

**Absorption and Mindfulness Reflect Distinct Patterns of Attentional Control and
Self-Related Processing**

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Abstract

Absorption and mindfulness are personality traits associated with experiencing states of highly-focused attention. Despite this apparent commonality, these two traits have rarely been directly compared, and little is known about what differentiates absorbed from mindful states. The present study explored how individual differences in the cognitive processes of attentional control and self-related processing relate to absorption and mindfulness. Participants completed four self-report measures assessing absorption, mindfulness, style of attentional control over internal/external stimuli, and self-related processing. Absorption and mindfulness were negatively correlated in our sample. Absorption was predicted by a propensity for stimulus-driven attention to external stimuli and frequent engagement in self-reflection without gaining insight into those reflections. Mindfulness was predicted by a propensity for goal-driven attentional control over external stimuli and a tendency to engage in insightful self-reflective processing. Our findings can inform research efforts to further elucidate cognitive mechanisms underlying the relationships of absorption and mindfulness with mental health.

Absorption and Mindfulness Reflect Distinct Patterns of Attentional Control and Self-Related Processing

Absorption and mindfulness are personality traits that represent different modes of attending to the world. Absorption refers to states of heightened focus on a single object of attention, with reduced awareness of, and attention to, other stimuli in the environment (Tellegen & Atkinson, 1974). Mindfulness refers to a nonjudgmental focus on thoughts and sensations as they occur, with an openness to moment-to-moment shifting of attention between those experiences (Kabat-Zinn, 2003). While both reflect a propensity for focusing attention, the two traits are sometimes negatively correlated with each other (e.g., Brown & Ryan, 2003) and sometimes positively correlated (e.g., J. Grant et al., 2013), depending on the measure of mindfulness being used. Furthermore, absorption and mindfulness have been shown to have drastically different relationships with mental health. While absorption is associated with psychotic experiences including hallucinations and delusions (Rosen et al., 2017), mindfulness is associated with symptom improvement (e.g., reduced anxiety symptoms following mindfulness-based therapy; Hölzel et al., 2013) and better psychological well-being (Brown & Ryan, 2003). The inconsistent relationship between absorption and mindfulness and their varied relationships with mental health highlight the need for further elucidating the underlying cognitive processes that may contribute to the experience of absorbed vs. mindful states.

Cognitive Processes of Interest

One important way in which absorption may differ from mindfulness is with respect to how attention is directed externally toward the environment and internally toward the self. Tellegen and Atkinson's (1974) definition of absorption emphasizes altered states of processing reality which include applying "self-like" qualities to objects of attention at the exclusion of other elements of the environment, and maladaptive forms of self-absorption have been associated with psychoses such as schizophrenia (Kállai et al., 2021). Mindfulness emphasizes moment-to-moment awareness of the self as the subject of ongoing experience (i.e., awareness of experiential self; Baer, 2009), and experiential self-focus has been associated with positive mental health outcomes such as increased specificity of autobiographical memories in individuals with depression (Watkins & Teasdale, 2004). Thus, the present study focused on attentional control and self-related processing as individual differences in cognition that may be differentially associated with absorption and mindfulness. Distinguishing aspects of attentional control and self-related processing that are similar/dissimilar between absorption and mindfulness within one sample of participants will help further elucidate the relationship between the two traits, which can shed light on the nature of attention-based interventions that may prove beneficial for individuals with psychosis.

Attentional control refers to the ability to focus and shift attention (Posner, 1980). Attention can be directed in a stimulus-driven ("bottom-up") or goal-driven ("top-down") manner, while being externally-oriented toward the surrounding environment or internally-oriented toward mental activities. Stimulus-driven attention is characterized by the spontaneous,

involuntary capture of attention by either external (e.g., turning one's head to a sudden noise) or internal stimuli (e.g., distraction by intrusive thoughts). Goal-driven attention reflects the ability to volitionally direct one's attentional resources to either external (e.g., checking the median of a freeway for a police officer) or internal stimuli (e.g., focusing on a mental checklist while packing for vacation). Self-related processing refers to a collection of processes by which an incoming stimulus is evaluated in relation to the self (Northoff, 2011). Although both attentional control and self-related processing have received consideration in research on absorption and mindfulness, it remains unclear whether they differentially predict absorbed or mindful tendencies.

