



Research Article

Reinforcement sensitivity and tripartite authenticity in the prediction of aggressiveness

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ABSTRACT

The primary aim of this study was to examine personality traits (from the revised Reinforcement Sensitivity Theory) and authenticity (according to the tripartite conception) as predictors of aggressiveness (anger, vengefulness, dominance, and hostility), as well as to determine the interaction effects of authenticity on the relationship between personality traits and aggressiveness. The sample comprised 460 participants (82.8% female, $M_{\text{age}} = 25$). Findings showed rRST traits, particularly the Behavioral Inhibition System (BIS) and Behavioral Activation System (BAS), significantly predict individual differences in authenticity, with a low BIS and high BAS combination proving optimal for authentic living. Authenticity dimensions, such as self-alienation and acceptance of external influences, also emerged as significant predictors of various aggressiveness dimensions. Crucially, moderation analyses revealed that authenticity complexly modulates the associations between rRST traits and aggressiveness. These interactions demonstrated nuanced effects; for example, authenticity could intensify anger responses to defensive behaviors or redirect BAS-driven energy towards dominance when authentic living was low. This research offers significant insights into the intricate interplay between reinforcement sensitivity, authenticity, and aggressiveness, enriching theoretical understanding and suggesting potential avenues for future research.

Keywords: reinforcement sensitivity, tripartite authenticity, aggressiveness

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Introduction

The consideration of authenticity as an important aspect of personality has long been present among psychologists of various theoretical perspectives and fields – psychodynamic, humanistic, existential, social, positive, and clinical psychology (Horney, 1951; Winnicott, 1965; Rogers, 1961; Maslow, 1968; Deci & Ryan, 1985; Yalom, 1980; Kernis & Goldman, 2006; Sheldon, 2004; Joseph & Linley, 2005). However, it is only in recent decades that there has been a rapid increase in research on authenticity, which is reflected in hundreds of published scientific articles (Hicks et al., 2019). Conceptual ambiguities and the lack of adequate measures of authenticity have made earlier research confusing (Harter, 2002). In an effort to resolve this, Wood and colleagues (Wood et al., 2008) relied on Rogers' theory (person-centered approach) (Rogers, 1961) and Barrett-Lennard's (Barrett-Lennard, 1998) tripartite conception of authenticity. Accordingly, these authors proposed a tripartite model of authenticity with accompanying operationalization – the Authenticity Scale (Wood et al., 2008). The model stands out for its comprehensiveness and includes three aspects: authentic living, self-alienation, and acceptance of external influences.

Authentic living represents a life true to oneself; that is, it includes behaviors that reflect the real self in different social contexts. *Self-alienation* describes an inadequate experience of identity due to a lack of self-knowledge and contradictions between the conscious experience of oneself and real experience. *Acceptance of external influences* denotes a person's belief that they must adapt to the expectations of others. In essence, an authentic person is one whose awareness of themselves (low self-alienation) coincides with their behavior (high authentic living) and resistance to external influences. Traditionally, studies, such as those conducted by Wood et al. (2008) and Kernis and Goldman (2006), define authenticity as a relatively stable personality trait. Alternatively, Sedikides et al. (2017) conceptualize authenticity as a transient state, characterized by an experience of psychological balance and alignment with one's core identity.

Research suggests that authenticity, according to the tripartite model, is a unique personality trait, explaining only a small portion of basic personality traits from models like the Big Five (11-13%), Gray's (5.7%), and

Cloninger's (18%) (Wood et al., 2008; Pinto et al., 2011). Authenticity and Honesty-Humility from the HEXACO model should be partly overlapping constructs, but research is unclear on this issue. Some studies have shown that they are separate traits (Wood et al., 2008), while others have found a link between the two? (Maltby et al., 2012). In addition to the evident distinctiveness of authenticity and personality traits from certain personality models, research has consistently shown that greater authenticity is associated with higher extraversion, agreeableness, conscientiousness, and openness, as well as lower neuroticism (e.g., Grégoire et al., 2014; Wood et al., 2008). Also, correlations have been established between all three aspects of authenticity and certain personality dimensions from Cloninger's model – people who avoid punishment tend less towards authentic living, and more towards environmental influence and self-alienation. Conversely, those with expressed reward dependence, self-directedness, and self-transcendence tend towards authenticity and are less susceptible to external influences and self-alienation. Interestingly, the dimension of persistence is positively associated only with authentic living, and negatively with its opposite – self-alienation. Further, research has shown that, from the original Reinforcement Sensitivity Theory (oRST; Gray, 1987), only BIS-anxiety and BIS-fear correlate with all three aspects of authenticity, negatively with authentic living, and positively with the remaining two aspects (Pinto et al., 2011). More precisely, only BIS-anxiety stood out as a significant predictor (in the negative direction) of the authenticity measure operationalized through the total score on the Authenticity Scale (Wood et al., 2008).

