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From Awareness to Action: Mindfulness Brief Interventions Shaping Positive Affect and Decision Certainty

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Abstract

Purpose: This study aims to explore the effect of a five-minute mindfulness audio intervention on improving state positive emotion and decision-making effectiveness under uncertainty, and to examine whether trait maximization moderates these effects among Chinese university students. ***Method:*** A randomized between-subjects experiment (N = 320) was conducted, in which participants were assigned to either a brief mindfulness exercise or a time-matched neutral audio control. State positive emotion was measured immediately after the manipulation using the PANAS positive affect scale. Participants then completed five worst-case scenario tasks (least-worst decision scenarios). Decision time, perceived decision difficulty, and the percentage of approach choices were recorded. Structural equation modeling was used to test mediation effects, and interaction modeling was applied to examine moderation. ***Findings:*** Participants in the mindfulness condition reported higher levels of positive emotion and demonstrated more effective decision-making patterns, characterized by faster decisions, lower perceived difficulty, and a higher proportion of approach-oriented choices. Positive emotion partially mediated the relationship between mindfulness and decision effectiveness. However, the benefits of mindfulness on approach choices were reduced among individuals with higher maximization tendencies. ***Originality/Implications:*** This study contributes to the literature on least-worst decision making by incorporating an affective mechanism and an individual difference moderator within a Chinese sample. The findings suggest that brief, scalable mindfulness interventions can support approach-oriented decision behavior under uncertainty, while also indicating that such interventions may need to be tailored for individuals with high maximization tendencies.

Keywords:
Shortness of Mindfulness;
Good Feelings;
Decision Making Under Uncertainty;
Least-Worst Decisions;
Maximization;
Mediation.

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1- Introduction

Introduction High-consequence decisions often occur under time pressure, incomplete information, and ambiguous tradeoffs. In least-worst situations, decision-makers must choose between imperfect alternatives, and time delays can contribute to further damage in the form of decision inertia and lost opportunities for action [1, 2]. Recent research further shows that values and threat appraisals determine whether or not people will continue deliberation or commit to action when outcomes are uncertain [3].

Mindfulness has thus been suggested as a useful tool for practicing decision readiness in such settings. Mindfulness is often defined as a nonjudgmental, nonreactive, and accepting focus on the momentary experience that intentionally occurs in the present [4, 5]. Throughout education and organizational processes, mindfulness-based interventions are linked to enhanced well-being and functioning [6, 7]. Meta-analytic evidence also suggests that structured mindfulness programs can help to reduce psychological distress and improve psychological health outcomes in non-clinical samples, including students [8-10]. Standard mindfulness programs are resource-intensive and therefore are not scalable in a setting where rapid support is needed. Brief mindfulness inductions in the form of short audio exercises have been shown

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to yield measurable state changes in attention and affect [11]. Recent efforts have focused on the short- or low-dose computerized mindfulness methods as they relate to impulsivity, risk attitudes, and acceptability for interventions, while noting that persistence and transfer of effects may be mixed [12-16]. These developments provide motivation for research into whether short enough and scalable mindfulness prompts can affect decisions that must be made quickly in the face of uncertainty.

A growing body of literature suggests mindfulness may influence the quality of decisions and prosocial conduct by increasing executive control and decreasing automatic reactive responding [17-20]. In the context of value-based decisions, mindfulness training may be able to modulate neural value signals and make individuals less susceptible to contextual biases [18]. In least-worst decision tasks, it was found that a brief mindfulness exercise can moderate decision inertia and increase action tendencies, and these effects are stronger in people lower in the trait maximization dimension [20]. One likely mechanism is positive emotion. Positive affect has the potential to focus attention and cognitive flexibility for constructive appraisal and approach-oriented coping [21]. Reviews of emotion and judgment demonstrate that affect influences the risk perception and information processing of items, suggesting that the emotional state just before a decision may affect how we handle uncertainty [22].

Mindfulness training has been argued to foster positive affect through decreased reactivity and being in an accepting stance toward experience, especially when monitoring is coupled with acceptance [23]. These relationships may be conditionally meaningful within a cultural context. Many mindfulness and decision-making studies are based on Western samples; however, there are cultural differences in the ideal effect and the processing of uncertainty. For example, the cultural contexts differ in terms of how much high-arousal positive emotional states, such as enthusiasm and excitement, or low-arousal positive emotional states, such as calm and peacefulness, are valued [24]. East Asian contexts also place a dialectical emphasis that can actually affect one's tolerance to contradiction and reading of ambiguous information [25]. Because the characteristics of ambiguities and trade-offs that make least-worst decision tasks inherently challenging can be examined in Chinese university students, such an examination constitutes a substantive test of generalizability and can be informative for the design of culturally appropriate interventions. Individual difference may further forecast the applicability of mindfulness. Trait maximization signifies a tendency to search extensively for the optimal option as well as to feel dissatisfied when outcomes are not ideal [26]. Maximization is linked to increased decision difficulty and decreased well-being, in part because of the time taken for alternative search and counterfactual thinking, which increase deliberation time [27, 28].