Absorption, Mindfulness, and Attentional Control

Existing studies suggest contradictory relationships between absorption and attentional control. For example, Qualls and Sheehan (1981) found that presenting high-absorption individuals with sensory biofeedback about muscle tension (i.e., a series of clicking sounds reflecting their current level of frontalis muscle tension) significantly impaired their ability to relax the muscle relative to when no such feedback was provided. Qualls and Sheehan posited that the external sensory feedback created a stimulus-driven attentional demand that interfered with the natural tendency of high-absorption individuals to use self-generated mental imagery (e.g., relaxing thoughts and images) as a relaxation technique, suggesting a potential association between absorption and higher levels of stimulus-driven attention to external stimuli. In comparison, Richards et al. (2014) found that participants who experienced inattention blindness (i.e., a failure to notice a salient, plainly visible object when attention is deployed elsewhere; Mack & Rock, 1998) had higher absorption scores compared to those who did not experience inattention blindness, and that the experience of inattention blindness among high-absorption participants was accounted for by their lower working memory capacity. These findings suggest that absorption may be associated with lower rather than higher levels of stimulus-driven attention to external stimuli, which may, in part, be driven by high absorption individuals' having fewer cognitive resources available to process incoming stimuli.

Current literature on mindfulness suggests a positive relationship between mindfulness and goal-driven attention. Moore and Malinowski (2009) reported that mindfulness meditators made fewer errors on tests of goal-directed attention (e.g., the Stroop task) than non-meditators, with higher self-reported mindfulness across the entire sample being associated with fewer errors. Similarly, Jha et al. (2007) demonstrated that performance on the orienting measure of the Attention Network Test, a measure of voluntarily directing attention to a visual stimulus, was enhanced by mindfulness meditation training. Trait mindfulness has also been positively associated with performance on sustained attention tasks (e.g., Ruocco & Direkoglu, 2013).

To our knowledge, no previous research has directly explored whether absorption and mindfulness differentially relate to attentional control over external and internal information. To address this gap, we used the Attentional Styles Questionnaire (ASQ; Van Calster et al., 2018) which assesses individuals' stimulus-driven vs. goal-driven attentional control styles, oriented either externally toward the environment or internally toward mentations. The ASQ comprises

two subscales reflecting the external vs. internal orientations of attention, with higher scores on either scale indicating a propensity for stimulus-driven attention and lower scores indicating a propensity for goal-driven attentional control. Van Calster et al. reported that the internal attention subscale predicted other indirect measures of internal attentional control (e.g., rumination) while the external attention subscale predicted general self-reported attentional control abilities. Given the contradictory findings relating absorption to attentional control, we made no a priori prediction for how absorption would be associated with attentional control (Exploratory 1). Based on consistent findings relating mindfulness to goal-driven attentional control, we hypothesized that mindfulness would be predicted by propensities for goal-driven attentional control over both external and internal stimuli (Hypothesis 1).

Absorption, Mindfulness, and Self-Related Processing

In separate investigations and across different theoretical definitions, absorption and mindfulness have both been associated with self-related processing. For absorption, Tellegen and Atkinson (1974) originally suggested that absorption can result in “an empathically altered sense of self” (p. 268), and others have proposed that absorption involves a deep engagement with the self (e.g., Roche & McConkey, 1990). Indeed, a recent study found a positive association between absorption and excessive, sustained self-awareness (i.e., self-absorption; Perona-Garcelán et al., 2013).

The relationship between mindfulness and self-related processing is more complicated. Neuroimaging studies have shown that mindfulness is associated with the down-regulation of cognitively effortful self-related processing (Berkovich-Ohana et al., 2012) and reduced activation in brain regions supporting self-related processing (Farb et al., 2007). In comparison, using self-report measures, Harrington and colleagues (2014) found that mindfulness was positively associated with self-reflection (i.e., the inspection/evaluation of one’s thoughts, feelings, and behaviors) and self-insight (i.e., the clarity of understanding of one’s thoughts, feelings, and behaviors).

