning-making efforts, and these efforts can lead to more critical approaches in evaluating and adjusting to negative life events.

4. METHODS

4.1 Participants

Multiple linear regression was used to test the hypotheses. Based on the G*Power program, with a medium effect size ($r = 0.15$) and 80% statistical power, 68 participants were needed to perform the multiple linear regression. The sample reached the required number of participants in both cases.

The questionnaire was completed by 223 Hungarian-speaking students from the Faculty of Psychology and Educational Sciences at Babeş-Bolyai University. During data collection, students majoring in psychology and special education were surveyed. In both cases, undergraduate students were included in the research. The sampling method used was convenience sampling, specifically quota sampling, which sought to improve representativeness.

The sample consisted of participants aged 18-38 ($M = 20.60$ $SD = 1.80$), of whom 207 were women (92.8%) and 16 were men (7.1%). The distribution by subject shows that 148 psychology students (66.36%) and 75 special education students (33.63%) participated in the research, while 74 (33.18%) were from the first year, 84 were in their second year (37.66%), and 65 were in their third year (29.14%). During sampling, an attempt was made to establish quotas based on the two variables discussed above (year and major) in order to ensure representativeness. As a result, 18 first-year special education students (8.7%), 27 second-year special education major students (12%), 30 third-year specializing in special education (13%), 55 first-year psychology students (25.1%), 56 second-year psychology students (25.5%) and 35 third-year psychology students (15.6%) took part.

4.2 Instruments

During the research, a total of six questionnaires were used, completed once by each participant. The six questionnaires used were as follows: demographic questionnaire, Student-Educator Negotiated Critical Thinking Dispositions Scale (SENCTDS), Hungarian standardised version of Eysenck's "Impulsivity-Risk Taking-Empathy" (IIKE) questionnaire, shortened version of Real-World Outcomes (RWO) Questionnaire, Mehrabian & Stefl Conformity Scale, Tobacyk Belief Scale.

In the questionnaire on demographic data, we asked about gender, age, field of study, year of study.

The Student-Educator Negotiated Critical Thinking Dispositions Scale (SENCTDS) is a 21-item tool that measures six dispositions: reflective ability, attentiveness, openness, organisation, perseverance and intrinsic motivation. Participants were asked to rate their agreement with each statement on a 7-

point Likert scale, where 1 (strongly disagree) and 7 (strongly agree). The reliability of the scale is .82 based on Cronbach's alpha, which indicates good internal consistency (Quinn, 2020).

From the *Hungarian standardised version of Eysenck's "Impulsivity-Risk Taking- Empathy"* (IIKE), we used the impulsivity subscale, which consists of 21 items. Participants had to indicate whether the given statement was true or false for them. The reliability of the scale based on Cronbach's alpha is .78, which indicates acceptable internal consistency. (Kozéki, 1998).

The *shortened version of Real-World Outcomes* (RWO) Questionnaire was used, which consists of 21 items. Participants had to indicate whether the given statement was true or false for them in the past year. Questions 1-3 refer to neglecting health, questions 4-6 refer to mismanagement, questions 7-9 measure slackness, questions 10-13 measure poor impulse control, questions 14- 17 measure academic negligence, and questions 18-21 measure rashness. The reliability of the scale is .72 based on Cronbach's alpha, which indicates acceptable internal consistency (Franco & Almeida, 2017).

The *Mehrabian & Stefl Conformity Scale* is a self-report conformity scale consisting of 11 items. Participants were asked to rate the extent to which each statement applied to them on a scale of 1 (Not at all true) to 5 (Completely true). The reliability of the scale is .78 based on Cronbach's alpha, which indicates acceptable internal consistency (Mehrabian & Stefl, 1995).

A *subscale Tobacyk Belief Scale*, which consists of 4 items. Participants had to rate on a scale of 1 to 5, where 1 – I do not believe in this at all, 2 – I rather doubt it, 3 – I am neither convinced nor unconvinced, 4 – I am more convinced than unconvinced, and 5 – I am completely convinced. They had to indicate how convinced they were about the given statement. The reliability of the scale is based on Cronbach's alpha .82, which indicates good internal consistency (Tobacyk, 2004).

4.3 Research design

In the study, a cross-sectional predictive research design was used in order to explore and understand in more detail the relationship between critical thinking disposition and the measured intrapersonal factors. The predictive design is important because it allows to investigate not only the relationship itself, but also the tendency of critical thinking disposition based on individual psychological characteristics. At the same time, the results obtained in this way and the conclusions drawn from them may be more relevant in how traditional teaching methods could be modified.

4.4 Procedure

Participants provided their informed consent for the use of their data for statistical analysis. The questionnaire was administered via the Google Forms platform and required approximately 15 to 20 minutes to complete per participant. Participation in the study was voluntary, and no randomization was applied.

4.5 Statistical analyses

As a first step, we examined the normality and the descriptive statistical data in our sample. We examined both demographic variables and the independent variables used in the research. The examination of standardised residuals is particularly important in the case of the outcome variable, critical thinking skills. Based on the Shapiro-Wilk test indicators, the test is not significant, so it can be concluded that the sample is normally distributed. The histogram also supports this conclusion. The relationship between each predictor and the outcome variable was linear. Multiple linear regression was used to test our hypotheses in both cases. This allowed us to examine the relationship between the personal factors we studied and critical thinking tendencies, we also examined the extent to which certain variables predict critical thinking disposition. Furthermore, we were able to demonstrate the combined predictive value of negative and positive predictors.

5. RESULTS

5.1 Descriptive statistical results

There were 223 participants in the entire study, and the normality of the entire sample for the predictor and outcome variables were all examined. No one was excluded from the study. The distribution of the different variables was separately examined, comparing each value to the normal distribution, and classifying them as skewed to the right or left, or peaked or flattened in the analysis. According to the kurtosis and skewness indicators, all of the variables examined fall within the -1 to +1 interval. At the same time, we also used the Shapiro-Wilk test for normality testing with regard to the regression model. In the case of critical thinking disposition, the Shapiro-Wilk test shows no significant deviation from normal distribution.

Table 1. *Descriptive statistics*

	N	M	SD	Min	Max	Skewness	Kurtosis
CritThink	223	5.01	0.65	3.33	6.67	0.06	-0.44
Impulse	223	1.61	0.19	1.0	2.00	-0.42	-0.30
NegLifeEv	223	1.60	0.17	1.14	1.95	-0.25	-0.59
SocCom	223	2.76	0.58	1.00	4.00	-0.33	-0.05
Reli	223	3.49	1.02	1.00	5.00	-0.40	-0.59

Note: CritThink = Critical thinking, Impulse = Impulsivity, NegLifeEv = Negative life events, Reli = Religiosity

5.2 Predictive statistical results

H1. Higher levels of conformity and impulsivity predict lower critical thinking skills.

Table 2. *Results of multiple linear regression on the predictive effect of impulsivity and conformity on critical thinking*

Variable	95% CI for B				β	R	R ²
	B	LL	UL	SE B			
Constant	8.15	7.41	8.90	0.37		0.51	0.26
Impulsivity	-1.40	-1.85	-0.95	0.22	-0.35***		
Conformity	-0.39	-0.52	-0.27	0.06	-0.35***		

Note: Results were obtained from 223 participants. CI = Confidence Interval LL = Lower Limit UL = Upper Limit *** $p < .001$.

Multiple linear regression was used to predict critical thinking, examining the effects of two negative predictors, impulsivity and conformity. The analysis yielded a statistically significant model, $R = .51$, $R^2 = .26$, which means that the model explained 26% of the variability of critical thinking. Impulsivity proved to be a significant negative predictor, $B = -1.40$, 95% CI $[-1.85, -0.95]$, $SE = 0.22$, $\beta = -.35$, $p < .001$. This result suggests that higher impulsivity is associated with lower critical thinking dispositions. Conformity was also significantly negatively related to critical thinking, $B = -0.39$, 95% CI $[-0.52, -0.27]$, $SE = 0.06$, $\beta = -.35$, $p < .001$, meaning that higher levels of conformity were also associated with lower critical thinking dispositions.

Table 3. Results of multiple linear regression on the predictive effect of negative life events and religiosity on critical thinking (95% CI for B)

Variable	B	LL	UL	SE B	β	R	R ²
Constant	3.47	2.67	4.27	0.40		0.28	0.08
NegLifeEv	1.04	0.57	1.51	0.23	.28***		
Religiousness	-0.04	-0.12	0.03	0.04	-.06		

Note: The results were obtained from 223 participants. NegLifeEv = Negative Life Events
 CI = Confidence Interval LL = Lower Limit UL = Upper Limit *** $p < .001$.

