



A Mindfulness-Based Intervention on Verbal Insight and Social Problem-Solving in University Students

Yasser Elbably¹, Mohamed Nemt-allah²

¹ Lecturer at Educational psychology and statistics department, Faculty of Education, Al-Azhar University (Egypt)

✉ yasserelbably.2026@azhar.edu.eg

² Assistant Lecturer at Educational psychology and statistics department, Faculty of Education, Al-Azhar University (Egypt)

✉ mohamednamatallah.2026@azhar.edu.eg

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Abstract:

The ability to effectively solve problems is a critical skill for success in academic and professional domains. This study investigated the impact of mindfulness training on problem-solving abilities among university students, with a focus on verbal insight problems and social problems. Sixty male students from the Information Technology Department at Al-Azhar University participated in the study, divided into an experimental group (n=30) that received an 8-week mindfulness-based training program and a control group (n=30). Quantitative measures assessed performance on a researcher-developed verbal insight problem test and the Social Problem-Solving Inventory-Revised (SPSI-R) before and after the intervention. Qualitative data was collected through interviews and focus groups exploring participants' subjective experiences. Results showed a statistically significant improvement in verbal insight problem-solving for the experimental group compared to controls after mindfulness training ($p < 0.01$). However, no significant differences emerged on social problem-solving measured by the SPSI-R. Qualitative findings suggested participants perceived benefits of mindfulness for emotional awareness, cognitive flexibility, and non-judgmental attitudes, which may facilitate insight problem-solving. This mixed-methods study provides empirical support for integrating mindfulness-based interventions in academic programs to enhance cognitive functioning and creative problem-solving capacities among students.

Keywords: *Mindfulness Intervention; Problem-Solving; Social Problems; University Students; Verbal Insight Problems.*

التدخل القائم على اليقظة العقلية في حل المشكلات الاستبصارية اللفظية والاجتماعية لدى طلاب الجامعة

ياسر البابلي¹، محمد نعمة الله²

¹ محاضر بقسم علم النفس التربوي والإحصاء بكلية التربية، جامعة الأزهر (مصر)

yasserelebably.2026@azhar.edu.eg ✉

² أستاذ مساعد بقسم علم النفس التربوي والإحصاء بكلية التربية، جامعة الأزهر (مصر)

mohamednamatallah.2026@azhar.edu.eg ✉

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ملخص:

تُعد القدرة على حل المشكلات بفعالية مهارة أساسية للنجاح في المجالات الأكاديمية والمهني. هدفت هذه الدراسة إلى كشف أثر التدريب القائم على اليقظة العقلية في مهارات حل المشكلات لدى طلاب الجامعة، مع التركيز على المشكلات الاستبصارية اللفظية والاجتماعية، وشارك في الدراسة (60) طالبًا من قسم تكنولوجيا المعلومات بجامعة الأزهر، تم تقسيمهم إلى مجموعة تجريبية (ن=30) تلقت برنامجًا تدريبيًا قائمًا على اليقظة العقلية لمدة (8) أسابيع، ومجموعة ضابطة (ن=30)، تم تقييم الأداء من خلال مقاييس كمية تمثلت في اختبار المشكلات الاستبصارية اللفظية من إعداد الباحثين، وقائمة حل المشكلات الاجتماعية المنقحة (SPSI-R) قبل وبعد التدخل، وتم جمع بيانات نوعية من خلال المقابلات وجلسات النقاش لاستكشاف التجارب الذاتية للمشاركين، وأظهرت النتائج تحسنًا ذا دلالة إحصائية في حل المشكلات الاستبصارية اللفظية للمجموعة التجريبية مقارنةً بالمجموعة الضابطة بعد تدريب اليقظة العقلية، في حين، لم تظهر فروق ذات دلالة إحصائية في حل المشكلات الاجتماعية وفقًا لقائمة حل المشكلات الاجتماعية المنقحة (SPSI-R)، وأشارت النتائج النوعية إلى أن المشاركين أدركوا فوائد اليقظة العقلية في زيادة الوعي الوجداني والمرونة المعرفية والمواقف غير الحكمية، مما قد يُسهّل حل المشكلات الاستبصارية. تقدم هذه الدراسة التي اتبعت منهجًا مختلطًا دعمًا تجريبيًا لدمج تدخلات قائمة على اليقظة العقلية لدى طلبة الجامعة.

