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Structural equation modeling of the relationships between positive thinking, self-esteem, and psychological hardiness among university students

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Abstract

This study examined the direct and indirect relationships among positive thinking, self-esteem, and psychological hardiness in university students, grounded in positive psychology and hardiness theory. Using a quantitative, cross-sectional design, data were collected from a stratified random sample of 480 students (301 male, 179 female) at King Khalid University through three validated scales. Data analysis via SPSS and AMOS employed structural equation modeling (SEM). The proposed model demonstrated a good fit: $\chi^2/df = 2.95$ (<3), RMSEA = 0.0321 (<0.08), and incremental fit indices (NFI = 0.966, CFI = 0.968, RFI = 0.915, IFI = 0.968, TLI = 0.920) all exceeded 0.90, confirming model adequacy. Significant direct effects were found for positive thinking on psychological hardiness (0.62) and self-esteem (0.31), and for self-esteem on psychological hardiness (0.21). Positive thinking and self-esteem also showed a significant bidirectional relationship. Indirect effects emerged through the mediating role of psychological hardiness and its dimensions (sense of duty, self-control, and high self-efficacy). These findings underscore the importance of fostering positive thinking and self-esteem as interrelated psychological resources that directly and indirectly enhance psychological hardiness. Interventions targeting these constructs may enhance students' resilience, coping capacity, and overall mental health.

Keywords: Positive thinking, Psychological hardiness, Self-esteem, Structural equation modeling, University students.

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1. Introduction and Theoretical Background

In recent years, positive psychology has gained momentum as a field concerned with promoting mental wellness and optimal functioning. It shifts focus from merely treating disorders to cultivating positive personal and social traits. At the personal level, this includes fostering attributes such as positive thinking, hope, contentment, optimism, happiness, and emotional well-being. At the individual level, it emphasizes love, courage, authenticity, perseverance, and mental openness, while the collective level focuses on altruism, justice, and social responsibility [1].

Within this framework, psychological hardiness has emerged as a key protective factor. Introduced by Kobasa [2] it refers to an individual's belief in their ability to effectively utilize internal and external resources to manage stressful situations. Hardiness consists of three central dimensions: commitment (engagement in meaningful life activities), control (the belief in one's ability to influence outcomes), and challenge (perceiving change as an opportunity for growth) [2, 3]. These dimensions serve to buffer the negative effects of stress and are positively linked to self-efficacy and optimism [4, 5].

Psychological hardiness supports adaptive functioning by enabling individuals to reinterpret stressful events in constructive ways, thereby enhancing overall well-being [6, 7]. This is particularly relevant in academic settings, where hardiness contributes to stress regulation, persistence, and emotional balance among students [8-10]. Individuals high in hardiness are often proactive, resilient, and view setbacks as learning opportunities [11, 12].

During crises such as political unrest or uncertainty, hardiness serves as a vital coping resource, especially for students dealing with chronic stress. It enhances core emotional regulation skills and decision-making [13]. Empirical evidence also supports its effectiveness: individuals with higher hardiness demonstrate stronger stress responses and better psychological outcomes [14, 15].

Subramanian and Vinothkumar [16] found that psychological hardiness and self-esteem act as internal mediators that influence how individuals cognitively appraise and manage stress. These internal resources help in reinterpreting stressors as less threatening and more controllable.

Broad psychological consensus holds that hardiness serves as a psychological buffer against distress. It fosters hardiness, emotional balance, and an optimistic view toward life, and it also promotes persistence, social involvement, and goal-directed behavior [7, 17].

Hardiness has been linked to academic performance and serves as a buffer against the harmful effects of stress [18]. Its three components function interactively: commitment relates to meaningful engagement, control supports agency, and challenge encourages embracing change [19, 20].

In addition to psychological hardiness, hardiness reduces the impact of anxiety and depression by enabling individuals to face new experiences proactively and maintain decisiveness and autonomy [21, 22]. Optimism, self-expression, and belief in one's abilities are further reinforced among highly hardy individuals, enabling them to thrive in dynamic environments [23, 24].

