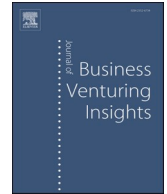




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Short-term mindfulness meditation training improves antecedents of opportunity recognition

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ABSTRACT

Entrepreneurial venture creation hinges on opportunity recognition, which is enabled by malleable cognitive characteristics such as alertness, creativity, and entrepreneurial self-efficacy. Meditation presents a promising strategy for cultivating these antecedents. In two studies, we examined the immediate effects of meditation on the antecedents of opportunity recognition. In Study 1, a 12-min guided meditation was administered to nascent entrepreneurs in a pre-post within-subjects experimental design. In Study 2, a 15-min breath counting task was used to assess how variations in accuracy and breathing rate shaped differences in outcomes. We found that the intervention in Study 1 had a small effect on alertness ($d = 0.44$), a medium effect on creativity ($d = 0.79$), and a large effect on entrepreneurial self-efficacy ($d = 0.93$). Study 2 revealed a more nuanced relationship, whereby faster breathing rates predicted greater counting accuracy and alertness; in contrast, slower breathing rates and more frequent mind-wandering predicted greater uniqueness in the generated ideas. These findings suggest that meditation is useful for nascent entrepreneurs to prime their minds for successful opportunity recognition. The improvement in creativity may not solely be due to meditative practice itself but rather to the periods of mind-wandering that occur during the practice.

1. Introduction

Entrepreneurial opportunities are “situations in which new goods, services, raw materials, and organizing methods can be introduced and sold at greater than their cost of production” (Shane and Venkataraman, 2000, p. 220). They constitute the starting point of entrepreneurial activity, signifying the importance of nascent entrepreneurs’ ability to recognize them (Busenitz et al., 2003). Successful opportunity recognition (OR) relies on a purposeful perception and effective evaluation, and research suggests that improvements in attention and cognition may enhance an individual’s ability to perform this critical entrepreneurial skill. Mindfulness meditation is a deliberate practice aimed at achieving a state of awareness where attention is directed toward present-moment experiences without judgment or interference (Brown and Ryan, 2003; Dane, 2011; Kabat-Zinn, 1990; Lutz et al., 2008); it can enhance various domains of attention (Sumantry and Stewart, 2021) and cognition (Chiesa et al., 2011; Gallant, 2016). The present study aims to elucidate whether the state effects occasioned by mindfulness meditation affect those attentional or cognitive personal characteristics that promote successful OR; these characteristics include alertness, creativity, and self-efficacy.

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2. Theoretical background

2.1. Alertness

Entrepreneurial alertness describes an individual's "propensity to notice and be sensitive to information about objects, incidents, and patterns of behavior in the environment, with special sensitivity to maker and user problems, unmet needs and interests, and novel combinations of resources" (Ray and Cardozo, 1996, p. 10); it represents a mode of attention that enables the recognition of opportunities without engaging in an active search for it (Ardichvili et al., 2003; Kirzner, 1979). Mindfulness involves attending to the entirety of one's immediate experience without accentuating one's desires or suppressing one's aversions. Its practice creates an attentional gap between stimulus and response (Bargh and Chartrand, 1999; Kang et al., 2013), reducing emotional bias (Roemer et al., 2015) and fostering self-detached thinking (Farb et al., 2007). In turn, mindfulness minimizes mind-wandering (Brewer et al., 2011; Hasenkamp et al., 2012), decreases distractibility (Y.-Y. Tang et al., 2007), and improves attentional stability (Mrazek et al., 2012; Valentine and Sweet, 1999). Therefore, mindful individuals may be better equipped to notice seemingly unrelated information in their surroundings and spontaneously recognize entrepreneurial opportunities.

Hypothesis 1. State effects following a mindfulness exercise increase alertness.