الكلمات المفتاحية: التدخل القائم على اليقظة العقلية؛ حل المشكلات؛ المشكلات الاجتماعية؛ طلاب الجامعة؛ المشكلات الاستبصارية اللفظية.

1. Introduction

In today's rapidly changing and increasingly complex world, the ability to effectively solve problems is a critical skill for success in both academic and professional domains. Problem-solving involves the cognitive processes of identifying and analyzing challenges, generating potential solutions, and selecting and implementing the most appropriate course of action (Rahman, 2019). Effective problem-solving requires not only cognitive abilities but also emotional and attentional regulation (Volkaert et al., 2020). This is where the concept of mindfulness comes into play.

Mindfulness, derived from ancient Buddhist traditions, has garnered significant attention in recent decades as a powerful tool for enhancing psychological well-being, cognitive functioning, and overall quality of life (Sathiyaseelan & Balasundaram, 2024; Smith et al., 2019). Mindfulness refers to a state of present-moment awareness, characterized by a non-judgmental and open attention to one's thoughts, emotions, and sensations as they arise (Kabat-Zinn, 2003). By cultivating a mindful state, individuals can disengage from ruminative thought patterns, reduce emotional reactivity, and enhance their ability to focus and concentrate (Brown & Ryan, 2003; Chambers et al., 2008).

The potential benefits of mindfulness extend beyond its well-established role in stress reduction and emotional regulation (Harp et al., 2022). Emerging research suggests that mindfulness can also enhance cognitive processes, including attention, working memory, and executive functioning (Chiesa et al., 2011; Jha et al., 2007; Zeidan et al., 2010). These cognitive abilities are essential for effective problem-solving, as they enable individuals to attend to relevant information, hold multiple perspectives in mind, and flexibly shift between different cognitive strategies (Gilhooly et al., 2015; Sio & Ormerod, 2009).

Furthermore, mindfulness has been linked to improved creativity and insight, both of which are critical components of successful problem-solving (Baas et al., 2014; Ostafin & Kassman, 2012). Insight problems, in particular, require a shift in perspective or a restructuring of the problem space, which can be facilitated by the open and non-judgmental awareness cultivated through mindfulness practice (Gilhooly & Fioratou, 2009; Schooler et al., 1993).

In addition to its potential cognitive benefits, mindfulness may also enhance problem-solving by promoting emotional regulation and social competence. Effective problem-solving often involves navigating complex social situations and interpersonal conflicts, which can elicit strong emotional responses (D'Zurilla & Nezu, 2021). Mindfulness has been shown to improve emotional intelligence, empathy, and interpersonal relationships (Dekeyser et al., 2008; Lippelt et al., 2014; Shapiro et al., 2011), which can facilitate more constructive and adaptive approaches to social problem-solving.

Despite the growing body of research on mindfulness and its potential cognitive and emotional benefits, few studies have directly investigated the relationship between mindfulness and problem-solving abilities, particularly among university students. University students face a wide range of academic, social, and personal challenges that require effective problem-solving skills. The transition to university life can be a significant source of stress, as students navigate new academic demands, social environments, and independence (Conley et al., 2014; Dyson & Renk, 2006). Developing problem-solving abilities during this critical period can not only enhance academic performance but also promote overall well-being and successful adaptation to the challenges of adulthood.

The current research aims to address this gap by exploring the effect of mindfulness training on problem-solving abilities among university students. Specifically, the study will investigate the impact of a mindfulness-based intervention on students' performance in solving verbal insight problems and social problems.

Verbal insight problems, also known as compound remote associate problems (CRA), are a type of problem that requires the solver to identify a single word or concept that can be combined with each of the three provided words to form a new, meaningful compound or phrase (Bowden & Jung-Beeman, 2003; Mednick, 1962). These problems are widely used in the study of insight and creative problem-solving, as they require the ability to overcome functional fixedness, suppress misleading assumptions, and engage in divergent thinking (Kounios & Beeman, 2014).

Social problems, on the other hand, involve challenges or conflicts that arise in interpersonal situations and require effective communication, emotional regulation, and perspective-taking (D'Zurilla & Nezu, 2021). Solving social problems requires not only cognitive skills but also emotional intelligence, empathy, and the ability to navigate complex social dynamics (Rahim et al., 2002).

By examining the impact of mindfulness training on both verbal insight problems and social problems, the current research aims to provide a comprehensive understanding of the potential benefits of mindfulness for problem-solving in both cognitive and social domains. The study will contribute to the growing body of literature on mindfulness and its applications in academic and educational settings.

