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BIS/BAS PROFILES AND PSYCHOLOGICAL RESILIENCE: DIFFERENTIAL ASSOCIATIONS ACROSS THREE DIMENSIONS RELEVANT TO STRESS ADAPTATION AND MENTAL WELL-BEING

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ABSTRACT

Psychological resilience is a component of mental health and well-being, yet the motivational mechanisms underlying its distinct dimensions remain insufficiently understood. This study examined whether the Behavioral Inhibition System (BIS) and the Behavioral Activation System (BAS) predict three forms of psychological resilience: engineering resilience, ecological resilience, and adaptive capacity. Data were collected in a two-wave online survey of 657 Polish adults from the general population. BIS/BAS were assessed using the BIS/BAS scales, and resilience was measured with the EEA Resilience Scale. Multiple regression and commonality analyses were conducted to examine the unique and shared contributions of motivational systems to resilience dimensions. Ecological resilience was positively predicted by BAS-Drive and BAS-Sensitivity to Reward, and negatively by BIS. Engineering resilience was primarily associated with lower BIS activation. Adaptive capacity was positively related to BAS-Pleasure Seeking and BAS-Sensitivity to Reward and negatively related to BIS. Commonality analysis further showed that BIS accounted for the largest share of variance in engineering resilience, whereas BAS-Drive and BAS-Sensitivity to Reward contributed most strongly to ecological resilience, and BAS-Pleasure Seeking to adaptive capacity. These findings suggest that psychological resilience is not a unitary construct, but is differentially associated with threat sensitivity and reward-related motivational tendencies, with implications for understanding stress adaptation and promoting mental health.

KEYWORDS

Behavioral Inhibition System; Behavioral Activation System; Psychological Resilience; Stress Adaptation; Mental Well-Being; Adaptive Functioning

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Introduction

Psychological resilience is increasingly recognized as an important component of mental health and well-being, influencing how individuals endure, adapt to, and recover from stress and adversity (Hu et al., 2015; Oshio et al., 2018; Southwick et al., 2014). Because resilience shapes psychological adjustment, coping effectiveness, and recovery following difficult experiences, identifying factors associated with individual. differences in resilience may provide valuable insights into adaptive functioning and well-being. Among the factors that may contribute to these differences are the Behavioral Inhibition System (BIS) and the Behavioral Activation System (BAS), two motivational systems rooted in Reinforcement Sensitivity Theory (RST; Corr & Cooper, 2016; Krupić & Corr, 2020).

The BIS and BAS are widely studied motivational systems that guide responses to punishment and reward cues. The BIS is primarily associated with threat sensitivity, heightened anxiety, and a tendency toward avoidance or behavioral inhibition (Corr & McNaughton, 2012). By contrast, the BAS is linked to reward sensitivity, positive affectivity, and goal-directed approach behavior (Alloy & Nusslock, 2019; Carver & White, 1994; Krupić & Corr, 2020). These systems may be particularly relevant for understanding how individuals respond to stress, regulate emotions, and maintain psychological functioning under challenging conditions, making them potentially important for explaining differences in resilience-related adaptation.

Resilience itself is not a unitary construct. Maltby et al. (2015) proposed a three-dimensional model that distinguishes between engineering resilience, ecological resilience, and adaptive capacity. Engineering resilience refers to the ability to rapidly return to a baseline level of functioning after disruption. Ecological resilience reflects the capacity to maintain relatively stable functioning despite stress-related disturbances. Adaptive capacity, in turn, captures the flexible adjustment of coping strategies in response to changing circumstances. This multidimensional perspective may be especially useful in research on health and well-being, as different resilience dimensions may reflect distinct patterns of stress adaptation, recovery, and psychological functioning.

Although previous studies have extensively documented associations between BIS/BAS and affective outcomes (Carver & White, 1994; Smillie et al., 2006), relatively few studies have examined how BIS/BAS relate to specific dimensions of psychological resilience (Krupić & Corr, 2020; Oshio et al., 2018). Given the established importance of resilience for subjective well-being, mental health, and coping with adversity (Hu et al., 2015; Oshio et al., 2018), examining the associations between BIS/BAS profiles and distinct resilience dimensions may improve understanding of the processes related to stress adaptation and post-stress recovery in individuals with different motivational dispositions. Such knowledge may also contribute to more tailored psychoeducational and supportive approaches aimed at strengthening mental well-being and stress adaptation in the general population.