However, scientific papers currently do not link the revised Reinforcement Sensitivity Theory (rRST; Gray & McNaughton, 2000) and authenticity. Considering the conceptual differences between the original and revised Gray's theory, studying the relationship between personality systems from the rRST and authenticity could provide significant insights into individual differences in authenticity. In the revised theory, the Behavioral Inhibition System (BIS) represents a defensive approach system, whose functions are threat assessment, behavior control (activating or inhibiting reactions from other systems), and conflict resolution. The BIS is associated with anxiety and is responsible for individual differences in the subjective assessment of threat, which does not have to be based on reality

(Smederevac et al., 2014). The Fight-Flight-Freeze System (FFFS) is a defensive avoidance system, which is also associated with negative emotionality and negative reinforcement. The FFFS can be activated by a wide range of aversive stimuli, and reactions to them can be manifested through Fight (anger), Flight (fear), and Freeze (panic). Essentially, the main role of the FFFS is to protect the individual from danger, and the reactions depend on the social situation and the subjective assessment of the threat (Krupić & Dinić, 2017; Randelović, 2016; Randelović et al., 2018). The Behavioral Activation System (BAS) is sensitive to all forms of reward (including avoiding punishment). Its activation is recognized in active and exploratory behavior, but also in difficulties with impulse control, impulsive, risky behavior, and an increased need for excitement (Smederevac et al., 2009). At the level of personality traits, the BAS is associated with impulsivity (Smederevac et al., 2014), extraversion, and positive emotions (Depue & Collins, 1999; Smillie et al., 2006).

In addition to researching authenticity in the context of the prominent psychobiological theory of personality, it is important to explain and understand authenticity in relation to some of the more specific personality traits associated with interpersonal functioning. One such trait is aggressiveness. The reason for choosing this trait is twofold. First, aggressiveness is not singled out as a separate personality dimension within the rRST. Second, a reduced tendency towards aggressive behavior is an indicator of greater psychological maturity, i.e., authenticity.

Although often used interchangeably, aggression and aggressiveness are different concepts. Aggression refers to any attempt to harm someone against their will (Allen & Anderson, 2017), while aggressiveness is a dispositional tendency towards such aggressive behavior in different situations and over time (Chester & DeWall, 2013). Aggressiveness can be divided into four dimensions (Dinić et al., 2014), which represent different patterns of connection with forms of aggression and personality traits. These are: anger, vengefulness, dominance, and hostility. *Anger* involves impulsive reactions, low self-esteem, and the tendency to interpret others' behavior as provocation. It manifests through a spectrum of intensity – from mild irritation to severe rage – and is a core component of affective aggressiveness. *Vengefulness* represents a tendency towards revenge, which can be

manifested impulsively and deliberately. In people with more pronounced vengefulness, predicting the triggers of revenge is difficult because they are hypersensitive to provocation and react to motives that may be insignificant to others. *Dominance* represents a tendency towards more subtle and masked forms of aggression, as it is usually unaccompanied by emotional reactions. It is also expressed through a need for control and the imposition of one's opinions. *Hostility* indicates a hostile attitude towards others, which is manifested through passive aggression, a tendency towards gossip, and low tolerance for the mistakes of others (Dinić et al., 2014).

Aggressiveness, although not a separate personality dimension within the rRST model, is part of the Fight/Flight/Freeze system. Research links proactive aggression with BAS (Carver, 2004; Corr & Perkins, 2009; Harmon-Jones & Sigelman, 2001), while specific components such as BAS-Drive and BAS-Fun Seeking have been shown to positively predict trait anger and aggressive responses to provocation (Cooper et al., 2008). Both BIS and BAS correlate with anger, but they differently affect its expression: BAS is associated with the manifestation of anger, while BIS inhibits it (Smits & Kuppens, 2005). The Fight subsystem is associated with reactive aggression, which is triggered by BAS activation. In addition, BIS is associated with avoidance behavior, in contrast to the BAS's approach-oriented nature (Krupić et al., 2016). Studies also suggest that physical aggression is positively correlated with BAS and negatively with BIS (Harmon-Jones, 2003).

According to the humanistic conception of personality, specifically Rogers' theory (1961), the basic direction of personality development is reflected in self-actualization. One of the conditions for healthy development is the congruence between self-awareness and one's own behavior. In other words, according to Rogers (1961), to be a person means to live authentically and to develop one's potential in a constructive way. People who do not succeed in this become anxious, fearful, defensive, and are more prone to dissatisfaction, maladjustment, dysfunctionality, aggressiveness, and the development of psychopathology, which has been empirically confirmed. Authenticity is associated with higher self-esteem, life satisfaction, positive affectivity, autonomy, personal growth, purpose in life, self-acceptance, healthy relationships with others, but also with lower negative affectivity,

stress/distress (e.g., Grégoire et al., 2014; Grijak, 2017, 2018; Naumova & Naumov, 2022; Rivera et al., 2019; Thomaes et al., 2017; Wood et al., 2008), self-handicapping behavior (e.g., Akin & Akin, 2014) and less aggression (e.g., McCormick et al., 2015; Pinto et al., 2012). In the research by Pinto et al. (2012), a significant positive and moderate correlation was recorded only between self-alienation and anger as a personality trait, while in the study by McCormick et al. (2015), a finding was obtained that supports a low negative correlation between authenticity (as a total score) and internalized aggression.

Current study

While the positive link between authenticity and general well-being is well-documented (e.g., Grijak, 2018; Rivera et al., 2019; Wood et al., 2008), its connection to aggressiveness as a personality trait remains a relatively unexplored field. Addressing this gap is crucial for a deeper understanding of individual differences in aggressive tendencies. Importantly, no studies examine the complex, interactional relationships between rRST personality traits, authenticity, and aggressiveness, making this study vital.