We examined the positive predictors of critical thinking in a separate model, where we analysed the role of experiencing negative life events and religiosity. The regression model proved to be significant, $R = .28$, $R^2 = .08$, which means that the model explains 8% of the variability of critical thinking.

Experiencing negative life events was a statistically significant positive predictor, $B = 1.04$, 95% CI [0.57, 1.51], $SE = 0.23$, $\beta = .28$, $p < .001$, meaning that the more negative life events the respondent experienced, the higher their level of critical thinking tendency. Religiousness did not prove to be a significant predictor, $B = -0.04$, 95% CI [-0.12, 0.03], $SE = 0.04$, $\beta = -.06$, $p = 0.309$, so this variable did not contribute significantly to the prediction of critical thinking skills in this model.

6. INTERPRETATION OF RESULTS AND CONCLUSIONS

When interpreting these results, it is critical to note that the sample's homogeneity, specifically the high proportion of female participants (92.8%) and the focus on a single university's psychology and special education students, inherently limits the external validity of the findings.

In our first hypothesis, we examined whether higher levels of conformity and impulsivity predict lower critical thinking skills. Based on the statistical results, the model significantly explains 26% of the variability in critical thinking, meaning that the more conformist a person is, the more likely they are to have weaker critical thinking skills.

This is not an unexpected result, as according to Asch's (1956) definition of conformity. Young adults are particularly sensitive to this pressure (Milan et al., 2023), as their identity and independent thinking skills are still developing.

Furthermore, our findings are supported by Kerry S. Walters' (1987) study, which argues that intellectual conformity is dangerous because it leads to passive acceptance of existing knowledge.

Impulsivity also proved to be a significant negative predictor. The current study is consistent with the findings of other authors who assumed a significant relationship between the two variables and, on the other hand, pointed out that people with an impulsive cognitive style have a weaker tendency towards critical thinking. (Baron, 2019; Batailler et al., 2022; Pennycook & Rand, 2021). In the case of students, this is mainly confirmed by the research of Kertiyani and Sarjana, who pointed out that students with a more impulsive cognitive style are more prone to making faster and less accurate decisions (Kertiyani & Sarjana, 2022). Our results contradict other studies that found no significant relationship between impulsivity and critical thinking (Kruijt et al., 2022).

Our second hypothesis, that religiosity and experiencing negative life events are significant predictors of critical thinking, was only partially confirmed. We based our hypothesis on the results of studies that showed a significant relationship between paranormal beliefs and religiosity (Eder et al., 2011). Certain studies have shown that programmes aimed at developing critical thinking were able to reduce belief in paranormal beliefs, while at the same time causing a change in the personal beliefs of religious people (Wilson, 2018). Contrary to these findings, our research confirmed that there is no direct correlation between critical thinking and religiosity. Although previous studies have not examined religiosity in relation to critical thinking, numerous other studies have examined variables related to critical thinking or its subscales, such as racism. One such study found no relationship between church attendance, strength of belief, and racism, and found that orthodox believers were only slightly more prejudiced than relativists (Duriez & Hutsebaut, 2000).

In contrast, experiencing negative life events predicts a higher level of critical thinking. Based on the statistical results, the model is significant, and experiencing negative life events explains 8% of the variability in critical thinking skills, meaning that experiencing negative life events can have an impact on critical thinking skills. Although this is an inadequately researched topic, our results support the existing literature, which suggests that individual life experiences, especially those with negative consequences, may influence the functioning of critical thinking (Franco et al., 2017). According to the reflective judgement model, negative life events often require cognitive restructuring, during which individuals must re-evaluate their own experiences. In many cases, this process promotes the development of deeper reflective thinking, which is the basis of critical thinking (King & Kitchener, 2004).

7. LIMITATIONS OF THE RESEARCH AND OPPORTUNITIES FOR IMPROVEMENT

Our research is innovative in the sense that other studies have not yet examined critical thinking tendencies in relation to these personal variables mentioned above. In many cases, we did not have access to previous research specifically related to the variables under investigation, so in many cases we formulated our hypotheses and explained our conclusions based on similar theoretical constructs that had been investigated previously. The literature on critical thinking is even more lacking in research conducted in the Hungarian speaking population. For this reason, the results must be supported by other studies in order to be able to draw general conclusions.

The homogeneity of the sample is also considered a limitation in our research. Although this is not confirmed by previous studies, it is worth raising the question of whether university students studying psychology or special education differ significantly from their peers studying other subjects in terms of the variables examined. At the same time, in the case of religiosity, for example, it would be worth clarifying which religion and how fundamentalist the participants' beliefs are, which could also nuance the relationship with critical thinking. In the future, it would be worthwhile to conduct more inclusive research covering more areas, possibly covering different age groups and social classes.

Another limitation may be the sampling method used, which is non-probabilistic and therefore does not guarantee the representativeness of the sample. However, the quota sampling method was used precisely for this reason, as it allowed us to improve the distribution of our sample in relation to the distribution of the population, thus increasing its representativeness.

We see the long-term perspective for the application of our results primarily in drawing attention to aspects of the traditional higher education system which, although they can be considered intrapersonal, nevertheless deserve significant attention from the point of view of critical thinking. At the same time, there are already existing programmes whose certain elements would be particularly important to transfer to Romanian higher education. A study aimed at exploring the effectiveness of the PDEODE (Predict - Discuss - Explain - Observe - Discuss - Explain) learning strategy on the critical thinking skills of students at Ronggolawe University in Indonesia, taking into account the differences in cognitive styles between reflective and impulsive learners, showed that the PDEODE learning strategy proved to be effective among both impulsive and reflective learners. Reflective learners were more likely to think thoroughly and deliberately, while impulsive learners responded more quickly but often inaccurately.

The strategy promoted students' active participation, independent thinking, reasoning and problem-solving skills in the online environment (Wulandari, 2021).

Another technique used to develop critical thinking is the "5 Whys" technique. The essence of this technique is to ask the question "Why?" at least five times in succession about a problem or phenomenon, asking again after each answer. In Herbert Nold's (2017) research, although the independent effect of this technique was not measured, when applied as part of the overall learning methodology it showed significant development in the critical thinking of university students thinking. According to the students' self-assessment, their level of critical thinking increased in the during the course, and this increase was statistically significant ($t = 2.18, p < .05$).

Statements and declarations

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The Vowel as an Acoustic, Emotional, and Biological Stimulus in Music Pedagogy

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ABSTRACT. This research explores the multidimensional role of vowels as acoustic, emotional, and biological stimuli within the context of music pedagogy. The study argues that vowels are not neutral phonological units but active triggers of affective and physiological processes. Using the formant architecture of the standard Serbian language as a baseline, the analysis demonstrates how specific vowel configurations are instinctively associated with spatial and emotional archetypes. Through the lens of the facial feedback hypothesis, the research shows that the mechanical activation of orofacial muscles during vowel production functions as a somatic stimulus, modulating the performer's internal affective state. Neurophysiological evidence further confirms that vowels elicit stable cortical responses, while empirical studies highlight their capacity to regulate biomarkers of stress, immunity, and social bonding through collective singing. By integrating insights from acoustic phonetics, biomechanics, and psychophysiology, this work repositions the vowel as a fundamental pedagogical tool – one that simultaneously shapes technical vocalization, authentic emotional expression, and biological regulation. The findings advocate for a holistic approach to music education, particularly for children and adolescents, where vowel articulation fosters systemic balance, resilience, and artistic integrity.

Keywords: vowels, phonoaesthetics, formant architecture, music pedagogy, biological regulation, emotional resonance

INTRODUCTION

Human speech and singing have traditionally been conceptualized as systems for transmitting lexical and musical information. However, contemporary research in phonetics, psychology, and musicology demonstrates that vowels

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possess an intrinsic expressive and biological power that transcends their conventional linguistic functions. Building upon the foundations established in *The Importance of Vowels in Music Education* (Petrović, 2017), this study deepens the inquiry by positioning vowels not only as acoustic symbols of affect but also as biological stimuli capable of modulating emotional and physiological states.