From a theoretical standpoint, psychological hardiness is grounded in existential theory, where meaning-making and courage in the face of adversity are emphasized [25-28]. Sense of coherence aligns with the commitment aspect of hardiness, while locus of control theory supports the control dimension by highlighting perceived influence over life events [29-31].

The challenge and growth theory [32, 33] suggests that individuals with high levels of hardiness perceive life changes as opportunities rather than threats. These conceptualizations were formalized in Kobasa's original theory and extended by further empirical work [4, 34], framing hardiness as a trait that influences stress appraisals and coping strategies.

However, some researchers argue that hardiness may overlap with personality traits such as low neuroticism [6, 35-37], raising questions about its construct independence.

Mindfulness theory contributes to understanding hardiness by emphasizing the role of present-moment awareness in reducing anxiety and enhancing cognitive flexibility traits akin to hardiness [38-41]. In contrast, perseverative cognition theory suggests that chronic negative thinking patterns such as rumination undermine health, and hardiness may help counteract such tendencies [42-45].

From a social-psychological lens, the social identity theory of leadership [3, 46, 47] shows how strong group-based leadership can cultivate collective resilience, especially in high-stress settings like the military.

Finally, Maddi [48] integrated these perspectives into a comprehensive model combining hardiness attitudes (the 3Cs) with behavioral skills such as self-care, goal-setting, and structured intervention programs (e.g., situational reconstruction, focusing, compensatory self-improvement). He also proposed the breakdown prevention system theory, viewing hardiness as a psychological immune system protecting against mental deterioration under chronic stress.

In sum, psychological hardiness is a dynamic and multifaceted resource that contributes significantly to stress adaptation, resilience, and personal development. By integrating existential, cognitive, and behavioral dimensions, hardiness equips individuals to navigate adversity with meaning, control, and growth-oriented thinking. Given its theoretical alignment with traits such as optimism and flexibility, the following section will explore the role of positive thinking as a complementary process that enhances and sustains psychological hardiness.

Positive thinking is increasingly acknowledged as a crucial cognitive orientation. This cognitive style not only fosters expectations of positive outcomes but also enhances the capacity to reframe challenges constructively [49, 50].

Ingram and Wisnicki [51] defined positive thinking as positive self-talk and internal dialogue, promoting adaptive emotional and behavioral responses. This is further embedded in the Psychological Capital (PsyCap) model by Luthans, et al. [52] which includes hope, optimism, hardiness, and self-efficacy as dynamic psychological resources that boost motivation and performance. Research suggests that positive thinking promotes emotional regulation and solution-focused

coping, particularly in stressful contexts [53, 54]. hope as comprising agency and pathway thinking, both predictive of academic success and emotional well-being [54, 55].

Emotional intelligence, as conceptualized by Salovey and Mayer [56], supports positive thinking by enabling emotion regulation and constructive interpersonal interaction. Empirical findings show that psychological capital mitigates academic stress [56] enhances well-being [57] and fosters life satisfaction [58].

Positive thinking has long-term benefits, including lower depression and enhanced hardiness under chronic stress [59, 60]. The Multidimensional Interaction Model, Endler [61] and Lazarus and Folkman [62] Transactional Model suggest that cognitive appraisals mediated by positive thinking shape responses to stress. Furthermore, Alessandri et al. [64] regard positive thinking as a relatively stable trait influencing adaptive capacity over time.

Among individuals with disabilities, such as those with visual impairments, positive thinking enhances self-worth and motivation by reframing limitations as opportunities for growth [63]. The Broaden-and-Build Theory [64, 65] adds that positive emotions expand thought-action repertoires, while optimism theory [66, 67] links positive expectations to effective coping.

Snyder [68] highlights the role of goal setting and agency in hardiness, and Hardiness Theory [69] aligns with positive thinking through its emphasis on commitment, control, and challenge. Models like the bi-dimensional affect theory [70] and tripartite model [71] further reinforce the protective impact of positive affect.

The Dual Motivational Systems Theory [72, 73] and attributional theories [74, 75] show how cognitive orientation toward internal, stable attributions of positive outcomes supports well-being. Teasdale and Barnard [76] and Padesky [77] added depth to this by emphasizing implicational meanings and schema-building. Lastly, therapeutic approaches like Well-Being Therapy [78] and Quality of Life Therapy [79] operationalize positive thinking to cultivate purpose, growth, and autonomy.