We conceptualize authenticity as a moderator in the relationship between rRST personality traits and aggressiveness. This is based on authenticity's role as a stable disposition for emotional self-regulation and internal experience integration (Kernis & Goldman, 2006; Wood et al., 2008). As a distinct construct (Pinto et al., 2011; Wood et al., 2008), authenticity is linked to enhanced emotional regulation and resilience (Kernis & Goldman, 2006; Rogers, 1961; Wood et al., 2008). This regulatory capacity provides a theoretical basis for positing that authenticity may attenuate the link between BIS (associated with anxiety and threat assessment) and aggressive dispositions, as well as the link between FFFS (associated with fear, anger, and panic responses to danger) and aggressive dispositions. Theoretically, low authenticity may conversely amplify aggressiveness due to weakened self-regulation (Wood et al., 2008). Authenticity is also hypothesized to influence threat appraisal (Harter, 2002; Kernis & Goldman, 2006), potentially preventing BIS and FFFS reactivity from escalating into aggression. For high BAS sensitivity (reward-seeking, risk-taking), authenticity may be expected to play a balancing role by channeling

motivational energy toward prosocial goals, thereby mitigating maladaptive aggression (Rogers, 1961; Wood et al., 2008).

Despite a lack of direct empirical evidence on authenticity's moderating role with rRST traits and aggressiveness, our study builds on a robust theoretical foundation of authenticity's link to emotional integration and psychological adjustment. Our conceptual model offers a novel theoretical extension to the literature on reinforcement sensitivity, authenticity, and aggressiveness.

This research aims to: 1) Predict authenticity aspects (self-alienation, authentic living, acceptance of external influences) based on rRST personality traits; 2) Examine how authenticity aspects predict aggressiveness dimensions (anger, vengefulness, dominance, hostility) and 3) Determine if authenticity aspects moderate¹ the relationship between personality traits and aggressiveness. Based on theory and prior findings, we expect BIS and FFFS to show negative associations with authentic living and positive associations with self-alienation and acceptance of external influence (Pinto et al., 2011). BAS is expected to show the opposite pattern – a positive association with authentic living and a negative with self-alienation and acceptance of external influences. This is supported by research linking Cloninger's Reward Dependence (conceptually close to BAS) to higher authenticity and less self-alienation/external influence (Pinto et al., 2011). Furthermore, authentic living should negatively relate to all aggressiveness dimensions, while self-alienation and acceptance of external influence should relate positively (McCormick et al., 2015; Pinto et al., 2012). Given the absence of prior direct empirical studies on interaction effects, we hypothesize no significant interaction effects between rRST traits and authenticity aspects in predicting aggressiveness.

¹ While the terms interaction and moderation are often used interchangeably in research, there is a subtle difference between them (Mededović, 2013). Interaction is a broader term that encompasses all types of relationships between variables, while moderation primarily refers to causal relationships (Wu & Zumbo, 2008). However, given their conceptual closeness and identical statistical analysis (Mededović, 2013), these terms will be used as synonyms in this paper.

Method

Sample and procedure

The sample of this study included 460 participants from the general population in Serbia (predominantly students (66.4%) and females (82.8%), aged from 18 to 68 years ($M = 25.32$; $SD = 8.19$). Regarding the level of education, the largest number of participants completed secondary school (66.4%); 30.7% had a college degree, master's degree, or doctorate, while 1.3% had primary education, and 1.5% had higher education. According to marital status, the majority of participants reported not being in a relationship at the time of the study participation (50.1%), 28.8% were in a relationship but did not live with a partner, 13.7% were married, while 6.8% lived in a cohabiting relationship, and 0.7% reported being divorced. Participants' average satisfaction with their household's material situation was 3.36 ($SD = 0.98$).

The research was conducted online, from June to October 2022, by asking participants to complete an online questionnaire (which was shared via social networks and personal contacts) created using the Google Forms application. As part of the battery of instruments that were given in this research, a single-item marker was included to check the attention of the respondents, that is, to check the validity of the respondents' answers ("Please, as a sign that you are carefully reading the claims, mark as the answer 'I agree' or '4'.").

Participation in the research was anonymous and voluntary. Before completing the questionnaire, all participants provided informed consent. The study was approved by the Ethics Committee of the Department of Psychology of the Faculty of Philosophy in Niš (number 3-2022).

Instruments

Reinforcement Sensitivity Questionnaire (RSQ)

The Reinforcement Sensitivity Questionnaire (RSQ; Smederevac et al., 2014) consists of 29 items that measure five different systems within the revised Reinforcement Sensitivity Theory. These are: Behavioral Activation

System (BAS) (6 items, e.g., "When I want something, I never think about possible obstacles."), Behavioral Inhibition System (BIS) (7 items, e.g., "I frequently worry about being criticized.") and the Fight/Flight/Freeze System (FFFS) – Fight (6 items, e.g., "When someone criticizes me, I don't hold back."), Flight (5 items, e.g., "When I encounter aggressive people, I try to get away.") and Freeze (5 items, e.g., "I just 'freeze' when I get really scared."). Respondents were asked to rate on a four-point Likert scale (1 = *strongly disagree* to 4 = *strongly agree*) how much each statement applies to them.

Authenticity Scale (AS)

The Authenticity Scale (AS; Wood et al., 2008; adapted to Serbian by Grijak, 2017) consists of 12 items that assess three separate components of authenticity: Authentic living (4 items, e.g., "I believe it's better to be yourself than to be popular."), Self-alienation (4 items, e.g., "I don't know how I really feel."), and Acceptance of external influence (4 items, e.g., "Other people's opinions strongly influence me."). Respondents are asked to rate the extent to which each statement describes them on a seven-point Likert scale (1 = *does not describe me at all* to 7 = *describes me very well*).

Aggression Questionnaire (BODH)

The Aggression Questionnaire (BODH: Dinić et al., 2014) is intended to assess the level of aggressiveness in respondents on a five-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). It consists of 23 items that are arranged in four subscales: Anger (5 items, e.g., "I get angry easily."), Vengefulness (6 items, e.g., "I would get revenge on anyone who wronged me."), Dominance (7 items, e.g., "People avoid conflict with me because they know they'll get the worst of it."), and Hostility (5 items, e.g., "I'm often dissatisfied with other people's behavior.").