The central premise is that vowels are autonomous acoustic signals whose articulation engages the orofacial musculature, respiratory system, and neurophysiological pathways. Their spectral architecture, defined by the first (F1) and second (F2) formants, provides a stable framework for cross-modal associations with spatial, cognitive, and emotional archetypes, as evidenced by recent behavioral and motor-response studies (Vainio, Wikström & Vainio, 2023; Vainio, Myllylä & Vainio, 2024). At the same time, recent neurophysiological and neuroimaging evidence confirms that vowel production stabilizes cortical responses and directly modulates autonomic nervous system function (Morales-Luque et al., 2025; Saus, Seither-Preisler & Schneider, 2025), while psychophysiological studies show that collective singing and vowel-centered chanting regulate biomarkers of stress, immunity, and social bonding (Canessa-Pollard, Anikin & Reby, 2025; Good & Russo, 2021).

To address this complex, triadic nature of vowels, this study adopts an integrative, interdisciplinary methodology. Rather than limiting the analysis to a single analytical framework, this approach synthesizes empirical data and theoretical insights from acoustic phonetics, vocal biomechanics, affective neuroscience, and music pedagogy. This specific methodology was chosen because the phenomenon of vowel articulation in singing cannot be fully captured by any single discipline. An isolated acoustic analysis would overlook the somatic, emotional modulation experienced by the performer, while a purely physiological approach would fail to account for the phonoaesthetic and aesthetic implications in vocal artistry. Bridging these diverse fields offers a deeper, more unified perspective that justifies treating vowel production as a central, multi-layered practice in music education.

This research is structured into four sections, followed by a conclusion. Section 1 establishes the acoustic foundation of vowels and their phonoaesthetic associations with size and space. Section 2 examines the biomechanical constraints of the vocal apparatus, highlighting the physiological architecture that shapes vowel identity. Section 3 explores the somatization of emotion through the facial feedback hypothesis, demonstrating how vowel articulation modulates affective states. Section 4 investigates vowels as archetypes of affective meaning and their musical manifestation, presenting empirical evidence on their role in emotional and biological regulation. The concluding section synthesizes these findings, underscoring their implications for music pedagogy and the holistic role of vowels as acoustic, emotional, and biological stimuli.

By integrating insights from acoustic phonetics, biomechanics, neuroendocrinology, and pedagogy, this study repositions the vowel as a holistic instrument – simultaneously technical, emotional, and biological. The thesis advanced here is that in music education, vowels must be treated as multidimensional stimuli: they are technical elements of vocalization, carriers of emotional resonance, and biological regulators. Recognizing this triadic role enables pedagogy to cultivate authentic vocal expression, systemic balance, and resilience in the next generation of performers.

PHONESTHETICS AND THE ACOUSTIC STRUCTURE OF SOUND SYMBOLISM

Phonoesthetics explores the aesthetic qualities of sounds and their profound influence on human perception and semantic attribution. Within this framework, auditory signals are conceptualized not merely as neutral conduits of information, but as carriers of latent symbolic values. These values manifest through euphony – the inherent pleasantness of vocal sounds – where specific configurations of vowels and consonants generate harmonic resonances. Beyond mere acoustics, the qualitative dimensions of these sounds, including timbre, duration, and resonance, dictate the perceived structural harmony of a linguistic or musical utterance.

The scope of phonoesthetics transcends linguistic boundaries, intersecting with the broader fields of musical and spatial perception. As argued in Petrović (2017), the vowel functions as the primary vehicle for this intersection. This is supported by Milanković et al. (2003), who suggest that tonal perception possesses an inherent spatial dimension: high-pitched tones are spontaneously experienced as being „above“ and „to the right“, while lower frequencies are perceived as „below“ and „to the left“. More recent behavioral studies confirm sound-symbolic associations between pitch and spatial orientation, with high tones consistently linked to „up“ and low tones to „down“ (Vainio, Wikström & Vainio, 2023). Recent acoustic studies (Brandner, Frank & Sontacchi, 2022) further demonstrate that sung vowels exhibit distinct horizontal and vertical directivity patterns, with /i:/ and /u:/ projecting energy forward. These findings confirm that vowel shaping is central not only to resonance but also to the spatial projection of the singing voice. Such insights confirm that vowels, through their unique acoustic architecture, actively construct spatial associations that bypass conventional linguistic functions.

The acoustic identity of a vowel is fundamentally governed by its formants – the resonant frequencies generated within the vocal tract. As illustrated in Table 1, these frequencies serve as the physical substrate for phonoesthetic associations. In standard Serbian, following the foundational research of Kostić

et al. (1964), vowels are categorized by two primary parameters: tongue height, which correlates with the first formant (F1 – degree of openness), and the place of articulation, which determines the second formant (F2 – front/back dimension). A defining characteristic of this architecture is the inverse relationship between formants: F1 reaches its maximum in the open vowel /a/ and its minimum in the closed vowels /i/ and /u/. Conversely, F2 peaks in front vowels (/i/, /e/) and diminishes in back rounded vowels (/u/, /o/). While these mean values fluctuate across genders and individual speakers, they provide a stable spectral framework for the symbolic and emotional qualities explored in the subsequent sections of this research.

Table 1. *Acoustic Characteristics of Standard Serbian Vowels (Kostić et al., 1964).*

Vowel	F1 (Hz) – Vowel Openness	Place of Articulation	F2 (Hz) – Position Description
/i/	250–350	2100–2500	High, front
/e/	450–550	1700–2000	Mid, front
/a/	700–850	1200–1400	Low, central
/o/	450–550	900–1100	Mid, back
/u/	250–350	700–900	High, back

Howell (2015) introduced the concept of Absolute Spectral Tone Color (ASTC), later expanded by Bozeman (2017), as a psychoacoustic framework explaining how listeners perceive frequencies as consistent „tone colors“ analogous to vowel qualities and brightness. This framework situates vowel perception not only within the physical domain of formants but also within the perceptual domain of tonal coloration, bridging acoustics and phonoesthetic experience.

Integral to this acoustic structure is sound symbolism (or phonosemantics), which investigates how meaning arises directly from phonetic properties. Cross-culturally, vowels have often been mapped onto dimensions of magnitude: Ullan (1978) discovered the front-small and back-large relation in 136 languages, while Sapir (1929) experimentally demonstrated that speakers link /i/ with diminutive objects and /a/ with larger ones. Newman (1933) expanded this into a systematic scale of phonetic magnitude, showing that back vowels are

perceived as „larger“ than front vowels. From a musicological and physiological perspective, Nettl (1954) observed that in American Indians songs high tones are sung on syllables with front vowels, whereas lower tones align with back vowels.

Recent research has confirmed and extended these early findings. Ekström (2022) reviewed the field of size-sound symbolism, highlighting how vowel quality, pitch, and phonation type interact to produce consistent associations of magnitude across languages. Vainio, Myllylä, and Vainio (2024) demonstrated that phoneme-response interactions extend beyond perception into motor behavior: vowels such as /i/ facilitate precise grasping actions, while /a/ supports stronger, forceful grips, linking sound symbolism to embodied cognition. Taken together, scholars such as Paget (1930) emphasized that sound symbolism is grounded in the physical volume of the oral cavity during articulation. This perspective suggests a complex, embodied relationship between physiological space and the perception of magnitude – a transition from abstract symbolism to phonetic reality shaped by the biomechanical constraints of the vocal apparatus.

Phonoesthetics posits that vowels serve as vehicles for emotional signaling, where their inherent sound symbolism – defined by shape, duration, and resonance – can trigger affective responses. During articulation, the activation of facial musculature is not neutral; these physiological movements are linked to internal emotional states. For instance, the production of open vowels such as /a/ requires a wider oral aperture, a configuration often associated with expressions of joy or surprise. Consequently, vowels are commonly described as carrying specific phonoesthetic qualities, like /a/ as being open and robust, /i/ bright and acute, and /o/ closed and resonant. These theoretical postulates of phonoesthetics find their biological substrate in the interplay between facial expression, respiratory modulation, and vocal articulation.

These acoustic associations, however, are not merely abstract constructs; they are deeply rooted in the physical body. The bridge between sound symbolism and phonetic reality is built upon the biomechanical constraints of the vocal apparatus. Therefore, understanding these sounds as stable symbolic markers requires a rigorous examination of the physiological architecture that governs their articulation.