In light of the reviewed literature, it becomes evident that positive thinking is not merely an optimistic disposition but a robust cognitive resource with profound implications for emotional hardiness, academic achievement, and psychological well-being. Its integration within theoretical models such as PsyCap, emotional intelligence, and hope theory reinforces its status as a foundational element of adaptive functioning. The cumulative evidence supports its value as both a personal strength and a modifiable skill. Therefore, cultivating positive thinking through training, therapeutic intervention, or educational programs holds promise for enhancing individual coping capacity and fostering long-term mental health across diverse populations and life challenges.

2. Research Problem

University students have faced increasing psychological challenges due to academic pressure, uncertainty about the future, and global crises that exacerbate stress and emotional instability. While traditional psychological approaches have focused on alleviating dysfunction, positive psychology has emphasized the development of internal strengths such as positive thinking, self-esteem, and psychological hardiness to promote well-being and resilience.

Despite the recognized importance of these constructs, little is known about how they interrelate within university populations, particularly in the context of Arab or Middle Eastern cultural settings. Previous studies have examined the individual impact of positive thinking or self-esteem on mental health outcomes, yet the dynamic interaction among positive thinking, self-esteem, and psychological hardiness remains underexplored, especially in academic environments.

Moreover, it is unclear to what extent these psychological strengths influence one another directly or indirectly, and how psychological hardiness may mediate or be influenced by self-esteem and positive cognitive styles. Given the growing demand for evidence-based strategies to support students' mental resilience, there is a pressing need to investigate these relationships using a structural model that captures both direct and mediated effects.

Accordingly, this study seeks to address this gap by examining the direct and indirect relationships among positive thinking, self-esteem, and psychological hardiness among university students, with the aim of informing interventions that enhance students' capacity to cope with stress and promote adaptive functioning.

"What are the structural relationships among positive thinking, self-esteem, and psychological hardiness in university students, as revealed by structural equation modeling?"

3. Methodology

3.1. Research Design

This study employed a quantitative, correlational, cross-sectional research design, utilizing structural equation modeling (SEM) to examine the direct and indirect relationships among positive thinking, self-esteem, and psychological hardiness among university students. The design was chosen to test the hypothesized structural model and assess the fit of the proposed relationships within a single time point. SEM was particularly appropriate because it allows for the simultaneous examination of multiple relationships, including both direct and mediated (indirect) effects, and provides goodness-of-fit indices to evaluate the adequacy of the model. Participants completed standardized self-report questionnaires measuring positive thinking, self-esteem, and psychological hardiness.

3.2. Research Population

The research population consists of university students enrolled in institutions of higher education within the Kingdom of Saudi Arabia during the academic year 2025.

3.3. Participants

The research sample consisted of 480 university students, selected using a stratified random sampling method based on academic qualification (301 male, 179 female). This stratified sampling approach ensured a balanced representation across different educational levels, aligning with the study's objectives to examine the relationships among positive thinking, self-esteem, and psychological hardiness across diverse academic stages.

3.4. Measures

To assess the main variables under investigation, positive thinking, self-esteem, and psychological hardiness, the current research employed three standardized self-report scales. All instruments used in this study had been previously adapted and validated for use within the Arab cultural context, ensuring both cultural relevance and psychometric adequacy for the study population.

3.4.1. Positive Thinking Scale by Ingram and Wisnicki [51]

The Positive Thinking Scale, originally developed by *Ingram and Wisnicki [51]* was adapted to the Arab cultural context by Al-Waqqad [80]. This instrument is designed to measure students' tendencies to engage in positive or negative thinking when confronted with challenges. It consists of 30 items, rated on a five-point Likert scale ranging from "Strongly Agree" to "Strongly Disagree." The items reflect thoughts concerning the self, others, and the future, and all statements are phrased positively.

Psychometric evaluation conducted during the adaptation process demonstrated strong internal consistency and reliability. Item-total correlations in a pilot sample of 55 university students ranged from 0.600 to 0.792 ($p < .01$). Test–retest reliability over a 10-day interval with 50 participants yielded a correlation coefficient of 0.823, and Cronbach's alpha was reported at 0.73, indicating acceptable reliability.