Under conditions of uncertainty, maximization strategies can lead to decision inertia and avoidance. Brief mindfulness may counteract this tendency by anchoring attention to the present moment and promoting acceptance of a "good-enough" decision; however, individuals with high maximization tendencies may resist such acceptance and continue to over-deliberate [29]. This study therefore tests an integrative model in which a brief mindfulness exercise increases state positive emotion, which in turn enhances decision-making effectiveness under uncertainty, while also examining trait maximization as a boundary condition. Using a randomized experiment with a sample of Chinese university students, the study extends research on least-worst decision making by (a) specifying an affect-mediated pathway, (b) testing generalizability in a non-Western context, and (c) demonstrating that brief mindfulness prompts, even without elaborate training, can effectively prime a shift toward approach-oriented behavior when choices are imperfect.

2- Literature Review

2-1- A Brief Introduction to Mindfulness Practice and Relationship with Positive Effect

Mindfulness interventions are often related to emotional benefits, such as improvements in positive affect and reductions of distress [8-10]. Brief mindfulness inductions can also engender shifts in state emotion; however, the magnitude of effects varies and may depend upon the equilibrium between attention-monitoring and acceptance processes [11, 23]. Recent research studies using student samples highlight the feasibility and the limits of low doses of the delivery. For example, brief or short mindfulness training may result in enhanced changes as measured by some regulatory outcomes but may show fewer impacts of a more sustained nature without continuing training [13]. Prolonged low-dose online formats might increase mindfulness and perceived relaxation but had smaller effects on distal affected outcomes [14, 16], indicating the importance of dose and type of outcome.

In the present research, positive emotion is operationalized through the PANAS positive affect scale, which contains descriptors that cover a range of different arousal levels. The scale is interpreted as a general indicator of positive affect state; however, specific positive emotions, such as calm versus enthusiasm, may help produce different behavioral consequences. This distinction is taken up again in the discussion and limitations.

H1: Participants who go through a brief mindfulness exercise will report more positive emotions than those who go through a neutral control audio.

2-2- An Investigation of Short-Term Mindfulness and Uncertainty Decision-Making

The least-worst decisions require choosing among imperfect choice combinations of uncertain consequence, where long consideration may increase the damage due to decision inertia [1, 2]. Mindfulness might help in such situations to promote adaptive action by buffering reactive avoidance and by promoting attentional control. A body of empirical work

has associated mindfulness with decision outcomes that have to be regulated with impulse and social responses such as ethical judgment [17], value-based decision processing [18], and inhibitory control during choice tasks [19]. In a least-worst critical incident paradigm, the completion of a brief mindfulness exercise decreased decision time and was found that an increase in the willingness to act was associated, suggesting the short, exhaustive burden of prompts can motivate otherwise indisposed uncertainty decisions where consequences of time and action matter [20].

H2: Participants completing a brief mindfulness exercise will demonstrate more effective decision-making under uncertainty that is reflected in shorter decision time, lower perceived decision difficulty, and more approach choices.

2-3- Positive Emotion and Decision Making Under Uncertainty

Positive emotion can provide broadened attention and support the operation of flexible cognition, which are especially advantageous when decisions include ambiguity and trade-offs [21]. Simultaneously, emotion can influence our perception of risk and the processing of information, and different positive emotions may not have the same impact on judgment [22]. In uncertain situations, calm and contentment may build up avoidance and deliberate engagement, while high-arousal positive emotions may build up action readiness but risky action, too. The current study tests a general affect-positive pathway and discusses emotion specificity as an important direction to pursue in the future.

H3: Positive emotion (higher positive emotion) will be associated with better decision-making under uncertainty.

2-4- Positive Emotion: Findings as a Mediator

Mindfulness training has in turn been hypothesized to have an effect on behavior, in part, by changing the way emotions are generated and regulated. Monitor-and-acceptance-based accounts suggest that mindfulness enhances an awareness process while acceptance weakens a reactivity process, which promotes conditions for the elicitation of positive affect [23]. If mindfulness enhances positive affect states, and positive affect makes for approach-oriented responses to uncertainty, positive emotion may offer no less plausible a mediating link between brief mindfulness and decision effectiveness.

H4: The positive emotion will mediate the relationship between brief mindfulness and decision-making effectiveness under uncertainty.

2-5- Trait Maximization as a Moderating Variable

Maximizers try to find the ideal choice and might feel regret in case things are not perfect [26]. This tendency has been related to an increased alternative search, a higher decision difficulty, and lower satisfaction [27, 28]. Under conditions of uncertainty, maximizing can increase deliberation and increase avoidance, especially when the information is incomplete. Mindfulness may help to reduce maximization-related over-deliberation by promoting acceptance and commitment to a functional option, but high maximizers may have more difficulty achieving acceptance and therefore reduced benefits of mindfulness. Prior least-worst decision research suggests that benefits of mindfulness can be reduced in those who tend to score high on maximization [20].