Data processing

First, participants ($n = 32$) who did not adequately answer the attention check question were excluded from the sample. After that, the existence of multivariate outliers was considered by calculating Mahalanobis distances, and one more participant was excluded from further data processing. The data were processed using SPSS 24.00. To answer the research hypotheses, we conducted a series of multiple regression analyses

and tested the moderator models using the PROCESS SPSS macro 3.4 (Hayes, 2022).

Results

Descriptive data and correlations

The results indicate that only the measures on the Vengefulness scale deviate from the normal distribution, given that the indicators of distribution asymmetry, skewness and kurtosis, are above the limits of +/- 1.5, which some authors take as a threshold (Tabachnick & Fidell, 2013; according to Dinić, 2019). The values of the internal consistency coefficients show that most scales have satisfactory measurement reliability, except for the Flight scale (Table 1).

Table 1

Descriptive Statistics of the Study Variables

Measured variable	Min	Max	M	SD	Sk	Ku	α
BIS	1.00	4.00	2.46	.66	-.18	-.58	.79
BAS	1.00	4.00	2.60	.58	-.08	-.08	.73
Fight	1.00	4.00	2.18	.59	.30	-.15	.74
Flight	1.00	4.00	2.80	.55	-.51	.38	.55
Freeze	1.00	4.00	2.13	.72	.34	-.54	.80
Authentic living	2.25	7.00	5.97	.86	-1.06	1.20	.77
Self-alienation	1.00	7.00	2.99	1.63	.61	-.62	.86
Acceptance of external influence	1.00	7.00	3.22	1.49	.51	-.60	.85
Anger	1.00	5.00	2.32	.93	.46	-.55	.86
Vengefulness	1.00	5.00	1.63	.72	1.61	2.95	.86
Dominance	1.00	4.71	2.13	.72	.63	.14	.77
Hostility	1.00	5.00	3.17	.84	-.01	-.50	.71

Expected associations were obtained between individual personality traits and aspects of authenticity, as well as between different dimensions of authenticity and aggressiveness (Table 2). No high correlations were found between personality traits and aspects of authenticity, indicating that there is no multicollinearity.

Table 2

Pearson Correlation Coefficients Between Personality Traits, Authenticity, and Aggressiveness

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Authentic living	-	-.45**	-.50**	-.36**	.36**	.12*	-.13**	-.29**	-.11*	-.03	.03	-.02
2. Self-alienation		-	.59**	.53**	-.21**	.05	.26**	.32**	.27**	.13**	.07	.21**
3. Acceptance of external influence			-	.59**	-.29**	-.10*	.35**	.44**	.24**	.05	.04	.17**
4. BIS				-	-.44**	-.05	.47**	.57**	.32**	.05	.05	.23**
5. BAS					-	.32**	-.25**	-.35**	-.03	.02	.18**	-.05
6. Fight						-	-.04	-.18**	.42**	.47**	.59**	.40**
7. Flight							-	.49**	.17**	.01	-.01	.22**
8. Freeze								-	.22**	.02	-.05	.17**
9. Anger									-	.33**	.40**	.58**
10. Vengefulness										-	.50**	.45**
11. Dominance											-	.44**
12. Hostility												-

Note. $p^{***} < .001$, $p^{**} < .01$, $p^* < .05$.

Prediction of authenticity based on personality traits

Three hierarchical regression analyses were conducted to examine the independent contribution of personality traits in predicting aspects of authenticity (authentic living, self-alienation, and acceptance of external influence). Due to their potential contribution to authenticity, we statistically controlled for gender and age in the initial step. While gender differences in authenticity are often inconsistent in the literature (e.g., Erickson & Ritter, 2001; Harter et al., 1998; Lopez & Rice, 2006; Wood et al., 2008), age typically shows a more consistent pattern, with findings suggesting increased authenticity, particularly lower self-alienation and less acceptance of external influence, as individuals age (e.g., Seto & Schlegel, 2018).

The results show that all three models achieve significant prediction. Gender, age, and personality traits contribute the most to the prediction of acceptance of external influence (37%), then to self-alienation (32%), and,

finally, to authentic living (21%). The BIS stands out as a predictor with the largest independent contribution to all three aspects of authenticity, explaining the most variance in self-alienation (positive direction), then in the acceptance of external influence (positive direction), and, finally, in authentic living (negative direction). The BAS stands out as a significant predictor (positive direction) only in predicting authentic living, and is followed by gender (positive direction), Flight (positive direction), and Freeze (negative direction). Regarding self-alienation, the significant individual predictors, in addition to the BIS, are gender and age (negative), as well as Fight (positive). Freeze also significantly predicts the acceptance of external influence (positive direction), as does age (negative direction) (Table 3).