The proposed research will employ a mixed-methods approach, combining quantitative measures of problem-solving performance with qualitative data on participants' experiences and perceptions of the mindfulness training. The quantitative component will involve administering standardized tests of verbal insight problem-solving and social problem-solving before and after the mindfulness intervention, allowing for a comparison of pre- and post-intervention performance within the experimental group, as well as between the experimental and control groups.

The qualitative component will involve conducting semi-structured interviews and focus groups with participants in the experimental group, exploring their subjective experiences with the mindfulness training and its perceived impact on their problem-solving approaches, emotional regulation, and overall well-being.

The mindfulness intervention will be designed based on established mindfulness-based programs, such as Mindfulness-Based Stress Reduction (MBSR) (Kabat-Zinn, 2003) and Mindfulness-Based Cognitive Therapy (MBCT) (Segal et al., 2018), and will incorporate various mindfulness practices, including body scans, mindful breathing, and mindful movement exercises. The intervention will also include psychoeducation on the principles and benefits of mindfulness, as well as group discussions and experiential exercises to facilitate the application of mindfulness in everyday life and problem-solving situations.

The findings of this research have the potential to contribute to our understanding of the mechanisms underlying mindfulness and its impact on cognitive and social functioning. If the mindfulness intervention is found to enhance problem-solving abilities, it could have important implications for the development of educational interventions and support programs aimed at fostering these critical skills among university students.

Moreover, by exploring the potential benefits of mindfulness for both cognitive and social problem-solving, the study may provide insights into the interplay between cognitive, emotional, and interpersonal factors in effective problem-solving, contributing to a more holistic and integrative understanding of this complex process.

The current research aims to investigate the effect of mindfulness training on problem-solving abilities among university students, with a particular focus on verbal insight problems and social problems. By combining quantitative and qualitative methods, the study will contribute to our

understanding of the potential cognitive and emotional benefits of mindfulness, as well as its applications in academic and educational settings. The findings may inform the development of interventions and support programs to enhance problem-solving skills, which are essential for academic success, personal growth, and effective navigation of the challenges of modern life.

2. Theoretical Framework

The proposed research is grounded in several theoretical perspectives and empirical findings related to mindfulness, cognitive processes, and problem-solving abilities. The primary theoretical underpinnings stem from the concepts of mindfulness, insight problem-solving, and social problem-solving theory.

2.1 Mindfulness Theory

Mindfulness, rooted in ancient Buddhist traditions, has been conceptualized as a state of present-moment awareness, characterized by a non-judgmental and open attention to one's thoughts, emotions, and sensations as they arise (Kabat-Zinn, 2003). The practice of mindfulness involves intentionally cultivating this state of conscious awareness and attention through various techniques, such as mindful breathing, body scans, and mindful movement exercises.

From a theoretical perspective, mindfulness is proposed to enhance various cognitive and affective processes that are crucial for effective problem-solving. The central mechanisms through which mindfulness may facilitate problem-solving abilities include:

- **Attentional regulation:** Mindfulness practice has been shown to improve attentional control and the ability to sustain focused attention (Jha et al., 2007). This enhanced attentional regulation can help individuals attend to relevant information and inhibit distracting or irrelevant stimuli during problem-solving tasks.
- **Cognitive flexibility:** By cultivating a non-judgmental and decentered perspective, mindfulness is thought to promote cognitive flexibility, enabling individuals to disengage from habitual thought patterns and consider alternative perspectives (Chambers et al., 2008). This cognitive flexibility is particularly beneficial for solving insight problems, which often require a restructuring of the problem space (Gilhooly & Fioratou, 2009).
- **Emotional regulation:** Mindfulness has been associated with improved emotional regulation and reduced emotional reactivity (Brown & Ryan, 2003; Chambers et al., 2008). Effective emotional regulation can facilitate more adaptive responses to challenging or emotionally charged situations, which is crucial for successful social problem-solving (D'Zurilla & Nezu, 2021).
- **Divergent thinking and creativity:** Emerging research suggest that mindfulness can enhance divergent thinking and creativity (Baas et al., 2014; Ostafin & Kassman, 2012), which are essential components of successful problem-solving, particularly for insight problems that require novel and unconventional solutions.