BIOMECHANICAL CONSTRAINTS AND PHYSIOLOGICAL MODULATION

The transition from abstract acoustic symbolism to phonetic reality is mediated by the specific biomechanical architecture of the vocal apparatus. While vowels serve as primary vehicles for emotional signaling, their efficacy is strictly governed by the physical parameters of the vocal tract. The relationship between vowel identity and affective expression is not uniform; rather, it is

shaped by articulatory constraints that either facilitate or inhibit emotional contrast. Within this hierarchy, the high-front vowel /i/ shows relative resistance to significant acoustic-emotional modulation, maintaining a stable profile compared to the more expansive and variable configurations of /a/ or /u/. This perspective extends Flemming's (2004) account of articulatory and prosodic constraints on vowel stability to affective expression, and is consistent with Lee et al. (2005), who found that /i/ exhibits comparatively less variation across affective states due to the physical limitations of lingual movement and oral geometry. In this sense, the configuration of /i/ offers reduced acoustic space for contrast, making it a comparatively consistent marker within the vocal spectrum. Such biomechanical stability can serve as a perceptual anchor for listeners, helping phonetic identity remain reliably recognizable even under emotional arousal or physiological constraints.

The manifestation of emotional affect through vocalization is fundamentally predicated upon the biomechanics of the articulatory system. Distinct vowels are shaped through the coordinated activity of the pharyngeal, oral, and nasal cavities, which collectively modulate the phonatory airstream. This modulation functions not merely as a mechanical filter but as a sophisticated process of acoustic shaping, wherein the geometry of the vocal tract determines the spectral characteristics of the sound. Helmholtz (1863) demonstrated that vowel timbre (*Klangfarbe*) arises from the resonant configuration of the vocal tract, grounding the metaphor of vowel color in the physical acoustics of the human body. From this foundation, two trajectories emerge: embodied accounts in phonetics and cognitive science (Sapir, 1929; Newman, 1933; Vainio et al., 2024; Ekström, 2022) emphasize the inseparability of vowel identity from physiological and affective dimensions of vocal production; Howell (2015) extends Helmholtz's acoustic legacy into vocal pedagogy through the psychoacoustic concept of Absolute Spectral Tone Color, framing vowel timbre as a perceptual analogue to color perception in light, and thereby reinforcing its embodied and pedagogical significance.

Variations in articulatory configurations produce diverse psychoacoustic effects: front vowels are associated with greater brightness than back vowels (Newman, 1933). Beyond individual vowel targets, the global positioning of the tongue and the tension within the orofacial complex can be understood as indicators of the articulatory state. Ladefoged (1964) was exploring the anatomical constraints of speech and collected data on tongue muscle positions to hypothesize how muscular forces shape vowels. Nastase et al. (2007) reported that different vowels produce distinct effects, likely due to articulatory constraints: open low vowels such as /a/ tend to show stronger effects than high vowels like /i/.

In this regard, formant frequencies generated by articulatory movements function not only as linguistic markers but also as acoustic indicators of internal states. Subtle shifts in formant values – induced by emotional arousal and muscular tension – reflect the affective state of the speaker or singer. While primary formant structures provide phonetic identity, their dynamic variation parallels musical phenomena. Vowel formant configurations can thus be understood as producing an „acoustic harmony“ that encodes and transmits affective signals. Petrović (2017) develops this perspective further, framing vowels as carriers of embodied resonance whose spectral organization contributes to emotional communication.

For vocal pedagogy, this understanding is of critical importance. Recognizing that the emotional „color“ of a vowel results from the negotiation between phonological targets and physiological arousal allows for more sophisticated development of vocal technique. When students grasp the affective resonance of each vowel, they can better navigate the biomechanical limits of their instrument. This awareness leads to improved vocal quality, fostering precise intonation and more authentic interpretation. By mastering the relationship between vowel articulation and its affective weight, students can reduce unnecessary physical tension, ensuring that vocal production is both technically sound and emotionally resonant. Articulation is therefore never a purely mechanical event. The tension and movement of the vocal apparatus do not merely shape sound; they serve as an interface for the manifestation of internal affective states. Consequently, the somatic reality of the voice finds its most profound expression through the orofacial complex, where the physical act of shaping a vowel becomes inseparable from the biological signaling of emotion. Thus, the pedagogy of the voice must be grounded not only in technical precision but also in the embodied reality of emotional expression.

The exploration of biomechanical constraints and physiological modulation has shown that vowel articulation is inseparable from the embodied processes of vocal production. Yet, the voice does not operate in isolation: its affective resonance is amplified and complemented by facial expression and respiratory dynamics. Emotional communication is therefore not confined to the acoustic domain but emerges from a multimodal system in which sound, breath, and facial movement converge. To fully understand how emotional meaning is transmitted, it is necessary to move beyond the internal mechanics of the vocal tract and examine the integrated pathways through which vocal and facial signals interact. Accordingly, the following section investigates this broader system of emotional communication, highlighting how acoustic and visual cues work together to encode and convey affective states.

VOCAL AND FACIAL PATHWAYS OF EMOTIONAL EXPRESSION

Vowels play a central role in sound production, early language development and emotional communication. Spencer (1855) and Darwin (1872) emphasized that singing possesses a unique capacity to externalize complex psychological states. Their importance is evident in universal affective vocalizations such as crying, laughter, and shouting, and in the pre-linguistic phase of infant development. Jakobson and Halle (1956) highlighted the primacy of vowels in early phonological development, arguing that they constitute the foundational elements of the child's emerging sound system. Empirical studies confirmed that infants' earliest vocalizations are predominantly vocalic (Oller, 1980; Stark, 1981), and that these sounds serve communicative functions before lexical precision is achieved. Analyses of infant crying revealed that variations in formant structure convey distinct emotional states such as hunger, distress, or contentment (Wasz-Höckert et al., 1985). More recent work has shown that infants' perception and production of vowels are closely linked to emotional and social development (Tsao et al., 2004). Philippot (2002) highlighted mechanisms such as the facial feedback hypothesis, where the physical shaping of sound can influence affective states.

Within this framework, a functional distinction emerges: consonants primarily provide lexical precision and structural boundaries, while vowels carry tone and affect. The evolutionary descent of the human larynx, discussed by Fitch (2000) and Lieberman (1988), increased the length and flexibility of the vocal tract, enabling a wider range of formant patterns. This anatomical change allowed humans to transmit subtle shifts in physiological arousal through vowel production. Historical observations support these biological findings. In his work on rhetoric, Mikhail Lomonosov (1755) categorized vowels according to their acoustic qualities, associating high-frequency vowels such as /i/ and /e/ with tenderness and affection, and darker vowels such as /u/ and /o/ with gravity and fear. Darwin (1872) noted that vowels such as /o/ and /a/ accompany laughter, while /e/ and /i/ are linked to amusement or grief. As noted by Jespersen (1922), back vowels are often found in words expressing disgust. Morton (1977), in his study of bird and mammal vocalizations, demonstrated that low, harsh sounds are associated with aggression, while high-frequency sounds signal affiliation and care – findings that have since been extended to human vocal and musical communication as evidence of universal acoustic coding. Cross-cultural studies by Scherer and Wallbott (1994) further showed that high-intensity emotions like anger are associated with expansive vocalic configurations, while sadness correlates with more constricted acoustic profiles.

In musical aesthetics, acoustic configurations are consistently mapped onto emotional archetypes. Murray and Arnott (1993) identified sadness with lower registers and subdued dynamics, while Davitz (1964) described joy and anger as expressed through elevated pitch and expanded tonal ranges. Kienast and Sendlmeier (2000) found that anger generates the highest degree of articulatory precision in both speech and song, producing acoustically dominant phonemes resistant to auditory masking. Yildirim et al. (2004) noted that both anger and sadness can employ extreme registers to convey intensity, suggesting that register extremity functions as a meta-signal of affective depth.

To synthesize this relationship between phonetic structure and psychological response, the following illustration maps these vowel configurations onto their emotional archetypes (Table 2).

Table 2. *The Phono-Symbolic Nexus: Mapping Vowel Articulation to Emotional Affect.*

Vowel	Acoustic/Articulatory Marker	Primary Mechanism	Emotional Archetype	References
/i/	High F2 (Front vowel)	Zygomaticus major (Smiling muscle)	Joy / Pleasure	(Rummer et al., 2014; Darwin, 1872)
/e/	Mid-High F2	Facial affiliation tension	Tenderness / Affiliation	(Lomonosov, 1755; Morton, 1977)
/a/	High F1 (Open aperture)	Mandibular aperture (Wide jaw)	Surprise / Anger	(Nordstrand et al., 2004; Sapir, 1929)
/o/	Low F2 (Back vowel)	Orbicularis oris (Lip rounding)	Sadness / Dysphoria	(Rummer et al., 2014; Lomonosov, 1755)
/u/	Lowest F2 (Back/Close)	Maximum oral constriction	Fear / Dread	(Morton, 1977; Darwin, 1872)

The biological substrate of emotional vocalization lies in the interplay between respiratory modulation, facial expression, and vocal articulation. Emotions manifest through a synchronized system of acoustic and visual signals, driven by specific respiratory patterns. Research indicates that mimicking these patterns can even induce the corresponding emotional state (Philippot, 2002). Specifically, fear is often associated with rapid, shallow respiration, while sadness is characterized by slower, deeper cycles (Philippot et al., 2002). These respiratory shifts are transmitted to the glottal source, rendering the vocal apparatus a reliable indicator of internal emotional states. Supporting this, Scherer (1986) argued that acoustic cues often provide a more transparent reflection

of affective states than visual ones, as vocal parameters such as intonation, tempo, and intensity are highly sensitive to physiological arousal and less subject to conscious suppression than facial expressions.