The present study examined whether BIS and BAS were differentially associated with engineering resilience, ecological resilience, and adaptive capacity in a general adult sample. We expected BIS to be negatively related to all three resilience dimensions, with the strongest association for engineering resilience. We further expected BAS-Drive and BAS-Sensitivity to Reward to be positively associated with ecological resilience, whereas BAS-Pleasure Seeking and BAS-Sensitivity to Reward were expected to be positively associated with adaptive capacity. Because BAS components are interrelated, we used both multiple regression and commonality analysis to estimate their unique and shared contributions.

Understanding Resilience: Psychological Correlates and Unresolved Theoretical

The three dimensions of psychological resilience—engineering resilience, ecological resilience, and adaptive capacity—have been conceptualized within a trait-based approach that treats resilience as a multidimensional individual-difference construct related to responses to stress and adversity (Maltby et al., 2015; Oshio et al., 2018). Although these dimensions are all positively associated with adaptive functioning, they differ in their correlational profiles, especially in relation to coping and personality traits (Denckla et al., 2020; Maltby et al., 2015, 2016). Engineering resilience refers to a relatively rapid return to baseline functioning after disruption. Ecological resilience reflects the capacity to maintain stable functioning under stress and appears to be more strongly linked to active and persistent coping. Adaptive capacity, in turn, is more closely related to flexibility and openness to change than to sustained goal-directed coping (Denckla et al., 2020; Maltby et al., 2015, 2016; Sarrionandia et al., 2018).

These differences suggest that the three resilience dimensions may also vary in their associations with motivational systems. Within Reinforcement Sensitivity Theory, the Behavioral Inhibition System (BIS) is related primarily to threat sensitivity and withdrawal, whereas the Behavioral Activation System (BAS) is linked to reward sensitivity, approach motivation, and positive affect (Carver & White, 1994; Corr & McNaughton, 2012; Alloy & Nusslock, 2019; Krupić & Corr, 2020). This distinction makes BIS/BAS a useful framework for examining whether the resilience dimensions are associated with different motivational profiles. In particular, lower BIS may be especially relevant to engineering resilience, whereas BAS-related tendencies may be more strongly related to ecological resilience and adaptive capacity.

Although BIS/BAS have been studied extensively in relation to affective functioning and personality, their associations with specific dimensions of resilience remain less clear (Krupić & Corr, 2020; Oshio et al., 2018). The present study therefore examined whether BIS and BAS dimensions were differentially associated with engineering resilience, ecological resilience, and adaptive capacity. Based on previous literature, we expected ecological resilience to be positively related to BAS dimensions associated with persistence and reward sensitivity, engineering resilience to be primarily associated with lower BIS, and adaptive capacity to be positively associated with BAS dimensions related to flexibility and exploration, while also showing a negative association with BIS.

The Role of BIS/BAS in Motivational and Adaptive Processes: Implications for Resilience

The Behavioral Inhibition System (BIS) is responsible for identifying threatening stimuli, assessing risk, and inhibiting behavior in situations of uncertainty or potential danger by engaging structures such as the amygdala, septum, and hippocampus (Gray & McNaughton, 2000). A low level of BIS activity accelerates responses to threats and stress by reducing the tendency for cautious risk assessment while simultaneously decreasing anxiety responses, thereby shortening the time required for action initiation (Corr, 2008). Although low BIS activity is not primarily involved in maintaining stable cognitive and behavioral functioning in everyday situations, it may still contribute to adaptive adjustments to change by reducing defensive inhibition and allowing faster and more flexible decision-making (Corr, DeYoung, & McNaughton, 2013).