2.2 Insight Problem-Solving Theory

Verbal insight problems, also known as compound remote associate problems (CRA), require individuals to identify a single word or concept that can be combined with each of the provided words to form new, meaningful compounds or phrases (Bowden & Jung-Beeman, 2003; Mednick, 1962). Solving these problems often involves overcoming functional fixedness, suppressing misleading assumptions, and engaging in divergent thinking (Kounios & Beeman, 2014).

Theoretical perspectives on insight problem-solving highlight the importance of cognitive processes such as selective encoding, spreading activation, and the restructuring of problem representations (Gilhooly et al., 2015). The process of insight problem-solving is proposed to involve

two distinct stages: (1) a preparatory stage, where the problem is initially processed and represented, and (2) an insight stage, where a sudden restructuring of the problem occurs, leading to the solution.

The cognitive mechanisms facilitated by mindfulness, such as attentional regulation, cognitive flexibility, and divergent thinking, are proposed to enhance both the preparatory and insight stages of verbal insight problem-solving. Mindfulness may help individuals attend to relevant information, suppress misleading assumptions, and consider alternative problem representations, ultimately increasing the likelihood of achieving an insightful solution.

2.3 Social Problem-Solving Theory

Social problems involve challenges or conflicts that arise in interpersonal situations and require effective communication, emotional regulation, and perspective-taking (D'Zurilla & Nezu, 2021). The Social Problem-Solving Theory, developed by D'Zurilla and colleagues, proposes a model for understanding and promoting effective social problem-solving abilities.

According to this theory, social problem-solving is a self-directed cognitive-behavioral process that involves the following components: (1) problem orientation (a motivational component that includes a person's general approach and attitudes toward problem-solving situations), (2) problem definition and formulation, (3) generation of alternative solutions, (4) decision-making, and (5) solution implementation and verification (D'Zurilla & Nezu, 2021).

Effective social problem-solving requires not only cognitive skills but also emotional intelligence, empathy, and the ability to navigate complex social dynamics (Rahim et al., 2002). Mindfulness, through its proposed effects on emotional regulation, empathy, and interpersonal understanding (Dekeyser et al., 2008; Lippelt et al., 2014; Shapiro et al., 2011), may enhance individuals' abilities to approach social problems with greater emotional awareness, perspective-taking, and adaptive problem-solving strategies.

2.4 Integration of Theoretical Perspectives

The proposed research integrates these theoretical perspectives by investigating the potential impact of mindfulness training on both verbal insight problem-solving and social problem-solving abilities among university students. The theoretical framework suggests that mindfulness, through its effects on attentional regulation, cognitive flexibility, emotional regulation, and divergent thinking, can enhance the cognitive and affective processes involved in solving both verbal insight problems and social problems.

Specifically, mindfulness may facilitate the preparatory and insight stages of verbal insight problem-solving by enhancing attentional control, cognitive flexibility, and divergent thinking, enabling individuals to overcome functional fixedness and restructure problem representations more effectively.

Additionally, mindfulness may enhance social problem-solving abilities by promoting emotional regulation, empathy, and interpersonal understanding, which are crucial for navigating the cognitive-behavioral components of social problem-solving, such as problem orientation, solution generation, and decision-making in interpersonal contexts.

By investigating the effects of mindfulness training on both cognitive and social aspects of problem-solving, this research aims to provide a comprehensive understanding of the potential benefits of mindfulness for various domains of problem-solving abilities. The findings may contribute to the development of educational interventions and support programs that leverage mindfulness practices to enhance critical thinking, creative problem-solving, and social competence among university students.

Overall, this theoretical framework integrates concepts from mindfulness theory, insight

problem-solving theory, and social problem-solving theory to provide a solid foundation for investigating the impact of mindfulness training on problem-solving abilities in an educational context.

3. Method

3.1 Participants:

The study involved 60 male students from the third-year Information Technology Department at the Faculty of Education for Boys, Al-Azhar University, Dakahlia Branch. The participants were divided into two groups: an experimental group ($n = 30$) and a control group ($n = 30$). The age range of the experimental group was 19.50 to 22.43 years ($M = 20.48$, $SD = 0.505$), and the age range of the control group was 19.33 to 22.58 years ($M = 20.59$, $SD = 0.649$).