H5: Trait maximization will moderate the effect of mindfulness on decision-making effectiveness such that the benefits of mindfulness will be smaller among higher maximizers.

3- Theoretical Framework

This research combines three complementary perspectives in an attempt to understand the possible impact of a moment of mindfulness on decisions that are characterized by uncertainty.

Firstly, the research on least-worst decision-making stresses the point that uncertain decisions are not optimizations but rather engagements amongst imperfect options where delays can bring further damage due to decision inertia [1, 2]. From this perspective, adaptive performance can be seen in the ability to be timely in commitment, the little gained paralysis of subjectivity, and the tendency to do so with a willingness to engage instead of to avoid it. Accordingly, decision-making effectiveness is operationalized through a latent factor that is indicated by decision time, perceived decision difficulty, and approach choices. We recognize that neither speed nor approach is necessarily best in all decision realms; however, we take these as contextually suitable to least-worst cases where failures to act are potentially costly.

Secondly, we invoke affective theories that suggest that positive emotion expands cognition and helps approach-oriented coping in circumstances of ambiguity [21]. Positive affect, therefore, may mediate the translation of state changes resulting from mindfulness into behavioral readiness to act.

Thirdly, process accounts of mindfulness argue that attention monitoring coupled with acceptance results in lower reactivity and adaptive emotion regulation, which leads to the emergence of positive affect and, subsequently, influence of downstream behavior [23].

Finally, this model is located in a context of a Chinese university. Cultural differences in ideal affect imply that low-arousal positive states may be especially valued in East Asian cultures, and this may influence the translation of mindfulness and positive affect to action tendencies [24]. Norms of dialectical reasoning may also affect tolerance for contradiction and ambiguity, both key to least-worst decisions [25]. Accordingly, we empirically test the hypothesized

model in a Chinese sample in which the findings will be considered as a contribution to cross-cultural generalizability rather than as a culture-specific claim. Figure 1 summarizes the conceptual model and hypothesis.

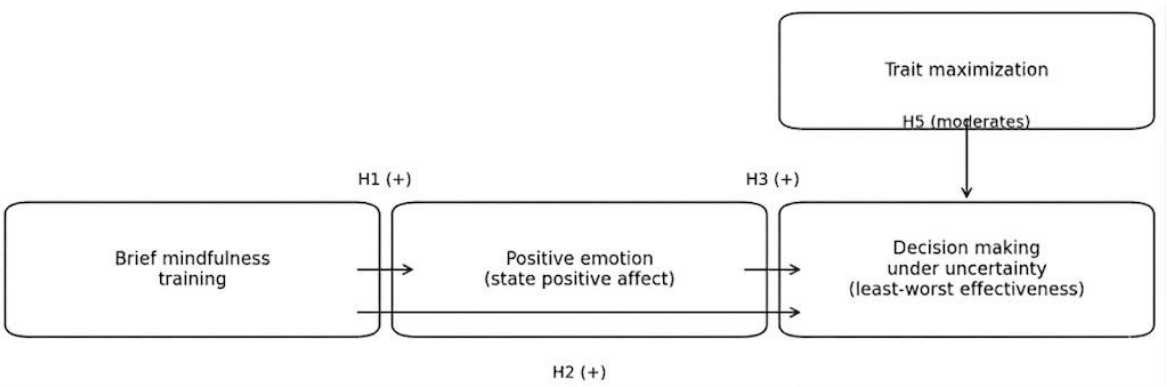

Figure 1. Conceptual framework of the dynamic relationship between some of the general characteristics of brief mindfulness interventions, positive affect and the effectiveness of decision-making under conditions of uncertainty trait-based maximization operates as moderating variable.

4- Methodology

4-1- Participants

The sample was composed of 320 Chinese university students (65% female; mean age=20.4, SD=1.8) recruited from two Chinese universities. Participation was voluntary and approved by the institutional ethics committee, and written informed consent was obtained from all participants.

4-2- Research Design and Teaching Procedures

A randomized between-subjects experimental design was used. Participants were first asked to complete demographic items in addition to the Maximization Inventory. They then were randomly placed in either a brief mindfulness audio or a neutral audio control. Immediately at the end of the audio, the participants answered the positive effect items on the Positive and Negative Affect Schedule (PANAS). Subsequently, participants were asked to complete five least-worst decision scenarios, which were presented on a computer (with decision time being automatic). After each scenario, the participants rated perceived decision difficulty and chose an approach or avoidance response option. The whole procedure took about 20 minutes.

Because the intervention was brief, it is conceptualized as a state manipulation rather than as a substitute for established multi-session mindfulness programs. Brief inductions can have measurable state changes that are counter-induced; however, their effects can be short-lived and outcome-dependent [11, 13, 16]. This consideration has been taken into account in the interpretation and limitation of the present study.

A workflow of the methodology is given in Figure 2.