2.2. Creativity

Creativity describes the ability to generate a diverse set of novel approaches or solutions to a given stimulus or challenge (Amabile, 1997; Guilford, 1967). In the entrepreneurial context, this involves either finding non-obvious associations between problems and solutions or recombining available resources in a novel and non-obvious way (Ray and Cardozo, 1996), underlining the importance of creativity to the entrepreneurial process (Endres and Woods, 2007). Mindfulness training can enhance the ability to overcome habitual responses (e.g., Kang et al., 2013) and reduce fear of judgment (e.g., Carson and Langer, 2006); in turn, it can improve creative performance (e.g., Ding et al., 2014) and insight problem solving (e.g., Ostafin and Kassman, 2012). Research suggests that even a single mindfulness meditation session can benefit creativity (Colzato et al., 2012). Thus, more mindful individuals may possess a heightened capacity for generating a wider array of original and unique solutions (Lebuda et al., 2016).

Hypothesis 2. State effects following a mindfulness exercise increase creativity.

2.3. Self-efficacy

Self-efficacy describes "people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (Bandura, 1994, pp. 71–72). These general beliefs inform the development of ambitious goals and drive consistent action in their pursuit, elevating motivation and responsiveness and thus explaining their correlation with performance (Bandura, 2012). Thus, self-efficacy may explain the gap between entrepreneurial intentions and actions (Rauch and Frese, 2007). While self-efficacy pertains to a person's overarching conviction, it can also encompass domain-specific abilities, such as entrepreneurial capability. Possessing a high degree of trust in one's entrepreneurial abilities not only enhances the appraisal of opportunities but also increases the perception of potential gains while minimizing perceived risks (Krueger and Dickson, 1994) and has been linked to successful OR (Krueger and Brazeal, 1994). Mindful individuals exhibit better behavioral regulation (Ostafin et al., 2015), allowing them to gain an advantage from a longer mental gap between a situation and their response to it through equanimous observation of their experiences (Brown et al., 2007). By fostering a greater sense of agency over their emotions, cognitions, and behaviors, mindfulness may also enhance trust in one's abilities to execute necessary actions effectively.

Hypothesis 3. State effects following a mindfulness exercise increase entrepreneurial self-efficacy.

3. Materials and method

3.1. Study 1

3.1.1. Sample

The sample consisted of $N = 33$ nascent entrepreneurs (see Reynolds, 1997) aged 21–29 years ($M = 24.97$, $SD = 1.98$; 11 female, 22 male), all of whom were enrolled in a two-year implementation-based course on entrepreneurship. The course required participants to recognize and pitch their ideas, then form founder teams to pursue their chosen ideas over an 18-month period during which they created a business plan, developed a product or service, and marketed it. Informed consent was obtained before the experiment; participation was voluntary.

3.1.2. Measures

Creativity was assessed using the Alternative Uses Task (AUT; Guilford, 1967). Subjects were shown ordinary objects for which they had to list unusual ways of using them. They received one point for each use (*fluency*, baseline Cronbach's $\alpha = 0.78$), one point for each category of uses (*flexibility*, $\alpha = 0.76$), one or two points if a use was listed by less than 5% or 1% of participants, respectively (*originality*, $\alpha = 0.76$), and one point for each mention of a context (*elaboration*, $\alpha = 0.73$). In the present study, the stimuli comprised a tire, a newspaper, a rope, and a button; visual aids were printed onto the questionnaire. The AUT's overall internal consistency reliability was $\alpha = 0.81$. The items were chosen to be different enough from each other to inspire dissimilar uses. Participants were allowed 3 min to complete the task for each item.

Entrepreneurial self-efficacy (ESE) was assessed using the 19-item ESE scale (McGee et al., 2009). The scale is a multifactorial measure comprised of searching ($\alpha = 0.73$), planning ($\alpha = 0.74$), marshalling ($\alpha = 0.71$), implementing-people ($\alpha = 0.77$), and

implementing-financial ($\alpha = 0.81$). The scale's overall reliability was $\alpha = 0.80$. An exemplary item of the searching subscale asks "How much confidence do you have in your ability to identify the need for a new product or service?", enabling the measure to capture state-dependent short-term changes in participants' cognition.

