Mindfulness in Children: Exploring Measures Beyond Self-Report

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Abstract

Though interest around mindfulness is increasing, definitions and theories about this construct remain disjointed and relatively ambiguous. Limitations in survey measures has engendered the call for more objective measures to capture specific aspects of mindfulness in children. We therefore developed novel behavioral measures of mindfulness aimed to capture *present-moment awareness.* Biofeedback metrics were analyzed alongside reported measures of breath count and perceived heart rate to assess children's abilities to monitor internal states. We designed and piloted a 2-session study utilizing an individual differences approach to compare internal and external monitoring abilities with one another and with established self-report measures of mindfulness. We predicted measures of internal monitoring would correlate positively with each other and with external monitoring. We also predicted that self-report measures would correlate positively. Though our sample was not large enough to draw conclusions regarding our predictions, this pilot study has positioned us to address limitations associated with data collection prior to running the broader 2-session study. Further research with appropriate power and variance is needed to more accurately examine these correlations.

Keywords: Mindfulness, Self-report Measures, Behavioral Measures, Monitoring, Executive Function, Present-moment Awareness

Acknowledgements

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Mindfulness has become widespread across popular culture, appearing in yoga studios, the workplace, and even within public school classrooms (Dane & Brummel, 2014; Felver et al., 2016). Research on mindfulness and mindfulness-based interventions (MBIs) has grown considerably in the last decade, but a definitive consensus regarding what mindfulness is comprised of remains open and undecided (Goodman et al., 2017). Although mindfulness has been associated with an increase in children's cognitive abilities, the exact mechanisms that drive these improvements are still relatively obscure (Tang et al., 2012). This is in part a consequence of the measures, or lack thereof, that are currently utilized in mindfulness research. Self-reported survey measures are commonly used to assess mindfulness, but these often come at the price of ambiguous data that is challenging to interpret (Davidson & Kaszniak, 2015). Additionally, a lack of objective measures to capture mindfulness among children has recently prompted scientists to call for a refinement in methodological procedures. In their meta-analysis, Goodman and colleagues called for the integration of behavioral measures with self-report surveys to allow for more accurate and comprehensive measurement of mindfulness (Goodman et., 2017). Incorporating both exploratory and existing measures of mindfulness will help advance the measurement of mindfulness in children and adults.

There is no general agreement about definitions associated with mindfulness, and theories are numerous and varied (Van Dam et al., 2017). Commonly, definitions of mindfulness include components related to acceptance, non-judgement, compassion, and metacognitive ability (Moore & Malinowski, 2009; Allen & Knight, 2005; Jankowski & Holas, 2014; Ong et al., 2012). Most ubiquitous across various operational definitions of mindfulness is *present-moment awareness* --which refers to a quality of attention that is grounded with intention to internal and

external moment-by-moment experience (Levinson et al., 2014; Van Dam et al., 2017). Present-moment awareness is contingent on one's ability to monitor thoughts, emotions, sensations, and surroundings (Bishop et al., 2004). For example, when lost in thoughts about the past or concerns about the future, one's attention is only haphazardly aware of the present. However, through engaging present-moment awareness, one can notice mind-wandering by means of monitoring attention and redirect focus back to the present moment. Though this quality of mindfulness is frequently referenced in research, there are no behavioral measures to assess this ability in children to date.

Self-report measures, the most commonly used assessment of mindfulness in both adults and children, offer a convenient yet questionable operationalization of this construct. The Mindfulness Attention Awareness Scale adapted for Children (MAAS-C) is a validated self-report measure that has been used alongside measures of socio-emotional and cognitive abilities to assess well-being and other related outcomes (Schonert-Reichl et al., 2015). By framing questions to target "mindlessness", or a distracted quality of mind that is often understood as the "absence of mindfulness", this survey was developed to capture the frequency an individual experiences mindful states (Brown & Ryan, 2003). Mindfulness as measured by the MAAS-C has shown to positively correlate with measures of optimism, positive affect, and academic achievement and negatively correlate with depression, anxiety, and rumination (Lawlor et al., 2014). However, the limitations associated with measuring mindfulness by means of self-report have been recognized by many (Goodman et al., 2017; Grossman, 2011; Sauer et al., 2013). Explicit behavioral aspects of mindfulness, such as the ability to monitor attention, cannot be accurately extracted from survey measures. Additionally, self-report biases and demand characteristics may be even more substantial in mindfulness-based research given that

participants with little to no experience with mindfulness are potentially more likely to misjudge the nature of their own minds (Goodman et al., 2017). In one study, according to self-report questionnaires, binge drinkers were found to be more "mindful" than experienced meditators (Leigh et al., 2005). Goodman and colleagues (2017) also observed that adolescents with meditation/yoga experience scored significantly lower on mindfulness than those without such experience because those with meditation/yoga experience were better able to detect when their mind was wandering. The questionable accuracy of self-report measures to capture mindfulness in children may be explored by integrating carefully designed behavioral measures of mindfulness.