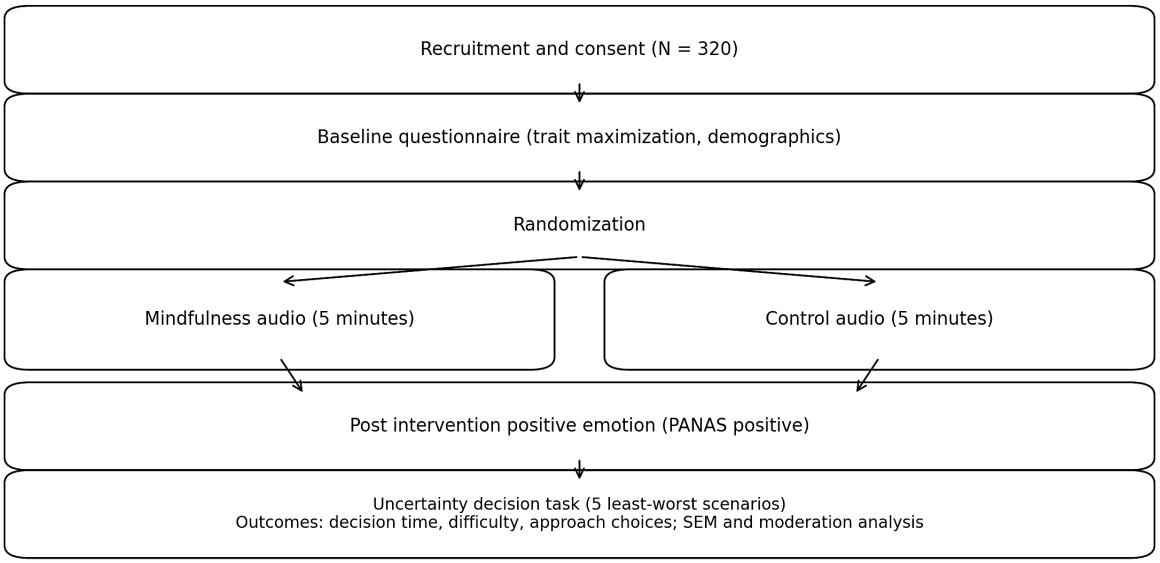

Figure 2. Workflow of Methodology and Mechanics of Measurement Sequence

4-3- Design of Questionnaire and Measures

State positive affect was measured with the 10-item positive affect subscale of the PANAS adapted for Spanish with responses on a scale from 1 to 5 and then summed to obtain a total score ranging from 10 to 50 [30]. A validated Chinese translation version of the instrument was used [31]. The items represent a continuum of arousal states, ranging from high-energy states (enthusiastic) to low-energy states (calm). In the present analysis, this scale is considered a general indicator of positive affect.

Measurement of trait maximization was made using the Maximization Inventory, which is on a 1-7 response scale where the score is summarized [29].

Participants completed five decision-making scenarios modified from least-worst decision research. Decision time was measured in seconds for decision time. The decision difficulty was perceived on a 0-100 scale. Approach frequency was calculated as the number of approach choices chosen over the 5 scenarios ranging from 0 to 5.

4-4- Data Analysis

Structural equation modeling (SEM) was used to assess hypothesized relationships between mindfulness condition, positive emotion, effectiveness of decision-making, and maximization. Model fit was measured by using standard indices including CFI, TLI, RMSEA, and SRMR [32]. To increase the interpretability and address reviewer concerns related to aggregation, we show both a latent decision effectiveness model and decision time, difficulty, and approach choices at the indicator level in descriptive comparisons.

The evaluation of mediation was conducted using bootstrapped indirect effects. Moderation was tested by an interaction of mindfulness condition and maximization, predicting decision effectiveness and the indicator of approach. All analyses were done using the stats package of Google's specific software, namely, the Statistical Package for the Social Sciences (SPSS) and AMOS.

5- Results

5-1- Descriptive Statistics and Reliability

Table 1 shows descriptive statistics for study variables. Internal consistency estimates are given in Table 2. All of the multi-item scales had acceptable reliability. The positive effect subscale of the PANAS showed a high internal consistency (Cronbach's alpha = 0.89), and the scalability for the maximization scale was shown to be acceptable (Cronbach's alpha = 0.81).

Table 1. Descriptive statistics of sample (N = 320)

Variable	Mean	SD
Positive Emotion	32.5	6.8
Decision Time (s)	5.62	2.14
Decision Difficulty (0–100)	58.3	18.4
Approach Frequency (0–5)	3.1	1.4
Maximization (1–7)	4.4	0.9

Table 2. Reliability Coefficients (Cronbach's α)

Scale	Cronbach's α
Positive Emotion (PANAS)	0.89
Maximization – Overall	0.81
Maximization – Decision Difficulty	0.87
Maximization – Alternative Search	0.81
Maximization – Satisficing	0.79

Table 3 shows zero-order correlations. Positive emotion was found to be positively correlated with approach frequency (r = 0.30) and that approach was negatively correlated with decision difficulty (r ~ -0.20), providing evidence that it is related to uncertainty-related decision indicators in the expected way. Maximization was found to be negatively correlated with approach frequency (r quasi equal to -0.22), consistent with the conception of maximizers as more avoidant when in an uncertain situation.