Table 3

Partial Contributions of Gender, Age and Personality Traits to the Prediction of Authenticity

		Authentic living	Self-alienation	Acceptance of external influence
		β	β	β
Model 1	Gender	.03	-.02	.05
	Age	.11*	-.24***	-.18***
		$R = .12; R^2 = .01;$ $Adjusted R^2 = .01$	$R = .24; R^2 = .06;$ $Adjusted R^2 = .05$	$R = .19; R^2 = .03;$ $Adjusted R^2 = .03$
		$F_{(2, 456)} = 3.09; p = .046$	$F_{(2, 456)} = 14.34; p < .001$	$F_{(2, 456)} = 8.38; p < .001$
Model 2		β	β	β
	Gender	.09*	-.10**	-.06
	Age	.08	-.15***	-.08*
	BIS	-.20***	.47***	.46***
	BAS	.24***	-.01	-.02
	Fight	.01	.09*	-.04
	Flight	.10*	-.00	.07
Freeze	-.16**	.08	.13**	

$R = .45; R^2 = .21;$	$R = .57; R^2 = .32;$	$R = .61; R^2 = .37;$
$Adjusted R^2 = .19;$	$Adjusted R^2 = .31;$	$Adjusted R^2 = .36;$
$\Delta R^2 = .19$	$\Delta R^2 = .26$	$\Delta R^2 = .34$
$F_{(7,451)} = 16.75; p < .001;$	$F_{(7,451)} = 30.44; p < .001;$	$F_{(7,451)} = 38.58; p < .001;$
$\Delta F_{(5,451)} = 21.94, p < .001$	$\Delta F_{(5,451)} = 34.75, p < .001$	$\Delta F_{(5,451)} = 48.90, p < .001$

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

Prediction of aggressiveness dimensions based on authenticity

Four hierarchical regression analyses were conducted to examine the independent contribution of aspects of authenticity (authentic living, self-alienation, and acceptance of external influence) in predicting dimensions of aggressiveness (anger, vengefulness, dominance, and hostility). Gender and age were also statistically controlled. This was done to account for their established contribution to certain aspects of aggression, as evidenced by the previous findings showing that gender significantly predicts anger and vengefulness (e.g., Cota-McKinley et al., 2001; Fahlgren et al., 2022; Uzun, 2018), while age significantly predicts predicting anger and hostility. While the predictive effect of gender persisted even after including authenticity, the effect of age diminished, suggesting authenticity might mediate its relationship with aggressiveness (Thomas, 2002).

According to our results (Table 4), three models proved to be statistically significant: the model for predicting anger, vengefulness, and hostility. The percentage of explained variance was not large in any of the models; however, gender, age, and authenticity accounted for the 11% of variance in anger (11%), 6% of the variance in hostility, and 4% of the variance in vengefulness. Self-alienation stood out as the most significant predictor in all three models. Self-alienation had the greatest independent (positive) contribution to the prediction of anger, followed by hostility and vengefulness. Acceptance of external influence significantly and positively predicted anger, while authentic living significantly (positively) predicted hostility, and gender significantly predicted anger (positively) and vengefulness (negatively).

Table 4

Partial Contributions of Gender, Age, and Aspects of Authenticity to the Prediction of Aggressiveness

		Anger	Vengefulness	Dominance	Hostility
		β	β	β	β
Model 1	Gender	.16***	-.15**	-.02	.03
	Age	-.11*	-.01	-.02	-.11*
	$R = .19; R^2 = .04;$ $R = .16; R^2 = .02;$ $R = .03; R^2 = .00;$ $R = .12; R^2 = .01;$ $Adjusted R^2 = .03$ $Adjusted R^2 = .02$ $Adjusted R^2 = -.00$ $Adjusted R^2 = .01$				
	$F_{(2, 456)} = 8.51;$ $F_{(2, 456)} = 5.69;$ $F_{(2, 456)} = .24;$ $F_{(2, 456)} = 3.10;$ $p < .001$ $p = .004$ $p = .783$ $p = .046$				
Model 2	Gender	.16***	-.15**	-.02	.02
	Age	-.04	.01	-.01	-.06
	Authentic living	.04	.05	.09	.13*
	Self-alienation	.21***	.16**	.09	.19**
	Acceptance of external influence	.13*	-.02	.04	.11
	$R = .33; R^2 = .11;$ $R = .20; R^2 = .04;$ $R = .11; R^2 = .01;$ $R = .25; R^2 = .06;$ $Adjusted R^2 = .10;$ $Adjusted R^2 = .03;$ $Adjusted R^2 = .00;$ $Adjusted R^2 = .05;$ $\Delta R^2 = .07$ $\Delta R^2 = .02$ $\Delta R^2 = .01$ $\Delta R^2 = .05$				
$F_{(5, 453)} = 11.30;$ $F_{(5, 453)} = 3.99;$ $F_{(5, 453)} = 1.07;$ $F_{(5, 453)} = 6.16;$ $p < .001;$ $p = .001;$ $p = .377;$ $p < .001;$ $\Delta F_{(3, 453)} = 12.73,$ $\Delta F_{(3, 453)} = 2.82,$ $\Delta F_{(3, 453)} = 1.62,$ $\Delta F_{(3, 453)} = 8.10,$ $p < .001$ $p = .039$ $p = .185$ $p < .001$					

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

Interaction effects of different aspects of authenticity on the relationship between personality traits and aggressiveness

We used Model 1 and centered the variables involved in the interaction. The results of the significant moderation models are presented in Table S1 in the Supplemental Materials.

First, a moderation analysis was conducted with Anger as the criterion variable. We found significant interaction effects of Freeze and authentic living ($\Delta R^2 = .01$, $F_{(1,455)} = 4.49$, $p = .035$) and Freeze and acceptance of external influence ($\Delta R^2 = .01$, $F_{(1,455)} = 3.86$, $p = .05$) on the Anger dimension.

According to our results, the association between the tendency to fight and the experience of anger was most pronounced in individuals with lower levels of self-alienation and acceptance of external influences. An increase in either self-alienation or acceptance of external influences weakened this connection. However, given that these interactions primarily show a change in effect size rather than in the direction of the conditional effect, and given that their statistical significance is most likely a result of our study's large sample size, we do not interpret these interactions as substantial (for the graphical representations of these findings, see Figure S1 and Figure S2 in the Supplemental Materials).