Objective measures of mindfulness will not only provide a multi-faceted approach of exploring this construct, but also a means to examine specific aspects of mindfulness. For example, present moment awareness may be disentangled from other characteristics of mindfulness, such as acceptance or non-judgment, by assessing abilities in monitoring. Monitoring reflects one's ability to observe internal or external goal-relevant cues and has been shown to improve over childhood (Gathercole et al., 2004). A component of executive functions (EFs), monitoring also plays a major role in the processing and utilization of conceptual knowledge, even when that information is not immediately salient (Miyake et al., 2000; Diamond, 2013). In order for a child to safely cross the street or avoid an obstacle while riding their bicycle, they must allocate cognitive resources to monitoring. Skills in monitoring help to keep us safe and enable us to respond appropriately to contextual stimuli. The Double Go task is an experimental computer assessment that has shown to capture children's abilities to monitor for external cues by presenting variable stimuli that requires rapid response (Chatham et al., 2012; Chevalier et al., 2014).

The monitoring of external stimuli, however, only constitutes a portion of present-moment awareness. Internal experiences such as thoughts, emotions, and sensations take place simultaneously with (and often in response to) environmental cues. For instance, by monitoring one's thoughts, it is possible to notice daydreaming during a lecture and redirect attention towards the lesson. Internal monitoring tasks that assess children's abilities to monitor internal cues may further inform the degree to which one can attend to the present moment. Levinson's (2014) respiratory measurement assesses the ability to accurately monitor and report breath count, but has not yet been validated in children (Goodman, 2017). Because observing the breath is a common exercise in mindfulness practices, breath counting accuracy among children could provide a reliable measurement of present moment awareness (Flook et al. 2010, Levinson et al., 2014). Additionally, children will complete a heartbeat perception task (adapted from Eley et al., 2007) aimed to assess abilities to monitor and report heartbeat count over three short periods of time. Reported heartbeats are compared to actual heartbeats to further inform abilities to monitor internal states.

The aim of this thesis is to explore novel behavioral measures of mindfulness in children. This pilot study directly supports considerations for the feasibility of a large-scale intervention study. Utilizing an individual differences approach, we will compare possible behavioral measures of mindfulness aimed to capture internal monitoring. We expect to see a positive correlation between measures of breath count and heartbeat perception. Further, we will examine the relationship between measures of internal and external monitoring. We predict internal monitoring will correlate with external monitoring, thus potentially setting the stage for considerations of combined measures to form a behavioral operationalization of present-moment awareness. We will also analyze how scores across self-report measures relate, and expect to see

a positive correlation. Introducing experimental tasks that target nuanced aspects of mindfulness can help clarify the meaning of this construct and how it is expressed among children (Van Dam et al., 2017).

Method

Participants

Because of the exploratory nature of this project, participants were designated for piloting in order to determine the feasibility of including particular measures in a broader two session study. We recruited child participants (N = 4, M_{age} = 12.68 years SD_{age} = .63 years, range = 11 to 13; males = 3) from a database of families who had previously shown interest in participating in child development research. Parental consent and child assent forms were obtained prior to participation. Child participants received two small prizes and a "Junior Scientist" certificate for involvement in this project and parents were given $5.00 for travel compensation.

Procedure

Data were collected over the course of a 120-minute session at the Cognitive Development Center at the University of Colorado at Boulder. Parents completed a demographic survey providing relevant racial, ethnic, and socioeconomic information. At the beginning of the session, child participants completed two mindfulness-based survey measures. Following the surveys, children were introduced to respiration and heart rate measurement devices. Measures of children's resting state were captured prior to internal monitoring tasks. Internal monitoring tasks included a breath counting task (adapted from Levinson et. al, 2014) and a heartbeat perception task (adapted from Eley et al., 2007). Finally, external monitoring was assessed via a computer task adapted for children.