Table 3. Bivariate correlations between the variables

Variable	1	2	3	4	5
1. Positive Emotion	1				
2. Decision Time	-0.12*	1			
3. Decision Difficulty	-0.20**	0.18**	1		
4. Approach Frequency	0.30**	-0.15**	-0.22**	1	
5. Maximization	-0.10	0.25**	0.28**	-0.22**	1

Note: * $p < 0.05$; ** $p < 0.01$.

5-2- Comparisons and Graphical Results for groups

Table 4 shows that the mindfulness condition participants reported higher levels of positive affect than the participants in the control condition. The mindfulness condition also showed more successful schemes of decision based on the three parameters in terms of shorter decision time, lower decision difficulties perceived, and higher approach frequency in attending to decisions. Figure 3 shows a visualization of the difference in positive affect across the conditions, and Figure 4 shows comparative results for three decision indicators.

Table 4. Group comparisons, condition (Means and SD)

Measure	Mindfulness (n = 160)	Control (n = 160)
Positive Emotion (10–50)	35.4 (6.1)	29.7 (6.3)
Decision Time (s)	5.0 (2.0)	6.2 (2.2)
Decision Difficulty (0–100)	53.1 (17.5)	63.5 (18.2)
Approach Choices (% of scenarios)	72.0 (26.0)	54.0 (28.0)

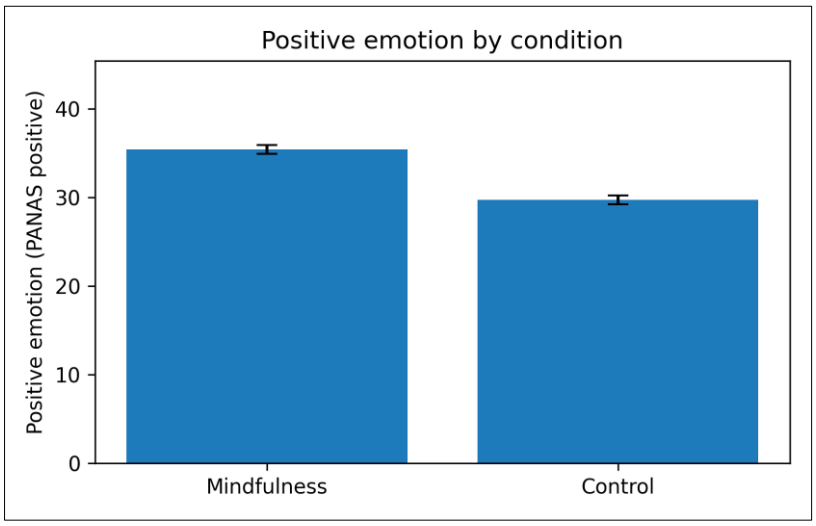

Figure 3. Condition grade positive affect Mean, with error bars giving standard error

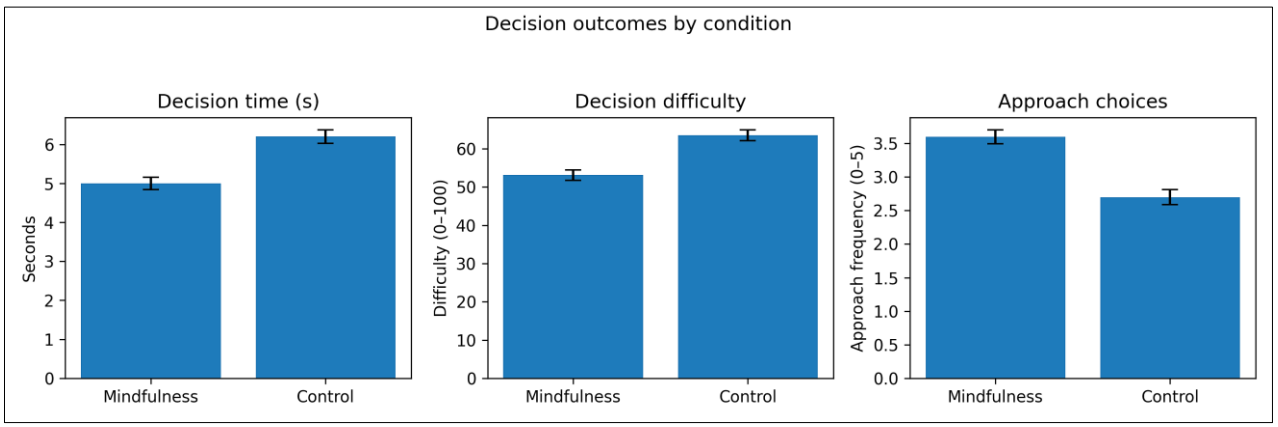

Figure 4. Mean Indicators of Decision Making by Condition: decision time, decision difficulty, frequency of approach (with error bars = standard error)

5-3-Structural Model, Mediation, and Moderation Tests

Table 5 presents the summary of the SEM results. The mindfulness condition was a significant positive predictor of positive affect (b= 0.30, p< 0.001) and decision-making effectiveness (b= 0.20, p= 0.004). Positive affect was also predictive for decision heterogeneous under decision making effectiveness (b = 0.25, p <0.001) providing support for H3. The indirect effect of mindfulness on decision effectiveness in terms of positive affect was significant (indirect effect = 0.07, p = 0.02), which is supportive of partial mediation and H4. Standardized coefficients in the mediation model are shown in Figure 5.

