Evaluating the Relationship between Interpersonal Mindfulness and Social Connectedness with Emotion Regulation as a Mediator *

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Interpersonal mindfulness is a newly conceptualized construct that aims to measure mindful awareness during interpersonal interactions. Considering not much research has yet been conducted on how standard mindfulness and interpersonal mindfulness relate differently towards social outcomes, this study aimed to further explore how interpersonal mindfulness relates to social connectedness (SC), and if emotion regulation (ER) mediated the relationship between the two variables. A dataset of 438 participants (females = 89.9%; *M* age = 35.31) was procured from a previous scale validation study during which participants completed measures of mindfulness, interpersonal mindfulness, social connectedness and emotion regulation. Hierarchical multiple regression analyses revealed that interpersonal mindfulness was significantly positively associated with SC after controlling for standard mindfulness. Mediation analyses revealed that ER partially positively mediated the relationship between interpersonal mindfulness and SC. Considering these preliminary findings, future studies should conduct longitudinal research comparing the associations of standard mindfulness and interpersonal mindfulness to SC and other social outcomes.

Interpersonal Mindfulness and Social Connectedness

Research on mindfulness has flourished in the last decade [1], and multiple meta-analyses indicate mental health benefits that extend to clinical and non-clinical populations [2-4]. Often defined as "paying attention in a particular way; on purpose, in the present moment, and nonjudgmentally" [5], mindfulness is typically cultivated by a variety of meditation practices to bring greater clarity towards our patterns of thinking, feeling and behaviour. These practices result in greater mental flexibility, which in turn tends to promote a further sense of care for oneself and others [6]. Part of its popularity may be attributed to the fact that it has gained considerable support of evidence in a wide range of academic fields, most considerably in medicine and psychology [7, 8]. In therapy, this standing remains robust even when comparing mindfulness-based interventions to other current evidence-based treatments, such as cognitive-behavioural therapy. For example, a meta-analysis by Goldberg and colleagues investigated comparative effects of mindfulness-based interventions to evidence-based treatments on a variety of psychiatric conditions (e.g., Schizophrenia, Major Depressive Disorder, etc.) and showed both interventions to be of similar effectiveness, regardless of disorders [9]. Similar results were found in non-clinical populations as well [10].

Given the amount of evidence supporting the effectiveness of mindfulness in the last decades [3, 11], certain researchers have directed their attention to other subfields, such as bringing mindful awareness during social exchanges [12]. Indeed, the development of a mindful practice en-

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hances the capacity to be receptively aware of one's own present moment experiences, such as thoughts, emotions, bodily sensations, sounds, smells, etc., but research suggests this awareness may also be extended to interpersonal interactions [13]. In romantic couples, a meta-analysis by McGill et al. of 10 studies suggested that the positive association between mindfulness and relationship satisfaction was statistically significant with a small-medium effect size of d = .27 [14]. Another area of interest has been regarding parenting and child behaviour. According to a study by Fuller & Fitter, "Mindful parenting has aided in the decrease of maladaptive behaviours by increasing parent attention to the present moment, increasing engagement with the child, and decreasing judgment of the situation" [15].

Past groundwork has mostly focused on developing more generalized mindfulness measures, which we will address as standard mindfulness. The arguably most common standard mindfulness scales seemingly measure mindful awareness towards intrapersonal events, such as thoughts, or sensory experiences, such as sounds, but few of their items involve applying mindfulness specifically during social interactions. For example, the Mindful Attention Awareness Scale [16] offers one item out of fifteen ("I find myself listening to someone with one ear, doing something else at the same time.")

The Freiburg Mindfulness Inventory [17] offers one item out of thirty ("I am impatient with myself and others") and the Five Facet Mindfulness Questionnaire [18] and the Kentucky Inventory of Mindfulness Skills [19] offer none. In consequence, such scales may not be best suited to measure mindful awareness during interpersonal interactions. Indeed, different complexities come into play during social exchanges. Social interactions shape our mind through the practice of verbal communication, nonverbal cues such as gestures, facial expressions, and postures [20]. Comprehension of verbal messages is associated with enhanced synchrony between the brains of the speakers and listeners [21] and even our behaviour automatically adapts to match that of others in one's current social environment [22].