To examine whether self-related processing differentially relates to absorption and mindfulness, we used the self-reflection/insight scale (SRIS; A. Grant et al., 2002) which comprises two subscales: self-reflection and self-insight. Grant et al. reported that self-reflection was positively correlated with measures of private self-consciousness, stress, and anxiety. Self-insight was positively correlated with measures of cognitive flexibility and self-regulation, and negatively correlated with measures of depression, stress, anxiety, and alexithymia. Based on the previously found positive association between absorption and self-reflective processing (Perona-Garcelán et al., 2013), we hypothesized that absorption would be positively predicted by self-reflection (Hypothesis 2). Given no research directly examining the relationship between absorption and self-insight, we made no a priori prediction for how absorption would be associated with self-insight (Exploratory 2). For mindfulness, we expected both self-reflection and self-insight to positively predict mindfulness, replicating the findings of Harrington et al. (2014) who also used self-report measures (Hypotheses 3 and 4). Table 1 summarizes the hypothesized patterns of relationships of absorption and mindfulness with the measures of

attentional control and self-related processing.

Table 1

Hypothesized patterns of relationships of absorption and mindfulness with attentional control and self-related processing

Attentional Control
Absorption: No a priori prediction (Exploratory 1)
Mindfulness: Mindfulness would be positively predicted by goal-driven attentional control over both internal and external stimuli. (Hypothesis 1)
Self-Related Processing: Self-Reflection
Absorption: Absorption would be positively predicted by self-reflection. (Hypothesis 2)
Mindfulness: Mindfulness would be positively predicted by self-reflection. (Hypothesis 3)
Self-Related Processing: Self-Insight
Absorption: No a priori prediction (Exploratory 2)
Mindfulness: Mindfulness would be positively predicted by self-insight. (Hypothesis 4)

Method

Participants

Participants were 235 self-reported fluent English speakers ($M_{age} = 33.41$ [$SD = 10.21$], 85 females) recruited through Amazon's Mechanical Turk (MTurk). They received US\$2.50 for their participation.

Measures

Modified Tellegen Absorption Scale (MODTAS; Jamieson, 2005)

The MODTAS is a 34-item questionnaire on which participants rate how often they experience certain events (e.g., "I like to watch cloud shapes change in the sky.") on a 5-point scale (0 = Never, 4 = Very Often). Higher total scores indicate higher levels of absorption. In our sample, the internal consistency was $\alpha = .96$. Our use of the MODTAS was guided by its improved psychometric properties over the original Tellegen Absorption Scale (Tellegen & Atkinson, 1974).

Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003)

The MAAS is a 15-item questionnaire on which participants rate how often they experience particular scenarios (e.g., "I find myself doing things without paying attention.") on a 6-point scale (1 = Almost Never, 6 = Almost Always).¹ Higher total scores indicate higher levels of dispositional mindfulness. In our sample, the internal consistency was $\alpha = .94$. Our use of the MAAS was based on our interest in individual differences in the mindful control of

¹ We reversed the order of responses from the original MAAS to provide consistency across the four questionnaires. Scoring was subsequently reversed.

attention during everyday activities.

Attentional Styles Questionnaire (ASQ; Van Calster, et al., 2018)

The ASQ is a 12-item questionnaire on which participants rate their agreement with statements about using attentional control on a 6-point scale (1 = Totally Disagree, 6 = Totally Agree). The ASQ comprises two subscales for internally-oriented (ASQ-IN, 7 items; e.g., “During an activity, unrelated thoughts and mental images come to my mind.”) versus externally-oriented attention (ASQ-EX, 5 items; e.g., “I can easily ignore my surroundings.”). For both subscales, total scores reflect a propensity for stimulus-driven versus goal-driven attention, with higher scores reflecting a stronger propensity for stimulus-driven attention. In our sample, the internal consistency was $\alpha = .73$ for ASQ-IN and $\alpha = .76$ for ASQ-EX.