3.2 Measures

Verbal Insight Problem-Solving Test (Researcher-developed) was developed by the researcher following these steps:

- Reviewing foreign research that developed scales for measuring insight problem-solving, such as Schooler et al. (1993).
- Attempting to compile verbal insight problems from psychological research, including a study that contained 67 problems representing most verbal, mathematical, and spatial insight problems (Dow & Mayer, 2004).
- Translating all 67 problems into Arabic.
- Focusing on the verbal section, which contained the largest number of insight problems and was most suitable for the participants.
- Excluding problems that were incompatible with the structure of the Arabic language or were ambiguous.
- Selecting 14 verbal insight problems that were culturally appropriate for the Egyptian and Arab contexts.
- Presenting the Arabic and English versions of the problems to a panel of experts in Arabic and English linguistics to evaluate their cultural appropriateness, translation accuracy, and clarity.

The final test consisted of 14 verbal insight problems. To ensure equivalence between the original and translated versions, both versions were administered to 40 students from the English Language Department. The Pearson correlation coefficient between the scores on the English and Arabic versions was 0.602, which is statistically significant at the 0.01 level.

Psychometric Properties of the Verbal Insight Problem-Solving Test: The test exhibited satisfactory content validity, as evaluated by a panel of experts (100% agreement on cultural appropriateness, 85.71% agreement on clarity of instructions and conceptual equivalence between Arabic and English versions). Additionally, the test showed concurrent validity, with a correlation of 0.688 ($p < 0.01$) with Schooler et al.'s (1993) insight problem-solving test. The test demonstrated good test-retest reliability ($r = 0.538$, $p < 0.01$) and internal consistency (Cronbach's alpha = 0.538) in a pilot study with 31 participants.

Social Problem-Solving Inventory - Revised (SPSI-R) (D'Zurilla et al., 2002; Researcher's translation): The SPSI-R is a 52-item self-report measure that assesses individuals' ability to solve problems in their daily lives. It evaluates five dimensions of problem-solving based on D'Zurilla's theory: Positive Problem Orientation (5 items), Negative Problem Orientation (10 items), Rational Problem-Solving (20 items: Problem Definition and Formulation, Generation of Alternative Solutions, Decision Making, Solution Implementation and Verification), Impulsivity/Carelessness

Style (10 items), and Avoidance Style (7 items). The SPSI-R has demonstrated good psychometric properties in previous research.

Mindfulness-Based Training Program (Researcher-developed): The researcher developed a mindfulness-based training program based on established programs such as Mindfulness-Based Stress Reduction (MBSR) (Kabat-Zinn, 2003) and Mindfulness-Based Cognitive Therapy (MBCT) (Segal et al., 2018). The program incorporated various mindfulness practices (e.g., body scans, mindful breathing, mindful movement exercises), psychoeducation on mindfulness principles and benefits, group discussions, and experiential exercises to facilitate the application of mindfulness in everyday life and problem-solving situations.

3.3 Procedure

The study employed a mixed-methods approach, combining quantitative measures of problem-solving performance with qualitative data on participants' experiences and perceptions of the mindfulness training.

3.4.1 Quantitative Component:

The Verbal Insight Problem-Solving Test and the SPSI-R were administered to the experimental and control groups as pre-tests. The experimental group participated in the mindfulness-based training program, while the control group did not receive any intervention. After completing the training program, both groups were administered the Verbal Insight Problem-Solving Test and the SPSI-R as post-tests. The experimental group also completed a follow-up assessment of the Verbal Insight Problem-Solving Test after a specified period.

3.4.2 Qualitative Component:

Semi-structured interviews and focus groups were conducted with participants from the experimental group to explore their subjective experiences with the mindfulness training and its perceived impact on their problem-solving approaches, emotional regulation, and overall well-being.

3.5 Data Analysis

The researcher planned to use the following statistical methods to analyze the quantitative data and test the research hypotheses: Means and standard deviations, Independent samples t-tests, Paired samples t-tests and Eta squared (effect size)

The qualitative data from the interviews and focus groups would be analyzed using appropriate techniques, such as thematic analysis or content analysis, to identify and interpret patterns and themes related to the participants' experiences and perceptions.

4. Results

The study employed both quantitative and qualitative methods to investigate the effect of mindfulness training on problem-solving abilities among university students.

The quantitative data was analyzed using means, standard deviations, independent samples t-tests, and paired samples t-tests. The results showed a statistically significant difference between the experimental and control groups' mean scores on the posttest of the Verbal Insight Problem-Solving Test, $t(28) = 3.174$, $p < .01$, with the experimental group ($M = 5.87$, $SD = 4.20$) outperforming the control group ($M = 3.00$, $SD = 6.61$). This suggests that the mindfulness training had a positive effect on the participants' ability to solve verbal insight problems.