The connection between the tendency to freeze and the experience of anger was initially not significant when considering participants with the most pronounced authentic living. However, our results showed that this connection is most pronounced in participants with a higher level of authentic living, and the size of this effect increases with increasing levels of authentic living. The connection between Freeze and the tendency towards anger is most pronounced in participants who are less prone to accepting external influences. The size of the effect decreases with increasing expression of external influence, indicating that accepting external influences weakens this connection ultimately leading to loss of significance when considering participants who are the most prone to accepting external influences (Table S1 in the Supplemental Materials and Figure 1 and 2).

Figure 1

Authentic Living as a Moderator Between Freeze and Anger

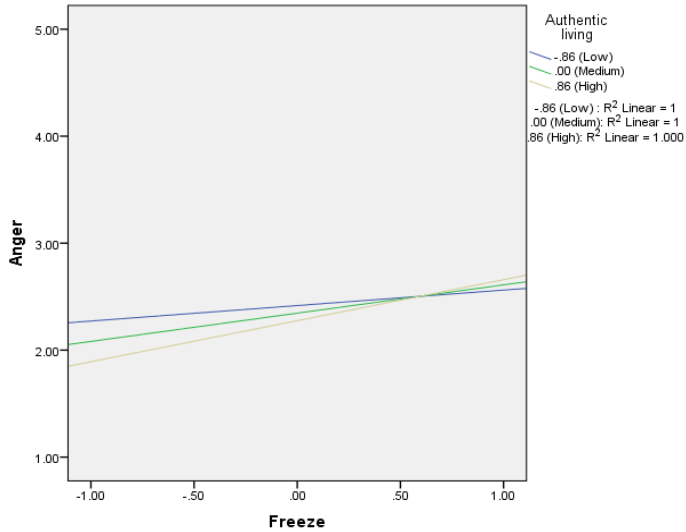
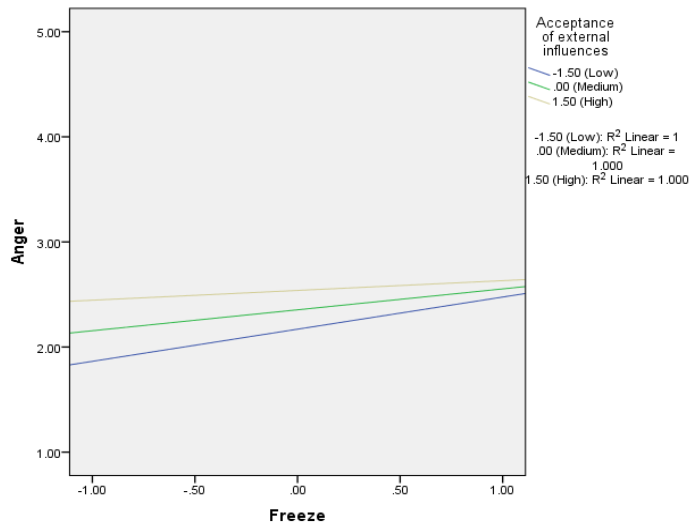


Figure 2

Acceptance of External Influence as a Moderator Between Freeze and Anger



In the analysis of the moderation model where Dominance is the criterion variable, significant interaction effects of BAS and authentic living ($\Delta R^2 = .01$, $F_{(1,455)} = 5.83$, $p = .016$) and BAS and self-alienation ($\Delta R^2 = .01$, $F_{(1,455)} = 5.01$, $p = .026$) were found on the Dominance dimension.

There were significant interaction effects of BAS and authentic living on the Dominance dimension. The interaction effect of BAS and self-alienation on Dominance was also significant. According to our findings, the connection between BAS and dominance was the strongest in individuals who exhibited the lowest level of authentic living, the connection between BAS and dominance is strongest. This connection weakened at the middle level of expressed authentic living and lost significance in participants with the most pronounced authentic living. In contrast, at the highest level of self-alienation, the connection between BAS and dominance was most pronounced. This connection weakened at the average level of expressed self-alienation, and, in participants with the least expressed alienation from themselves, it lost significance (Table S4 in the Supplemental Materials and Figures 3, 4).