Self-Reflection/Insight Scale (SRIS; A. Grant et al., 2002)

The SRIS is a 20-item questionnaire on which participants rate their tendency to engage in self-reflective behavior on a 6-point scale (1 = Strongly Disagree, 6 = Strongly Agree). The SRIS comprises two subscales: self-reflection (SRIS-SR, 12 items; e.g., “I frequently examine my feelings.”) and self-insight (SRIS-IN, 8 items; e.g., “My behavior often puzzles me.”). Higher total scores indicate higher levels of self-reflection and self-insight. In our sample, the internal consistency was $\alpha = .93$ for SRIS-SR and $\alpha = .84$ for SRIS-IN.

Procedure

After consenting, participants completed the MODTAS, MAAS, ASQ, and SRIS in random order. Within each questionnaire, instructional manipulation checks (IMCs) were added to enhance data quality (Oppenheimer et al., 2009). All participants passed all IMCs. After completing the questionnaires, participants indicated their gender, age, and level of education (on a scale ranging from 1 = “some high school” to 7 = “Ph.D., M.D., J.D., or other advanced professional degree”).

Results

Bivariate Correlations

Table 2 presents raw correlations between all study constructs, along with the correlations between the constructs and demographic variables including age, gender (coded as female = 0; male = 1), and level of education. Absorption was positively correlated with a propensity toward externally-oriented stimulus-driven attention, self-reflection, and level of education, while being negatively correlated with mindfulness, self-insight, and age. Mindfulness was positively correlated with a propensity toward internally- and externally-oriented goal-driven attentional control, self-reflection, self-insight, and age, while being negatively correlated with level of education.

Table 2

Bivariate Correlations between Study Constructs and Demographic Variables

Variable	MODTAS	MAAS	ASQ-IN	ASQ-EX	SRIS-SR	SRIS-IN
1. MODTAS	–					
2. MAAS	-.44**	–				
3. ASQ-IN	.02	-.41**	–			
4. ASQ-EX	.33**	-.73**	.52**	–		
5. SRIS-SR	.30**	.31**	-.23**	-.20**	–	
6. SRIS-IN	-.31**	.77**	-.36**	-.57**	.31**	–
7. Age	-.27**	.18**	.02	-.10	-.16*	.22**
8. Gender	.01	.06	-.07	-.09	.07	.08
9. Education	.15*	-.19**	-.05	.14*	-.03	-.17*

Note: Correlation values represent Pearson coefficients except for coefficients for gender that represent point-biserial coefficients and those for education that represent Spearman’s rank coefficients. * $p < .05$, ** $p < .01$. MODTAS = absorption; MAAS = mindfulness; ASQ-IN = internal attentional control; ASQ-EX = external attentional control; SRIS-SR = self-reflection; SRIS-IN = self-insight.

Predictors of Absorption and Mindfulness

To determine whether individual differences in attentional control and self-related processing differentially predict absorption and mindfulness, we ran a multiple linear regression analysis separately for each trait, while controlling for age, gender, and level of education. Within the same block, we entered each subscale with a significant correlation with the dependent measure as the predictors.

First, we regressed absorption scores on externally-oriented attentional control, self-reflection, and self-insight. The model was significant, $F(7, 227) = 15.84, p < .001, R^2 = .33$. While we made no a priori predictions regarding how absorption would relate to attentional control and self-insight (Exploratory 1 and 2), we found that absorption was predicted by greater externally-oriented stimulus-driven attention and lower self-insight. In addition, in line with our Hypothesis 2, absorption was positively predicted by self-reflection (Table 3).

Table 3

Multiple Linear Regression on Absorption (Total MODTAS) Scores

Predictor	<i>t</i>	<i>p</i>	β	<i>F</i>	<i>df</i>	<i>p</i>	R^2
Overall Model				15.84	7, 227	< .001	.33
ASQ-EX	3.72	< .001	1.17				
SRIS-SR	6.98	< .001	0.92				
SRIS-IN	-3.72	< .001	-1.01				

Note: ASQ-EX = external attentional control; SRIS-SR = self-reflection; SRIS-IN = self-insight.