Measures

MAAS - C - The MAAS-C is a validated self-report measure developed for children between the ages of 9 and 13 (Lawlor et al., 2014). Used to assess a single-factor of mindfulness, the MAAS-C includes Likert scale-style questions with statements such as, "I find myself doing things without paying attention" that children rate from 1 (Almost Never) to 6 (Almost Always). The MAAS-C assesses trait mindfulness as measured by questions aimed at capturing children's dispositional awareness and judgment of their thoughts, emotions, and actions. All survey items were reverse-scored and averaged (as in Lawlor et al., 2014), with higher scores indicating higher mindfulness.

MICA - The Mindfulness Inventory for Children and Adolescents (MICA) is a self-report questionnaire which measures internal and external awareness and acceptance of thoughts and behaviors (Briere, 2011). In this survey, children rate how much they agree (1 = Disagree a lot, 5 = Agree a lot) to questions such as, "I usually know what I am thinking or feeling", and "I like myself the way I am". Although the MICA has yet to be validated, it has shown to be more sensitive to pre/post intervention measures than other established surveys (Goodman et al., 2017). Composite scores for the MICA were calculated by taking the sum of all answers (as in Briere, 2011), with higher scores indicating greater mindfulness.

Breath Counting Task - A 6-minute breath counting exercise (adapted from Levinson et. al, 2014) assessed the participant's ability to accurately monitor and count their breaths. In this task, children were instructed to maintain awareness of their breath and count their breaths from 1-9 repeatedly. They were further instructed to press a computer key (down arrow) as they took

breaths 1-8, and a second key (up arrow) when they took breath 9. If at any time the child lost

count they pressed the spacebar to restart from 1. A respiration belt was worn to physiologically

confirm accurate breath tracking among participants. Accuracy scores were derived by dividing

the number of correct sets of 9 by the total number of sets and multiplying by 100.

Heartbeat Perception Task - A 3-minute heartbeat perception task (adapted from Eley et al.,

2007) informed internal monitoring abilities by asking children to count the number of times

their heart beat during three defined periods (25, 35, and 45 seconds respectively). Before the

task, children were instructed not to take their pulse during any trials (ie. keeping hand away

from heart or fingers away from neck and wrist). After each trial, children were asked how many

times their heart beat, and how confident they were about feeling their heartbeat. Children's

reported count was compared to actual heartbeat data collected via electrocardiogram. Error

scores equated to the absolute difference between actual heartbeats (AB) and counted heartbeats

(CB) as a percentage of the number of actual heartbeats (ie. ((AB-CB)/AB) x 100; as in Eley et

al., 2007). Using this formula to calculate error scores, a score of 0 indicates no errors, while a

score of 100 indicates total inaccuracy, or feeling no heartbeats at all.

Double-Go - The Double-Go Task was used to assess children's abilities to monitor for external

cues (Chatham et al., 2012). In a child-adapted version of this task (Chevalier et al., 2014),

children were told that they would be helping George the Monkey get yellow bananas and avoid

brown bananas. In frequent trials, a yellow banana appeared (no-signal) on the left or right side

of the screen, and children were instructed to respond by clicking on a corresponding computer

key. However, if after a variable delay a yellow banana turned brown (infrequent signal) they

were told to press the key twice (see *Figure 1.*). In this task, participants must respond rapidly

and correctly to "signal" or "no-signal" trials. Reaction times to the second key press in "signal"

trials (ie. time to respond following the appearance of an infrequent cue) were analyzed, with

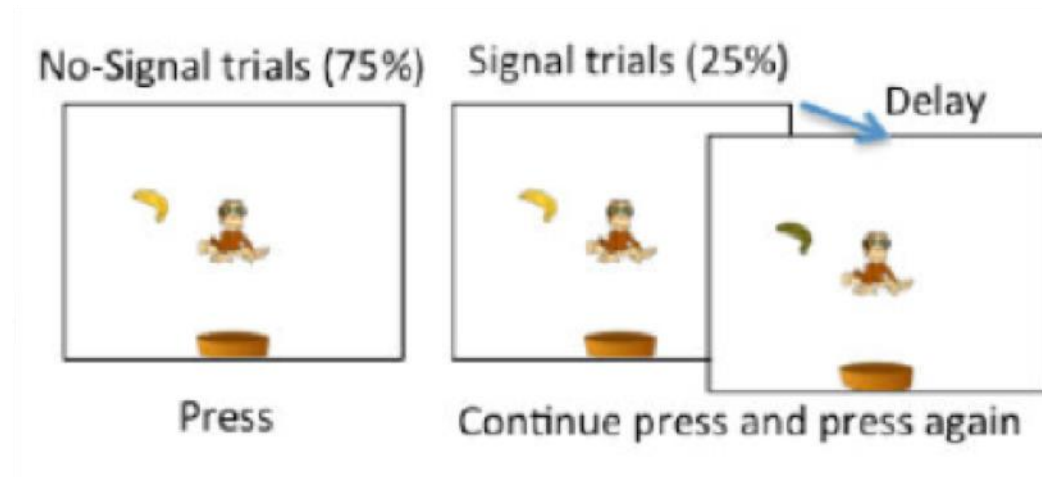faster reaction times to infrequent cues indicating greater monitoring ability.