Moderation analysis demonstrated that the relationship of mindfulness condition to maximization was significantly different (b~}), for maximization (b='0.18', p='0.014') was significantly related to mindfulness condition (H5). Simple-slope estimates (Table 6) and the interaction plot (Figure 6) suggest that mindfulness led to greater approach behavior in participants with low and average levels of maximization; however, the effect was smaller and negligible for participants with high levels of maximization.

Table 5. Structural equation modelling path coefficients

Path	β	p
Mindfulness → Positive Emotion	0.30	< 0.001
Mindfulness → Decision Effectiveness	0.20	0.004
Positive Emotion → Decision Effectiveness	0.25	< 0.001
Interaction (Mindfulness × Maximization) → Decision Effectiveness	-0.18	0.014
Indirect (Mindfulness → Positive Emotion → Decision Effectiveness)	0.07	0.02
Model Fit: CFI = 0.97; TLI = 0.95; RMSEA = 0.04; SRMR = 0.03		

Table 6. Conditional impact of mindfulness between levels of maximization on approach choices

Maximization level	Control approach (%)	Mindfulness approach (%)	Difference
Low (−1 SD)	55	78	+23
Mean	54	72	+18
High (+1 SD)	56	50	−6

Note: Percentages are based on approach selections across five scenarios. The pattern indicates diminishing mindfulness benefits as maximization increases.

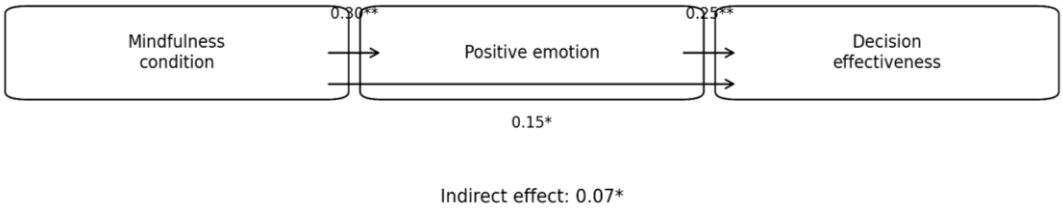

Figure 5. Model of mediation with standardized coefficients (p < .05; * p < .01) - standardized

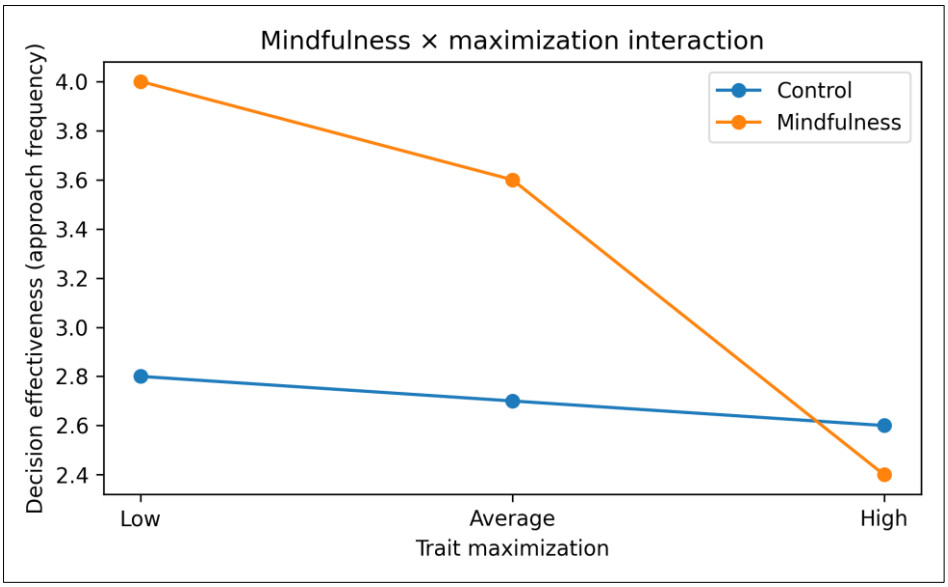

Figure 6. Interaction between mindfulness condition and maximization approach frequency

6- Discussion

This present study examined whether an abbreviated mindfulness audio intervention affected the decision-making process in this sample using positive affect in case of uncertainty and whether trait maximization moderates these impacts in a sample of Chinese university students. Consistent with hypotheses H1 and H2, participants in the mindfulness condition reported greater positive affect and showed more competent patterns of decision in terms of faster responses, lower perceived difficulty, and greater propensity for approach decisions. Structural equation modeling further supported hypotheses H3 and H4, meaning that positive affect predicts the effectiveness of decisions and partially mediates the effect of mindfulness.