Figure 3

Authentic Living as a Moderator Between BAS and Dominance

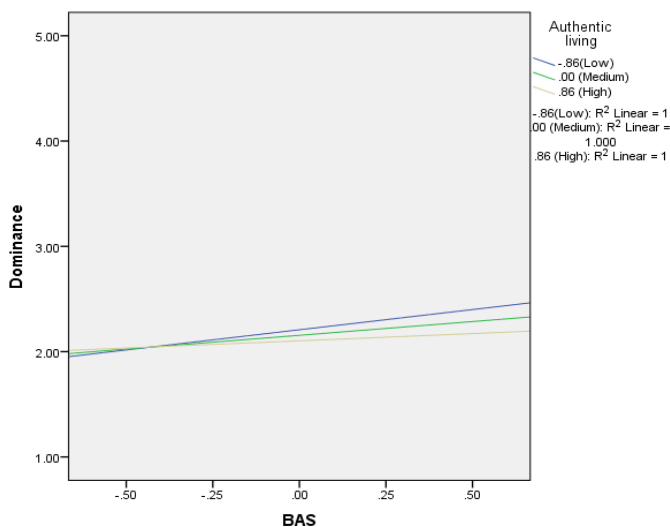
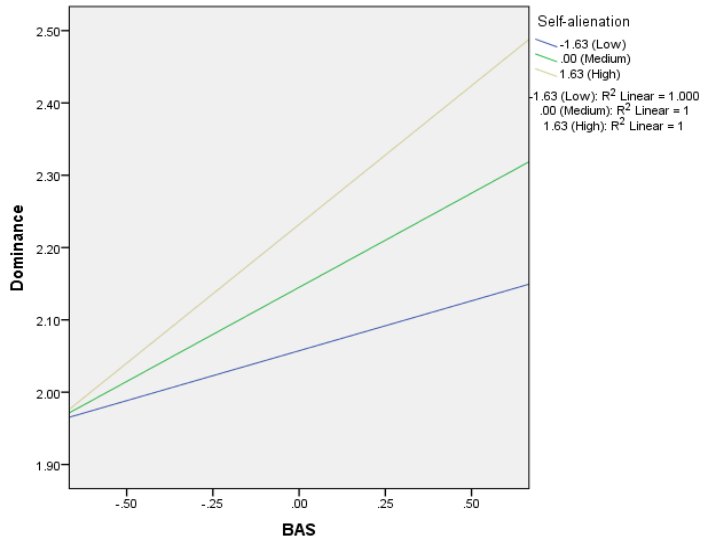


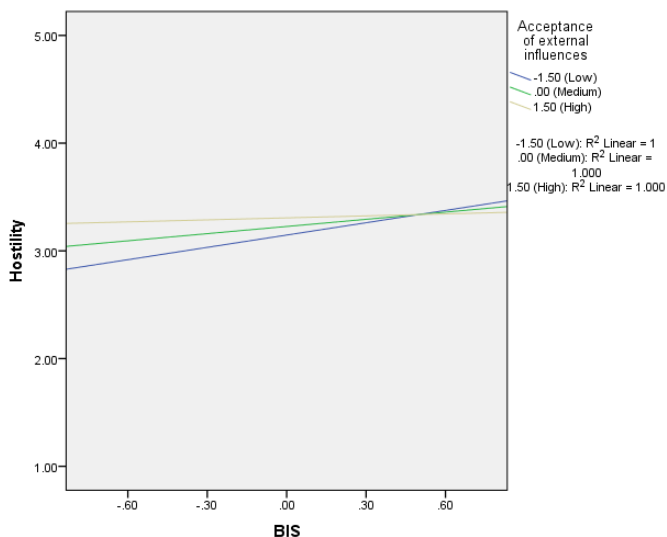
Figure 4*Acceptance of External Influence as a Moderator Between BAS and Dominance*

Finally, a significant interaction between BIS and acceptance of external influence was found ($\Delta R^2 = .01$, $F_{(1,455)} = 7.18$, $p = .008$), indicating the relationship between the BIS and Hostility dimensions was moderated by the acceptance of external influence dimension.

The connection between BIS and hostility was the strongest in individuals who were least prone to accepting external influences. This connection weakened at the next level of expressed external influences, and became insignificant in participants with the most pronounced acceptance of external influences (Table S5 in the Supplemental Materials and Figure 5).

Figure 5

Acceptance of External Influence as a Moderator Between BIS and Hostility



Discussion

This research aimed to examine the prediction of authenticity by rRST personality traits and to explore the predictive and moderating role of authenticity in relation to aggressiveness. Our findings provide significant insights into these complex interrelationships. A central finding of this research is that authenticity dimensions significantly moderated the relationships between rRST traits (BIS, BAS, and FFFS) in predicting various dimensions of aggressiveness, which highlights the role of the authentic self in shaping behavioral output from defensive and appetitive systems.

The moderation analysis revealed that authenticity dimensions significantly shaped the relationship between the defensive systems (BIS and FFFS) and anger/hostility. The association between Freeze and anger was strongest in individuals with the highest authentic living, weakening and becoming non-significant as authentic living decreased. This suggests that for those who live in accordance with their values (Rogers, 1961; Wood et al., 2008), the impediment shaped by freezing in expressing their essential being

results in more intense anger. Furthermore, the association between Freeze and anger was most pronounced in individuals less prone to accepting external influences, diminishing as acceptance of external influences increased. Such a finding implies that individuals accustomed to compliance may experience freezing less as a thwarting of personal autonomy, leading to a less intense anger reaction. Similarly, less susceptibility to external influences (an indicator of higher authenticity) led to a stronger connection between BIS and hostility. Although BIS inhibits overt aggression (Smits & Kuppens, 2005), hostility (i.e., passive aggression and low tolerance; Dinić et al., 2014) can serve as a "safer" outlet for aggressive feelings when direct confrontation is inhibited. The obtained results suggests that authenticity, through enhanced emotional regulation (Kernis & Goldman, 2006; Rogers, 1961), influences the expression of aggressive feelings, rather than necessarily diminishing them. These nuanced findings underscore authenticity's complex role in emotional self-regulation and internal experience integration (Kernis & Goldman, 2006; Wood et al., 2008); rather than solely attenuating negative emotions, authenticity can amplify anger when an individual's authentic expression is impeded by the Freeze response or channel aggressive feelings into passive hostility. This offers novel insights into the subtle interaction between defensive systems and the authentic self in emotional reactions to threat.