In the current study, the reliability of the scale was reassessed. Cronbach's alpha for the total scale score was 0.83, reflecting a high level of internal consistency. Test–retest reliability was also confirmed, yielding a Spearman–Brown coefficient of 0.80, supporting the temporal stability of the instrument. Furthermore, Pearson correlation coefficients between individual item scores and the total scale score ranged from 0.68 to 0.82 ($p < .01$), indicating strong coherence among items. These findings confirm that the scale demonstrates robust reliability and construct validity, making it suitable for use with university student populations.

3.4.2. Self-Esteem Scale Radwan [81]

The Self-Esteem Scale, originally developed by Radwan [81] and widely used internationally, was employed in its Arabic adaptation by Zayed [82] for this study. The scale consists of 10 items, with five positively worded statements (items 1, 3, 4, 6, 9) and five negatively worded statements (items 2, 5, 7, 8, 10). Responses are rated on a four-point Likert scale, ranging from "Strongly Agree" to "Strongly Disagree." Positively worded items are scored from 4 to 1, whereas negatively worded items are reverse-scored.

The Arabic version of the scale demonstrated high reliability in prior research, with a reported Cronbach's alpha of 0.84 [82]. In the present study, the reliability of the Self-Esteem Scale was re-examined, yielding a Cronbach's alpha of 0.84 for the total score, indicating a high level of internal consistency. Furthermore, the split-half reliability, calculated using the Spearman–Brown coefficient, was 0.81, reflecting satisfactory stability between the two halves of the scale.

Internal consistency was also confirmed by computing Pearson's correlation coefficients between each item and the total score, which ranged from 0.58 to 0.76 ($p < .01$). These findings indicate strong and statistically significant associations between individual items and the overall self-esteem, supporting the scale's construct validity and internal reliability for use among university students.

3.4.3. Psychological Hardiness Scale by Radwan [81]

The Psychological Hardiness Scale, developed by *Radwan [81]* comprises 41 positively phrased items designed to assess psychological hardiness across three dimensions:

The Psychological Hardiness Scale assesses three core dimensions of hardiness. The first dimension, Sense of Duty (Items 1–13), reflects adherence to societal norms, a strong sense of responsibility, and effective decision-making. The second dimension, Self-Control (Items 14–28), measures an individual's ability to regulate emotions and maintain logical thinking under stress. Finally, the third dimension, High Self-Efficacy (Items 29–41), assesses willpower, resilience, and the capacity to engage in adaptive coping during crises. Responses are rated on a three-point Likert scale: "Applies Completely" (3), "Applies to Some Extent" (2), and "Does Not Apply" (1). In Radwan's [84] validation study, Cronbach's alpha coefficients demonstrated robust internal consistency, ranging from 0.645 to 0.896 for Sense of Duty, 0.825 to 0.845 for Self-Control, and 0.770 to 0.793 for High Self-Efficacy. Discriminant validity was established through statistically significant t-tests between upper and lower quartile groups ($p < .01$).

In the present research, the scale's reliability was reassessed using Cronbach's alpha in the current sample, yielding alpha values of 0.87 (Sense of Duty), 0.85 (Self-Control), and 0.86 (High Self-Efficacy), with a total score reliability of 0.90, indicating excellent internal consistency. Additionally, the split-half method with Spearman–Brown correction produced reliability coefficients of 0.76, 0.78, and 0.80 for the three subscales, and 0.82 for the total score, confirming the scale's temporal stability.

Pearson's correlation coefficients between individual items and their respective subscale totals ranged from 0.55 to 0.81 ($p < .01$), supporting strong internal consistency. These findings affirm that the Psychological Hardiness Scale

possesses satisfactory reliability and validity for use among university student populations.

