

The Relationship Between Superstitious beliefs, Locus of control, and Trait Anxiety among University Students

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Abstract: Uncertainty is the only certainty there is, and individuals often rely on psychological resources to cope with it. In the face of unpredictability, individuals seek ways to regain balance and ease anxiety. Yet, research shows that those high in trait anxiety perceive control differently, often resorting to rigid or superstitious thinking as a means to restore a sense of order amid uncertainty. The present study examined the role of locus of control in the relationship between superstitious beliefs and trait anxiety among university students. A sample of 102 university students (females $n = 64$ and males $n = 38$) completed the Superstitious Beliefs Scale (Chukkali & Dey, 2020), the Brief Locus of Control Scale (Sapp & Harrod, 1993), and the State-Trait Anxiety Inventory (Spielberger et al., 1968) via Google Forms. Data was analysed using correlation, t-test, and mediational analysis through SPSS. Results showed that superstitious beliefs correlated positively with the variable of chance factors ($r = 0.3$ $p < 0.01$). Trait anxiety correlated positively with the variables of powerful others ($r = 0.24$ $p < 0.05$) and chance factors ($r = 0.25$ $p < 0.05$), but negatively with internal locus of control ($r = -0.31$ $p < 0.01$). Internal locus of control was the only significant predictor of trait anxiety ($B = -0.67$, $p = 0.018$). Findings reveal that superstitious beliefs are tied to an external locus of control, while trait anxiety decreases with a stronger internal locus of control. The results underscore the therapeutic value of nurturing an internal locus of control for improved mental health and well-being.

Keywords: superstitious beliefs, internal locus of control, external locus of control, trait anxiety, mediational analysis

Superstitious beliefs refer to irrational associations perceived between unrelated events, objects, or actions; often emerging in situations marked by a lack of control (Vyse, 2014). These beliefs can result in behaviours such as using certain numbers while avoiding others, wearing lucky charms, or performing specific rituals, hoping that they can alter outcomes in one's own favour. Certain animals, such as pigeons, demonstrate ritualistic behaviour in the face of random reinforcements (Skinner, 1948). While deemed unscientific in origin, superstitions have existed in many cultures. Therefore, they possibly hold a deeper psychological significance. Regardless of the way they manifest, superstitions function as coping strategies in the face of stress and unpredictability (Risen, 2016; Keinan, 2002). Situations perceived as unpredictable may seem more controllable or comfortable after practising superstitious behaviour (Schippers & Van Lange, 2006). They can alleviate anxiety as well as enhance feelings of self-efficacy. This may happen even if we do not have complete faith in them (Damisch et al., 2010). Research has found significant interactions between belief in negative (e.g., a black cat crossing one's path is unlucky) and positive superstitions (e.g., eating yoghurt before an exam will improve the result) (Wiseman & Watt, 2004).

From a psychological perspective, superstitions involve complex interactions between human cognition, emotion, and cultural beliefs. They are related to several kinds of cognitive biases that include illusory correlation, the illusion of control, and the detection of patterns (Lindeman & Aarnio, 2007; Langer, 1975). Despite higher levels of education and scientific awareness, superstitions are common in India. About 60 to 70% of the literate working population, including scientists and highly educated youth, endorse superstitions (Kashyap, 2012). Challenging stereotypes, suggesting that women tend to be more superstitious, Chelwani et al. (2023), who studied 232 urban Indian young adults, found no gender differences in superstitious beliefs.

Maqsood et al. (2018) discovered that emotional reasoning, experiential thinking, and reliance on intuition predict superstitious beliefs, even among educated groups. This suggests that superstitions persist due to cognitive tendencies shaped by cultural and emotional factors and not simply a lack of knowledge. Education can improve critical thinking, but it fails to influence psychological motivations that drive superstitious behaviours. Jahoda (1970) conceptualised magical thinking and superstitions as a "contagion" of thought that