Within the framework of reward theory (Gray, 1991; Depue & Collins, 1999; Pickering & Gray, 2001), mechanisms associated with BAS Drive, BAS Sensitivity to Reward, and Pleasure Seeking reflect different modes of responding to reward signals, cost-benefit estimation, and action initiation, which are importantfor shaping perseverance and effective coping with difficulties. BAS Drive is primarily linked to the activation of the dorsomedial striatum (DMS; Costumero et al., 2016), a region responsible for sustaining goal-directed behavior, instrumental learning (Costumero et al., 2013a; Delgado et al., 2000, 2003; O'Doherty et al., 2004), and cost-benefit evaluation, which influences action selection (Westbrook et al., 2020). The dorsomedial striatum plays a role in goal-directed instrumental learning and conscious behavioral planning; however, in high-stress situations or when rapid adaptation to uncertain conditions is required, its activity is reduced in favor of more automatic processes within the dorsal striatum, particularly in the dorsolateral striatum (DLS; Schwabe & Wolf, 2011). This phenomenon is explained by the predominance of habit-based mechanisms under stress, where previously learned response patterns controlled by more central and lateral regions of the dorsal striatum take precedence over cognitive-resource-intensive areas such as the DMS (Dias-Ferreira et al., 2009; Schwabe et al., 2010). This configuration enables individuals to persist in goal-directed behavior despite stress or obstacles, maintaining a sense of control and agency.

On the other hand, BAS components such as Sensitivity to Reward and Pleasure Seeking are primarily associated with activity in the nucleus accumbens, a key part of the ventral striatum, as confirmed by studies showing that these brain regions become highly activated in response to rewarding stimuli and during the execution of reward-directed behaviors (Hahn et al., 2009; Simon et al., 2010). Notably, individual differences in BAS traits, particularly Pleasure Seeking and Reward Sensitivity, correlate with increased nucleus accumbens activation when exposed to emotionally rewarding stimuli (Hahn et al., 2009). This translates into a heightened sensitivity to cues encouraging exploration of new opportunities and risk-taking behaviors (Braams et al., 2015; Telzer, 2016). From this perspective, individuals with higher BAS Sensitivity to Reward may perceive potential benefits in difficult situations more rapidly, which can be impactful for adaptive processes. Studies further indicate that high reward sensitivity is not solely limited to stronger responses to positive stimuli in some individuals; it can also enhance forms of active avoidance in threatening situations (Arnett & Newman, 2000; Smillie & Jackson, 2005). In terms of coping strategies, this suggests that high reward sensitivity can both motivate problem-solving efforts (due to an increased "approach" tendency) and prompt rapid withdrawal from perceived threats.

At the same time, the distinction between "liking" (the hedonic experience of reward) and "wanting" (the motivation to attain it) highlights the fact that an intense pursuit of reward does not always equate to an enhanced sense of pleasure (Berridge & Robinson, 2003; Berridge et al., 2015). Research further suggests that BAS components such as Sensitivity to Reward and Pleasure Seeking have distinct neural correlates (Berridge & Robinson, 2003; Berridge et al., 2015), confirming earlier theoretical assumptions (Corr, 2008).

Dopaminergic systems are characterized by high plasticity, making them a crucial adaptive mechanism: an increase in ventral striatum reactivity may enhance exploration and engagement in new activities, supporting adaptation to novel conditions (Braams et al., 2015; Telzer, 2016). From the perspective of Reinforcement Sensitivity Theory (RST), this plays a vital role in shaping stress and threat coping strategies: greater openness to new experiences may facilitate flexibility in problem-solving approaches, whereas motivation maintenance (supported by dorsomedial striatum activation) allows continued efforts despite obstacles. Ultimately, individual differences in dopaminergic striatal activity translate into distinct behavioral profiles, ranging from systematic, long-term goal pursuit driven by exploitation (BAS Drive) and cost-benefit analysis (Costumero et al., 2016; Westbrook et al., 2020) to more spontaneous, hedonic tendencies (BAS Sensitivity to Reward, Pleasure Seeking) focused on exploration (Corr, 2008). Individuals may also engage in directed exploration, combining prior experiences with active search for new opportunities, which is particularly adaptive in high-uncertainty environments with limited cognitive resources (Cohen et al., 2007;

Daw et al., 2006). However, in practice, dynamic shifts between exploration and exploitation depend on current cognitive resources, expected reward value, and perceived uncertainty (Daw et al., 2006). Consequently, higher BAS-Drive activity, focused on stable goal pursuit, may become dominant when cognitive resources are limited and exploratory benefits are less apparent.