3.5. Data Collection Procedures

Data were collected electronically using a Google Forms survey, which was distributed to university students through institutional communication channels and academic networks. Prior to participation, students were presented with an informed consent statement that explained the objectives of the research, emphasized the voluntary nature of participation, and assured the confidentiality and anonymity of their responses. The digital format allowed participants to complete the questionnaire at their convenience, thereby reducing external pressure and enhancing the accuracy of their responses. Throughout the data collection process, the researcher closely monitored submissions to ensure data integrity and full compliance with ethical research standards.

3.6. Statistical Analyses

The data were analyzed using SPSS (0.25) and AMOS (23.0.0) statistical software packages. Several statistical techniques were employed to examine the psychometric properties of the instruments and to test the hypothesized research model. Specifically, Structural Equation Modeling (SEM) was conducted to assess the causal relationships among positive thinking, self-esteem, and psychological hardiness.

To evaluate the reliability of the scales, Cronbach's alpha coefficients were computed to determine internal consistency. Furthermore, model adequacy was assessed by examining several goodness-of-fit indices, including the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), and the Tucker–Lewis Index (TLI). These analyses ensured that the measurement and structural models demonstrated acceptable levels of reliability and fit to the data.

4. Results

4.1. Results of Research Question 1

"Does the proposed structural model adequately fit the patterns of relationships among positive thinking, self-esteem, and psychological hardiness among university students?" The validity of the proposed model was tested using AMOS (23.0.0).

The proposed structural model, as illustrated in Figure 1, was examined to determine its adequacy in explaining the observed relationships among the study variables. The fit indices (see Table 1) indicated that the model demonstrated an excellent fit to the data, supporting its validity and suggesting that the hypothesized relationships between positive thinking, self-esteem, and psychological hardiness are consistent with the observed data.

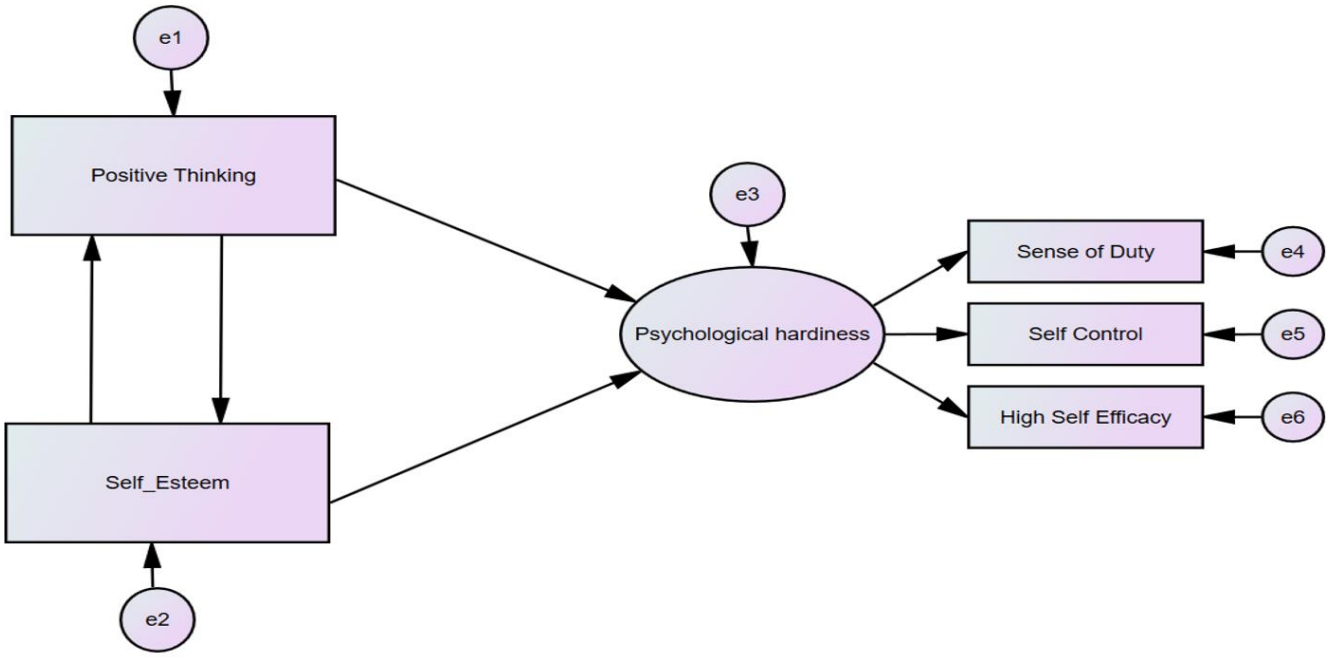

Figure 1.
The proposed structural model.