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exists even in modern societies. His work challenged the idea that magical belief is simply a feature of "primitive" minds, asserting instead that it is a persistent cognitive structure. As superstitions can provide a sense of control, it can be proposed that individuals experiencing high academic or work pressure, identity concerns, or life transitions may be more susceptible to superstitions. Indian university students face significant academic pressure, competitive environments, and uncertainty about their future goals. This points to the need to explore their psychological reasons behind holding superstitions. Trait anxiety is defined as a relatively stable, persistent individual difference in anxiety proneness. Those high on trait anxiety show a propensity to perceive a wide range of situations as threatening or dangerous (Spielberger, 1983). Cognitive models indicate that individuals with high trait anxiety exhibit biases such as catastrophizing (Beck & Clark, 1997). Findings highlight the role of heightened amygdala reactivity and reduced prefrontal regulation (Etkin et al., 2011). Developmental and social learning models suggest that insecure early attachment (Mikulincer & Shaver, 2007), behavioural inhibition (Kagan et al., 1988), and repeated exposure to stress may lead to stable anxiety traits. Locus of control (Rotter, 1966) is closely associated with anxiety. External Locus of Control (ELOC), which involves attributing events to chance, fate, and powerful others (Levenson, 1974), correlates with high anxiety, stress, and depressive symptoms (Naditch et al., 1975; Kobasa, 1979). An Internal locus of control (ILOC), or the belief that outcomes arise from one's own actions and efforts, is associated with increased resilience, autonomy, and well-being (Lefcourt, 1982).

The discussion on anxiety and locus of control is relevant here because of research findings showing that individuals turn towards superstitions when they feel a lack of control. The lack of control itself is anxiety-provoking. Moreover, studies by Sagone and De Caroli (2014), Archer (1979), and Hoffmann et al. (2022) demonstrate that people who possess high anxiety are more likely to resort to superstitious beliefs. People with high trait anxiety show greater externality in attribution patterns, which may foster reliance on superstition. While superstitious beliefs appear to be harmless, they may lead to distorted decision-making and maladaptive coping among individuals who exhibit high trait anxiety (Boiko et al., 2020).

Overall, existing literature highlights superstitions to be associated with anxiety, perceived control, cognitive style, and personality- and not just mere ignorance and traditions. The intersection of superstitious beliefs, locus of control, and trait anxiety is likely to determine how individuals cope with stress. This study aims to explore the relationships between these variables in Indian college-going students. The following research questions were formulated: (1) What is the relationship between trait anxiety and superstitious beliefs? (2) What kind of relationship exists between locus of control (internal and external) and superstitious beliefs? (3) What is the relationship between trait anxiety and locus of control (internal and external)? (4) How does the locus of control mediate the relationship between superstitious beliefs and trait anxiety? The Social Determination Theory, Rotter's Social Learning Theory, and Lazarus's Cognitive Appraisal Theory provide the theoretical rationale to study these questions.

Self-Determination Theory. SDT offers a robust model for comprehending motivation and personality through understanding the interplay between individuals and their social contexts (Deci & Ryan, 1985, 2000; Ryan & Deci, 2017). It makes a distinction between intrinsic and extrinsic drives. Further, it examines how these motivations shape cognitive development, personality, and situational behaviour. Three basic needs- autonomy, competency, and relatedness are seen to serve as the basis for psychological well-being. SDT delves into how environmental factors support or suppress these needs, thus impacting capacities for emotional regulation, performance, and the sense of self (Legault, 2017). In the context of the present study, when the 3 needs are hindered, individuals may rely on superstitions for compensatory control.

Social Learning Theory. Julian Rotter's work (1954) suggests that behaviour is determined by the interaction of expectations, value of reinforcement, and psychological context. People act based on their expectations and the importance they assign to the outcomes they expect. Rotter also introduced the concept of locus of control. This refers to whether people perceive outcomes as dependent on their own actions (internal locus) or on external factors such as fortune and the powerful people in one's life (external locus). Learning occurs through experience and cognitive interpretation instead of stimulus-response

associations (Rotter, 1954; Rotter, 1966; Rotter, 1975). In the present context, superstitions reflect learned expectancies where outcomes are seen to depend on luck or external forces. An external locus of control develops through histories of reinforcement, diminishing perceived personal efficacy, and enhancing anxiety.