All three resilience dimensions- ecological resilience, engineering resilience, and adaptive capacity- were expected to be associated with BIS activity, as BIS governs threat monitoring, risk assessment, and anxiety regulation in response to stressors (Gray & McNaughton, 2000; Corr, 2008). However, in the case of ecological resilience, this association is expected to be less strongly negative than in engineering or adaptive capacity, as ecological resilience is primarily characterized by stress absorption and sustained functioning over time, which requires BAS activation, particularly BAS-Drive, Reward Sensitivity, and Pleasure Seeking (Costumero et al., 2016; Liljeholm & O'Doherty, 2012). This mechanism involves maintaining long-term motivation (Drive), reinforcing positive experiences (Reward Sensitivity), and deriving satisfaction from available pleasurable stimuli (Pleasure Seeking), which supports persistent effort despite prolonged stress (Berridge & Kringelbach, 2015; Alloy & Nusslock, 2019).

Conversely, engineering resilience was expected to show the strongest negative correlation with BIS activity, as this resilience form is based on immediate, automatic responses to stressors without detailed risk assessment or learning processes (Dias-Ferreira et al., 2009; Schwabe & Wolf, 2011). High BIS activity, which promotes inhibition, risk assessment, and caution, could effectively block rapid, spontaneous responses characteristic of engineering resilience. As a result, engineering resilience is unlikely to rely heavily on BAS systems, which primarily facilitate long-term goal pursuit, instrumental learning (Kringelbach & Berridge, 2017; Tricomi et al., 2004), and action optimization based on cost-benefit analysis (Westbrook et al., 2020), rather than automatic reactions.

On the other hand, adaptive capacity was expected to be negatively associated with BIS activity, as effective adaptation to changing conditions requires moderate BIS activation to support risk assessment, caution, and flexible responses in dynamic stress situations (Corr et al., 2013). At the same time, adaptive capacity is linked to Reward Sensitivity and Pleasure Seeking, which promote environmental exploration, discovery of new coping strategies, and flexible behavioral reorganization (Alloy & Nusslock, 2019). However, it was not strongly associated with BAS-Drive, as Drive focuses on exploitation (maintaining established goals and long-term pursuits), which can limit exploratory behavior (Blanchard & Gershman, 2018; Carver & White, 1994; Cockburn et al., 2022; Corr & Cooper, 2016; Daw et al., 2006).

Material and Methods

Participants and Procedure

The present study uses data from previously conducted studies (Sękowski et al., 2023; Subramanian et al., 2022). The dataset was originally collected to examine the relationships between narcissism and the behavioral inhibition and behavioral activation systems. Other analyses have focused on associations between narcissism and resilience; however, the relationship between BIS/BAS and resilience has not been examined jointly. The current analyses address research questions that were not investigated in the original publications.

We administered a two-wave survey to a general sample of 1,100 Polish adults via the Ariadna online research panel. The two waves were separated by one week. We separated the measurement of dependent and independent variables to reduce common-method bias and used a randomized order of scales for each participant (Podsakoff et al., 2012). The final sample comprised 657 participants (372 women, 285 men) aged 18 to 82 years (M age = 45.31, SD = 15.38), after excluding 443 respondents who did not participate in the second wave or failed an attention-check item (e.g., "Please select response option 5"). Participants received loyalty points through the Ariadna online research panel. The study was conducted in accordance with the Declaration of Helsinki, and all procedures were approved by the institutional ethics board (KEiB–10/2018). Data and supplementary materials are available in the OSF repository: https://osf.io/yrjqw/?view_only=dabbce4ac1b54ed4817f18f231a33b57

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Measures

Approach–Avoidance Motivation

The BIS/BAS Scale is a 24-item measure of the Behavioral Inhibition System (BIS) and the Behavioral Activation System (BAS), designed to assess avoidance and approach motivation, respectively (Carver & White, 1994). Thirteen items reflect approach (e.g., *I go out of my way to get things I want*) and are divided into three aspects: drive (e.g., *I will do everything, despite the obstacles, to get what I want*), pleasure-seeking (e.g., *I often do things just for fun*), and sensitivity to reward (e.g., *Winning the competition would be exciting*). Seven items reflect avoidance (e.g., *Criticism or scolding hurts me quite a bit*). There were also four filler items (e.g., *A person's family is the most important thing in life*). Respondents answered using a four-point Likert-type scale ranging from 1 (*very false*) to 4 (*very true*).