Table 1: Comparisons for Verbal Insight Problem-Solving and SPSI Measures

Variable	Experimental		Control		T-value	df
	M	SD	M	SD		
Verbal Insight Problem-Solving	5.87	4.20	3.00	6.61	3.174**	28
Positive Problem Orientation	16.73	2.65	16.33	3.33	0.514	28
Negative Problem Orientation	26.77	6.38	24.60	7.76	1.18	28
Rational Problem-Solving	59.20	7.88	57.53	10.88	0.679	28
Impulsivity/Carelessness Style	25.00	5.09	23.93	6.00	0.742	28
Avoidance Style	19.33	3.61	17.73	4.03	1.61	28
Total SPSI	147.07	16.57	139.47	25.03	1.386	28

Note. N = 30. SPSI = Social Problem-Solving Inventory; ** p < .01.

Furthermore, a paired samples t-test revealed a significant difference between the pretest (M = 3.33, SD = 3.25) and posttest (M = 5.87, SD = 4.20) scores of the experimental group, $t(29) = 4.181$, $p < .01$. However, there was no significant difference between the posttest (M = 6.77, SD = 4.79) and follow-up test (M = 6.46, SD = 3.843) scores, $t(12) = 0.693$, $p > .05$, indicating that the improvements in verbal insight problem-solving were maintained over time.

Table 2: Pretest and Posttest Comparisons for Verbal Insight Problem-Solving and SPSI Measures

Variable	Pretest		Posttest		T-value	df
	M	SD	M	SD		
Verbal Insight Problem-Solving	3.33	3.25	5.87	4.20	4.181**	29
Positive Problem Orientation	16.76	2.67	16.73	2.65	0.051	29
Negative Problem Orientation	24.43	6.82	26.77	6.38	1.334	29
Rational Problem-Solving	60.30	7.14	59.20	7.88	0.607	29
Impulsivity/Carelessness Style	23.56	5.17	25.00	5.09	1.091	29
Avoidance Style	18.13	4.95	19.33	3.61	1.033	29
Total SPSI	143.20	18.68	147.07	16.57	0.819	29

Note. N = 30. SPSI = Social Problem-Solving Inventory; ** p < .01.

The results did not show any statistically significant differences between the experimental and control groups' mean scores on the posttest of the SPSI-R, nor between the pretest and posttest scores of the experimental group. This suggests that the mindfulness training did not significantly impact the participants' social problem-solving abilities as measured by the SPSI-R. The effect size (eta squared) for the difference between the experimental and control groups on the Verbal Insight Problem-Solving Test posttest was 0.26, which is considered a large effect.

The qualitative data collected through semi-structured interviews and focus groups with participants from the experimental group provided insights into their subjective experiences with the mindfulness training and its perceived impact on problem-solving approaches, emotional regulation, and overall well-being.

The results indicated that the mindfulness training had a significant positive effect on the participants' ability to solve verbal insight problems, but did not significantly impact their social problem-solving abilities as measured by the SPSI-R. The qualitative data provided a deeper understanding of the participants' experiences and perceptions of the mindfulness training and its potential benefits for problem-solving and overall well-being.

5. Discussion

The present study investigated the effect of mindfulness training on problem-solving abilities among university students, with a focus on verbal insight problems and social problems. The quantitative results revealed a statistically significant improvement in verbal insight problem-solving performance for the experimental group after undergoing the mindfulness-based training program. This finding is consistent with a growing body of research that suggests a positive relationship between mindfulness and insight problem-solving (e.g., Ostafin & Kassman, 2012; Ren et al., 2011)

The enhanced ability to solve verbal insight problems among participants who received mindfulness training may be attributed to several potential mechanisms. Mindfulness cultivates a state of open, non-judgmental awareness and attentional control, which can facilitate cognitive flexibility and the ability to disengage from habitual thought patterns (Brown & Ryan, 2003; Chambers et al., 2008). This cognitive flexibility and decentering from rigid mental sets are particularly beneficial for solving insight problems, which often require a shift in perspective or a restructuring of the problem space (Gilhooly & Fioratou, 2009; Schooler et al., 1993).

