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Research Article

Convergent Validation of the State-Trait Anxiety Inventory with Measures of Personality, Affective Control and, Risk Propensity

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ABSTRACT

We standardized the State-Trait Anxiety Inventory (STAI) with 407 young adults. Norms (high, medium, and low anxiety scores) were derived based on T scores and percentile ranks. Convergent validation was performed using correlation and multiple regression analysis followed by moderation analysis to study the relationship between anxiety (STAI) and personality dimensions (NEO-FFI 3), affective control, and risk propensity. State anxiety emerged as a significant predictor for both affective control and risk propensity. While trait anxiety moderated the relationship between personality and affective control as well as personality and risk propensity. Higher levels of trait anxiety seem to increase the disabling effect of neuroticism on affective control. In addition, with high level of trait anxiety and higher risk propensity, affective control was found to be better in terms of less emotional distress. Findings of the study also highlight the differential effects of types of anxiety and the need to investigate the structure of STAI with trait and state anxiety as different constructs. The transient factors underlying state anxiety may affect cognition more strongly whereas trait anxiety as a much enduring disposition may influence cognition through the interaction with other variables. The current study adds to the evidence that STAI is a valuable measure for anxiety in healthy adults across populations/cultures and that anxiety is correlated with cognitive-affective and pre-dispositional factors.

Keywords: State-Trait Anxiety Inventory (STAI); Personality; Affective control; Risk propensity; Standardization; Convergent validation

INTRODUCTION

Anxiety is an aversive emotional and motivational state in threatening circumstances. Anxiety has often been used as a measure of individual differences in a healthy population and seems to be an important factor in the manifestation of certain disorders such as drug abuse, alcoholism [1-3] and post-traumatic stress disorder [4]. It also has an impact on cognition, emotion regulation, and decision-making [5-9]. Spielberger (1966) distinguished between two dimensions of anxiety as state and trait anxiety with the former reflecting a transient subjective emotion whereas trait anxiety as a predisposition to worry about future events. State-Trait Anxiety Inventory (STAI) [10] has been a widely accepted measure of state and trait anxiety for healthy population. Easy to use and well-defined norms for a wide range of populations [11] make STAI an efficient tool for the assessment of anxiety in comparison to others. STAI has been translated into many languages and adapted for healthy volunteers [12-14]. Further, state and trait anxiety also have a differential impact on cognition and behaviour [15]. The current study aimed to standardize and validate STAI by using convergent validation method in young Indian adults (18-30 years old) with measures of personality (NEO-FFI3), affective control (affective control scale) and risk (risk propensity scale).

Emerging adulthood and psycho-social factors

Emerging Adulthood (EA) marks a period of transition into adulthood (18-29 years) with distinct features such as identity explorations, instability, self-focus, feeling in-between, and optimism [16,17]. Psychosocial and health outcomes in young adulthood are, to a large extent dependent on one's personality, family relationships, and socioeconomic conditions during childhood and adolescence [18,19]. The transitional period of emerging adulthood can be stressful due to the multiple life transitions such as accepting responsibility for oneself, making independent decisions, financial independence and social pressure. The multiple stressors of emerging adulthood also contribute to significant alterations in mental health [20,21].

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This period in life also marks the onset of most of the affective disorders like anxiety disorders, depression and bipolar affective disorder [22-24].

While facing the daily stressors during emerging adulthood some adults adapt well, while others develop vulnerability to psychological issues such as negative affect, irritability, and adjustment disorders. The extent to which individuals are able to modulate their affective responses to daily stressors reflects the role of emotion regulation in stress management [25]. The degree of an individual's stress-reactivity is an important feature of affective instability [26]. In most cases, negative affect is found to be a general factor for all affective disorders [27]. Personality trait of neuroticism too has been dominantly associated with depression, anxiety, everyday affectivity and stress; and shapes the emotional development from adolescence to young adulthood [28,29]. Personality traits such as conscientiousness acts as a stress-protective factor through its influence on the use of problem-focused coping strategies [30,31]. While openness to experience facilitates a distinctly adaptive response profile during stress exposure [32,33]. Further, conscientiousness along with trait extraversion is also predictive of proactive resilience *via* perceived competence, adaptation to change and perceived control in young adults. Further openness to experience and agreeableness are predictive of reactive resilience *via* stress management and spirituality [34,35]. Thus, a well-adjusted personality promotes well-being by enhancing resilience and reducing stress/emotional reactivity in this period.