In contrast, the moderation analysis concerning the Behavioral Activation System (BAS) revealed unexpected patterns, showing that authenticity determines how appetitive motivation is channeled toward dominance. The strongest connection between BAS and dominance was observed in individuals with low authentic living and high self-alienation. This indicates that a lack of authenticity (a mismatch between self-awareness and behavior; Rogers, 1961) can "unleash" BAS-driven proactive aggression, where dominance (the need for control and imposing opinions; Dinić et al., 2014) becomes a compensatory mechanism. While BAS generally promotes active and exploratory behavior, without the guiding role of an authentic self towards prosocial goals (Rogers, 1961; Wood et al., 2008), its energy can be redirected towards maladaptive forms of expression, especially when impulsivity and impulse control difficulties associated with BAS are present (Smederevac et al., 2014).

Additionally, this study revealed that rRST personality traits significantly predict individual differences in authenticity, underscoring rRST's more potent and conceptually refined predictive framework compared to previous findings (Pinto et al., 2011). Specifically, the combination of low BIS and high BAS emerged as optimal for the experience of authenticity, a key finding that underscores the critical interplay between threat avoidance and reward seeking for overall optimal psychological functioning (e.g., Grégoire et al., 2014; Grijak, 2017, 2018; Naumova & Naumov, 2022; Rivera et al., 2019; Thomaes et al., 2017; Wood et al., 2008). In terms of individual systems, BIS consistently predicted lower authentic living and higher self-alienation and acceptance of external influences. This finding aligns with previous research (Pinto et al., 2011; Wood et al., 2008), suggesting that heightened worry leads individuals to suppress genuine self-expression and seek safety in conformity, consistent with the rRST's conceptualization of BIS as a system for threat assessment and conflict resolution (Gray, & McNaughton, 2000; Smederevac et al., 2014). Conversely, BAS positively predicted authentic living, suggesting that individuals sensitive to rewarding stimuli (Gray & McNaughton, 2000) are more likely to actively explore their environments and inner experiences, fostering personal growth and an authentic self. This is indirectly supported by positive associations between authenticity and approach-related traits (Grégoire et al., 2014; Wood et al., 2008). Within FFFS, the Freeze response predicted acceptance of external influences and negatively predicted authentic living, reflecting how the perceived paralysis (Smederevac et al., 2014) hinders genuine self-expression and inherently fosters passive compliance (Gray & McNaughton, 2000). The Flight response was marginally associated with authentic living and the Fight response with self-alienation; nevertheless, considering their marginal statistical significance and the unsatisfactory reliability of the Flight scale, we refrain from drawing further interpretations from these specific results.

Our results demonstrate that different aspects of authenticity significantly predict certain dimensions of aggressiveness, underscoring the complex role of authenticity in shaping aggressive behavior. Consistent with previous findings (Pinto et al., 2012), self-alienation emerged as the strongest predictor of aggressiveness, particularly anger and hostility. Additionally, acceptance of external influences was significantly associated with a greater

degree of anger and hostility, suggesting that individuals prone to conformity may also be more prone towards aggressive behavior. A notable, unexpected finding was the positive association between authentic living and hostility. This appears contrary to humanistic principles (Rogers, 1961) that link authenticity with psychological maturity and reduced aggression (e.g. McCormick et al., 2015; Pinto et al., 2012), suggesting a more complex relationship where authentic individuals, living in accordance with their values, might experience intense anger when their essential being is thwarted. This finding suggests that authenticity may not eliminate negative emotions but rather shape their expression, consistent with authenticity's role in emotional self-regulation and internal experience integration (e.g., Kernis & Goldman, 2006; Wood et al., 2008).

Limitations

This research has several limitations. A primary limitation involves the correlational nature of our design. While our moderation models support the hypothesized associations, results should not be interpreted as proof of causality. Alternative causal pathways or the contribution of unmeasured variables, such as social adaptation, cannot be ruled out. Second, the study relied on only one personality model (rRST), which may limit the comprehensiveness of the findings. Future research could utilize other theoretical personality frameworks (e.g., HEXACO) to obtain a more complete picture of the relationships between personality traits from different paradigms and the tripartite conception of authenticity. Third, the findings should be interpreted with caution due to the non-representative nature of the sample, which was predominantly female and composed mainly of students. This limits the generalizability of our results to the wider population. Fourth, the Flight scale demonstrated unsatisfactory measurement reliability in our sample. While its findings were included for theoretical completeness and exploratory purposes, these specific results should be interpreted with caution until further validation of the scale's reliability in similar contexts. Finally, a limitation of this study lies in the lack of deeper exploration into the role of socio-demographic variables, such as gender and age, on the relationships between the examined constructs. Although these were treated as control variables in this research, previous

studies have emphasized the importance of differences in authenticity and aggressiveness with respect to gender and age. Therefore, to better understand their role in the relationships between the studied constructs, future research should assign gender and age a different status within the model, moving beyond their exclusive treatment as control variables.

Conclusion

This research provides significant insights into the complex associations among rRST personality traits, authenticity, and aggressiveness, highlighting rRST's contribution to explaining the variance in authenticity, particularly acceptance of external influences. A key finding is that optimal authenticity is characterized by a combination of low BIS and high BAS, indirectly suggesting a configuration that contributes to overall psychological functioning. Furthermore, the study demonstrated that authenticity not only predicts various dimensions of aggressiveness but also moderates the association between rRST traits and aggressiveness. It was shown how authentic living and acceptance of external influences shape the association of anger with Freeze, and how authenticity modifies the relationship of BAS with dominance and BIS with hostility. These findings enrich the theoretical understanding of interactions among reinforcement sensitivity systems and the authentic self. Furthermore, they offer practical implications for promoting authenticity and reducing aggressiveness through strategies aimed at balancing behavioral systems and fostering authentic self-expression.

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Conflict of interest

We have no conflicts of interest to disclose.

Data availability statement

Data files are available upon a reasonable request.

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