Furthermore, mindfulness has been associated with improved creativity and divergent thinking (Baas et al., 2014; Ostafin & Kassman, 2012), which are essential components of successful problem-solving, especially for insight problems that require novel and unconventional solutions. By fostering a state of open awareness and acceptance, mindfulness may reduce cognitive rigidity and facilitate the generation of novel ideas and perspectives (Lebuda et al., 2016).

The current study's findings align with the broader literature on the positive effects of mindfulness on creativity and innovative thinking (e.g., Ding et al., 2014; Lebuda et al., 2016). Collectively, these studies suggest that mindfulness can enhance cognitive processes and attitudes that are conducive to creative problem-solving and insight.

However, it is important to note that the present study did not find a significant effect of mindfulness training on social problem-solving abilities as measured by the SPSI-R. This result contrasts with previous research suggesting that mindfulness can improve emotional intelligence, empathy, and interpersonal relationships (Dekeyser et al., 2008; Lippelt et al., 2014; Shapiro et al., 2002), which are relevant to effective social problem-solving (D'Zurilla & Nezu, 2021). Several factors may contribute to this lack of significant findings.

First, the SPSI-R assesses problem-solving abilities in a broad range of everyday life situations, which may not have been directly targeted or influenced by the specific mindfulness practices and exercises included in the training program. It is possible that the program's emphasis on cultivating present-moment awareness and cognitive flexibility may have had a more direct impact on the cognitive processes involved in solving insight problems, while the emotional and interpersonal aspects of social problem-solving were less affected.

Second, the duration and intensity of the mindfulness training program may have been insufficient to produce measurable changes in social problem-solving abilities. Previous research has suggested that more extended or intensive mindfulness interventions may be required to observe significant improvements in social and emotional competencies (Kang et al., 2013; Lomas et al., 2017).

Third, the SPSI-R is a self-report measure, which may not fully capture the nuances of social problem-solving abilities in real-life situations. Observational or performance-based measures of social problem-solving may be more sensitive to potential changes resulting from mindfulness training.

Despite the lack of significant findings for social problem-solving, the qualitative data

collected through interviews and focus groups shed light on the participants' subjective experiences and perceptions of the mindfulness training. Many participants reported experiencing greater emotional awareness, emotional regulation, and a more accepting and non-judgmental attitude towards themselves and others. These self-reported changes, while not reflected in the SPSI-R scores, suggest that mindfulness training may have had positive effects on emotional and interpersonal aspects of well-being, which could potentially contribute to more effective social problem-solving in the long term.

The present study contributes to the growing body of literature on the potential benefits of mindfulness for cognitive functioning and problem-solving abilities in educational settings. By demonstrating the positive effect of mindfulness training on verbal insight problem-solving among university students, the findings offer empirical support for the incorporation of mindfulness-based interventions in academic programs and support services aimed at enhancing critical thinking, creative problem-solving, and overall academic performance.

Moreover, the mixed-methods approach employed in this study provides a more comprehensive understanding of the potential mechanisms and subjective experiences underlying the relationship between mindfulness and problem-solving. The qualitative data offer valuable insights into the perceived benefits of mindfulness training beyond the cognitive domain, such as increased emotional awareness, self-acceptance, and interpersonal understanding.

While the current study focused on a specific population of university students, the findings may have broader implications for problem-solving and decision-making in various professional and personal contexts. By cultivating mindfulness skills, individuals may enhance their ability to approach complex challenges with clarity, cognitive flexibility, and emotional regulation, which are essential for effective problem-solving in today's rapidly changing and demanding environments.

Future research could explore the effects of mindfulness training on problem-solving abilities in different age groups, educational levels, or professional domains. Additionally, longitudinal studies could investigate the long-term implications of mindfulness practice on problem-solving skills and overall cognitive functioning. Furthermore, researchers could explore the potential synergistic effects of combining mindfulness training with other cognitive or problem-solving interventions.

6. Conclusion

In conclusion, the present study provides valuable insights into the potential benefits of mindfulness training for enhancing verbal insight problem-solving abilities among university students. While the findings did not extend to social problem-solving as measured by the SPSI-R, the qualitative data suggest positive effects on emotional awareness and regulation, which could potentially contribute to more effective social problem-solving over time. By integrating mindfulness practices into educational programs and support services, institutions can foster the development of critical thinking, creative problem-solving, and overall well-being among students, equipping them with essential skills for academic success and personal growth in an increasingly complex world

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