Cognitive Appraisal Theory. Lazarus' theory (1984) states that emotional and stress responses do not result directly from events as they occur. Rather, they emerge from a person's appraisal of events. There are two kinds of appraisal- primary and secondary. In primary appraisal, individuals evaluate whether an event is insignificant, positive, or stressful. In secondary appraisal, they evaluate their coping resources and the strategies available to manage situational demands. Emotional responses are determined by the dynamic interaction between perceived environmental demands and perceived personal resources, making stress a relational process. This theory also discusses reappraisal, a continuous feedback mechanism in which people modify their previous evaluations as new information becomes available, and emphasizes the fluid and transactional nature of person-environment interactions (Lazarus & Folkman, 1984; Lazarus, 1991; Lazarus, 1999). Here, superstitions influence primary and secondary appraisals by shaping perceived control over threats. ELOC reduces coping confidence, whereas ILOC enhances resource appraisal, thereby lowering anxiety proneness.

Method

Hypotheses

The hypotheses that were tested are as follows:

- (H₁) *Superstitious beliefs will have a significant positive correlation with trait anxiety.*
- (H₂) *Superstitious beliefs will have a significant positive correlation with an external locus of control*
- (H₃) *Superstitious beliefs will have a significant negative correlation with an internal locus of control.*
- (H₄) *Trait anxiety will have a significant positive correlation with the external locus of control*
- (H₅) *Trait anxiety will have a significant negative correlation with internal locus of control.*
- (H₆) *Internal Locus of Control will mediate the relationship between superstitious beliefs and trait anxiety.*

Sample

The sample consisted of 102 university students residing in Delhi-NCR, aged between 20 and 30 years ($M = 22.27$ years), selected using the convenience sampling technique. In this sample, 64 participants were female, and 38 were male. Of the participants, 38 were undergraduate students, and 64 were postgraduate students. Of all participants, 19 reported having a history of mental illness. All participants met the inclusion criteria (20-30 years of age, English proficiency, and living in the Delhi-NCR). Data was collected online through the use of Google Forms.

Measures

Superstitious Beliefs Scale (SBS; Chukkali & Dey, 2020). This consists of 17-items on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with higher scores suggesting stronger endorsement of superstitious beliefs. The instrument was developed based on the framework proposed by Wiseman & Watt (2004) and later expanded by Fluke et al. (2014). The original scale measured beliefs about good and bad luck through positive and negative superstitions, but did not report internal consistency. The revised framework conceptualises superstition as multidimensional, including positive beliefs, negative beliefs, and beliefs about the ability to change one's luck, while also acknowledging cultural influences on superstitious beliefs. In the study by Chukkali and Dey (2020) for the Indian context, the scale demonstrated good construct validity through exploratory factor analysis, strong reliability through Cronbach's alpha ($\alpha = .87$), and high test-retest reliability ($r = .90$).

Locus of Control scale. This brief 9-item scale, developed by Sapp & Harrod (1993), was adapted from Levenson's original multidimensional scale and retains the three dimensions of internal control, chance, and powerful others. These have been defined as (Sapp & Harrod, 1993):

Internal Control- The belief that life outcomes are primarily determined by one's own actions, efforts, and personal abilities.

Chance- The belief that events in life occur due to luck, fate, or accidental happenings rather than personal effort.

Powerful others- The belief that important outcomes in life

are controlled by influential people, authority figures, or strong institutions.

Factor analytic studies have generally supported this structure, providing evidence of construct validity, while confirmatory factor analyses have reported acceptable model fit indices. The scale has shown satisfactory reliability, with Cronbach's alpha values typically around or above .70, along with evidence of convergent and predictive validity through its associations with psychological outcomes such as anxiety, depression, and perceived risk. The subscales showed acceptable internal consistency, with Cronbach's alpha coefficients of .59 (Internal Control), .65 (Chance), and .72 (Powerful Others) (Sapp & Harrod, 1993).

State-Trait Anxiety Inventory. This tool, developed by Spielberger (2010), consists of 20 items assessing how individuals generally experience anxiety, rated on a four-point scale. The scale has demonstrated strong internal consistency, with Cronbach's alpha values typically ranging from .86 to .95 across different populations, and acceptable test-retest reliability over time. Factor analytic

studies suggest a hierarchical structure with one overall trait anxiety factor and related subcomponents reflecting worry and negative affect. Evidence of convergent validity has been shown through strong correlations with other anxiety measures, although research notes that the scale may not clearly distinguish anxiety from depressive symptoms.