Young adulthood is also considered to be a period of fronto-limbic balance mediating affective control. The heightened experience of negative affect increases the use of negative or maladaptive styles of emotion regulation including affective suppression [36,37]. The negative styles of emotion regulation, rumination and suppression further increase the vulnerability for internalizing disorders, anxiety or depression [38,39]. Young adults exhibit more support seeking adaptive emotion regulation strategies than adolescents and have higher competence in individual and social emotion regulation [40] which in turn makes individuals capable of responding adaptively to stress [41].

Further developing a sense of personal identity is also a formative developmental task during the transition from adolescence to adulthood. Individuals who experience difficulty in developing a sense of identity, have propensity to engage in maladaptive risky behaviour [42]. However, the sense of identity exploration and personal growth also encourages young adults towards positive risk taking, determined by sensitivity to rewards and tolerance for ambiguity. People who take positive risks look for rewards in the social world, in a socially accepted way [43]. Poor styles of emotion regulation too predict greater propensity for risky behavior such as smoking, gambling and unprotected sexual activities in young adults [44]. The relationship between risk tendencies and emotion regulation are usually dependent upon the positive affect associated with risk perception [45,46]. Personality factors such as neuroticism are closely associated with negative affect and moderate the relationship between emotion regulation and risky behaviors in adulthood. At higher levels of neuroticism, the level of emotion regulation (high *vs.* low) makes a difference leading to higher risk-taking in adults with anxiety disorders [47]. However, individuals with high levels of conscientiousness pursue benefits through disciplined striving rather than risk-taking [48].

Thus, emerging adulthood is a dynamic period of significant changes in social, cognitive and affective spheres. An adaptive personality profile along with mature strategies of emotion regulation and adaptive risk-taking predicts wellbeing during young adulthood. Therefore, the current study aimed to perform convergent validation of STAI with the given variables namely personality, affective control, and risk propensity with anxiety as the moderating variable.

Anxiety as moderator

In new urbanized nations like India, young adulthood is gradually becoming more similar to developed nations as more and more young people experience (a) greater access to higher paying jobs, (b) more opportunities for higher education, (c) greater autonomy in decisions related to personal and career choices, and (d) changes in social cultural landscape and family structure [49,50]. With this shift, the burden of mental illness has also increased among young adults globally and in Indian context, in the past few years; especially the prevalence of sub-clinical anxiety symptoms and affective disorders [51-53].

The neurobiological models of stress and anxiety also suggest high trait anxiety as a personality trait and as a vulnerability factor for depression and anxiety disorders. This leads to maladaptive coping styles in high trait anxious individuals towards stress. Increased/continuous usage of such strategies in the face of constant stress and adversity may turn a depressive episode into depressive disorder [54,55]. Anxiety can also be manifested from the expectations held regarding what it means to 'become' an adult, and create further distress about whether one is transitioning to adulthood in an appropriate way [56]. Thus, anxiety shapes the interactions between the social-emotional-cognitive variables like affective control and risk propensity during young adulthood.

The present study

Anxiety as a dynamic context and experiences of subclinical anxiety, are common during emerging adulthood. We examined the relationship between state/trait anxiety and psycho-social variables such as personality, risk propensity, and affective control, more specifically the moderating effect of anxiety (state/trait) on the relationship between these psycho-social variables. Secondly, to attain the first objective, we standardized and validated STAI in young adults. STAI has been translated to Hindi but has not been standardized and validated in Indian population [57]. STAI as a questionnaire, is of particular importance since it allows to segregate the effects of state anxiety from trait anxiety. The existing literature suggests a differential effect of state and trait anxiety on cognition and mental health [58-59].

We hypothesized that state anxiety being a transient subjective emotion, would moderate the relationship between the more dynamic measures such as personality dimensions of openness to experience, agreeableness, and conscientiousness. On the contrary, trait anxiety as a more stable predisposition was expected to moderate the relationship between more stable measures of individual differences such as neuroticism and risk propensity. It was also hypothesized that anxiety will moderate the relationship between personality traits and affectivity particularly related to the regulation of negative affect. The interaction of these factors in an apparently healthy and productive population is important to find the protective/preventive or risk factors that may trigger subclinical symptoms of anxiety and even depression, highly prevalent in young adults.

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MATERIALS AND METHODS

Phase 1: Standardization of State-Trait Anxiety Inventory (STAI) in the young adult population

The State-Trait Anxiety Inventory [10] was administered with 407 (224 males, 183 females) participants. The participants were aged between 18-29 years (Males=21.10 ± 2.22 years; Females=20.81 ± 2.17 years), from University of Allahabad. All the participants had adequate reading and writing skills in English as their second language. They did not report any difficulty in understanding the instructions or in following the statements in the inventory. The study was approved by the Institutional Ethics Review Committee. Written informed consent of the participants was obtained. Data obtained was analyzed by converting the raw scores into a transformed score for ease of comparison after which percentiles were calculated. Based on the percentiles, participants could be divided into low (T scores ≤ 15th percentile), medium (T score between 45th to 55th percentile), and high anxious (T scores ≤ 85th percentile) (Table 1).