Resilience

We assessed resilience with the EEA Resilience Scale which contains three subscales: Ecological resilience (e.g., '*I give my best effort no matter what the outcome may be*'); engineering resilience (e.g., '*Does not take a long time to recover*') and adaptive capacity (e.g., '*I enjoy dealing with new and unusual situations*'). The EEA is a 12-item measure (Maltby, Day, & Hall, 2015; see Maltby et al. 2016; for the Polish version). The response options ranged from 1 (*strongly disagree*) to 4 (*strongly agree*). Higher scores on each of the resilience subscales indicate a higher level of resilience.

Analytical Strategy

Due to the interdependencies among the components of the BAS system (Drive, Sensitivity to Reward, Pleasure Seeking; Corr & Cooper, 2016; Krupić & Corr, 2020), which may lead to high multicollinearity, a three-step analytical strategy was employed to better capture both shared and unique variance of individual predictors. First, we analyzed zero-order relations among BIS, BAS components, and the three resilience dimensions. Second, we conducted a commonality analysis (Ray-Mukherjee et al., 2014) which partitions the explained variance into a unique portion attributable solely to a given predictor and a shared portion, representing variance jointly accounted for by multiple predictors. This approach allows for a clearer determination of how each predictor contributes to the dependent variable (Ray-Mukherjee et al., 2014; Zientek & Thompson, 2006). However, commonality analysis does not directly test the statistical significance of individual predictors. Multiple regression, in contrast, estimates the unique contribution of each predictor after controlling for shared variance. Therefore, in the third step, we conducted standard multiple regression analyses. Because high multicollinearity can produce unstable regression coefficients and complicate interpretation, regression and commonality analyses were treated as complementary approaches (Kraha et al., 2012; Tonidandel & LeBreton, 2011). The complementary application of both methods provided a more comprehensive, transparent, and stable depiction of the analyzed relationships, allowing us to conclude that significant effects in regression primarily result from unique variance, while commonality analysis reveals the additional variance shared among predictors.

Results

Table 1. Reliabilities, descriptive statistics, and zero-order correlations between variables

	1	2	3	4	5	6	7
1. Ecological res.							
2. Engineering res.	.17**						
	[.10,.25]						
3. Adaptive capacity	.39**	.34**					
	[.32,.45]	[.27,.41]					
4. BIS	-.08	-.53**	-.35**				
	[-.16,.00]	[-.58, -.48]	[-.42, -.28]				
5. BAS-D	.35**	.15**	.28**	-.12**			
	[.29,.42]	[.07,.22]	[.21,.35]	[-.19, -.04]			
6. BAS-P	.18**	.08*	.42**	-.07	.49**		
	[.10,.25]	[.01,.16]	[.35,.48]	[-.15,.01]	[.43,.55]		
7. BAS-S	.31**	-.03	.25**	.22**	.47**	.47**	
	[.24,.38]	[-.11, -.05]	[.17,.32]	[.15,29]	[.40,.52]	[.41,.53]	
Cronbach's α	.81	.83	.80	.76	.74	.66	.70
M	2.96	2.47	2.64	2.74	2.49	2.53	3.03
SD	(.64)	(.57)	(.65)	(.52)	(.60)	(.57)	(.47)

Note. N = 657. BIS = the behavioral inhibition system; BAS = the behavioral activation system. BAS-D = BAS-drive; BAS-P = BAS pleasure seeking; BAS-S = BAS sensitivity to reward. *p <.05; **p <.01

Multiple Regression

Table 2. Multiple regression analysis in which BIS and BAS were used as predictors of resilience aspects