Data analysis

Associations between variables were assessed using Pearson product-moment correlational analysis. Mediation analysis was conducted using the PROCESS macro-model 4 to understand the impact of ILOC, chance, and powerful others as mediators between superstitious beliefs and trait anxiety. Superstitious beliefs were entered as the Independent Variable (IV), while Trait Anxiety was entered as the Dependent Variable (DV). The other variables - internal, chance, and powerful others locus of control were entered as parallel mediators. To test indirect effects, bootstrapping with 5,000 resamples and a confidence interval of 95% was selected. SPSS version 20 was used to carry out the statistical analysis.

Results

Table 1

Pearson Correlations Among Study Variables (N = 102)

	1. SB	2. TA	3. ILOC	4. PO	5. CH
1. SB	—				
2. TA	.05	—			
3. ILOC	.10	-.31**	—		
4. PO	.09	.24*	-.31**	—	
5. CH	.30**	.25*	-.29**	.43**	—

* $p < .05$, ** $p < .01$ (2-tailed)

Among the first 3 hypotheses developed for the study related to superstitions, the findings are partially in line with H2, although not in line with H1 and H3. Superstitious beliefs (SB) were only positively correlated with chance factors (CH; $r = .30, p < .01$). The findings were in line with H4 and H5 as trait anxiety (TA) was significantly positively correlated with powerful others (PO; $r = .24, p < .05$) and CH ($r = .25, p < .05$). It showed a significant negative correlation with ILOC ($r = -.31, p < .01$). ILOC also showed a negative correlation with, powerful others (po) ($r = -.31, p < .01$), and chance (CH) ($r = -.29, p < .01$). Furthermore, PO and CH showed a moderate positive intercorrelation ($r = .43, p < .01$).

Table 2

Mediation Analysis for Direct and Indirect Effects of Superstitious Beliefs (SB) on Trait Anxiety (TA) Through ILOC, Chance Factors (CH), and Powerful Others (PO)

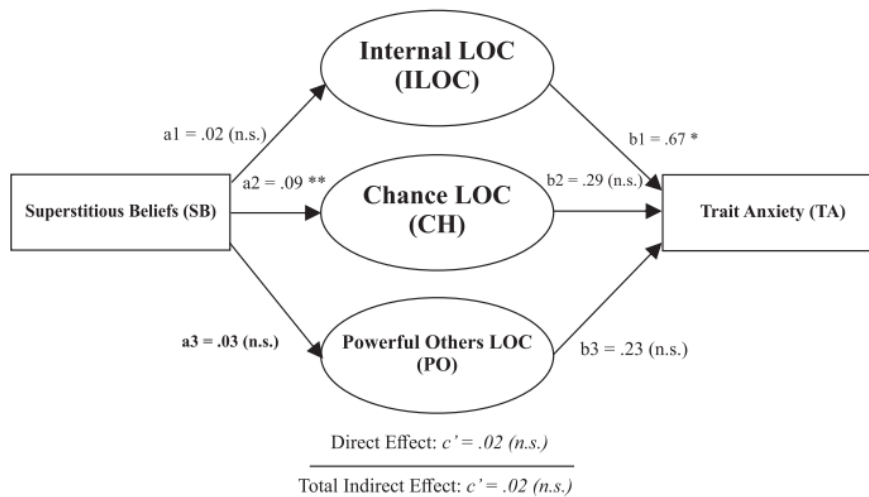
Path	B	SE	95% CI	p
SB → ILOC	0.02	0.03	[-0.03, 0.07]	.343
SB → CH	0.09	0.03	[0.03, 0.14]	.002
SB → PO	0.03	0.03	[-0.03, 0.09]	.375
ILOC → TA	-0.67	0.28	[-1.22, -0.12]	.018
CH → TA	0.29	0.27	[-0.24, 0.82]	.283
PO → TA	0.23	0.23	[-0.24, 0.69]	.337
SB → TA	0.02	0.07	[-0.12, 0.16]	.774
Indirect via ILOC	-0.02	0.02	[-0.06, 0.02]	—
Indirect via CH	0.03	0.03	[-0.02, 0.09]	—
Indirect via PO	0.01	0.01	[-0.01, 0.03]	—
Total Indirect	0.02	0.04	[-0.06, 0.09]	—

Note. Indirect effects were computed using 5,000 bootstrap resamples. Statistical significance is found when the confidence interval does not contain zero.