Figure 1. Double Go Task (taken from Chevalier et al., 2014). On No-Signal trials children were

instructed to press a key that was on the same side as the target. Signal trials involved a change

in the target, from yellow banana to brown. Children were told to press the key twice when they

observed this cue.

Results

Descriptive Statistics, Data Plots, and Preliminary Analyses

Descriptive statistics of the mean and standard deviation for the continuous dependent variables

extracted from survey and behavioral measures of mindfulness and monitoring abilities are

included below. Additionally, data plots and preliminary statistical analyses outline the

correlations of interest. Due to an insufficient sample size, it was not possible to draw conclusive

results from our analysis. We did, however, take this opportunity to investigate potential patterns

and signs of ceiling or floor effects. Mean error rates for heart beat perception in children are below those reported in previous literature (~70%; Eley et al., 2007), and children thus far exhibit less accuracy in breath counting relative to adults (see Levinson et al., 2014). Data collection is ongoing, and these relationships will be reassessed once appropriate power has been established.
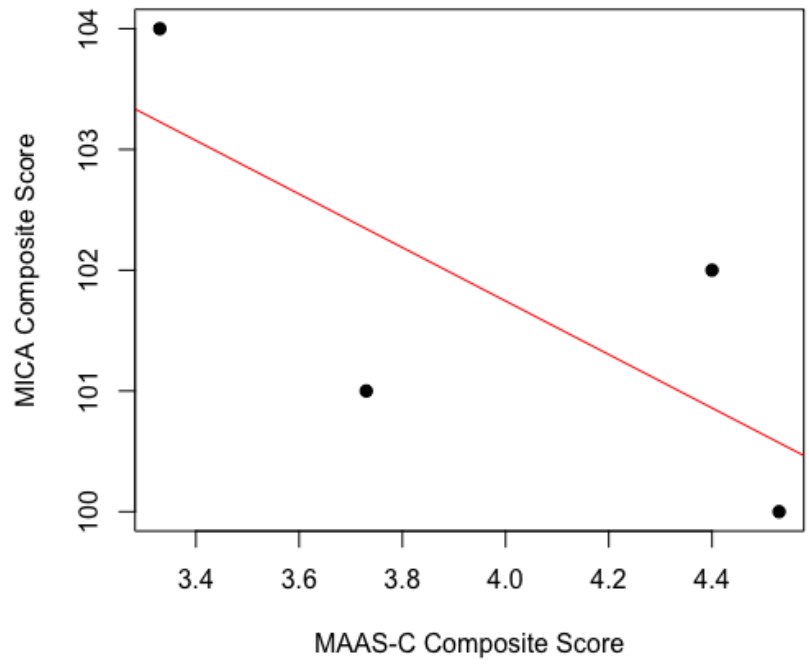
Table 1. Descriptive statistics of continuous variables

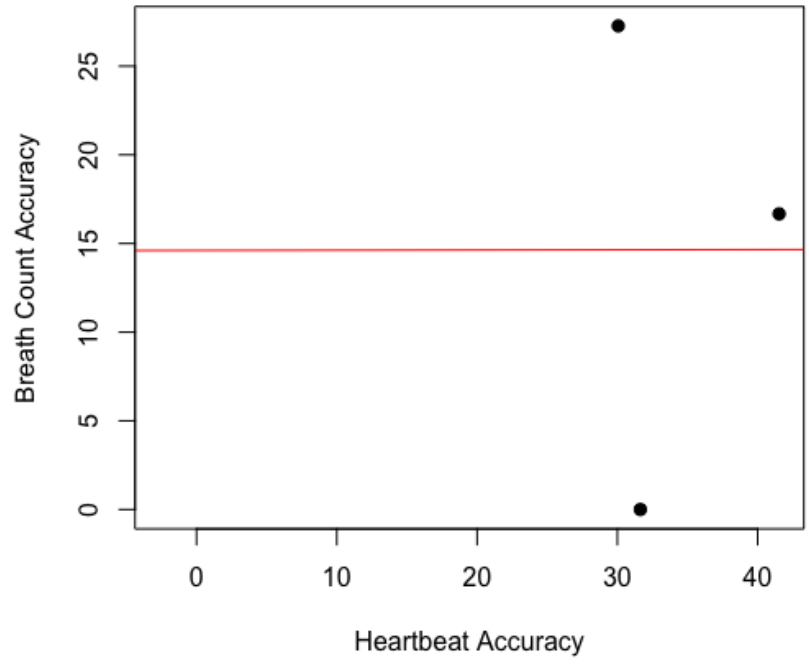| *Variable*	*M*	*SD*
MAAS-C Composite Score	4	.57
MICA Composite Score	101.75	1.7
Double Go "Signal" Reaction Time	576.84	103.03
Breath Counting Accuracy Score	14.65	13.75
Heartbeat Perception Error Score	25.15	19.2