	Ecological Resilience				Engineering Resilience				Adaptive Capacity			
	β	95% CI	*t*	ΔR^2	β	95% CI	*t*	ΔR^2	β	95% CI	*t*	ΔR^2
Step 1				.00				.03**				.00
Sex	-.03	[-.13,.06]	-.67		.17	[.11,.28]	4.14**		.01	[-.09,.11]	.24	
Age	-.02	[-.04,.02]	-.51		.04	[.00,.00]	1.14		-.03	[.00,.00]	-.73	
	R^2 =.001, F (2,654) =.35, p =.707				R^2 =.03, F (2, 654) = 10.45, p <.001				R^2 =.001, F (2, 654) =.30, p =.740			
Step 2				.16**				.27**				.30**
Sex	-.02	[-.31, -.03]	-.60		.06	[-.01,.14]	1.71		-.05	[-.15,.02]	-1.51	
Age	.00	[.00,.00]	-.24		.00	[.00,.00]	.03		.00	[.00,.00]	-.01	
BIS	-.12	[-.24, -.05]	-2.94**		-.53	[-.65, -.50]	-14.66**		-.38	[-.56, -.39]	-10.60**	
BAS-D	.27	[.17,.37]	5.94**		.05	[-.02,.13]	1.33		.00	[-.09,.09]	-.02	
BAS-P	-.08	[-.19,.01]	-1.81		-.02	[-.10,.06]	-.46		.31	[.26,.44]	7.54**	
BAS-S	.25	[.21,.46]	5.40**		.08	[.00,.20]	1.92		.18	[.13,.36]	4.29**	
Full Model	R^2 =.17, F (6, 650) = 21.52, p <.001				R^2 =.30, F (6,650) = 45.74, p <.001				R^2 =.31, F (6,650) = 47.73, p <.001			

Note. N = 657. BIS = the behavioral inhibition system; BAS = the behavioral activation system. BAS-D = BAS-drive; BAS-P = BAS pleasure seeking; BAS-S = BAS sensitivity to reward. Coding for sex: 0 = women, 1 = men. *p <.05; **p <.01

The multiple regression results revealed distinct motivational profiles for the three resilience dimensions. Ecological resilience was positively associated mainly with BAS-Drive and BAS-Sensitivity to Reward, with a weaker negative association with BIS. Engineering resilience was predicted primarily by lower BIS activation, with no significant contribution from BAS components. In contrast, adaptive capacity was positively associated with BAS-Pleasure Seeking and BAS-Sensitivity to Reward and negatively associated with BIS. Age and sex were not significant predictors in the full models.

Commonality Analysis

Table 3. Commonality analysis with variance explained uniquely by each form, its shared effects and total effects.

	Ecological Resilience				Engineering Resilience				Adaptive Capacity			
Contribution type	BIS	BAS-D	BAS-P	BAS-S	BIS	BAS-D	BAS-P	BAS-S	BIS	BAS-D	BAS-P	BAS-S
Unique	.01	.05*	.00	.04	.26*	.00	.00	.00	.12*	.00	.06	.02
	[-.01,.02]	[.01,.04]	[-.01,.01]	[.00,.06]	[.20, .32]	[-.01,.00]	[-.01,.00]	[-.01,.01]	[.07, .17]	[-.01,.00]	[.03, .09]	[-.01,.02]
Shared	.00	.08*	.03	.06*	.03	.02	.01	.00	.00	.08	.11*	.04
	[-.01,.00]	[.04,.11]	[-001,.06]	[.03, .09]	[-.01,.04]	[-.01,.03]	[-.01,.02]	[-.02,.01]	[-.03,.03]	[.03, .12]	[.07, .15]	[-.01,.03]
Total	.00	.13*	.03	.10*	.28*	.02	.01	.00	.12*	.08	.18*	.06
	[-.01,.00]	[.01,.09]	[.00,.05]	[.04, .14]	[.22,.35]	[-.01,.04]	[-.01,.01]	[-.01,.00]	[.07,.18]	[.03, .12]	[.12,.23]	[-.01,.04]
Percent unique	2.05%	8.86%	0.81%	7.47%	41.37%	0.32%	0.03%	0.56%	13.77%	0.00%	7.21%	2.44%
Percent shared	-0.79%	15.34%	5.16%	11.10%	4.00%	3.07%	1.07%	-0.43%	0.41%	8.93%	12.82%	4.42%
Percent total	1.26%	24.20%	5.98%	18.57%	45.37%	3.40%	3.40%	0.13%	14.18%	8.93%	20.03%	6.85%