Phase 2: Convergent validation of STAI with measures of personality, affective control, and risk propensity

Participants: The convergent validation of STAI was conducted with 60 participants (random assignment) who participated in Phase-1 (36 male, 24 females; mean age: (Male=21.10 ± 2.22 years; Female=20.81 ± 2.17 years) from the University of Allahabad. The measures including Neo-FFI (Five Factor personality Inventory)-3 [60], risk propensity scale [61], and affective control scale [62], were administered in random order across participants to minimize any order effects. Shapiro-Wilks's test was used to test the normality assumption. All variables except extraversion from Neo-FFI (W (60)=0.948, p=0.013) and anxiety sub-component of ACS (W (60)=0.952, p=0.020) were found to be normally distributed. There was no significant effect of gender measures of personality, affective control, and risk propensity. Hence, the scores of males and females were combined for further analysis (Table 2).

Table 1: Descriptive characterization of young Indian adults on State Trait Anxiety Inventory (STAI).

Characteristics	Males (N=224)		Females (N=183)	
	State	Trait	State	Trait
Mean	39.37	41.99	38.75	41.56
SD	8.24	8.14	10.08	8.22
Minimum	22	22	20	25
Maximum	62	66	71	73
15th percentile	31	34	29	34
45th percentile	38	41	36	40
55th percentile	40	43	40	42
85th percentile	48	50.55	47	50

Note: Descriptive statistics for forms Y1 (State Anxiety) and Y2 (Trait Anxiety) for male (N=224) and female (N=183) participants. Percentile reported here are calculated on raw scores; SD=Standard Deviation

Table 2: A two-way Pearson correlation and descriptive statistics for components of personality (NEO-FFI 3), affective control (affective control scale) risk (risk propensity scale), and anxiety (state-trait anxiety inventory).

S.no	Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1	N	23.45	6.21													
2	E	27.6	5.93	-28[a]												
3	O	29.2	6	0.02	-0.21											
4	A	26.68	4.46	-0.18	0.05	-0.03										

5	C	31.22	5.65	-0.05	0.06	-0.1	-0.09									
6	ACS	3.64	0.65	0.37[b]	-0.24	-0.01	0.06	-0.09								
7	ANG	4.09	0.9	0.15	-0.15	-0.07	0.28	0.05	0.75[c]							
8	POSAFF	3.59	0.7	0.21	-0.06	0.07	0.15	-0.08	0.84[c]	0.61[c]						
9	DEPMD	3.55	0.81	0.37[b]	-0.3[a]	-0.14	0.07	0.03	0.76[c]	0.43[c]	0.52[c]					
10	ANX	3.47	0.87	0.42[c]	-0.26[a]	0.02	0.09	-0.2	0.84[c]	0.44[c]	0.54[c]	0.57[c]				
11	ACA	3.72	0.65	0.29[a]	-0.19	-0.04	0.08	-0.01	0.95[c]	0.82[c]	0.89[c]	0.76[c]	0.63[c]			
12	RPS	4.87	0.91	-0.37[b]	0.01	0.21	0.06	-0.28[a]	-0.4[b]	-0.41[b]	-0.22	-0.27[a]	-0.42[c]	-0.33[a]		
13	STATE	37.65	8.86	0.42[c]	-0.02	-0.34[b]	-0.33[a]	-0.01	0.27[a]	0.08	0.09	0.34[b]	0.22	0.25	-0.01	
14	TRAIT	40.82	8.73	0.47[c]	-0.02	-0.28[a]	-0.33[b]	-0.16	0.08	0.07	-0.03	0.09	0.13	0.04	-0.21	0.55[c]

Note: M: Mean for all variables; SD: Standard Deviation for all variables; N: Neuroticism; E: Extraversion; O: Openness to Experience; A: Agreeableness; C: Conscientiousness facets of NEO-FFI 3 scale; ACS is the total score on the Affective Control Scale; ANG: Anger; POSAFF: Positive Affect; DEPMD: Depressed Mood; and ANX: Anxiety components of Affective Control Scale; ACA refers to the total score after removing the anxiety facet score; RPS: Risk Propensity quotient; STATE: State Anxiety score (Y1) and TRAIT: Trait Anxiety score (Y2) on the State-Trait Anxiety Inventory; [a]p < .05; [b]p < .01; [c]p < .001.