Comparisons with extant literature suggest the similarity with findings of decision-making convergence to least-worst decisions that have been formulated on Western populations. Summerall and colleagues found that a simple mindfulness exercise was able to reduce decision inertia and increase approach behavior in a critical incident paradigm [20]. The present findings extend this finding to a Chinese student context and present findings that positive affect is a plausible proximal mechanism. The mediation pathway is in accordance with process accounts suggesting that mindfulness encourages adaptive outcomes in part by promoting acceptance-based emotion regulation and positive affect [23].

The Chinese university setting not only provides a test of Western generalizability, but it also presents an opportunity to shed some light on the influence of cultural affect preferences to shape intervention response. Research on ideal affect suggests that the East Asian contexts may appreciate calm, low-arousal positive states over high-arousal excitement [24]. Dialectical reasoning norms possibly affect tolerance for contradiction and ambiguity and thus the appraisal of uncertainty [25]. Our findings indicate that a short mindfulness cue can remind people to get the feeling of general positive affect and change action tendencies even in this culture. Nevertheless, future research should compare groups directly across cultures and evaluate ideal affect and dialectical thinking in order to clarify the mechanisms of cultural moderation.

The reviewer made a good point about the differential effects that separate positive emotions may have. The PANAS positive affect scale is a broad index of both high and low arousal descriptors. It is plausible that calmness may reduce avoidance and support deliberate engagement, whereas enthusiasm may support action readiness but at the same time increase risk-taking. Because we have found that our mediation measure is unidimensional, our results from the present study should be interpreted as evidence for a general positive affect mechanism instead of specific discrete emotions. Future research should gather distinct calm and high-authorship positive affect measures or use experience sampling to try to enlist how discrete emotions straight in advance of an authentic high bring the decisions the book consults and appraisal bears.

The fact that the five-minute intervention is so brief also needs to be carefully interpreted. Brief inductions can change state mindfulness and affect it; however, they are not equivalent to multi-week mindfulness programs [11]. Recent work suggests that low-dose and digital mindfulness interventions may positively affect proximal outcomes (i.e., felt relaxation, enjoyment, or mindfulness skills), while showing smaller effects, or no greater effects, on distal outcomes (i.e., those not experienced during sustained practice) [13, 14, 16]. Accordingly, we take the current findings to be immediate state effects that may be useful for practical purposes such as in-the-moment decision support and not evidence that a five-minute prompt engenders enduring trait change.

Another methodological concern relates to the idea of whether the neutral audio control might have caused boredom, which in turn would have exacerbated differences with respect to affect. Although the control condition was duration-matched and meant to be emotionally neutral, illicit differential engagement is possible. And active control interventions used in recent online mindfulness research typically include podcasts or educational content, which can be of different levels of interest and engagement [14]. Future research should have direct measures of engagement and boredom and examine alternative active controls that could be more equitable in terms of expectancy and attentional demand.

The construct of decision-making effectiveness also needs to be put in perspective. In the least worst paradigms, deliberations can bring about worse outcomes in terms of decision inaction, and often will is a measure of adaptation where uncertainty must be faced or otherwise tolerated [1, 2]. For this reason, our indicators were aimed at decision time, perceived difficulty, and approach behavior. Nevertheless, acceleration or more approach-related decisions are not superior in all domains for all decisions, and we do not suggest that speed is always better. The results should in turn be construed as indicating a movement away from paralysis and avoidance and moving towards timely engagement within a set of least-worst tasks employed here.

The scenarios utilized were realistic but hypothetical. Real-life high-stakes decisions may include increased physiologically driven arousal, social accountability, and consequential rights that can change emotion and cognition. Field studies and research based upon simulation with consequence-based incentives would provide ecological validity and may reveal different patterns of emotion specificity and persistence of intervention.

Finally, the use of decision time, difficulty, and approach frequency as a latent factor combination is theoretically desirable for the representation of a common decision readiness construct but raises robustness questions as well. To deal with this, we presented results that strongly relate to these issues using indicator level descriptive comparisons (Table 5 and Figure 4) that accompany the results of the latent factor analysis. The indicators show the same direction as the latent factor, which points to the interpretive robustness. Future work should involve formally comparing the results of alternative models in which outcomes are analyzed separately and test whether the effects of interventions stay the same across indicators and measurement specifications.