The relationship between articulation and emotion is driven by orofacial mechanics. Speech motor control studies show increased jaw displacement during high-arousal states, such as anger, to enhance emotional saliency (Nordstrand et al., 2004). Furthermore, prosodic emphasis through hyper-articulation requires wider jaw opening, marking stressed syllables as critical, multisensory indicators of emotion (De Jong, 1995). Rummer et al. (2014) demonstrated that vowels function as potent emotional signals through a psychophysiological interplay. Their findings establish that facial musculature activity does not merely reflect internal states but actively modulates emotional experience via the facial feedback hypothesis. For instance, the articulation of /i/ requires the contraction of the zygomaticus major, the primary muscle involved in smiling, thereby enhancing positive mood states. Conversely, vowels requiring a more constricted orofacial posture, such as /o/, can induce a shift toward negative valence through the activation of the orbicularis oris.

Ringeval and colleagues (2008) demonstrated that prosodic features of vowels (duration, rhythm, intonation) contribute to emotion recognition. Blacking (1973) emphasized the cultural and musical dimensions of vocalization, showing that vowels and musical intervals can function as carriers of human feeling. Curtis and Bharucha (2010) demonstrated that the minor third, traditionally associated with melancholia, has a direct equivalent in prosodic contours of speech, confirming that music and language share a bio-acoustic lexicon. Following these findings, research indicates that both vocal cues (Scherer, 1986) and facial expressions (Ekman, 1982) constitute reliable pathways for decoding emotional states, with each modality offering distinct advantages depending on context. Collectively, these studies indicate that vowels and facial expressions convey patterns that connect linguistic structure with human affect.

This deep-seated connection between vowel archetypes and affective valence suggests that the human voice does more than just represent emotion; it translates internal states into structured acoustic signals. When these signals transcend speech and enter the domain of musical expression, they activate a shared set of universal codes. Accordingly, the transition from linguistic vocalization to singing marks a sophisticated escalation of the affective system, where the biomechanics of articulation and the aesthetics of music converge to produce a profound impact on both the listener's perception and the singer's biological reality. From the perspective of music pedagogy, articulation is not merely a technical requirement but a tool for emotional regulation, enabling performers to embody emotion authentically and transmit it through sound in ways that

bridge linguistic structure, cultural codes, and biological reality. This convergence of biomechanics, aesthetics, and pedagogy sets the stage for the following section, where vowels are examined as archetypes of affective meaning and as stimuli with profound biological implications.

VOWELS AS ARCHETYPES OF AFFECTIVE AND BIOLOGICAL MEANING

The human voice functions as a biological transducer, converting physiological states into acoustic signals through coordinated laryngeal, respiratory, and resonant activity (Sundberg, 1987; Titze, 1994). Within this framework, vowels emerge not only as linguistic units but as archetypal carriers of affective and biological meaning. Neurocognitive studies demonstrate that vowels are processed simultaneously as perceptual and motor events, activating auditory, motor, and limbic networks (Obleser et al., 2003; Pulvermüller et al., 2006). This dual activation situates vowel articulation at the intersection of sensory input, motor output, and emotional regulation. Recent findings confirm that vowel production can stabilize cortical resonance (Saus et al., 2025), modulate autonomic function (Morales-Luque et al., 2025), and foster relaxation and social cohesion through collective chanting dominated by mid-central vowels (Canessa-Pollard et al., 2025). These results highlight vowels as biological stimuli with measurable impact on stress regulation, wellbeing, and expressive authenticity. Welch (2021) situates such findings within a broader framework, arguing that music optimizes wellbeing and human development by integrating biological regulation, emotional expression, and social cohesion.

This body of evidence – ranging from neurocognitive activation of auditory, motor, and limbic networks to findings on cortical resonance, autonomic modulation, and collective vowel chanting – suggests that the impact of vocal music cannot be reduced to semantic or lexical content alone. As Stevens (1998) argues, the expressive meaning of a vocal work is significantly expanded through its acoustic properties, where sound itself functions as a primary carrier of meaning. Consequently, vowels must no longer be treated as secondary technical elements or mere vehicles of lyrics; instead, they must be recognized as integral components of the emotional architecture of singing. The technical shaping of a vowel, characterized by its specific formant structure, acts as a physiological „trigger“ that initiates a neuroendocrine response, directly influencing the singer's biological state.

Biological studies corroborate these effects: singing modulates immune markers (Kreutz et al., 2004), reduces stress hormones, and enhances oxytocin-mediated bonding (Good & Russo, 2021; Bowling et al., 2022). More recent evidence confirms that singing interventions directly influence endocrine and immune responses, lowering cortisol levels, increasing oxytocin release,

and modulating cytokine activity (Fancourt & Perkins, 2018). Complementary findings demonstrate that choir singing modulates both oxytocin and cortisol, suggesting reduced stress and dynamic social-bonding effects. The sharper oxytocin drops observed in older children, alongside age-linked cortisol shifts, point to developmental differences in how collective singing shapes biological regulation (Petrović, 2025). Taken together, these mechanisms highlight the endocrine dimension of vocalization, positioning vowel articulation not merely as a technical act but as a biological regulator that fosters systemic balance, resilience, and emotional growth. As Reybrouck (2021) and Habibi & Damasio (2014) emphasize, music engagement operates as a primary biological and emotional regulator, assisting the organism in maintaining internal stability against environmental stressors.

From a pedagogical perspective, vowel training must be understood as a multidimensional practice: technical in its precision, emotional in its expressive depth, and physiological in its regulatory function. Within music pedagogy, this positions vowel training as a uniquely integrative practice, where formant shaping becomes a conduit for both artistic authenticity and embodied balance. This integrative view underscores that the shaping of vowels is not a peripheral technical exercise but a central pedagogical strategy that unites the scientific, emotional, and artistic dimensions of singing.

Contemporary pedagogy reflects this convergence. American institutions such as NATS and AATS have institutionalized science-informed frameworks, emphasizing resonance, vowel shaping, and standardized terminology, while scholars highlight inclusivity and psychophysiological safety (Bozeman, 2017; Benson, 2020; Benson & Rosen, 2023). Applied science further confirms the pedagogical efficacy of biofeedback and acoustic visualization (Nair, Schellenberg & Gick, 2015), demonstrating that the integration of technology into vocal training enhances both precision and awareness. Globally, Igna & Ma (2025) define pedagogy as a scientific discipline, integrating acoustics, physiology, and psychology into teaching, while Li, Mazlan & Safian (2026) situate it within the framework of 21st-century skills, integrating creativity, collaboration, and digital literacy. These developments collectively affirm that vowel training is not only a matter of vocal technique but a pedagogical practice that embodies the principles of holistic education.

Taken together, these insights reposition vowels as archetypes of affective meaning. They are not passive carriers of text but active stimuli that shape emotional resonance, hormonal regulation, and social connection. In music pedagogy, this recognition transforms vocal instruction into a holistic discipline, where vowel shaping becomes a conduit for both artistic authenticity and systemic wellbeing, situating the singer as both an expressive agent and a biological actor whose voice fosters harmony, resilience, and human development.

CONCLUSION AND PEDAGOGICAL IMPLICATIONS

This study has traced the role of vowels across historical, neurophysiological, biological, and pedagogical dimensions, demonstrating their function as archetypes of affective and systemic meaning. Vowels possess an intrinsic phonoesthetic quality: their articulation requires specific configurations of the orofacial musculature that are biologically and neurologically tethered to emotional states. In this sense, they transcend their status as mere phonological units of language and emerge as autonomous acoustic signals of affect. This profound interconnectedness was recognized as early as the medieval period, when Guido d'Arezzo established a systematic liturgical practice in which vowels were strategically mapped onto specific pitch degrees within the hexachordal system, underscoring the enduring link between phoneme identity, tonal positioning, and affective resonance (Petrović, 2017).