Measures

NEO-FFI 3 (Costa and McCrae, 1992): NEO-FFI 3 is the updated version of the NEO-FFI. It provides a quick measure of personality across five domains: Neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. It is a 60-item version, having 12 questions for each of the five domains. The participants were required to rate the statements on a five-point scale varying from strongly disagree >0, disagree >1, neutral >2, agree >3, strongly agree >4. Each subcomponent was scored separately. Some items in each domain were reverse scored before summing up to make a domain base score. Cronbach's alpha coefficients ranging from 0.68 (Agreeableness) to 0.89 (Neuroticism) were reported by Costa and McCrae. In the current study, the Cronbach alpha for neuroticism (α=0.66), Extraversion (α=0.69), Openness to experience (α=0.66), Conscientiousness (α=0.71). Some of the items (A1, A4, A7, A12) on the dimension of agreeableness were negatively correlated with the scale, so these items were removed from the analysis and Cronbach alpha was calculated again, Agreeableness (α=0.44).

Affective control scale (Williams et.al, 1997): The affective control scale is a 42-item self-report scale that measures distress about and fears of losing control while experiencing strong affective states such as anxiety, depression, anger, and positive affective states on a 7 pointer Likert scale ranging from very strongly disagree to neutral to strongly agree. Responses for some of the items were reverse coded. The total score was computed by calculating the mean score of all 42 responses. Higher scores on the scale indicate greater distress of emotional response. The overall scale has a good test-retest reliability (r=0.78) and an internal consistency, Cronbach alpha (α=0.94). The internal consistency for the sub scales range between, α=0.72 to 0.91 (Williams et.al, 1997). In the current study, Cronbach alpha for affective control scale is (α=0.91). The internal consistency for the subscales also ranges from α=0.72 to 0.88.

Risk propensity scale: Risk propensity measures the general risk-taking tendencies of an individual. The questionnaire did not mean to measure the risk that involves the violation of the social norms. This scale consists of seven items, which assess risk propensity on a nine-point Likert scale ranging from totally disagree to totally agree. Items 1-4 are reverse coded. All the item responses were summed to obtain a total risk propensity score and was further divided by 7 to form a risk propensity quotient. The scale has an internal reliability coefficient (Cronbach's alpha) of 0.77. In the present study, we obtained similar reliability estimates (Cronbach's alpha) of 0.75 after removing item number 4 and 5 which were negatively correlated with the scale [61].

RESULTS

Correlation and regression analysis

A two-tailed Pearson correlation analysis was performed between STAI and the scores on NEO-FFI 3, ACS, and RPS. Detailed description of the results based on correlation analysis. Further, multiple regression analysis was performed to determine the independent variables for the moderation analysis. In the first model, affective control was the dependent variable while NEO-FFI3, risk propensity, and state and trait anxiety were predictors. Multicollinearity was identified with VIF and tolerance, since VIF for all the variables is <10, there is no issue of multicollinearity and additivity. Further, two outliers were identified with the case wise diagnostics and were excluded from further analysis (standard residuals were greater than 3). The model was significant with F (8, 49)=6.909, p<0.001. The correlation coefficient was 0.73 and the model was significant with 53% of the variance in affective control explained by the state anxiety, risk propensity, neuroticism, and agreeableness. State anxiety (S) (β=0.48, p<0.001) significantly predicted affective control as did Risk Propensity (RPS) (β=-0.44, p<0.001), Neuroticism (N) (β=0.29, p=0.03) and Agreeableness (A) (β=0.23, p=0.04) (Equation 1).

The resulting equation of the model is: Y(ACS)=2.73+0.48×S-0.44×RPS+0.29×N+0.23×A ..... (1)

The second model was with RPS as the dependent variable, while facets of NEO-FFI 3, affective control quotient, state and trait anxiety scores were taken as predictors. Multicollinearity was identified with VIF and tolerance, since VIF for all the variables <10, there is no issue of multicollinearity and additivity. Further, no outliers were identified with the case wise diagnostics. The

correlation coefficient was 0.68 and the model was significant, F (8, 51)=5.68, p<0.001, with 47% of the variance in risk propensity explained by affective control, state anxiety, trait anxiety, conscientiousness and openness to experience. Affective Control Significantly (ACS) predicted Risk Propensity (β=-0.43, p<0.001) as did State Anxiety (S) (β=0.40, p=0.005), Trait Anxiety (T) (β=-0.39, p=0.006), Conscientiousness (C) (β=-0.33, p =0.004), and Openness to experience (O) (β=0.23, p=0.05) (Equation 2).