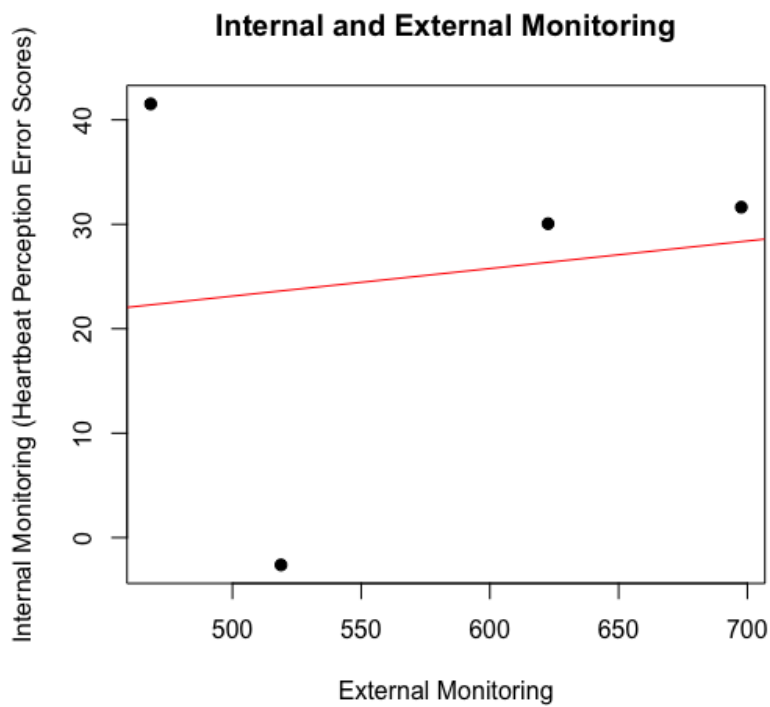M = Mean   SD = Standard Deviation

Mindfulness Survey Measures

MAAS-C and MICA; r (2) = -.73, p = .27

Internal Monitoring

Breath count accuracy and heartbeat perception; r (1) = .0005, p = .99

Internal and External Monitoring

Heartbeat perception error scores and Double Go "signal" reaction time; r (2) = .14, p = .86

Internal and External Monitoring
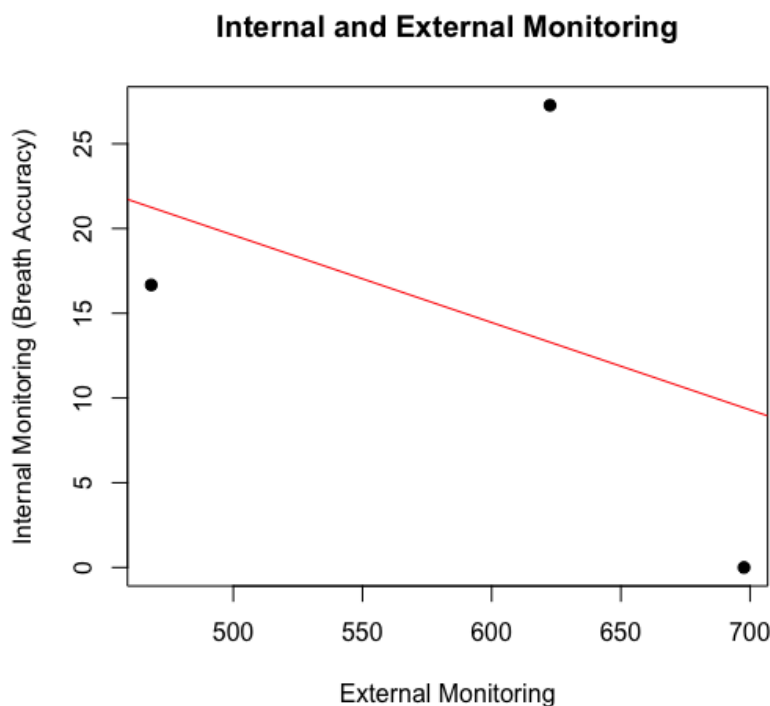
Breath count accuracy and Double Go "signal" reaction time; r (1) = -.43, p = .71