This study has shown that vowels, through their phonoesthetic qualities and sound symbolism, construct associations of size, brightness, and spatial orientation. Their identity is inseparable from the biomechanical architecture of the vocal tract, where articulatory stability and variation shape affective resonance. Vowels dominate early language development and emotional communication, functioning as multimodal signals that integrate sound, breath, and facial movement. At the same time, neurocognitive and biological evidence confirms that vowel articulation activates auditory, motor, and limbic networks, regulates endocrine and immune responses, and serves as a multidimensional pedagogical stimulus – technical, emotional, and physiological.

The pedagogical implications of these findings are profound. Vowel training must be recognized as a holistic practice that unites acoustics, physiology, psychology, and artistry. In practical terms, these findings translate into specific pedagogical strategies within the vocal pedagogy. For instance, vocal teachers can deliberately utilize the high-front vowel /i/ not only as a technical tool for resonance and forward vocal placement, but as a psychological catalyst to stimulate positive affect and reduce performance anxiety via the activation of the zygomaticus major muscle. Conversely, open vowels like /a/ can be strategically introduced in repertoire coaching to facilitate emotional release and high-arousal expressions such as joy or dramatic intensity, optimizing jaw displacement to enhance acoustic projection without causing vocal strain. By applying these vowel-specific interventions, educators can design targeted vocal exercises and warm-ups that directly bridge somatic awareness with scientific precision, simultaneously supporting the students' vocal health and emotional resilience.

Contemporary frameworks already reflect this convergence, integrating science-informed methods, positioning the singer as an embodied communicator whose voice regulates biological states while transmitting aesthetic meaning. Globally, music and vocal pedagogy is increasingly defined as a discipline that bridges acoustics, physiology, and creativity, situating vowel shaping at the heart of 21st-century skills.

Taken together, this research repositions vowels as holistic instruments – simultaneously acoustic, emotional, and biological. They are not passive carriers of text but active stimuli that shape resonance, systemic wellbeing, and social connection. Ultimately, understanding the symbiotic relationship between pitch, vowel articulation, and emotional response enhances the pedagogical value of music education. It empowers the student to perceive sound as a medium that transcends both linguistic and purely musical structures, fostering a deeper, more embodied engagement with the art of singing. By repositioning the vowel as a psychophysiological tool, music pedagogy can cultivate a new generation of performers capable of authentic, scientifically-informed, and emotionally resonant vocal expression, fostering systemic biological balance and artistic integrity through the mastered art of phonation.

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Attitudes Toward Inclusive Education: Predictors Among Hungarian Teachers in Transylvania

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ABSTRACT. The aim of this study is to highlight the demographic, disability-specific, pedagogical, and psychological factors that may predict Hungarian teachers' attitudes toward inclusive education in Transylvania. The study involved N = 233 teachers who completed a self-report demographic questionnaire and a set of instruments comprising the Sentiments, Attitudes, and Concerns about Inclusive Education Scale, the Attitudes and Perspectives Toward Persons with Disabilities Scale, the Special Education Preparedness Scale, and the Tolerance and Acceptance of Difference Scale. Hierarchical regression analyses indicated that positive attitudes toward inclusion were most strongly predicted by special education preparedness and direct experiences with students with special educational needs (SEN), both within and outside of school contexts. Negative emotions toward SEN individuals emerged as the most significant inhibitory factor. Neither years of professional experience nor the type of teaching environment were significant predictors. The results support the Knowledge-Attitude-Behavior theoretical framework, suggesting that knowledge and experience jointly shape attitudes, which in turn influence behavior, in this case pedagogical practice. The findings underscore the importance of experiential, empathy-building teacher education that integrates special education knowledge to foster inclusive orientations.

Keywords: inclusive education, attitudes, special education needs, special education preparedness, tolerance, Knowledge-Attitude-Behavior (KAB) model

ABSTRAKT. Ziel dieser Studie ist es, demografische, behindertenspezifische, pädagogische und psychologische Faktoren aufzuzeigen, die die Einstellungen ungarischer Lehrkräfte in Siebenbürgen gegenüber inklusiver Bildung vorhersagen

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können. An der Studie nahmen $N = 233$ Lehrkräfte teil, die einen demografischen Selbstbericht sowie einen Instrumentensatz bearbeiteten, bestehend aus der Sentiments, Attitudes, and Concerns about Inclusive Education Scale, der Attitudes and Perspectives Toward Persons with Disabilities Scale, der Special Education Preparedness Scale und der Tolerance and Acceptance of Difference Scale. Hierarchische Regressionsanalysen zeigten, dass positive Einstellungen gegenüber Inklusion am stärksten durch die sonderpädagogische Vorbereitung und direkte Erfahrungen mit Schülerinnen und Schülern mit sonderpädagogischem Förderbedarf (Special Education Need, SEN) sowohl innerhalb als auch außerhalb der Schule vorhergesagt wurden. Negative Emotionen gegenüber SEN-Personen stellten den bedeutendsten hemmenden Faktor dar. Weder die Dauer der Berufserfahrung noch die Art der Unterrichtsumgebung erwiesen sich als signifikante Prädiktoren. Die Ergebnisse stützen den theoretischen Rahmen des Knowledge-Attitude-Behavior-Modells, wonach Wissen und Erfahrung gemeinsam Einstellungen formen, die wiederum das Verhalten, in diesem Fall die pädagogische Praxis, beeinflussen. Die Befunde betonen die Bedeutung erfahrungsorientierter, empathiefördernder Lehrkräfteausbildung, die sonderpädagogisches Wissen integriert, um inklusive Haltungen zu fördern.

Schlüsselwörter: inclusive Pädagogik, Einstellungen, sonderpädagogischer Förderbedarf, sonderpädagogische Vorbereitung, Toleranz, Knowledge-Attitude-Behavior (KAB)-Modell

INTRODUCTION

Inclusive pedagogy and education can be approached from an attitude-based perspective, according to which teachers' knowledge, beliefs, and affect play a fundamental role in shaping convictions and pedagogical practices related to the inclusion of students with special educational needs (SEN) (Boyle et al., 2020). The literature highlights several demographic, pedagogical, and psychological factors that can be identified as predictors of a positive inclusion-oriented perspective.

Special education preparedness - whether gained during university studies or other training programs - namely, prior training on teaching SEN students and methodological as well as didactic knowledge, is consistently emphasized in most studies as a major contributor to positive attitudes toward inclusion. Jurca et al. (2023) found that teachers who subjectively perceived their training in special education to be insufficient demonstrated less positive attitudes and reported lower self-efficacy regarding the inclusion of SEN students. Similar findings are reported in other studies, which underscore the mediating role of

self-efficacy, fostered through prior training and professional development, in shaping positive inclusion-oriented attitudes (Sharma et al., 2008; Vieira et al., 2024). The Knowledge-Attitude-Behavior (KAB) model (Alassaf, 2025) may help explain this effect, as it emphasizes that acquiring specialized knowledge directly contributes to attitude formation, which in turn may lead to behavioral change - namely, the implementation of inclusive pedagogical practices.

In addition to formal training, direct teaching experiences with SEN students, as well as experiences outside of school settings, are also of considerable relevance for shaping positive attitudes. Dias and Cadime (2015) found that teachers with little to no experience teaching SEN students held significantly more negative views on inclusion compared to those with more extensive experience. This highlights the importance of practical exposure, alongside theoretical training, within teacher education. Likewise, findings suggest that non-school experiences with SEN individuals (e.g., through family or friendship networks) are also linked to greater acceptance of inclusion (Subban & Sharma, 2006). Such shared experiences and direct interactions may help dismantle stereotypes about difference.

A systematic review further revealed that novice teachers with less professional experience expressed more negative attitudes toward inclusive practices compared to their more experienced colleagues. A similar pattern was observed between teachers working in rural settings, who generally reported less favorable attitudes compared to those in urban contexts. Additionally, teachers' attitudes varied depending on the type of SEN student in question, with the most negative attitudes most frequently reported toward children with neurodevelopmental disorders (e.g., autism spectrum disorder or intellectual disabilities) (Linder et al., 2023).

Beyond demographic and pedagogical factors, psychological variables have also been found to play a significant role in shaping inclusion-related attitudes. Brandes and Crowson (2009) reported that higher levels of intolerance toward difference and negative feelings toward SEN individuals were negatively associated with positive inclusion attitudes. In other words, the stronger the presence of conservative social ideologies and discomfort toward difference, the less likely teachers are to support inclusive practices. This mechanism is further supported by studies showing that negative affect toward SEN students can inhibit positive inclusive practices by obstructing the development of supportive teacher-student relationships and effective collaboration (Lyra et al., 2023; Meyers & Lester, 2016).