The resulting equation is: Y (RPS)=9.66-0.43×ACS+0.40-S-0.39×T-0.33×C+0.23×O ..... (2)

Moderation analysis

The predictors obtained from multiple regression analyses were further taken for moderation analysis with state/trait anxiety as moderator, affective control and risk propensity as dependent variables. All the moderation analyses were performed in R version 3.5.2. The independent variables and the moderator variable in every model were transformed into z scores before entering into the model. Outliers were calculated and removed using Mahalanobis, Leverage, and Cook's distance method. Moderation models were assumed with 3 Independent Variables (IVs) Neuroticism (N), Risk Propensity (RP), Agreeableness (A) one at a time; state/trait anxiety as the Moderator (M) variable and Affective Control (AC) as the dependent measure.

Neuroticism, trait anxiety and affective control

In a model with neuroticism, trait anxiety, and affective control; neuroticism and trait anxiety were significant predictors of AC, F(3,51)=5.826, p=0.002, R2=0.255. Greater neuroticism predicted higher emotional reactivity/emotional distress (AC), b=0.399, t(51)=3.011, p=0.004. While affective control (emotional distress) was not affected by higher levels of trait anxiety, b=0.084, t(51)=0.628, p=0.533. Affective control was also predicted by the interaction between neuroticism and trait anxiety, b=0.237, t(51)=1.926, p=0.059 (Figure 1 and 2). To interpret the interaction, we used the regression equation to estimate AC means for participants who were low (-1 SD) versus high (+1 SD) on neuroticism and among those who were comparatively low (-1 SD) versus high (+1 SD) on trait anxiety. Among low trait anxious (-1 SD) individuals, neuroticism was not a strong predictor of AC, b=0.143, t(51)=0.717, p=0.476. While among high trait anxious (+1 SD) individuals, neuroticism's predicted affective control, b=0.656, t(51)=3.011, p<0.001. These results suggest that greater levels of trait anxiety increase the disabling effect of neuroticism on affective control (Figure 1).

Trait Anxiety weakly moderates the effects of neuroticism on affective control. Interaction effects over levels is further depicted in Figure 2.

Risk propensity, trait anxiety and affective control

The second moderation model with Risk Propensity (RP), Trait Anxiety (T) and Affective Control (AC) was also identified. The model was significant, F (3,52)=6.015, p=0.001, R2=0.26. Greater risk propensity predicted lesser emotional reactivity/emotional distress (AC), b=-0.428, t(51)=-3.442, p<0.001. While affective control was not solely affected by trait anxiety, b=0.148, t(52)=1.20, p=0.236. Affective control was also predicted by the interaction between risk propensity and trait anxiety, b=-0.239, t(52)=-1.979, p=0.053 (Figure 3 and 4). To interpret the interaction, we used the regression equation to estimate AC means for participants who were low (-1 SD) versus high (+1 SD) on risk propensity and among those who were comparatively low (-1 SD) versus high (+1 SD) on trait anxiety. Among low trait anxious (-1 SD) individuals, risk propensity was not a strong predictor of AC,

b=-0.212, t(52)=-1.376, p=0.175. While among high trait anxious (+1 SD) individuals, risk propensity predicted affective control, b=-0.644, t(52)=-3.656, p<0.001, such that the high trait anxious who have higher risk propensity tends to feels less distressed than those who have lower risk propensity.