Next, we regressed mindfulness scores on internally-oriented attentional control, externally-oriented attentional control, self-reflection, and self-insight. The model was significant, $F(8, 226) = 73.38, p < .001, R^2 = .72$. Confirming our Hypotheses 1, 3, and 4, mindfulness was predicted by greater externally-oriented goal-driven attentional control, higher self-reflection, and higher self-insight (Table 4).

Table 4

Multiple Linear Regression on Mindfulness (Total MAAS) Scores

Predictor	<i>t</i>	<i>p</i>	β	<i>F</i>	<i>df</i>	<i>p</i>	R^2
Overall Model				73.38	8, 226	< .001	.72
ASQ-IN	0.08	.94	0.01				
ASQ-EX	-8.93	< .001	-1.16				
SRIS-SR	2.24	.03	0.11				
SRIS-IN	10.73	< .001	1.08				

Note: ASQ-IN = internal attentional control; ASQ-EX = external attentional control; SRIS-SR = self-reflection; SRIS-IN = self-insight

Exploratory Mediation Analyses

The highly interrelated nature of our constructs suggests that there may be theoretically important mediation effects among the constructs. In particular, given the differential associations of self-absorption and mindful/experiential self-focus with mental health reported in previous literature (Huffziger & Kuehner, 2009; Kállai et al., 2021; Perona-Garcelán et al., 2013; Watkins & Teasdale, 2004;), we reasoned that any predictive power of attentional control on absorption and mindfulness might be mediated by self-related processing. We included all study constructs in the mediation analyses, given the possibility of ‘inconsistent mediation’ (MacKinnon et al., 2000) in which opposite-signed direct and indirect effects may render the total correlation between two constructs nonsignificant.

Exploratory mediation analyses were conducted using the PROCESS macro (Model 4, Hayes, 2018) with 5,000 bootstrapped samples. Separately for absorption and mindfulness, we ran two models each that included internally- or externally-oriented attentional control as the sole explanatory variable.² Self-reflection and self-insight served as parallel mediators given the inconsistent relationship between them (A. Grant et al., 2002). Age, gender, and level of education served as covariates.

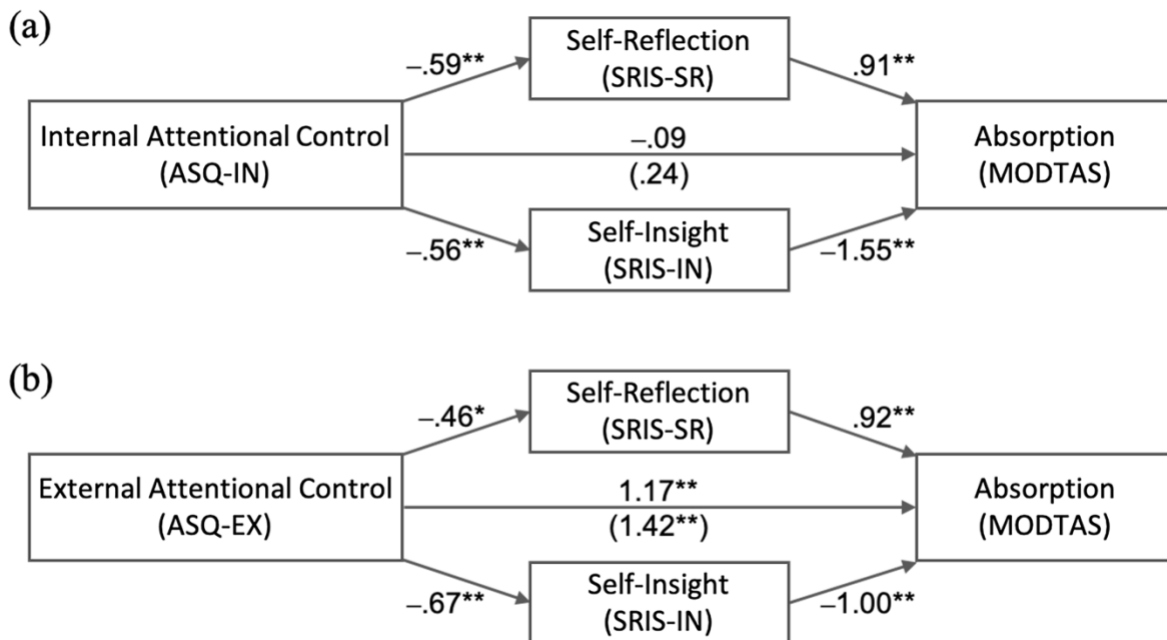
For absorption (see Figure S1 in the Electronic Supplementary Material [ESM]),