7- Conclusion

Using a randomized controlled design with Chinese university students, a five-minute mindfulness audio intervention raised state positive affect, as well as the effectiveness of an uncertainty-decision profile (in the form of reduced decision latency, lower perceived decision difficulty, and increased propensity of approach choices). Structural equation modeling further found that positive affect mediates the relationship between mindfulness and decision-making effectiveness to some extent, suggesting that the processes of affective broadening and attenuated reactivity are plausibly proximal mechanisms underlying the relationship between mindfulness and action readiness in least-worst situations. These findings add to the emerging literature on least-worst decision-making by describing an affective mechanism and finding it to be generalizable to a Chinese sample, where cultural norms associated with ideal affect and dialectical reasoning may influence responses to uncertainty. Moreover, this study outlines relative boundary findings, and it was reported that the enhancement in approach behavior of mindfulness is reduced among stronger optimizing trends, which suggests that a stronger drive towards achieving optimal choices may need additional support to enact mindful attention on acceptance and follow-through.

Masterminding, from a practical point of view, the results imply that short and scalable mindfulness prompts can act as real-time decision support tools in an educational or organizational context that is characterized by frequent uncertainty and time pressure. However, the brevity of the intervention and hypotheticality of the scenarios highlight the need for future research that measures durability and ecological validity through longitudinal implementation and active control conditions that are similar to engagement levels and possibly field and/or simulation research involving consequential stakes. Collectively, the evidence suggests that brief mindfulness is a promising and cost-efficient tool for reducing paralysis in uncertain decision-making and improving timely engagement that simultaneously reveals the importance of targeting those who score high on maximization.

7-1- Implications of the Study

The study has several implications for both research and practice settings. First, the data suggest that short mindfulness prompts may act as decision-support mechanisms in the context of uncertain environments with imperfect options and time constraints. Consequently, these kinds of prompts could be used in decision-training curricula, classroom interventions, or preparation routines for high-pressure tasks.

Second, this in turn implied (from the partial mediation through positive affect) an important role for affective processes, which should be directly targeted. Interventions that involve mindfulness in combination with brief inductions of positive emotion, such as, e.g., gratitude or self-compassion prompts, are likely to boost the willingness of people to engage in confronting uncertain circumstances.

Third, moderation by the maximization trait implies the idea that interventions ought to be tailored. Individuals who show high levels of maximization may benefit from specific forms of augmentation to reduce or avoid overthinking and counterfactual thinking, such as the use of satisficing-oriented reappraisal strategies or certain training strategies that explicitly teach decision rules to specify acceptable decision options in uncertain situations.

7-2- Limitations

There are various drawbacks of the current study that should be given due attention. First and foremost, the intervention was of a short nature and can only be termed as a state-level change and not a trait-level change. Therefore, the reported effects might be short-lived unless there is a repeated exposure, and the five-minute prompt employed in this case cannot be compared with properly developed multi-session programs of mindfulness. Second, on the basis of controls on duration, the control audio itself might have varied significantly in the extent to which it was able to engage participants or elicit task-related boredom. Third, the situations used were hypothetical. Despite the aim to be realistic, in reality high-stakes decisions that take place in the real world are more likely to have high levels of arousal, responsibility, and consequential consequences, and this is a constraint to ecological validity. Fourth, there was measurement of positive affect through a general composite index, which might blur the distinction between specific positive emotions and degree of arousal. Last but not least is the latent decision-effectiveness factor, which is parsimonious but only signifies one of the modeling methods and may not encompass all factors of readiness to make decisions.

7-3- Future Research Directions

Future research ought to investigate application dose relationships, effect habituality, and cross-settings transferability using designs with repeated implementation of the interventions. Future studies must incorporate the direct measures of participant engagement and apply the active control conditions that are closer to anticipating expectancy and attentional demands. To find out the extent to which the observed affective mechanisms would be applicable to situations with real decision consequences, simulation-based or field studies are required. In continued research, the discrete positive emotions, e.g., calmness and enthusiasm, should then be unpacked to understand emotion-selective mechanisms and determine whether the cultural ideals of affect can determine predictive validity. Besides this, future studies are also advised to engage in direct comparisons across the rival measurement and structural models, such as genetic models, tests of measurement non-invariance, and formal model comparison procedures, to determine the indicators that are the most sensitive to mindfulness interventions and the ones that are the most predictive of real-world performance.

8- Declarations

8-1- Author Contributions

Conceptualization, S.A.P. and N.A.N.; methodology, Y.D., S.A.P., and N.A.N.; software, N.A.N.; validation, S.A.P. and N.A.N.; formal analysis, Y.D. and H. L.; investigation, Y.D. and H. L.; resources, S.A.P. and N.A.N.; data curation, Y.D., H.L., and S.A.P.; writing—original draft preparation, Y.D. and H.L.; writing—review and editing, S.A.P. and N.A.N.; visualization, H.L.; supervision, S.A.P. and N.A.N.; project administration, S.A.P. and N.A.N. All authors have read and agreed to the published version of the manuscript.

8-2- Data Availability Statement

The data presented in this study are available on request from the corresponding author.

8-3- Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

8-4- Institutional Review Board Statement

Not applicable.

8-5- Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

8-6- Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

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