Alertness was assessed using the 10-item Toronto Hospital Alertness Test (THAT; Shapiro et al., 2006). The introductory prompt was adapted to refer to the present moment rather than the previous week. The scale's reliability was $\alpha = 0.74$. This measure of general state alertness was chosen instead of a measure of entrepreneurial alertness (e.g., Kaish and Gilad, 1991; J. Tang et al., 2012) because those conceptualized alertness not as a mode of attention but rather as a stable trait approximated via routine behaviors; responses are unlikely to change within a brief period. An exemplary item states "I feel able to concentrate.", which can reflect state-dependent short-term changes.

3.1.3. Procedure

The participants were administered the AUT, the ESE, and the THAT prior to and after the intervention, which consisted of a 12-min introductory guided meditation session. The session played from an audio file, instructing participants to close their eyes and direct their attention to various sensory perceptions. They were encouraged to return to the exercise non-judgmentally if their mind wandered elsewhere. The instructor guided the participants' attention to their auditory, tactile, and respiratory sensory fields, each including instructions and a period of silent observation. Then, participants were asked to let go of their attentional focus and observe all internal and external perceptions or experiences. Finally, the exercise ended by directing their attention back to the room.

The AUT was administered in a crossover design to account for possible test-retest bias. The pre-intervention and post-intervention measurements involved presenting two objects each to the subjects. In half of the questionnaires, the objects "rope" and "button" were presented before the intervention, followed by "automobile tire" and "newspaper" after the intervention; the sets of objects used before and after the intervention were reversed in the other half, creating two groups, $n_1 = 17$ and $n_2 = 16$. Independent samples *t*-tests failed to attest significant inter-group differences in creativity, both before the intervention, $t(31) = 0.89$, $p = .380$, and afterward, $t(31) = 0.16$, $p = .877$. Both groups' scores were consolidated.

3.1.4. Results

Descriptive statistics on all obtained measurements can be found in Table 1. Differences in mean values (*MD*) between the pre- and post-intervention assessments will be tested via dependent samples *t*-tests; effect sizes will be reported as Cohen's *d* (0.2 = small, 0.5 = medium, 0.8 = large). The results are visualized in Fig. 1.

First, the intervention had a significant, albeit small, effect on alertness, $MD = 3.33$, $t(32) = 2.51$, $p = .018$, $d = 0.44$, lending support for Hypothesis 1. Second, the intervention had medium effects on overall creativity, $MD = 5.25$, $t(32) = 4.55$, $p < .001$, $d = 0.79$, and on its dimension of fluency, $MD = 1.67$, $t(32) = 3.11$, $p = .004$, $d = 0.54$; it had a small effect on flexibility, $MD = 1.49$, $t(32) = 2.49$, $p = .018$, $d = 0.43$, no significant effect on originality, $MD = 0.52$, $t(32) = 1.64$, $p = .111$, $d = 0.29$, and a medium effect on elaboration, $MD = 1.58$, $t(32) = 4.27$, $p < .001$, $d = 0.75$. Thus, the intervention positively affected overall creativity and three of its four dimensions, supporting Hypothesis 2. Third, the intervention had a large effect on the overall ESE score, $MD = 0.27$, $t(32) = 5.50$, $p < .001$, $d = 0.93$, a medium effect on searching, $MD = 0.30$, $t(32) = 4.23$, $p < .001$, $d = 0.73$, no significant effect on planning, $MD = 0.17$, $t(32) = 1.89$, $p = .067$, $d = 0.32$, a medium effect on marshalling, $MD = 0.30$, $t(32) = 3.56$, $p = .001$, $d = 0.61$, a medium effect on implementing-people, $MD = 0.35$, $t(32) = 4.47$, $p < .001$, $d = 0.78$, and a small effect on implementing-financial, $MD = 0.19$, $t(32) = 2.54$, $p = .016$, $d = 0.44$. The intervention positively affected overall ESE and four of its five dimensions, supporting Hypothesis 3.