The results indicated that the Chi-square (χ^2) value was statistically not significant (2.95), and the RMSEA value was 0.321, which exceeds the recommended threshold of 0.05, as shown in Figure 1 and Table1.

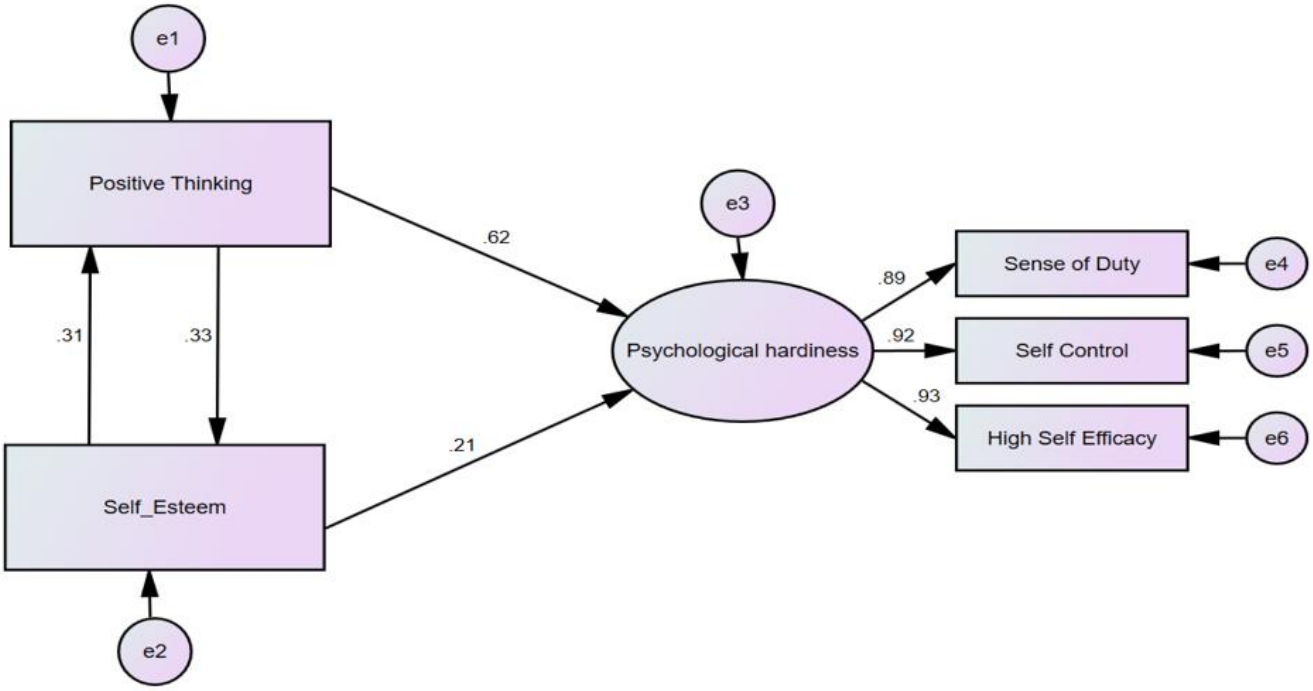

Figure 2.
The modified structural model of the study illustrates the relationships between positive thinking, self-esteem, and psychological hardiness among university students.

Table 1.
The fit indices and their corresponding ideal ranges for the extracted model.