Self-Report and Objective Measures

Pairwise comparisons were conducted to analyze the correlations between survey and behavioral

measures of mindfulness and monitoring abilities in children.

Table 2. Pairwise correlation matrix between survey and behavioral measures of mindfulness and monitoring abilities in children.

	MICA Composite	MAAS-C Composite	Double Go Signal RT	Breath Count Accuracy	Heartbeat Perception
MICA Composite	1.0	-0.73	-0.99	0.45	0.90
MAAS-C Composite	-0.73	1.0	0.54	0.51	-0.86
Double Go Signal RT	-0.99	0.54	1.0	-0.44	-0.90
Breath Count Accuracy	0.45	0.51	-0.44	1.0	0.0005
Heartbeat Perception	0.90	-0.86	-0.90	0.0005	1.0

Discussion

This study has introduced a potential means to capture mindfulness in children via behavioral assessment. In particular, present-moment awareness has been operationalized as the ability to monitor for internal and external cues. Exploring a means to capture this component of mindfulness has included the use of software and hardware (Somatic Vision's *Alive*) that records and reports biofeedback metrics. Gaining familiarity with this new equipment has constituted a large portion of the work conducted in this thesis. Likewise, developing and refining protocol for how these novel measures are to be administered has supported the structure of the broader project. Determining which measures would provide the most relevant data, and how to interpret and process the data output in order to arrive at our final dependent variables, required substantial brainstorming and testing. Analyses were performed in order to assess preliminary patterns and potential floor and ceiling effects. On average, child participants are not currently exhibiting performance that indicates our tasks are too difficult or easy. Our analyses are underpowered and exploratory in nature; thus, findings inform methodological and analytical procedure more so than the relationships between internal and external monitoring and survey measures of mindfulness.

By homing in on present moment awareness we were able to examine a specific aspect of mindfulness. Disentangling the particular mechanisms of mindfulness and how they are expressed is a necessary step to address the semantic ambiguity currently associated with this construct (Van Dam et al., 2017). Self-report questionnaires offer valuable insight regarding how one perceives their own disposition and subjective awareness (Goodman et al., 2017). It becomes confusing, however, when there is a lack of distinction as to which aspects of mindfulness are being measured via survey. Furthermore, considering the limitations associated with self-report

measures, behavioral assessments may also more accurately capture particular components of mindfulness. This is the first experiment to include an objective measurement of mindfulness in children. Including objective measures alongside surveys can offer a more holistic and nuanced approach to examine mindfulness in children.

Limitations

This thesis directly supports a large-scale intervention study that is currently still in development (See Figure 1 in *Appendix A*). This larger project aims to recruit 120 children between the ages of 9-13 and includes two 90-minute lab visits. In between these sessions children will either take part in a brief mindfulness intervention or be assigned to a passive control condition. The complexities and complications of developing this 2-session study left us with little time to collect and analyze data, thus, an obvious limitation of this thesis is its low sample size. We originally set out to conduct a full experimental study, but due to time pressures have instead focused our efforts on informing the feasibility of the aforementioned two-session study. Supporting project development has been a major aspect of this thesis. Considering tasks to be included in the intervention study, developing components of a potential intervention, writing IRB revisions, and involvement in establishing means to extract relevant data from exploratory measures are some of the "behind the scenes" aspects associated with this project.