Some researchers have even suggested that interpersonal mindfulness may be a distinct construct from standard mindfulness [12, 23, 13]. Interpersonal mindfulness is defined as: "paying attention in the present moment while with another person/s, including being aware of internal experiences (bodily sensations, thoughts, reactions, mood, etc.) and external experiences (verbal and nonverbal communication, apparent mood, etc.)" [13]. Although standard and interpersonal mindfulness have similarities, being interpersonally mindful consists of being simultaneously aware of one's own experience while also attending to the experience of another person. According to the authors, this may allow a loosening of limiting cognitive-affective patterns such as: (1) ingrained emotional responses based on past interpersonal experiences, (2) not listening to others deeply because we focus on what we want to say next, or (3) misinterpretation of emotional signals from others because of a distortive internal narrative [13]. Given not only the added challenge of remaining attentive to oneself and to another person simultaneously, but of the possible loosening of the consequences mentioned, interpersonal mindfulness may draw upon different skills than those assessed in standard mindfulness scales.

To measure the social aspects of mindfulness, Pratscher et al. developed the Interpersonal Mindfulness Scale (IMS) and found that interpersonal mindfulness was associated with romantic relationship satisfaction above and beyond correlations with standard mindfulness [13]. Additionally, although standard and interpersonal mindfulness constructs did unsurprisingly correlate with the IMS (r = .71), the association was not as strong as the one found between various

standard mindfulness questionnaires (r = .88). Considering the recent development of the scale, little is still known about ways interpersonal mindfulness may uniquely relate to countless mental health constructs, particularly those pertaining to our social needs.

Social Connectedness

In a parallel fashion, destabilization following the start of the COVID-19 global crisis is also bringing a shift of focus in multiple academic fields, including psychology. Many countries have enforced numerous restrictions on daily living including social distancing, isolation, and home confinement. With the addition of in person interactions being replaced by virtual ones, the way we conceive human nature's need for social connection is being conscientiously reassessed. Social connectedness (SC), as originally drawn from Kohut's Self Psychology [24], is defined by Lee and Robbins as "an attribute of the self that reflects cognitions of enduring interpersonal closeness with the social world in toto" [25]. Closeness to others is experienced at a macro level, encompassing closer relationships with family and friends to further ones with strangers, community, or society. This denotes an internal subjective sense of belongingness with others at large, rather than to a certain group or to specific peer affiliations [26].

According to Lee & Robbins, SC emerges in early childhood years through parent-child attachment styles and continues to develop in adolescence as we start building rapport and securing bonds with people who share similar values, interest, or appearances [25]. In adulthood, these experiences slowly integrate into a relatively stable sense of self that persists amidst common social vacillations. A lack of SC indicates a persistent struggle towards feeling connected to others, which often results in a relative sense of loneliness [25]. Although related, it differs from loneliness, isolation, as well as loss of social support, the latter which tends to be impacted by specific events (e.g., the loss of a friendship, moving to a different city, romantic breakups; [27, 28]. People with higher SC tend to have higher self-esteem, social competence, and hope [28]. They also tend to have fewer interpersonal problems, fewer depression and anxiety symptoms, less rejection sensitivity, loneliness, and social avoidance [29]. Standard mindfulness, on the other hand, has shown to ease levels of depression, anxiety, and loneliness, as well as augment relationship satisfaction and secure attachment [30, 31], which suggests it could also play a role in regard to SC.

Emotion regulation

To shed further clarity on the possible mechanisms explaining the relationship between interpersonal mindfulness and SC, past evidence points to the potential role of emotion regulation (ER) as a mediator. ER is defined as follows: A process involving the (a) awareness and understanding of emotions, (b) acceptance of emotions, (c) ability to control impulsive behaviours and behave in accordance with desired goals when experiencing negative emotions, and (d) ability to use situationally-appropriate emotion regulation strategies flexibly to modulate emotional responses as desired in order to meet individual goals and situational demands [32].