3.2. Study 2

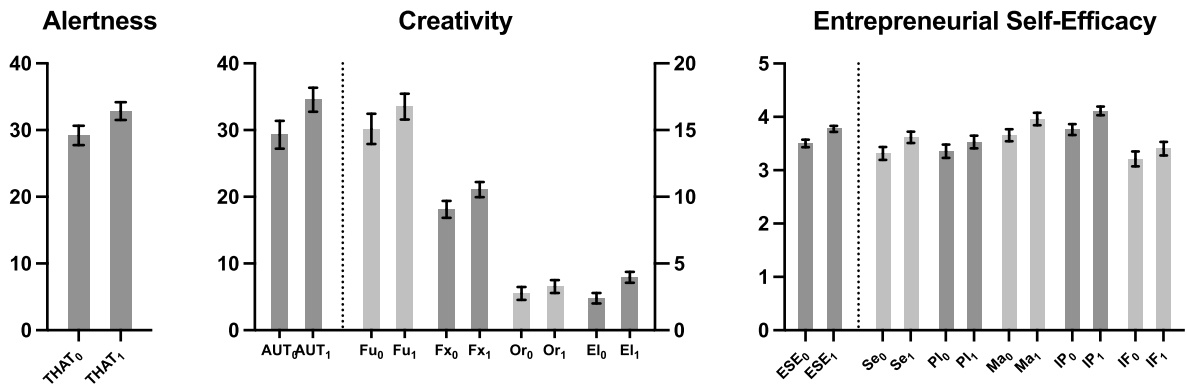
3.2.1. Sample

While Study 1 yielded encouraging results, its validity is called into question by the uncertainty of participants' adherence to the prescribed protocol and potential contamination by alternative mental activities. To shed greater light on the influence of inter-individual variations in meditative experience on the investigated antecedents, we pursued a follow-up study with $N = 54$

Table 1
Descriptive statistics of all scales and subscales used in study 1.

Variable	Pre-Intervention		Post-Intervention		Cohen's <i>d</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Overall Alertness	28.61	6.76	31.94	6.78	0.44	*
Overall Creativity	29.30	12.03	34.55	10.38	0.79	***
Fluency	15.09	6.52	16.76	5.51	0.54	**
Flexibility	9.06	3.65	10.55	3.26	0.43	*
Originality	2.76	2.78	3.27	2.74	0.29	
Elaboration	2.39	2.26	3.97	2.37	0.75	***
Overall ESE	3.50	0.42	3.78	0.33	0.93	***
Searching	3.31	0.69	3.62	0.60	0.73	***
Planning	3.36	0.73	3.53	0.69	0.32	
Marshalling	3.66	0.65	3.96	0.67	0.61	**
Implementing-People	3.76	0.58	4.11	0.47	0.78	***
Implementing-Financial	3.21	0.81	3.40	0.73	0.44	**