Index	Index Value	Ideal Range of the Index	Fit of Value to Ideal Range
Standardized or Relative Chi-square (χ^2/df)	2.95	Non-significant Chi-square	Fit
Root Mean Square Error of Approximation (RMSEA)	0.0321	Less than 0.08	Fit
Normed Fit Index (NFI)	0.966	0–1	Fit
Comparative Fit Index (CFI)	0.968	0–1	Fit
Relative Fit Index (RFI)	0.915	0–1	Fit
Incremental Fit Index (IFI)	0.968	0–1	Fit
Tucker-Lewis Index (TLI)	0.920	0–1	Fit

The results shown in Table 1 and Figure 1 confirm that the structural model adequately fits the observed patterns of relationships between positive thinking, self-esteem, and psychological hardiness among university students. The model met the recommended fit indices, indicating that it demonstrates a good fit to the data. The fit indices reported in the table indicate that the proposed structural model demonstrates a good fit to the data. The standardized or relative Chi-square (χ^2/df) was 2.95, which falls within the commonly recommended range of less than 3, suggesting an acceptable level of model fit despite the significant Chi-square statistic. The root mean square error of approximation (RMSEA) was 0.04, which is well below the threshold of 0.08, indicating a close fit of the model to the data and minimal approximation error.

Incremental fit indices, including the Normed Fit Index (NFI = 0.966), Comparative Fit Index (CFI = 0.968), Relative Fit Index (RFI = 0.915), Incremental Fit Index (IFI = 0.968), and Tucker-Lewis Index (TLI = 0.920), all fall within the acceptable range of 0 to 1 and are above the commonly accepted benchmark of 0.90, which suggests a strong improvement of the specified model over the null model. These indicators confirm that the structural model provides a good representation of the observed data, supporting the hypothesized relationships among positive thinking, self-esteem, and psychological hardiness.

4.2. Results of Research Question 2

"Are there indirect effects among positive thinking, self-esteem, and psychological hardiness among students at King Khalid University?"

The indirect effects in the model were derived based on Figure 2 and the corresponding table, as presented in Table 2.

Table 2.
The indirect effects between positive thinking, self-esteem, and psychological hardiness among university students.

Predictor	Outcome	Indirect Effect
Self-Esteem	Positive Thinking	0.037
Positive Thinking	Self-Esteem	0.034
F1 (Hardiness)	Self-Esteem	0.237
F1 (Hardiness)	Positive Thinking	0.147
High Self-Efficacy	Self-Esteem	0.418
High Self-Efficacy	Positive Thinking	0.716
Self-Control	Self-Esteem	0.415
Self-Control	Positive Thinking	0.711
Sense of Duty	Self-Esteem	0.398
Sense of Duty	Positive Thinking	0.682

The findings demonstrate the presence of indirect effects between positive thinking, self-esteem, and psychological hardiness through the mediating role of psychological hardiness and its dimensions. Specifically, positive thinking exerted an indirect effect on self-esteem of 0.034, while self-esteem indirectly influenced positive thinking with a coefficient of 0.037. Additionally, psychological hardiness itself had notable indirect effects on self-esteem (0.237) and positive thinking (0.147). The three dimensions of hardiness, high self-efficacy, self-control, and sense of duty, also contributed substantial indirect effects: high self-efficacy on self-esteem (0.418) and positive thinking (0.716); self-control on self-esteem (0.415) and positive thinking (0.711); sense of duty on self-esteem (0.398) and positive thinking (0.682). These results underscore the significant mediating role of psychological hardiness in linking self-esteem and positive thinking.

4.3. Results of Research Question 3

"Is there a statistically significant direct effect of self-esteem on psychological hardiness among university students?"
The direct effects of the model were derived based on Figure 2 and the corresponding table, as shown in Table 3.

Table 3.
The direct effects of positive thinking on self-esteem among university students.

Predictor	Outcome	Direct Effect
Self-Esteem	F1 (Hardiness)	0.212

The analysis revealed a statistically significant direct effect of self-esteem on psychological hardiness, with a standardized path coefficient of 0.21 (as shown in the AMOS diagram and direct effects table). This suggests that individuals with higher self-esteem tend to exhibit greater psychological hardiness, supporting the theoretical link between self-worth and resilience.

4.4. Results of Research Question 4

"Is there a statistically significant direct effect of positive thinking on psychological hardiness among university students?"
The direct effects of the model were derived from Figure 2 and the corresponding table, as shown in Table 4.

Table 4.
The direct effects of positive thinking on psychological hardiness among university students.