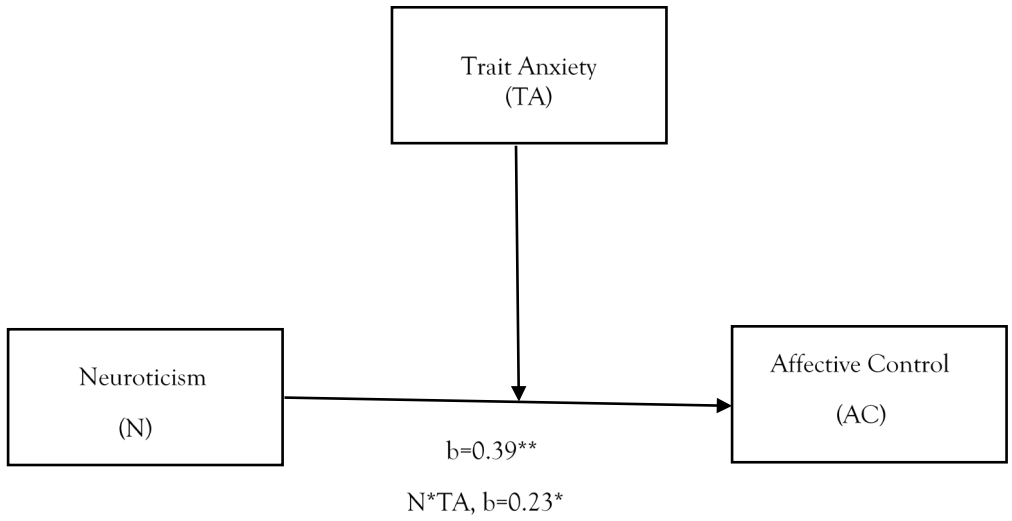

Figure 1: Unstandardized regression coefficients for relationship between Neuroticism (N) and Affective Control (AC) as moderated by Trait Anxiety (TA). **Note:** N×TA is the interaction effect of variables on AC. The b values (b=0.23*) of interaction effect as compared to b values of independent effect (b=0.39**) can be interpreted as decrease of N's direct estimated effect across levels of TA. Trait anxiety weakly moderates the effects of neuroticism on affective control.

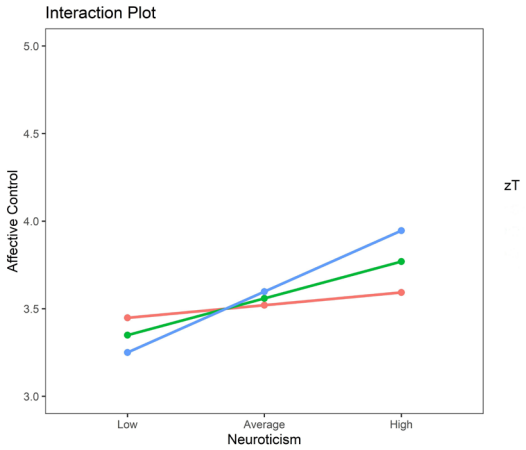

Figure 2: Simple interaction slopes for neuroticism predicting affective control for 1 SD below the mean of trait anxiety, mean of Trait Anxiety (zT), and 1 SD above the mean of trait anxiety. Neuroticism and trait anxiety scores are transformed into z-scores. At lower levels of Trait Anxiety, the low and the high levels of neuroticism exerts similar effects on affective control. While at the greater levels of trait anxiety, higher levels of neuroticism had a disabling effect on affective control. **Note:** ( ): 1 SD above mean; ( ): Mean; ( ): 1 SD below mean.

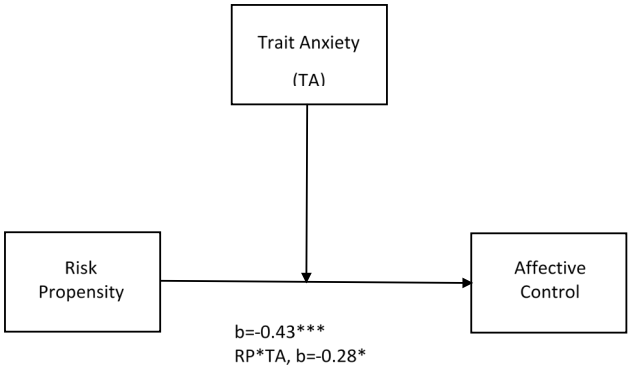

Figure 3: Interaction effects over levels. **Note:** Unstandardized regression coefficients for relationship between Risk Propensity (RP) and Affective Control (AC) as moderated by Trait Anxiety (TA). RP×TA is the interaction effect of variables on AC. The b values (b= -0.28*) of interaction effect as compared to b values of independent effect (b= -0.43***) can be interpreted as decrease of RP's direct estimated effect across levels of TA. Trait anxiety weakly moderates the effects of risk propensity on affective control. Interaction effects over levels is depicted in Figure 4. However, no moderation models were found for risk propensity that were moderated by trait or state anxiety.

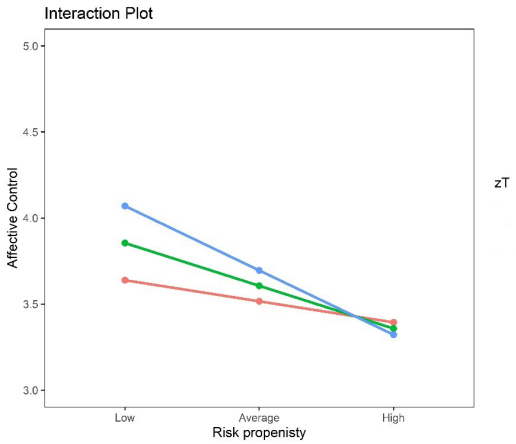

Figure 4: Simple interaction slopes for risk propensity predicting affective control for 1 SD below the mean of trait anxiety, mean of Trait Anxiety (zT), and 1 SD above the mean of trait anxiety. Risk propensity and trait anxiety scores are transformed into z-scores. At lower levels of trait anxiety, those having lower as well as high risk propensity have similar emotional reactivity. At high levels of trait anxiety, those who have higher risk propensity have a lower emotional reactivity (better affective control). **Note:** ( ): 1 SD above mean; ( ): Mean; ( ): 1 SD below mean.