While previous Romanian studies (Jurca et al., 2023) have examined teachers' attitudes toward inclusive education, the present study contributes to the literature in several important ways. First, it specifically focuses on Hungarian-speaking

teachers in Transylvania, a culturally and linguistically distinct educational context that remains underrepresented in inclusion research. Second, beyond demographic and pedagogical variables, the study simultaneously examines psychological factors such as intolerance toward difference and negative emotions toward individuals with SEN, thereby offering a more integrative understanding of the predictors underlying inclusive attitudes. Finally, the study interprets these relationships through the framework of the Knowledge-Attitude-Behavior (KAB) model, providing a theoretically grounded perspective on attitude formation in inclusive education.

OBJECTIVES

The aims of the study can be articulated on multiple levels. The study seeks to identify and examine factors that significantly predict the attitudes of Hungarian teachers in Transylvania toward inclusion. Since the success of inclusive education is strongly determined by teachers' attitudes, it is essential to clarify which demographic, intrapersonal, and professional characteristics play a role in shaping these attitudes. To ensure greater transparency, we analyze these predictors across three main variable groups: demographic and disability-specific factors, psychological factors, and pedagogical variables.

By identifying potential risk factors within these dimensions that may hinder the development of positive inclusion attitudes, the study aims to provide insights for the design of targeted interventions. Such interventions could support teachers, strengthen inclusive perspectives, and thereby promote the implementation of inclusive pedagogical practices.

MATERIALS AND METHODS

Participants

To determine the ideal sample size, we followed the recommendations of the G*Power program, which provides information on the minimum number of participants required to conduct statistical tests with adequate reliability (Kang, 2021). For hierarchical linear regression analysis with nine predictor variables, a medium effect size, and a statistical power of 0.95, a minimum of 166 participants was recommended (Faul et al., 2009).

The inclusion criteria specified that all participants had to be over 18 years old, working as Hungarian-speaking teachers in Transylvania. The sample was predominantly female (89.3%), with ages ranging from 24 to 65 years ($M = 39.5$, $SD = 9.48$). More than half of the participants (54.9%) taught in urban

settings, and most worked in mainstream schools (85.4%). The majority were primary (39.1%) and secondary school teachers (39.5%), though kindergarten teachers (20.5%) and higher education instructors (0.9%) were also represented. Most respondents (87.1%) reported having some teaching experience with SEN students, yet only a small proportion (7.3%) felt fully prepared for the task. Over half of the participants (50.6%) indicated that they had received no or only minimal special education training during their university years. Outside of school, the vast majority (81.1%) also reported having direct personal contact with SEN individuals.

Ethics Statement

A questionnaire-based procedure was employed to collect participants' demographic information and to assess their level of tolerance, attitudes toward inclusion, attitudes toward individuals with SEN and special education preparedness. All method and procedure complied with the with the professional requirements of the Romanian College of Psychologists (COPSI). The questionnaire package contained written information about the study as well as a consent statement for the participants.

Instruments

Demographic Questionnaire

Participants were asked about their gender, age, type of school setting (urban or rural), and institution type (mainstream or special school). Additional questions addressed the educational level they taught, their professional and personal experiences with SEN individuals (both in and out of school), and their subjective perception of preparedness for inclusive pedagogy, including prior university-level training on teaching SEN students.

Sentiments, Attitudes, and Concerns about Inclusive Education Scale

This 14-item self-report scale assesses teachers' attitudes toward inclusion across four subscales: (a) attitudes toward inclusion (e.g., "Students who have attention problems should be in regular classes."), (b) concerns about inclusive education (e.g., "I am concerned that I do not have the necessary skills and knowledge to teach a student with special needs."), (c) emotions toward individuals with disabilities (e.g., "I am afraid to look straight at a person with a disability."), and (d) fear of disability (e.g., "I would be very distressed if I had a disability myself."). Items are rated on a four-point Likert scale (1 = strongly agree; 4 = strongly disagree). Higher scores indicate more positive attitudes toward inclusion, fewer concerns, less fear, and more favorable emotions toward SEN individuals.

Attitudes and Perspectives Toward Persons with Disabilities Scale

This scale measures attitudes toward individuals with SEN on two dimensions: cognitive beliefs (e.g., “People with SEN deserve to live where and how they want.”) and affective dispositions (e.g., “I find it difficult to approach people with SEN because I feel they are different from me.”). The 9-item scale uses a five-point Likert format (1 = not at all true; 5 = completely true), with some items reverse-coded. Higher total scores indicate stronger negative attitudes and emotions toward SEN individuals.

Special Education Preparedness Scale

This self-report scale evaluates teachers' perceived level of preparedness in special education (Mecklenburg, 2021), including emotional, attitudinal, methodological, and didactic competencies (e.g., “I know what intellectual disability means,” “I know what an individual development plan is,” “I am sufficiently trained to teach students with intellectual disabilities in my field.”). Items are rated on a four-point Likert scale (1 = strongly disagree; 4 = strongly agree). Higher scores reflect higher levels of preparedness and knowledge in special education.

Tolerance and Acceptance of Difference Scale

This 12-item self-report instrument measures general tolerance and acceptance of difference, providing a single overall index without subscales. Items address various aspects of difference (e.g., “It would be very bad if a homosexual boy or girl were placed in my class.”; “An unemployment office is opening on the ground floor of our building. I am afraid it will be full of strange people.”). Items are rated on a four-point Likert scale (1 = strongly disagree; 4 = strongly agree), where higher final scores indicate greater intolerance.

Data Processing and Statistical Analysis

The research was based on a cross-sectional, correlational arrangement (Lau, 2017). Following the completion of data collection, the obtained information was subjected to statistical analyses using the IBM SPSS 20 software package. As a first step, we carried out a data cleaning process, which resulted in a final sample of $N = 233$ Hungarian teachers from Transylvania. Prior to the analyses, various statistical assumptions were tested. These included the examination of descriptive statistical data, reliability analysis, linearity, multicollinearity, and the assumption of homoscedasticity (Pallant, 2011). Subsequently, hierarchical multiple linear regression was performed, in which predictor variables were entered sequentially in theoretically defined block (Roustaei, 2024). In the

regression analysis, demographic and disability-specific variables were entered first, and the direction and strength of the relationships were checked. Such variables included the place of teaching, years of professional experience, prior experience with teaching students with SEN, the type of SEN encountered in the school context, the presence of direct contact with a person with SEN outside the school context, as well as the degree of preparation received during university studies regarding the education of students with SEN. Demographic and disability-specific variables were treated and entered into the model as dummy variables. This allowed us to include the presence or absence of particular categories or conditions (Neifer, 2024). The second model incorporated pedagogical variables, which in this case referred to the degree of special education preparedness. Finally, in addition to the previous two, the third model added psychological variables to the analysis, specifically negative emotions toward individuals with SEN and feelings of intolerance toward difference.

RESULTS

Preliminary analysis

The data processing began with the examination of descriptive statistics and reliability analysis. Information related to the obtained data is presented in Table 1.

Table 1. *Summary of descriptive statistics and reliability analysis of the variables*

Variable	N	Min	Max	M	SD	Cronbach α
Attitude toward inclusion	233	25	53	37.150	5.850	.703
Special education preparedness	233	23	48	34.875	4.716	.722
Intolerance toward difference	233	12	35	19.227	4.985	.784
Attitude toward individuals with SEN	233	9	37	20.596	5.208	.780

The descriptive statistics for the variables attitude toward inclusion, special education preparedness, attitude toward individuals with SEN, and intolerance toward difference include the minimum, maximum, mean, and standard deviation values. The normal distribution of the variables themselves was not examined,

given that the assumption for conducting linear regression requires only the residuals - not the variables themselves - to be normally distributed (Schmidt & Finan, 2018). The results presented in the Table 1 indicate that all measurement instruments used in the study demonstrate adequate reliability, and are therefore suitable for the appropriate examination of the targeted psychological and pedagogical constructs. This is supported by Cronbach's α values greater than .700 across all four scales (Izah et al., 2024).