We encountered various discrepancies with data collection that rendered analysis less than ideal. For example, we noticed that some participants were moving their hand during heartbeat perception trials. This movement disturbed the electrocardiogram sensor and distorted some of the data collected. Additionally, our adapted Double Go task did not accurately capture participants' responses to "no-signal" stimuli. This was due to an error in programming that failed to incorporate negative feedback when children pressed twice on trials in which they were

supposed to only press once. Since incorrectly pressing twice on "no-signal" trials seemed to be within the bounds of successful task response, half of our participants adopted this strategy and pressed twice on nearly every trial. Given that these children's reaction times (RTs) to "no-signal" trials did not accurately reflect their ability to monitor for infrequent cues, the traditional formula for calculating monitoring ability could not be used. In order to normalize scores across participants, RTs to no signal trials are subtracted from RTs to signal trials. This difference score becomes our dependent variable for measuring external monitoring ability. In our case, however, since "no-signal" RTs for half our participants could not be used, we abandoned the difference score approach and instead simply used RTs to "signal" trials. Furthermore, we did not capture breath count data for one of our participants, possibly due to experimenter error failing to initiate the computer program that captures key presses during the breathing task. Data from another participant suggested that they were unable to accurately track their breath across all sets of the breathing task. This may, however, reflect an issue with the positioning of the respiratory belt, and not the child's actual performance.

Although the issues with data collection make it difficult to present compelling findings, facing these challenges now has given direction for refining the procedures that will be implemented moving forward. We now know, for example, to explicitly ask that children do their best not to move their hand during the heartbeat perception task. Additionally, our adapted Double Go task now gives proper feedback to all forms of correct and incorrect responses. Though our sample size does not provide the appropriate power and variance necessary to make strong claims, it has afforded us the opportunity to gauge the prospect of conducting a 120-minute experimental session with children between the ages of 9 and 12 years old. Having

worked within the constraints of these limitations, considerations for optimal experimental

conditions are ongoing and more conclusive results are forthcoming.

Future research

Building upon the methodological approaches discussed in this pilot study, future

research can more thoroughly assess the relationship between internal and external monitoring

abilities in children. Additionally, these behavioral measures can be compared with self-reported

mindfulness to inform the degree to which they correlate. Comparing multiple established survey

measures with more objective measures of mindfulness may inform how these surveys relate to

specific aspects of mindfulness. Self-reported measures should become more nuanced and

describe the exact components of mindfulness their aiming to capture. Furthermore, future work

can consider behavioral operationalization of the various subcomponents of mindfulness. *Present*

moment awareness is the subcomponent we chose to operationalize in this study, but there are

other mechanisms associated with mindfulness, such as *acceptance* and *metacognition*. Rahl and

colleagues (2017) observed that mindfulness training which included an acceptance component

facilitated attentional and emotional regulation significantly more than "attention-monitoring

only" training conditions. Future work could also examine interactions between subcomponents

of mindfulness, thus contributing to theoretical refinement.

The intervention study is incorporating assessments capturing various executive functions

(EFs), and these will be analyzed alongside measures of internal and external monitoring to

examine potential relationships between these processes. These include measures of shifting and

inhibitory control. Skills in shifting and monitoring appear to be pertinent to successfully

maintaining moment-by-moment awareness, and improvements in cognitive inhibition are

thought to be associated with mindfulness practices (Bishop et al., 2004). Exploring whether

there is a positive relationship between children's shifting, inhibition, and monitoring abilities and measures of mindfulness could inform theoretical considerations about what subcomponents mindfulness includes and how they are expressed. Furthermore, sustained attention and mind wandering have been proposed to be opposing constructs that are both nonetheless implicated within mindfulness (Mrazek et al., 2012). Future research could include measures such as the Sustained Attention to Response Task (SART; Mrazek et al., 2012) to examine how mind-wandering and sustained attention correlate with EF and internal monitoring abilities.

Implications

Mindfulness practices constitute one form of cognitive training that has been associated with improved behavioral regulation, metacognition, overall EF, and specific domains of EF in youths and individuals with lower EF performance (Flook et al., 2010, Diamond & Lee, 2011). Mindfulness interventions with elementary school children (specifically first, second, and third graders) were associated with improvements in sustained attention, cognitive flexibility, monitoring, perspective taking, and social skills as well as reduced test anxiety and perseveration (Abdi et al., 2016; Napoli et al., 2005; Zelazo & Lyons, 2012; Diamond & Lee, 2011). Though mindfulness has been associated with increases in various positive outcomes, the exact mechanisms that drive these improvements are still relatively unknown. In order to clarify the ambiguity of mindfulness as a single-factor solution, this study explored the operationalization of *present-moment awareness* and its relation to self-reported mindfulness.