² Given the positive correlation between internally- and externally-oriented attentional control, these variables were examined separately to avoid washing out possible effects (Hayes, 2018).

internally-oriented stimulus-driven attention had no significant direct ($\beta = -.09, p = .80$) or total effects ($\beta = .24, p = .51$). However, there were opposite-signed, significant indirect effects: The relationship between internally-oriented stimulus-driven attention and absorption was negatively mediated by self-reflection (estimate = $-.54, 95\% \text{ CI}_{\text{bootstrap}} = [-.98, -.17]$), but positively mediated by self-insight (estimate = $.86, 95\% \text{ CI}_{\text{bootstrap}} = [.46, 1.40]$). In comparison, externally-oriented stimulus-driven attention had significant positive direct ($\beta = 1.17, p < .001, 95\% \text{ CI} = [.55, 1.79]$) and total effects ($\beta = 1.42, p < .001, 95\% \text{ CI} = [.85, 1.99]$). The relationship between externally-oriented stimulus-driven attention and absorption was negatively mediated by self-reflection (estimate = $-.42, 95\% \text{ CI}_{\text{bootstrap}} = [-.76, -.15]$), but positively mediated by self-insight (estimate = $.67, 95\% \text{ CI}_{\text{bootstrap}} = [.32, 1.11]$).

Figure S1

*Relative direct, indirect, and total effects of (a) internal attentional control and (b) external attentional control on absorption. Numbers along the paths are unstandardized regression coefficients. Values in parentheses represent the total effects (i.e., the sum of the corresponding relative direct and indirect effects). * $p < .05$, ** $p < .001$*