Among the assumptions, the examination of multicollinearity was also included, as one of the fundamental requirements of predictive analyses is that the potential predictor variables entered into the models should be approximately independent of one another (Shrestha, 2020). Multicollinearity can be identified when two or more variables display excessively strong linear relationships, which may distort the estimated regression coefficients and consequently compromise the interpretability and reliability of the model. To rule this out, indicators such as the Variance Inflation Factor (VIF) and tolerance values were examined (Flatt & Jacobs, 2019). The former reflects the extent to which the variance of a given predictor is potentially inflated due to its correlation with other predictors, with values above 5 possibly indicating a problem (Shrestha, 2020). In contrast, tolerance refers to the proportion of variance in a predictor that is not explained by the other predictors; based on literature standards, values below .20 may suggest an issue (Senaviratna & Cooray, 2019). For the predictor variables entered into the model, the VIF values ranged between 1.082 and 1.256, meeting the $VIF < 5$ criterion. The tolerance values ranged between .796 and .925, likewise fulfilling the $\text{tolerance} > .20$ condition. Taken together, these results indicate that no issues with multicollinearity were present. In other words, no substantial linear relationships existed among the predictor variables, thus making the regression analysis feasible.

Demographic, disability-specific, pedagogical and psychological predictors of teachers' attitudes toward inclusion

The study employed a three-phase hierarchical regression analysis. In this process, we examined the relationships and predictive strength of different groups of variables in relation to attitudes toward inclusion. The results of the hierarchical regression analysis are presented in Table 2.

Table 2. The results of the hierarchical regression

Variable	Model 1			Model 2			Model 3		
	B	SE B	β	B	SE B	β	B	SE B	β
(Constant)	38.457*	.538		29.086*	3.125		40.640*	4.264	
Place of teaching (Village)	-.706	.878	-.056	-.614	.863	-.049	-.050	.860	-.004
Professional experience (Low)	.123	1.449	.006	.308	1.425	.014	-.557	1.403	-.026
Teaching experience with SEN students (No)	-.247	1.685	-.010	-.091	1.656	-.004	.354	1.614	.014
Type of SEN encountered (Neurodevelopmental disorder)	-1.406	2.629	-.035	-1.708	2.584	-.042	-.966	2.520	-.024
Direct contact with SEN outside the school (No)	-2.216*	.931	-.155	-2.171	.915	-.152	-1.252	.906	-.106
University preparation for teaching SEN students (No)	-1.833*	.838	-.146	-.901*	.878	-.072	-.970	.854	-.077
Special education preparedness				.259*	.085	.208	.128	.089	.103
Intolerance toward difference							-.107	.081	-.091
Negative emotions toward individuals with SEN							-.253*	.081	-.225
R	.236			.305			.388		
R ²	.056*			.093*			.150*		
Adj. R ²	.031			.065			.116		

Notes. N = 233. *p < .05. Model 1 included demographic and disability-specific factors. Model 2 included pedagogical factors. Model 3 included psychological factors.

In the first model, various demographic and disability-specific variables were entered, which were treated as dummy variables (Neifer, 2024). These included: place of teaching, years of professional experience, prior experience in teaching students with SEN, the type of SEN encountered in the school context, the presence of direct contact with a person with SEN outside the school context, and the degree of preparation received during university studies for teaching students with SEN. After testing the model, it was found that the introduced variables predicted positive attitudes toward inclusion significantly but accounted for only 5.6% of the variance ($R^2 = .056$, $F(6,226) = 2.222$, $p = .042$). Significant factors included the lack of prior personal contact with SEN students ($B = -2.216$, $p = .042$) as well as the lack of prior university preparation ($B = -1.833$, $p = .030$).

As the second step, pedagogical variables were added to the existing demographic and disability-specific predictors, namely the degree of special education preparedness. As a result, the explained variance increased by an additional 3.7% ($\Delta R^2 = .037$), meaning that with this new group of variables, the model explained 9.3% of the variance ($R^2 = .093$, $F(7,225) = 3.296$, $p = .002$). The findings indicate that special education preparedness was identified as a statistically significant positive predictor of positive attitudes toward inclusion ($B = .259$, $p = .003$). At the same time, the lack of direct contact with individuals with SEN remained a significant negative predictor.

In the third stage of the analysis, psychological variables were added, namely negative emotions toward individuals with disabilities and intolerance toward diversity. This step resulted in a further substantial increase in explanatory power ($\Delta R^2 = .057$), such that in total, the model accounted for 15% of the variance ($R^2 = .150$, $F(9,223) = 4.382$, $p < .001$). Negative attitudes toward individuals with SEN emerged as the strongest predictor in the model ($B = -.253$, $p = .002$), showing a negative association with positive attitudes toward inclusion. Regarding psychological factors, intolerance toward diversity did not prove to be a significant predictor ($p = .186$).

DISCUSSION AND CONCLUSION

The findings of this study are broadly consistent with previous research (Boyle et al., 2020; Jurca et al., 2023; Sharma et al., 2008; Vieira et al., 2024), while also reinforcing the validity and relevance of the Knowledge-Attitude-Behavior (KAB) model (Alassaf, 2025). Our results underscore the multidimensional character of attitude formation, suggesting that the development of positive inclusive attitudes is simultaneously shaped by demographic, pedagogical, and psychological factors.

Specifically, the absence of direct contact and interaction with individuals with SEN, as well as insufficient prior university training concerning the education of SEN students, emerged as significant predictors of more negative inclusive attitudes. Conversely, stronger methodological and special educational preparedness was clearly identifiable as a predictor of positive attitudes, highlighting the direct attitude-shaping role of knowledge and expertise. A further noteworthy contribution of our model lies in its emphasis on the role of teachers' affective experiences. It became evident that teachers' negative emotions toward individuals with SEN fostered less favorable orientations toward inclusive education, aligning with the conclusions of Brandes and Crowson (2009) and Lyra et al. (2023).

In contrast to the preliminary findings of Linder et al. (2023), our study did not identify the type of SEN, the length of professional experience, or the teaching context as significant predictors. This may be explained by the fact that, in the present sample, the qualitative aspects of experience - such as special educational preparedness or direct contact with individuals with SEN - played a more salient role than the quantitative dimension of professional experience. Another possible explanation may be the relatively undifferentiated representation of urban versus rural teaching contexts in this population.

Although the final model explained a relatively modest proportion of variance in attitudes toward inclusion (15%), this finding is consistent with the multifactorial nature of inclusive attitudes described in previous literature. Teachers' orientations toward inclusion are likely shaped by numerous additional factors that were not examined in the present study, including organizational climate, institutional support, perceived workload, burnout, personality characteristics, previous personal experiences, and broader socio-cultural attitudes toward disability. Therefore, the current findings should be interpreted as highlighting several meaningful but partial predictors within a considerably more complex attitudinal system.

Taken together, these findings indicate that positive inclusive orientations cannot be reduced to a single factor or dimension. Both the theoretical framework of the KAB model and the present results point to the need for teacher education to encompass not only the transmission of theoretical knowledge but also direct experiential learning opportunities with individuals with SEN. As a recommendation for future practice, the development of teachers' core competencies in special education should be complemented with sensitization and empathy-building practical elements, since adequate professional and methodological preparedness, along with more balanced emotional patterns toward individuals with SEN, may serve as protective factors against negative inclusive attitudes.

LIMITATIONS AND FUTURE DIRECTIONS

First, as the study is based on a correlational design, it does not allow for the exploration of causal relationships. Therefore, the predictors identified at the level of the results can indicate associations but cannot demonstrate causality. Furthermore, the specific nature of the sample may also be considered a limitation in certain respects. Since all the targeted and ultimately included participants were Hungarian-speaking teachers from Transylvania, the findings cannot be generalized beyond this population and are strictly applicable only to this specific group. Although the study worked with a sufficient number of cases for statistical analyses, the distribution of certain parameters or demographic characteristics (e.g. teachers working in urban versus rural contexts) was not proportional, which may also have influenced the outcomes. As the research employed self-report instruments, there is a possibility that in the case of certain constructs, results were biased. For example, due to social desirability, some teachers may have reported more positive attitudes than those that are actually reflected in their pedagogical practice. The fact that the final model accounted for only 15% of the variance also highlights that many potentially significant factors were not included in the analysis. Such factors may relate both to the organizational culture and resources of schools as well as to subjective intra- and interpersonal components, the inclusion of which would be warranted in future research on this topic. Moreover, future investigations could be complemented with qualitative methods, such as interviews, in order to gain a more accurate understanding of teachers' attitudes and emotional patterns. Finally, it would be advisable to examine the effectiveness of different interventions, such as sensitization programs or methodological trainings, which could also provide insights into possible causal mechanisms underlying attitude formation.

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