SB was found to significantly predict CH ($B = 0.09, p = .002, 95\% \text{ CI } [0.03, 0.14]$) but did not significantly predict ILOC ($B = 0.02, p = .343$) or PO ($B = 0.03, p = .375$). When predicting TA, only ILOC emerged as a significant predictor ($B = -0.67, p = .018, 95\% \text{ CI } [-1.22, -0.12]$), whereas CH ($B = 0.29, p = .283$) and PO ($B = 0.23, p = .337$) were non-significant. The direct effect of SB on TA was also non-significant ($B = 0.02, p = .774$). Consistent with these findings, none of the specific indirect effects through ILOC, CH, or PO were statistically significant. The overall indirect effect was not statistically significant ($B = 0.02, 95\% \text{ CI } [-0.06, 0.09]$), suggesting that the proposed mediation model was not empirically supported. Thus, Hypothesis (H_6) was rejected.

Figure 1

Parallel Mediation Model Examining the Indirect Effects of Superstitious Beliefs on Trait Anxiety Through Locus of Control Dimensions



Discussion

This study aimed to understand the relationship between trait anxiety, superstitious beliefs, and locus of control among Indian college-going students. The findings did not reveal a statistically significant link between trait anxiety and superstitious beliefs. While limited evidence exists to support these findings, a study by Chelwani et al. (2023) reported that trait anxiety did not significantly impact attitudes toward superstition, as other variables like rational-experiential processing might play a more prominent role. Superstitious beliefs were found to be significantly correlated with other factors like neuroticism rather than trait anxiety and may be used as a situation-specific regulatory mechanism rather than substantially affecting stable anxiety dispositions (Frost et al, 1993; Hoffman et al, 2022). Next, the study also aimed to investigate the relationship between locus of control and superstitious beliefs by analysing both ILOC and ELOC. With respect to the external dimension, the study found a statistically significant association between an ELOC and superstitious beliefs. This aligns with Rotter's theory that individuals with an ELOC are more likely to attribute outcomes to fate, luck, or powerful others (Bedel, 2012). Superstitious beliefs and practises could become a way of influencing factors like fate or luck and thus used to gain an illusion of control to cope with uncertainty (Rudski, 2004). This can be translated as "*unwarranted optimism*" by wanting to control what may be uncontrollable (Gollwitzer & Kinney, 1989). The acceptance of one superstitious phenomenon could lead to embracing the validity of several other superstitious phenomena (Randall & Desrosiers, 1980). In terms of internal locus of control, prior literature (Bleak & Frederick, 1998; Sagone & Caroli, 2014) has indicated the possibility of a negative correlation between superstitious beliefs and ILOC. However, no significant relationship was found. There seems to be no definite link between holding superstitious beliefs and the tendency to attribute outcomes to one's own actions, efforts, and personal abilities, at least in the present sample.

With respect to trait anxiety, our findings revealed a significant negative linear correlation between ILOC and trait anxiety and a significant positive linear correlation between ELOC and trait anxiety. This reveals that greater perceived personal control over outcomes is associated with lower anxiety. Similarly, an external attributional

style is associated with higher trait anxiety. Future research can explore the therapeutic implications of these findings for the Indian population. Attachment and control studies show that individuals who naturally divert to ELOC are more prone to anxiety and avoidance (Hazrati & Parvin, 2015; Cohen et al., 1976). As such, they believe that their lives are significantly influenced by powerful others and are often left to chance. Thus, they tend to score higher on neuroticism and trait anxiety and exhibit poorer social adjustment (Hoehn-Saric & McLeod, 1985; Biaggio, 1985). The SDT posits that ELOC influences an individual's perception of their life. The perceived influence of external forces can dictate life outcomes and can foster feelings of helplessness and a lack of personal agency. This perceived lack of control may make individuals more susceptible to trait anxiety. With respect to the internal dimension, perceived agency explains the inverse link between ILOC and trait anxiety. Individuals who attribute their agency in shaping what happens to them tend to use coping and problem-solving techniques that promote stability. Due to their resilience, autonomy, and proactive engagement, they report more positive life experiences (Cobb-Clark & Schurer, 2013). When independence and initiative within ILOC combine, they often serve as defenses against long-term anxiety, and hence people are better able to process and recover from stressful events (Lefcourt, 1991).