Our findings offer insight regarding the degree to which behavioral and survey measures may assess individual differences in aspects of mindfulness in children. Specifically, measures of internal and external monitoring may inform abilities to monitor the present moment. Training in attentional monitoring is typically included as a first step in MBIs and correlates with

improvements in cognitive flexibility by prompting practitioners to shift back to their intended

focal point (i.e., the movement of one's breath) upon recognition of mind-wandering (Lindsay &

Creswell, 2015). As monitoring attention is necessary to detect distraction or rumination (Bishop

et al., 2004) and shifting plays a role in redirecting attention from distractions to the present,

monitoring and shifting tasks may constitute objective measures of mindfulness. Further, if each

subcomponent of mindfulness is expressed at varying degrees within individuals, targeted

interventions aimed at specific skills may aid in children's EF and mindfulness abilities. In order

to promote mindfulness in its entirety, it is imperative to explore the many expressions implicit

within this construct.

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Appendix A

Figure 1. All tasks included in 2-session study

Name of instrument/tool/procedure	Purpose	Time to Complete
Child survey of mindfulness knowledge and past experience	**Child measure of past mindfulness exposure**	**5 mins**
Children's Attitudes toward mindfulness	**Child measure of mindfulness specific self-report response bias**	**5 mins**
Mindful Attention Awareness Scale – Child (MAAS-C)	**Child self-report questionnaire of mindfulness**	**5 mins**
Child and Adolescent Mindfulness Measure (CAMM)	**Child self-report questionnaire of mindfulness**	**5 mins**
Mindfulness Inventory for Children and Adolescents (MICA)	**Child self-report measure of mindfulness**	**10 mins**
Baseline physiological measures	**Baseline measures of respiration, heart rate and variability, and galvanic skin response**	**10 mins**
Breath counting exercise	**Child measure of awareness of internal states (breath counting accuracy)**	**6 mins**
Heartbeat perception task	**Child measure of awareness of internal states (heartbeat perception accuracy)**	**3 mins**
Stop-signal task	**Child EF measure (monitoring/inhibitory control)**	**15 mins**
Double-go task	**Child EF measure (external monitoring)**	**20 mins**
Track-It	**Child EF measure**	**5 mins**
Verbal Fluency task	**Child EF measure (monitoring/shifting)**	**6 mins**

MEASURES BEYOND SELF-REPORT

Mindfulness task	*Child behavioral measure of mindfulness*	*10 mins*
Wechsler Abbreviated Scale of Intelligence (WASI-II)	*Child measure of vocabulary*	*7 mins*
Metacognitive awareness task	*Child measure of metacognitive awareness*	*5 mins*
Children's Social Desirability – Short (CSD – S)	*Child measure of general self-report response bias*	*5 mins*
Parent's attitudes toward mindfulness survey	*Parent measure of past mindfulness exposure*	*5 mins*
Parent survey of child mindfulness knowledge and past experience	*Parent measure of attitudes toward mindfulness*	*5 mins*
Behavior Rating Inventory of Executive Function	*Parent report measure of child behavior and EF*	*15 mins*
Strengths and Difficulties Questionnaire	*Parent report measure of child behavior*	*5 mins*

Figure 2. Breakdown of task order within sessions 1 and 2

Visit #	Procedures/Tools		How much time the visit will take
Visit 1	- Mindfulness Control Measures - Child survey of mindfulness knowledge and past experience - Children's Attitudes toward mindfulness - Established Self-Report Mindfulness Measures - Mindful Attention Awareness Scale – Child (MAAS-C) - Mindfulness Inventory for Children and Adolescents (MICA) - Objective Mindfulness Measures - Baseline physiological measures - Breath counting exercise - Heartbeat perception task - Executive Function Measures - Stop-signal task - Double-go task - Track-It - Verbal Fluency task - State Mindfulness Task - Alive Mindfulness task - Parent Measures - Parent's attitudes toward mindfulness survey - Parent survey of child mindfulness knowledge and past experience - Behavior Rating Inventory of Executive Function (BRIEF)		120 minutes
Visit 2	- State Mindfulness Task - Alive Mindfulness task - Established Self-Report Mindfulness Measures - Child and Adolescent Mindfulness Measure (CAMM) - Mindfulness Inventory for Children and Adolescents (MICA) - Objective Mindfulness Measures - Baseline physiological measures - Breath counting exercise - Heartbeat perception task		120 minutes

	- Executive Function Measures - Stop-signal task - Vocabulary Control Measure - Wechsler Abbreviated Scale of Intelligence (WASI-II) - Metacognitive awareness task - Response Bias Control Measure - Children's Social Desirability – Short (CSD – S) - Parent Measure - Strengths and Difficulties Questionnaire (SDQ)	