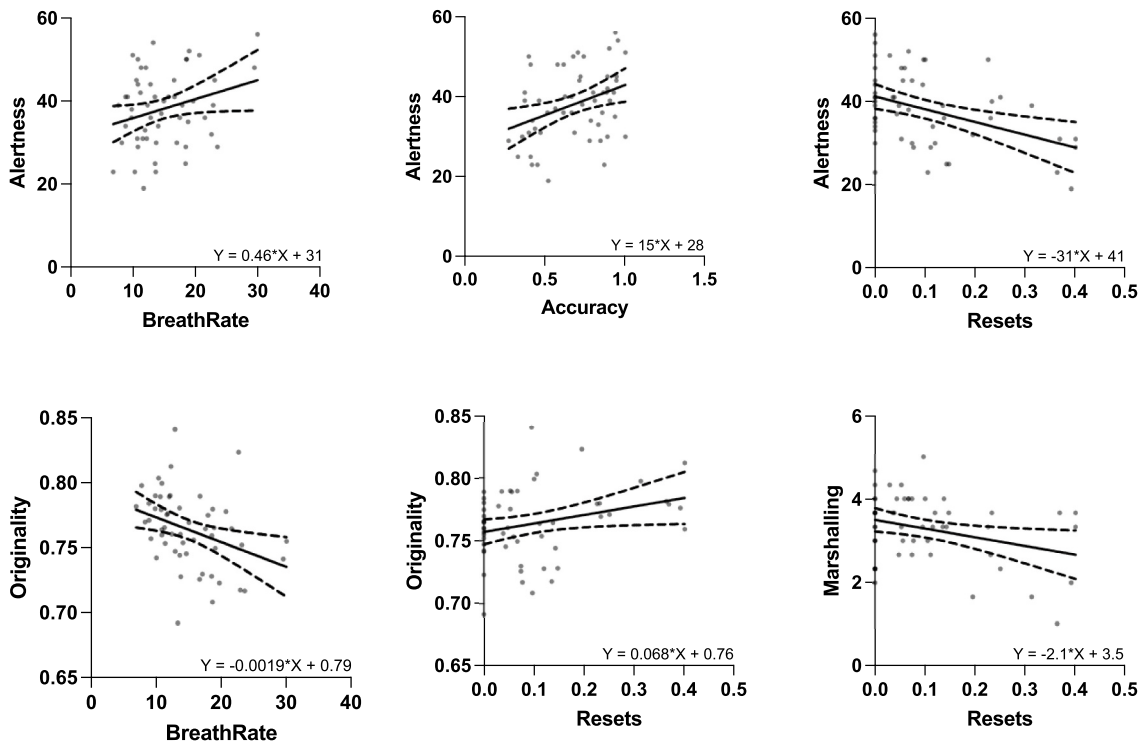
Note. $N = 33$. * $p < .05$. ** $p < .01$. *** $p < .001$.



Note. Comparison of pre- and post-intervention measures (demarcated by subscript 0 and 1, respectively) on the dependent variables and their subdimensions. Error bars represent one standard error of the mean. THAT = Toronto Hospital Alertness Test total score. AUT = Alternate Uses Test total score, Fu = Fluency, Fx = Flexibility, Or = Originality, El = Elaboration. ESE = Entrepreneurial Self-Efficacy mean score, Se = Searching, PI = Planning, Ma = Marshalling, IP = Implementing-people, IF = Implementing-financial.

Fig. 1. Pre-post comparison for study 1.

individuals aged 20–48 years ($M = 30.04, SD = 8.01$; 25 female, 29 male). The participants were recruited via www.prolific.co, which has been shown to yield satisfactory data quality (Peer et al., 2017; Peer et al., 2021). Participants were pre-screened for prior meditative experience to ensure their familiarity with the practice. Further, the use of objective instruments like the BCT and the AUT facilitated the identification and removal of dishonest respondents. Informed consent was obtained before the experiment;



Note. Scatter plots and linear regression lines for correlations between meditation intensity and antecedents of opportunity recognition. Regression lines are plotted with 95% confidence intervals. All $ps < .05$.

Fig. 2. Correlations between meditation intensity and antecedents of opportunity recognition.

participation was voluntary.

3.2.2. Measures & procedure

Creativity, entrepreneurial self-efficacy, and alertness were again assessed using the AUT, ESE, and THAT (see Section 3.1.2.). The data were collected immediately after participants performed a 15-min breathing meditation, which was implemented by participants completing a computerized breath counting task (BCT; see Levinson et al., 2014). Participants were instructed to count their breaths from 1 to 8 with one button and to signal the completion of a cycle by pressing another button once they reached 9. The task yielded four distinct metrics (see Wong et al., 2018): *breathing rate* (average breaths per minute), *accuracy* (proportion of cycles ended on 9), *miscounts* (proportion of cycles ended incorrectly), and *resets* (proportion of cycles where participants indicated a loss of count via pressing of a third button). The BCT was implemented using PsyToolkit (Stoet, 2010, 2017). Further, to score the AUT more objectively, we applied latent semantic analysis (Dumas et al., 2021) using the Open Creativity Scoring website (Organisciak and Dumas, 2020).