Note. BIS = the behavioral inhibition system; BAS = the behavioral activation system. BAS-D = BAS-drive; BAS-P = BAS pleasure seeking; BAS-S = BAS sensitivity to reward. Percentage values were calculated based on non-rounded estimates. Total contribution type represents sum effect of unique and shared contributions. $*p < 0.05$

The commonality analysis also indicated distinct contribution patterns across the three resilience dimensions. Ecological resilience was explained primarily by BAS-Drive and BAS-Sensitivity to Reward, whereas BIS and BAS-Pleasure Seeking showed smaller contributions. Engineering resilience was accounted for predominantly by BIS, with only minimal contributions from BAS components. In contrast, adaptive capacity was explained mainly by BAS-Pleasure Seeking and BIS, while BAS-Drive and BAS-Sensitivity to Reward made smaller contributions.

Discussion

Previous research on BIS/BAS motivational systems has often relied on simple correlational analyses or standard multiple regression, which may obscure subtle but meaningful differences between their individual components (Harmon-Jones & Gable, 2018; Leone & Russo, 2009). In particular, although BAS dimensions such as Drive, Sensitivity to Reward, and Pleasure Seeking tend to be positively correlated at the self-report level, neuropsychological evidence suggests that they may reflect partly distinct functional mechanisms (Beaver et al., 2006; Kringelbach & Berridge, 2017). By combining multiple regression with commonality analysis, the present study was able to distinguish between the shared and unique contributions of these motivational dimensions more precisely. This analytical approach provides a more differentiated picture of how BIS/BAS profiles relate to distinct forms of psychological resilience and, in turn, may help clarify individual differences in stress adaptation and mental well-being.

The findings suggest that engineering resilience is primarily associated with reduced BIS activity rather than with BAS-related motivational processes. Although engineering resilience has previously been linked to an approach-oriented coping style, the absence of significant associations with BAS components in the present study indicates that this form of resilience may depend less on reward-driven engagement and more on lower threat sensitivity and reduced behavioral inhibition. This interpretation is consistent with earlier work showing that engineering resilience is strongly related to lower neuroticism (Maltby et al., 2015; Oshio et al., 2018) and with theoretical accounts emphasizing the role of BIS in anxiety regulation and avoidance tendencies (Corr & McNaughton, 2012). In this context, lower BIS reactivity may facilitate quicker and more automatic responses to stressors by reducing prolonged threat monitoring and hesitation. Thus, engineering resilience may reflect a profile that supports rapid recovery from stress, allowing individuals to return to baseline functioning more efficiently when confronted with adversity.

A different pattern emerged for ecological resilience. In this case, lower BIS activity appeared to play a weaker role, whereas BAS-Drive and BAS-Sensitivity to Reward were the most important positive predictors. This pattern aligns with previous findings suggesting that ecological resilience is grounded less in rapid disengagement from threat and more in sustained functioning, active environmental management, and long-term goal-directed behavior (Denckla et al., 2020; Maltby et al., 2015). Ecological resilience may therefore depend on motivational processes that help individuals maintain effort, pursue meaningful goals, and remain engaged despite prolonged or repeated stress. The non-significant association with BAS-Pleasure Seeking is also theoretically consistent, as impulsive pursuit of novelty or immediate gratification does not necessarily support the persistence and stability required for maintaining functioning under chronic strain (Krupić & Corr, 2020; Smillie et al., 2006). In contrast, BAS-Drive and BAS-Sensitivity to Reward appear more closely tied to the active coping and sustained motivational engagement that may protect functioning and well-being over time.

Adaptive capacity was associated with a somewhat different configuration. This dimension was positively linked to BAS-Pleasure Seeking and BAS-Sensitivity to Reward, but not to BAS-Drive, while also showing a negative association with BIS. These results suggest that adaptive capacity may depend less on persistence in pre-existing goals and more on motivational tendencies related to exploration, openness to new possibilities, and flexible responsiveness to changing circumstances. This interpretation fits the conceptualization of adaptive capacity as the ability to adjust coping strategies when conditions change (Sarrionandia et al., 2018). Individuals with higher reward sensitivity and greater inclination toward pleasurable or novel experiences may be more likely to notice alternative opportunities, experiment with new responses, and reorganize their behavior when established strategies are no longer effective. In this sense, adaptive capacity may be particularly relevant for maintaining psychological adjustment in uncertain or dynamic environments, where flexibility rather than persistence is most beneficial.