DISCUSSION

The current study aimed to standardize and validate the State-Trait Anxiety Inventory (STAI) using the convergent validation method to investigate how anxiety as a predisposing factor would moderate the relationship between the other psycho-social factors and measures of individual differences such as personality, risk propensity, and affective control. The psychometric properties computed with the normative data suggest that STAI is both valid and reliable (Cronbach alpha Y1=0.85, Y2=0.82) for the healthy young adults in Indian context. Gender difference was not found to be significant for both state and trait anxiety. Scores on STAI were found to be significantly correlated with various dimensions of personality (both state and trait anxiety to neuroticism, openness to experience, agreeableness), affective control (only state anxiety) and risk propensity (only trait anxiety).

The results based on multiple regression and moderation analysis showed that a) state anxiety, risk propensity and neuroticism predicted affective control whereas trait anxiety moderated the effect of neuroticism on affective control, i e., higher levels of trait anxiety amplify the effect of neuroticism on affective control; b) Affective control, conscientiousness and state/trait anxiety predicted risk propensity. Results based on regression analysis suggest that as the state anxiety increases, risk propensity also increases. On the other hand, less trait anxiety decreases rsity in young adulthood [63,64]; c) Trait anxiety moderated the interaction between risk propensity and affective control. The explanations and implications of these results are discussed in the upcoming sections.

Trait anxiety moderates the relationship between neuroticism and affective control

In line with the current literature, neuroticism emerged as a significant predictor of affective control [65,66]. The relationship between neuroticism and affective control was further moderated by trait anxiety. The moderation model suggested that when trait anxiety was low, neuroticism irrespective of its level (low or high) had a similar effect on affective control. However, when trait anxiety was high, higher levels of neuroticism had a more disabling impact on affective control (more emotional distress/emotional reactivity). The tripartite model also gives importance to neuroticism and its role in the development of affective disorders *via* increased use of negative styles of emotion regulation [27,38]. Although, neuroticism was found to be a weak/moderate predictor of affective control yet, when interacted with trait anxiety, the effect of neuroticism on affective control was amplified. Thus, neuroticism is always present at the core and having a predisposition of an anxiety-like trait increases the risk for affective irregularities [27]. The association between neuroticism and anxiety is well established since neuroticism is related to the development of trait anxiety in interaction with stress vulnerability [54,67]. This association might lead to increased ruminative exploration in young adults, which in turn may lead to greater distress and poorer resilience [42,68,69]. Moreover, neuroticism or trait anxiety manifest individual's vulnerability to the development of affective disorders [70].

Secondly, state anxiety predicted affective control, which is explained by the fact that higher state anxiety in young adults is associated with increased distress and reactivity, while lower levels of distress are related to emotion understanding and self-efficacy [71]. The relationship between state anxiety and affective control reflects the role of day-to-day stressful factors in the maintenance of negative reactivity to emotional events.

Trait anxiety moderates the relationship between risk propensity, and affective control

Higher risk propensity was found to be correlated with lower emotional reactivity in the current study. Young adulthood is not only limited to the maladaptive and harmful risks but also the risks related to freedom and exploration, which might promote behavior that involves uncertainty but is not necessarily problematic. It is possible that when people take positive risk in the face of uncertainty or with the motivation of 'growth' or 'achievement', it may predict greater control over emotional reactions [72].

Further, the interaction between risk propensity and affective control was moderated by trait anxiety. The moderation model suggested that with low trait anxiety, there are no differences in affective control between low and high levels of risk propensity. However, with high trait anxiety those who have a higher risk propensity tend to feel less distressed compared to those having lower risk propensity. Thus, for high trait anxious, risk taking can be the unhealthy coping mechanism to feel relieved from stress. Heightened level of stress and anxiety is managed either by internalizing (e.g., showing increases in anxiety and depressive symptoms) or externalizing the stress (e.g., increasing health-risk behavior and aggression) as a coping mechanism. High trait anxious individuals usually adopt dysfunctional styles of coping in the face of negative emotions. They are less able to effectively regulate their negative mood states, thus becoming vulnerable to the immediate relief promised by various risky behaviors. Engagement in risky behaviors often brings relief *via* distraction or euphorigenic effects of substances for instance [73] also manifested in the form of initiation of substance use and severity of substance-related problems in mood and anxiety disorders [74,75].