3.2.3. Results

To identify the degree to which performance on the BCT predicted creativity, entrepreneurial self-efficacy, and alertness, we computed Pearson correlations and linear regressions. First, the participants' breath rate correlated positively with alertness, $r = 0.27$, $p = .050$, and negatively with the originality dimension of the AUT, $r = -0.35$, $p = .010$. Further, accuracy correlated positively with alertness, $r = 0.36$, $p = .008$. No significant correlations were found between miscounts and any outcome. Furthermore, reset rate was negatively related to alertness, $r = -0.41$, $p = .002$, positively associated with originality, $r = 0.28$, $p = .039$, and negatively linked to the marshalling dimension of self-efficacy, $r = -0.31$, $p = .024$. These correlations are depicted in Fig. 2; the full correlation matrix can be found in the Appendix.

4. Discussion

4.1. Findings

The present study hypothesized that state effects obtained from short-term guided mindfulness meditation training significantly improved three cognitive antecedents of successful entrepreneurial OR, namely alertness (Hypothesis 1), creativity (Hypothesis 2), and entrepreneurial self-efficacy (Hypothesis 3). The intervention in Study 1 occasioned improvements in all three variables' overall scores and differentiated effects on various subdimensions; the results convincingly supported all three hypotheses. Study 2 yielded a more nuanced picture of differential effects linked to interpersonal differences in meditation intensity.

4.1.1. Effects on alertness

The intervention in Study 1 had a small, yet significant, effect on alertness; subjects were slightly more in control of their attentional resources following the intervention. Meditation is a process of steering one's attention and awareness (Lutz et al., 2008) that can make attentional control both more effective (Wadlinger and Isaacowitz, 2011) and more efficient (Kozasa et al., 2012; Slagter et al., 2007). Study 2 revealed that greater alertness correlated with a faster breathing rate and greater task performance in terms of accuracy and resets. The respiratory and autonomic nervous systems are firmly linked, where slow breathing is associated with parasympathetic activation and relaxation, whereas fast breathing is associated with sympathetic activation and wakefulness (Ashhad et al., 2022). The latter two observations suggest that alert attention through faster breathing enabled the ability to sustain attention to be focused on the task and be less liable to mind-wandering.

4.1.2. Effects on creativity

Further dissecting the significant medium-sized effect of the intervention on overall creativity in Study 1, we observed medium-sized effects on fluency and elaboration as well as a small effect on flexibility. Following the intervention, subjects listed more possible uses for each item, drew from a more diverse array of categories, described the uses in greater detail, and gave more contextual information. Meditation practice gives rise to cognitive processes that promote open awareness and heightened sensitivity, which are beneficial to creativity (Horan, 2009), e.g., by reducing the tendency to react to stimuli in habitual patterns (Kang et al., 2013; Ostafin and Kassman, 2012) and lowering social comparison (Langer et al., 2010). These changes are typically accompanied by multifaceted improvements in cognitive functioning (Chiesa et al., 2011; Gallant, 2016). Taken together, these findings may explain the findings of increased creativity in Study 1. There was no effect on the dimension of originality; the intervention did not affect the degree of uniqueness or novelty of responses compared to the other subjects' responses. Based on Guilford (1967), one or two points are to be awarded if no more than 5% or 1% of participants have listed the same use, respectively. Due to the sample size, one point was awarded if no more than one other participant had listed the same use, whereas awarding two points was not applicable. Besides, the participants were only allowed 3 min to complete the task, a widely used yet relatively short duration that may have biased the experiment to yield more obvious responses. In Study 2, only originality among the dimensions of creativity varied with participants' task performance. Interestingly, while there is a strong theoretical link between alertness and opportunity recognition (Kirzner, 1979), Study 2 indicated that a faster breathing rate was linked to greater alertness but simultaneously reduced originality of the created responses. Inversely, we found that more frequent mind-wandering during the task, as indicated by the reset rate, enabled ideas that were more semantically distant from the prompted item. Thus, greater alertness may actually hamper attempts to generate uncommon and innovative solutions to a given problem, calling for further investigation into meditative practices involving a divergent attentional breadth rather than its convergent focus.