The absence of a significant association between adaptive capacity and BAS-Drive also deserves attention. BAS-Drive is typically linked to long-term goal pursuit, effortful persistence, and behavioral organization around stable objectives (Corr & Cooper, 2016; Costumero et al., 2016; Westbrook et al., 2020). These characteristics may be more relevant to maintaining stable functioning over time than to modifying strategies in response to changing demands. By contrast, adaptive capacity appears more closely related to exploratory and flexible aspects of reward sensitivity. Although these differences can be discussed in neurobiological terms, at the psychological level they suggest that not all forms of resilience are supported by the same kind of motivational engagement. Some forms may depend primarily on reduced inhibition, some on sustained goal pursuit, and others on exploratory flexibility. This distinction is important for understanding why individuals differ not only in whether they cope well with stress, but also in how they do so.

Taken together, the findings only partially confirmed the expectation that all BAS components would be associated with resilience. In practice, the BAS dimensions showed different patterns across resilience types. BAS-Drive was most strongly linked to ecological resilience, BAS-Sensitivity to Reward was associated with both ecological resilience and adaptive capacity, and BAS-Pleasure Seeking was most closely related to adaptive capacity. This pattern supports the view that psychological resilience is not a unitary phenomenon, but rather a multidimensional construct shaped by distinct motivational tendencies. From the perspective of health and well-being, this distinction is meaningful because different profiles may support different forms of coping under stress: rapid recovery, sustained functioning, or flexible adjustment. Understanding these profiles may therefore improve the conceptualization of resilience-related functioning and help explain why some individuals maintain well-being under prolonged strain, whereas others adapt more effectively to change or recover more quickly after disruption.

The present findings also highlight the value of using more advanced analytical approaches in research on BIS/BAS systems. Because the components of BAS are interrelated at the self-report level, standard correlational analyses or multiple regression alone may fail to capture their distinct effects clearly (Corr & Cooper, 2016; Krupić & Corr, 2020). The use of commonality analysis made it possible to separate unique and shared variance, thereby offering a more transparent account of how individual motivational dimensions contribute to specific forms of resilience. This more differentiated perspective may be useful not only for theory development, but also for identifying motivational profiles that are relevant to stress prevention, psychoeducation, and support for psychological well-being in social science and public health contexts.

Conclusions

The present findings show that BIS and BAS motivational systems are differentially associated with three distinct dimensions of psychological resilience: engineering resilience, ecological resilience, and adaptive capacity. Ecological resilience was most strongly linked to BAS-Drive and BAS-Sensitivity to Reward, suggesting that sustained functioning under stress may depend on long-term motivational engagement and responsiveness to positive reinforcement. Engineering resilience was primarily associated with lower BIS activation, indicating that rapid recovery from stress may rely more on reduced threat sensitivity and lower behavioral inhibition than on reward-related motivation. Adaptive capacity, in turn, was most clearly related to BAS-Pleasure Seeking and reward sensitivity, highlighting the importance of exploratory flexibility in adjusting to changing conditions.

These findings support the view that psychological resilience is not a unitary construct, but rather reflects distinct patterns of stress adaptation associated with different motivational tendencies. They also suggest that BIS and BAS components should not be treated as functionally uniform, as their roles vary depending on the form of resilience being considered. More broadly, the study contributes to a better understanding of individual differences in coping and psychological functioning under stress.

From a practical perspective, these results may help inform more tailored psychoeducational and supportive approaches aimed at strengthening mental well-being. For example, some individuals may benefit more from interventions that support sustained goal engagement, whereas others may benefit from strategies that enhance flexible coping or reduce excessive threat sensitivity. By linking motivational profiles to distinct resilience dimensions, the present study offers a more differentiated framework for understanding resilience-related functioning in the context of stress.

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