Affective control, personality traits, and anxiety predict risk propensity

Affective control, conscientiousness, and state/trait anxiety emerged as significant predictors of risk propensity. Lower emotional reactivity/distress predicted higher risk propensity in the young adults. Those with better affective control reported lower emotional reactivity and lower risk propensity. Since young adulthood is a phase of new responsibilities, greater risk propensity and perceived control might be a sign of autonomy, which may lead to an increase in perceived self-efficacy, a sense of self-belief for competent decision-making, and one may therefore see more opportunities in risky choices [76]. Thus, affective control may operate mainly *via* decreasing the attention given to the negative aspects of risky choices as well as focusing on usage of mature strategies like reappraisal to reduce aversion for risky decisions [77-79]. In this way our results support previous research that greater affective control may allow young adults to employ refined decision-making to selectively engage in risk-taking actions, and avoid serious consequences of risky behaviors [80]. Secondly, higher conscientiousness predicted lower risk propensity. Higher conscientiousness in young adults is associated with higher levels of perceived risk and lower levels of perceived benefits for risk in domains like health, safety and ethics-related decision-making [81,82]. The traits linked with conscientiousness are also related to the behavioral component of goal-directedness and effortful control [83,84]. Therefore, low conscientiousness makes it easier to cross the cognitive barriers of need for control, deliberation,

and conformity, which lead to greater risk propensity [85,86]. Thus, young adults lacking in deliberative self-control, are less concerned with the fulfilment of their societal duties and are more likely to engage in risky behaviour [87]. In such a case higher conscientiousness may allow individuals to minimize ruminative exploration and fewer behavioral issues [88,89]. This personality trait also seems to be a protective factor against the development of eating disorders as well as substance abuse [90].

State *vs.* trait anxiety and psychosocial variables

As hypothesized, state and trait anxiety tend to have a differential effect on the relationship between the psycho-social variables. The results of the current study are consistent with previous findings suggesting that increase in state anxiety regulates one's affect and maladaptive behaviour by influencing the attentional resources to the salient stimuli. On the contrary, trait anxiety shapes patterns of behaviour while coping with environmental challenges resulting in cognitive and structural changes in the brain [59]. State anxiety (transient emotional state), emerged as a strong predictor (not as a moderator) for affective control and risk propensity, while trait anxiety (enduring factor) was found to moderate the relationship between personality and affective control/risk propensity. The external transient factors underlying state anxiety may affect cognition more strongly whereas trait anxiety as a much stable disposition may influence cognition only through the interaction with other variables. While experiencing state anxiety, the brain transiently changes functional connections and generates maladaptive behavior which shows greater emotional reactivity in individuals with high state anxiety [91]. It is possible that trait anxiety provides a context for personality or risk related psychopathologies to evolve over time and have an effect on affective control. This also aligns with the proposition related to trait anxiety as a phenotype for affective disturbances [55].

The current study suffers from certain limitations such as smaller sample size for convergent validation. However, despite having a comparatively smaller sample size we found that both state and trait anxiety correlated well with personality traits, affective control and risk propensity. Secondly, strength of the correlation coefficients ranged between (r=0.29 to r=0.55) small to medium yet were highly significant. Thirdly, although state anxiety emerged as a significant predictor, yet the interaction between state anxiety and other variables was not significant in any of the moderation models. However, the current study demonstrates that anxiety acts as a risk factor for affective disorders and shows the effect of core negative affect. In the current study, affective control and risk propensity are correlated (regression and moderation analysis), however, their interaction is moderated by trait anxiety. Under highly stressful situations, the high trait anxious might indulge in risky behaviour to make themselves feel better, and to overcome the conflicting situations. Findings of the current study have implications for understanding how the interplay between psychosocial variables could be modulated by anxiety as it may explain the protective *vs.* risk factors for developing subclinical symptoms of anxiety and other affective disorders as well as coping with day-to-day stressors among the healthy young adults [92,93].

CONCLUSION

The current study adds to the evidence that STAI is a valuable measure for state and trait anxiety in healthy adults across cultures. This is the first attempt towards such a convergent validation of STAI with affective control and risk propensity and their interaction with state/trait anxiety in young adults. The relationship between anxiety, personality dimensions, and affective control as observed in the current study, suggests that trait anxiety moderates the interaction between neuroticism and affective control as well as the interaction between risk propensity and affective control. However, state anxiety emerged as a strong predictor for affective control and risk propensity but was not found to moderate the interaction between the measures of individual differences and psychosocial factors. These findings imply that state and trait anxiety may vary in their interaction with cognitive, affective, and pre-dispositional factors such as personality traits, thus highlighting the usefulness of STAI as a measure of anxiety in healthy population.

Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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