4.1.3. Effects on entrepreneurial self-efficacy

Granularizing the significant and large effect that the intervention exerted on overall ESE in Study 1, we observed a significant medium-sized effect on the dimension of searching; the training bolstered participants' beliefs in their abilities to recognize entrepreneurial opportunities successfully and to develop an innovative product or service. OR has been conceptualized as a form of pattern recognition (Baron and Ensley, 2006), a skill that can be improved through mindfulness via its effects on metacognition (Jankowski and Holas, 2014), i.e., the ability to reflect upon and adapt one's thinking processes (Schooler, 2002). Thereby, mindfulness may reduce cognitive biases stemming from past experiences or negative emotional states and make individuals more open to considering novel information (see Gordon and King Schaller, 2014). Notably, there was no significant effect on planning; the intervention did not affect the subjects' trust in their abilities to evaluate an idea and transform it into a business plan. This dimension might benefit from utilizing a more convergent mode of thinking (e.g., Kaufman and Beghetto, 2009). However, mindfulness meditation broadens one's awareness and might predominantly promote divergent thinking instead. The analysis of marshalling and implementing-people indicated medium-sized effects on the subjects' trust in their abilities to interact with other individuals purposefully. Not only did they have more trust in themselves to be able to inspire followers and supporters to assist in launching the venture, but also to recruit, train, and manage employees effectively once the business was established. This observation might rest on the positive effects of mindfulness on interpersonal relationships via improved communication due to increased empathy and compassion (Condon et al., 2013; Dekeyser et al., 2008). Lastly, there was a small effect on implementing-financial, that is, the organization and management of financial assets and records. These improvements may be due to enhanced cognitive abilities (Gallant, 2016), but similar to the dimension of planning, an intervention facilitating convergent thinking rather than divergent thinking might be better suited to bolster this dimension. In Study 2, the effects of the meditation intervention were narrower, with more frequent mind-wandering being linked to lower trust in one's ability to network with others and inspire them with a vision.

4.2. Limitations and future research directions

First, despite the notion that strengthening antecedents of OR will improve OR itself, the existing literature lacks a comprehensive list of antecedents and a quantifiable evaluation of their impact. Hence, future research should delve into the cognitive mechanisms of OR to create a tool for measuring OR as an immediate ability instead of approximating it through its antecedents. Second, future research might utilize a larger sample and assess additional control variables like other antecedents of OR or prior experience in mindfulness practice to identify possible inter-group differences. The within-subjects design employed in Study 1 may have been susceptible to test-retest bias. The results in Study 2 were more nuanced and inconclusive. Future research should employ a randomized controlled longitudinal intervention study and an active control condition, as experienced meditators often practice meditation when idle (Y.-Y. Tang et al., 2015). Additionally, the evidence of long-term structural brain changes through continued meditation practice needs further examination, as a recent study failed to replicate such physiological training effects (Kral et al., 2022). Fourth, the breath counting task (Levinson et al., 2014) is a promising objective assessment tool that can be conducted during meditation, yet it only approximates the participant's actual cognitive engagement with the task. Further research using techniques such as electroencephalography or functional near-infrared spectroscopy may provide a more comprehensive picture and aid in determining the duration of state effects.

4.3. Practical implications

The results suggest that aspiring entrepreneurs can augment their pursuit of entrepreneurial ventures by incorporating a meditative practice before actively searching for opportunities. This study offers valuable insights into how meditation can enhance self-efficacy and improve collaboration skills, critical attributes for successful venture creation. The mindfulness cultivated through meditation can aid entrepreneurs in building trust with co-founders, securing funding, and leading teams. Hence, entrepreneurs can benefit from conducting a meditative session before interacting with key stakeholders.