Lastly, the study examined how locus of control mediates the relationship between superstitious beliefs and trait anxiety using the PROCESS Model 4 (Hayes, 2018). Results indicated that superstitious beliefs significantly predicted the variable of chance factors but not ILOC or powerful Others. Both superstitious and chance orientation involve external attributions, suggesting that individuals may rely on superstitions to experience an illusory sense of control while conserving cognitive efforts (Stanke & Taylor, 2004; Sagone & De Caroli, 2014). In contrast, individuals with higher ILOC view themselves as agents of outcome and therefore, their reliance on superstitions is minimal under uncertainty (Tobacyk et al., 1988). On the Outcome pathway (Path B), only ILOC significantly predicted trait anxiety, with higher ILOC being associated with lower anxiety. This finding aligns with previous literature showing that perceived control buffers chronic anxiety (Archer, 1979; Spielberger et al., 1970). In contrast, PO and CH did not significantly predict trait anxiety. One possible

explanation is that external attributions are heterogeneous. While loss of control can increase anxiety, attributing outcomes to fate may dampen personal responsibility and self-blame. Further, cultural and educational factors may moderate whether the external belief is stress-reducing or stress-amplifying. Trait anxiety reflects a stable disposition, linked to enduring beliefs about personal competence rather than situational attributions. Bootstrapped confidence intervals showed that neither the indirect effects nor the direct effects of superstition beliefs on trait anxiety were significant. The locus of control did not mediate the relationship, and so within this sample, superstitious beliefs were not a significant predictor of trait anxiety. These findings can be understood through Lazarus's Cognitive Appraisal Theory, which posits that emotional responses are dependent on the evaluation of threat and coping resources, that is, anxiety arises when situations are interpreted to be uncontrollable and threatening. Superstitions may serve as a symbolic control strategy for uncertain situations, especially for individuals who endorse chance. However, such beliefs might not be enough to shift a person's core sense of inadequacy that fuels this anxiety. ILOC strengthens our secondary appraisal (perceived coping ability), thereby reducing anxiety vulnerability. Overall, superstitious beliefs were associated with chance attribution but did not directly or indirectly predict trait anxiety. ILOC emerged as the primary protective factor. The absence of mediation suggests that other variables - personality, uncertainty intolerance, or cultural systems - may better explain this link between belief systems and trait anxiety.

Limitations and Future Directions

This study was limited to university students in the Delhi NCR area. The study also did not aim to measure trait anxiety with respect to a specific occupation, since individuals in high-pressure occupations may consistently exhibit higher baseline anxiety due to the enduring nature of these role-specific expectations, influencing the results of the study differently (Hood, 2002). Social desirability bias due to the use of self-report measures and the inability to use an experimental or longitudinal design for ascertaining conclusive evidence are the major limitations of this study.

The findings of this study may inform therapeutic interventions aimed at strengthening the internal locus of control to reduce anxiety. ILOC could also be used for mitigating the effects of superstitious beliefs in clients. In terms of research methodology, further investigation could be done to understand the role of situational functional roles to boost performance (e.g., athletes, performing artists). Longitudinal analysis of these could reveal the influence of locus of control or superstitious thinking during critical transitions (e.g., moving from undergraduate to postgraduate studies), and their perpetuating effects on anxiety.

Conclusion

The present study investigated the relationship between superstitious beliefs, locus of control (internal, powerful others, and chance), and trait anxiety among university students. Results showed that superstitious beliefs correlated most strongly with chance-based external control, while trait anxiety was negatively associated with ILOC. However, no conclusive relation emerged between superstitious beliefs and trait anxiety, suggesting that holding superstitious beliefs does not necessarily predict anxiety levels.

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