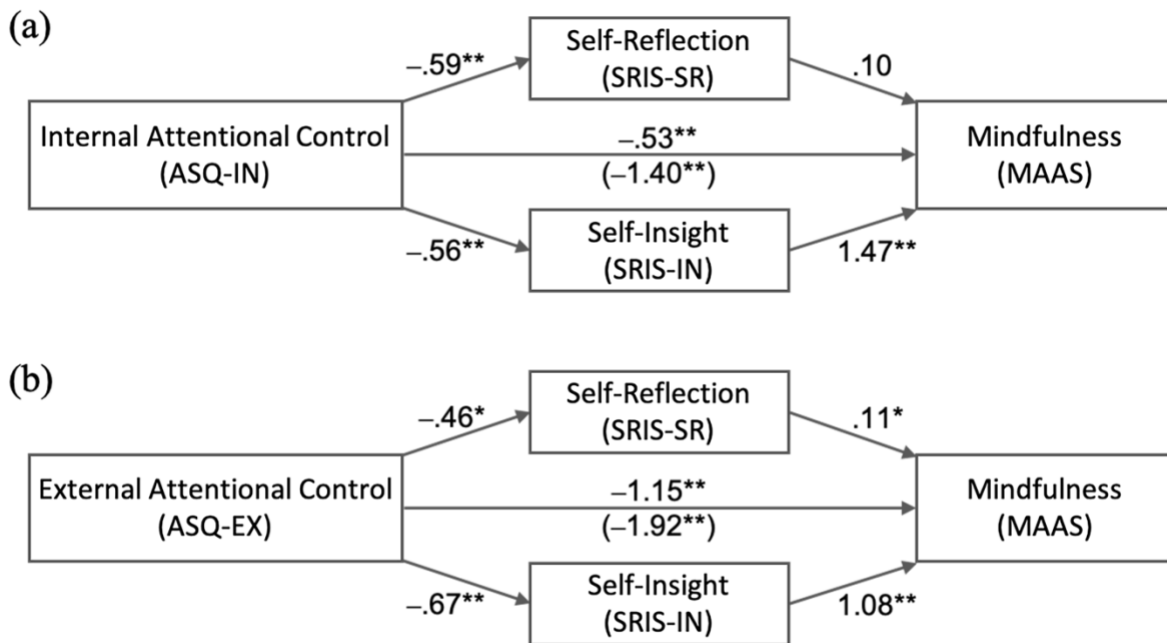


For mindfulness (see Figure S2 in the ESM), internally-oriented stimulus-driven attention had significant negative direct ($\beta = -.53, p < .001, 95\% \text{ CI} = [-.81, -.24]$) and total effects ($\beta = -1.40, p < .001, 95\% \text{ CI} = [-1.77, -1.03]$). Self-insight ($\beta = -.82, 95\% \text{ CI}_{\text{bootstrap}} = [-1.20, -.48]$), but not self-reflection (estimate = $-.06, 95\% \text{ CI}_{\text{bootstrap}} = [-.16, .02]$), significantly negatively mediated the relationship between internally-oriented stimulus-driven attention and mindfulness. Similarly, externally-oriented stimulus-driven attention had significant negative direct ($\beta = -1.15,$

$p < .001$, 95% CI = [-1.38, -.92]) and total effects ($\beta = -1.92$, $p < .001$, 95% CI = [-2.17, -1.68]). Self-insight (estimate = -.72, 95% CI_{bootstrap} = [-.96, -.53]) and self-reflection (estimate = -.05, 95% CI_{bootstrap} = [-.11, -.003]) negatively mediated the relationship between externally-oriented stimulus-driven attention and mindfulness.

Figure S2

Relative direct, indirect, and total effects of (a) internal attentional control and (b) external attentional control on mindfulness. Numbers along the paths are unstandardized regression coefficients. Values in parentheses represent the total effects (i.e., the sum of the corresponding relative direct and indirect effects). * $p < .05$, ** $p < .001$



Discussion

The present study explored individual differences in the cognitive processes associated with absorption and mindfulness, focusing on attentional control and self-related processing. Absorption and mindfulness were negatively correlated, and showed distinct patterns of associations with individual differences in attentional control and self-related processing.

Theoretical Contributions

While we had no a priori prediction about the relationship between absorption and attentional control (Exploratory 1), we found that absorption was positively predicted by a propensity for stimulus-driven attention to external stimuli. Our finding is consistent with Qualls and Sheehan (1981) who showed that external sensory feedback signals distracted high-absorption participants from engaging in mental imagery, suggesting that high-absorption

individuals' attention may be easily drawn to an external stimulus. Consistent with our Hypothesis 2, absorption was positively predicted by self-reflection. The negative relationship between absorption and self-insight was a novel finding of the present study for which we had no a priori prediction (Exploratory 2). According to Tellegen and Atkinson (1974), becoming fully absorbed in a single object of attention results in reduced cognitive resources available to engage in processing outside of that object of absorbed attention. As a result, fewer resources would be available for insightful thought into *why* the object is the center of one's attention in the first place and/or the consequences of being absorbed in the object. While absorption was not directly associated with internally-oriented attentional control, mediation analyses showed that this was driven by self-reflection and self-insight having opposite mediating effects: Propensities for stimulus-driven attention to both internal and external stimuli were related to decreases in self-reflection and self-insight, but self-reflection was positively related to absorption while self-insight was negatively related to absorption. The positive association between absorption and self-reflection provides support for the proposed association between absorption and states of deep engagement with oneself (Roche & McConkey, 1990).

The negative association between absorption and self-insight may have implications on understanding psychopathology. Rumination involves a repetitive and passive focus on negative personal concerns without any action/insight toward changing behavior (Nolen-Hoeksema, 1991). Our finding that absorption is more likely when thoughts capture one's attention in the absence of insight into those thoughts suggests that a dispositional propensity to become absorbed in experiences may serve as a risk factor for the development of ruminative thinking patterns. Additionally, our findings are relevant to the previously observed positive relationship between absorption and procrastination (Sirois, 2014). This link between absorption and procrastination may, in part, arise from high-absorption individuals' lack of self-insight into the consequences of focusing on present moment stimulation.