Further, leaders and managers of established firms can benefit from cultivating an entrepreneurial mindset. Enhancing their innovation ability can ensure their company's survival amidst today's volatile and ambiguous globalized markets. These outcomes are not limited to entrepreneurs and managers but extend to their employees. The improvement of self-efficacy has been shown to positively impact individual performance (Stajkovic and Luthans, 1998), thereby contributing to organizational efficacy. High self-regulatory capacities can steer employees towards prioritizing long-term goals over immediate gratification (Y.-Y. Tang et al., 2015). Enhanced communication and collaboration skills can raise sales personnel's performance or customer service representatives' empathy. Communication extends beyond interpersonal interactions, as businesses communicate with their customers through marketing. By improving communication and creativity through meditation, employees can better understand and respond to the needs of their target audience, thus positively shaping customer perception and enhancing the company's reputation. Furthermore, incorporating meditation into the corporate culture can foster a more supportive and harmonious workplace dynamic by enhancing interpersonal communication among leaders and employees.

5. Conclusion

This work aimed to elucidate whether short-term mindfulness meditation training affected the ability to recognize entrepreneurial opportunities. Participants in Study 1 benefited from improvements in three antecedents of opportunity recognition, namely alertness, creativity, and entrepreneurial self-efficacy, suggesting trickle-down improvements in opportunity recognition caused by the intervention. In Study 2, we added more detail to this picture by revealing that alertness may actually impede creativity, suggesting that mindfulness may exert its effects by creating a space for mind-wandering to occur. Thus, we propose mindfulness meditation as an

implementable strategy in the repertoires of nascent entrepreneurs and innovators; it could fertilize the soil from which the entrepreneurial process sprouts. Considering the study's limitations, further research into practices that open rather than focus alertness is needed to confirm this promising proposal.

Credit authorship roles

Sebastian Moder: Conceptualization, Methodology, Investigation, Data curation, Formal analysis, Writing – original draft, Visualization. Elias Jehle: Methodology, Investigation, Writing – review & editing. Marco Furtner: Conceptualization, Methodology, Validation, Writing – review & editing, Supervision. Sascha Kraus: Resources, Writing – review & editing, Supervision, Project administration

Declaration of competing interest

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

Appendix A

Table 2

Means, standard deviations, and correlations in Study 2.

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Breath Rate	14.89	5.23													
2. Accuracy	0.68	0.21	.17												
3. Miscounts	0.22	0.16	-.07	-.83**											
4. Resets	0.10	0.12	-.21	-.64**	.11										
5. Alertness	38.13	8.91	.27*	.36**	-.17	-.41**									
6. ESE	3.19	0.57	.09	.11	.04	-.25	.59**								
7. Searching	3.15	0.77	.23	.17	-.14	-.12	.49**	.59**							
8. Planning	2.78	0.65	.19	.00	.05	-.08	.41**	.72**	.45**						
9. Marshalling	3.29	0.81	.17	.13	.05	-.31*	.44**	.81**	.41**	.53**					
10. Imp.-Peo.	3.48	0.76	-.07	.02	.08	-.15	.42**	.83**	.30*	.47**	.65**				
11. Imp.-Fin.	3.11	1.05	-.06	.10	.05	-.23	.37**	.62**	.15	.24	.35**	.37**			
12. Fluency	8.32	2.56	-.08	-.09	-.01	.17	-.00	.10	.06	.09	-.07	.22	-.01		
13. Originality	0.76	0.03	-.35*	-.25	.11	.28*	-.13	-.12	.03	-.21	-.28*	.02	-.06	.15	
14. Elaboration	2.07	0.57	-.21	-.05	.03	.05	-.15	-.08	-.01	-.26	-.08	-.10	.13	-.12	.02

Note. N = 54.

*p < .05. **p < .01.

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