Predictor	Outcome	Direct Effect
Positive Thinking	F1 (Hardiness)	0.622

The results indicate a statistically significant and strong direct effect of positive thinking on psychological hardiness, with a standardized coefficient of 0.62 (AMOS diagram and direct effects table). This highlights positive thinking as a key predictor of psychological resilience, consistent with prior research emphasizing its role in coping and adaptability.

4.5. Results of Research Question 5

"Is there a statistically significant direct effect of positive thinking on self-esteem among university students?"
The direct effects of the model were derived from Figure 2 and the corresponding table, as presented in Table 5.

Table 5.
The direct effects of positive thinking and self-esteem among university students.

Predictor	Outcome	Direct Effect
Positive Thinking	Self-Esteem	0.307
Self-Esteem	Positive Thinking	0.27

Finally, the data confirm a statistically significant bidirectional direct effect between positive thinking and self-esteem. Positive thinking directly influences self-esteem with a standardized coefficient of 0.27, while self-esteem directly influences positive thinking with a coefficient of 0.33 (as reflected in the AMOS figure and direct effects table). This

reciprocal relationship suggests that enhancing one construct can positively reinforce the other.

5. Discussion

The present study investigated the direct and indirect effects of positive thinking, self-esteem, and psychological hardiness among university students. The findings revealed significant indirect effects among the three constructs, with psychological hardiness and its dimensions (commitment, control, and challenge) serving as mediators between positive thinking and self-esteem. This aligns with the conceptualization of hardiness as a protective factor that buffers stress and fosters adaptive coping [2, 5].

Specifically, the strong indirect effects of high self-efficacy, self-control, and sense of duty on both positive thinking and self-esteem corroborate the idea that internal resources enable individuals to reinterpret stressors as less threatening and more manageable [16]. This also reflects Antonovsky's [29] sense of coherence and locus of control theories [30, 31], which underpin the control and commitment dimensions of hardiness.

Regarding direct effects, the results demonstrated a statistically significant direct effect of self-esteem on psychological hardiness. This is consistent with findings that self-esteem supports individuals' confidence in their ability to manage stress, thus enhancing hardiness. Similarly, the strong direct effect of positive thinking on psychological hardiness confirms that positive cognitive orientations facilitate resilience and coping [64, 65]. The bidirectional, direct relationship between positive thinking and self-esteem further supports the literature on reciprocal reinforcement between self-worth and positive cognitive styles [50, 52]. Positive thinking enables individuals to reframe challenges constructively [49] and enhances agency and persistence, which in turn bolsters self-esteem and engagement [7].

These findings also resonate with the broaden-and-build theory [64], which suggests that positive emotions expand cognitive and behavioral repertoires, and with hope theory [68], which emphasizes agency and pathway thinking in resilience. The observed mediating role of hardiness underscores its conceptualization as a psychological immune system that protects individuals under chronic stress [48]. The study provides empirical support for the integration of positive thinking, self-esteem, and psychological hardiness as dynamic, interrelated resources that collectively enhance students' ability to cope with stress and thrive academically and personally.

6. Conclusion

This study highlights the intricate relationships among positive thinking, self-esteem, and psychological hardiness in university students. The findings confirm that positive thinking and self-esteem not only directly influence each other but also contribute to psychological hardiness, both directly and indirectly through their core dimensions. The results underscore the importance of fostering these positive psychological resources to promote resilience, well-being, and academic success. Given the theoretical and empirical evidence, interventions aimed at enhancing positive thinking and self-esteem may effectively strengthen psychological hardiness and, consequently, students' adaptive functioning in the face of stress.

7. Limitations

While the study offers valuable insights, several limitations should be acknowledged:

- The sample was limited to students from a single university, which may affect the generalizability of the findings to other populations or cultural contexts.
- The cross-sectional design precludes conclusions about causality between the constructs. Longitudinal studies are needed to assess the directionality of these relationships over time.
- Other potential mediators or moderators, such as personality traits or environmental factors, were not examined and could provide a more comprehensive understanding of the dynamics among the variables.

Future research should address these limitations by employing diverse samples, longitudinal designs, and additional variables to further validate and extend these findings.

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