Consistent with our Hypothesis 1, mindfulness was predicted by externally-oriented goal-driven attentional control. This finding aligns with previous observations that mindful awareness is associated with reduced response time variability (Ruocco & Direkoglu, 2013) and fewer errors (Schmertz et al., 2009) during sustained attention tasks involving visual stimuli, as well as the notion that mindfulness is associated with the flexible control of attention (Dorjee, 2010). Consistent with our Hypotheses 3 and 4, we found positive relationships between mindfulness, self-reflection, and self-insight, replicating Harrington et al.'s (2014) findings. Mediation analyses showed that self-insight positively mediated the relationships of mindfulness with internally- and externally-oriented goal-driven attentional control. In comparison, self-reflection positively mediated the relationship between mindfulness and externally-oriented, but not internally-oriented, goal-driven attentional control. These findings suggest that while both self-insight and self-reflection are positively related to mindfulness, when attention is directed toward internal mentation, gaining insight into one's own thoughts and feelings rather than simply engaging in contemplation about oneself is more likely to result in the experience of a mindful state.

Limitations and Future Directions

The present study has a number of limitations. First, it should be noted that any observed relationship between mindfulness and absorption is likely to be influenced by the specific measure of mindfulness. Recently, Park and colleagues (2013) reported that at least 10 different mindfulness measures have been validated in the literature, with different conceptualizations of mindfulness across the measures. This necessarily impacts the interpretation of the present findings with respect to the existing literature. For example, prior research has shown that absorption was positively associated with mindful observation and nonreactivity (J. Grant et al., 2013) measured by the Five Facet Mindfulness Questionnaire (Baer et al., 2008). In contrast, we observed a negative association between absorption and mindfulness using the MAAS. The differing relationships observed between absorption and mindfulness likely reflect the associations between the propensity to become absorbed and particular aspects of mindful behavior. For instance, while absorption may result in attending to objects deeply (i.e., observation), that attention may be stimulus-driven, rather than goal-driven. This would result in absorption being positively related to the observational aspects of mindfulness, but negatively related to the attentional control aspects.

Another limitation pertains to our use of an MTurk sample. Although research suggests that data collected via MTurk are on par with those collected through traditional methods in terms of reliability (e.g., Buhrmester et al., 2011), MTurk samples may not be representative of the general population (Paolacci & Chandler, 2014). In addition, the MTurk participants may be non-naïve, likely having completed numerous psychological measures/tasks (Chandler et al., 2014). Furthermore, the general assumption that “high-quality” MTurk participants (i.e., those who have demonstrated superior performance on a large number of MTurk tasks) would provide higher-quality data compared to average MTurk participants was shown to not necessarily be valid (Rouse, 2020). Given the limitations of the MTurk sample, replication of the present findings using more traditional means of data collection is desirable.

Finally, although self-reported tendencies are helpful for understanding individuals' subjective experience, future research could examine whether the present pattern of relationships between absorption, mindfulness and attentional control hold true using task-based, behavioral measures. Administering behavioral attention tasks in conjunction with self-report measures of absorption, mindfulness, and attentional control in one sample of participants could further elucidate how absorption and mindfulness are related to the ways in which we attend to the world around (and within) us.

Conclusions

In sum, the present study showed that while both absorption and mindfulness reflect states of attentional focus, they are predicted by distinct attentional control styles and aspects of self-related processing. By identifying aspects of attentional control and self-related processing that are similar versus dissimilar between absorption and mindfulness, our findings can inform future work on potential cognitive mechanisms underlying the relationship of absorption and mindfulness with mental health. Further elucidating the nature of maladaptive attention directed

toward both the environment and internal mentations in psychopathology and the potential mediating impact of self-related processing in this regard would benefit the development of targeted attention-based interventions for individuals with different psychiatric conditions.

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