There is a clear correlation between standard mindfulness and ER as currently defined, and the two have even been found to share neurobiological correlates [33, 34], although they remain distinct constructs that only share moderate amounts of variance [35]. Higher levels of self-reported standard mindfulness related to lower scores on the Difficulties in Emotion Regulation Scale (DERS) [24], even after controlling for symptoms of stress, anxiety, and depression [36].

On the other hand, greater ER enhances the development of social skills [37] and relationship

satisfaction [38]. This is in line with previous studies, considering understanding and differentiating one's emotions permits to understand others [39]. Finally, a correlational study by Winter, Moriarty, and Short, found that impairments in emotion regulation experienced by patients with traumatic brain injury negatively associated with various sub-aspects of social connectedness, such as interpersonal functioning [40]. Considering these findings altogether, interpersonal mindfulness may also facilitate ER in social contexts, perhaps even beyond standard mindfulness.

In light of the above, more research is needed to explore the potential of interpersonal mindfulness, especially in relationship with SC and ER. Findings may enlighten new interventions more effective at targeting interpersonal outcomes. The objective of this study would be to explore if interpersonal mindfulness positively relates to SC, and whether this association is mediated by ER. We hypothesize that (1) even when controlling for standard mindfulness, higher levels of interpersonal mindfulness will be associated with higher levels of SC and that (2) higher ER will mediate the relationship between interpersonal mindfulness and SC.

Method

Participants

A dataset was obtained from a sample of 1191 individuals who completed 27 scales in the context of a scale development and validation study conducted between 2018 and 2019. Half of the sample recruited were undergraduates from McGill University, whereas the other half were recruited from the general Montreal community. No exclusion criteria regarding participation were applied. After excluding individuals who did not complete the four scales of interest for this study, our final sample consisted of 438 participants (females = 89.9%; *M* age = 35.31; 74% White, 21.9% Asian, 2.1% Black, 2.5% as Latin American, 1.8% as Arab, and 4.8% from Indigenous descent). Since 67.1% of participants had at least a college degree, and 83% indicated that they always or mostly had enough money, the sample may be qualified as WEIRD. This acronym was term coined by Henrich, Heine and Norenzayan to define samples whose participants were mainly white, educated, industrialized, rich and from democratic countries [41].

Procedure

Compensation was of either 2 participant pool credits for the undergraduates, or 25$ for individuals from the Montreal community. Participants who signed up completed the questionnaires online via LimeSurvey. The total duration of the study was around 2 hours.

Measures

Social Connectedness Scale- Revised (SCoS-R). The SCoS-R consists of 20 items and measures interpersonal closeness that individuals feel between themselves and others at a macro level [25]. For example, "I don't feel related to anyone." It has shown to have good test-retest (α = .96) and internal reliability (α = .91; [25, 29]. Items are placed on a 6-point Likert Scale (1 = strongly disagree to 6 = strongly agree), and higher scores represent a stronger sense of belonging.

Difficulties in Emotion Regulation Scale (DERS). The DERS [24] is a 36-item questionnaire that measures several elements of emotion regulation, including awareness, understanding, acceptance of emotions, as well as ability to regulate them adaptively to situations. However, it is conceptualized as a reverse scale. An example item is "I experience my emotions as overwhelming and out of control". Authors reported internal consistency of α = .93, test-retest reliability of α

= .88 during a 4- to 8-week interval. Items are placed on a 5-point Likert Scale (1 = almost never to 5 = almost always). Higher scores indicate greater difficulties in emotion regulation [24].

Five Facet Mindfulness Questionnaire (FFMQ). The FFMQ [18] is a 39-item measure comprising five subscales of trait standard mindfulness: describing, observing, acting with awareness, non-reactivity, and non-judgmental acceptance. Items are placed on a 6-point Likert Scale (1 = strongly disagree to 6 = strongly agree) and include "I watch my feelings without getting carried away by them" Higher scores on subscales indicate higher trait standard mindfulness. Repeated administration pointed at high test-retest reliability and internal consistency of the assessment [42].

Interpersonal Mindfulness Scale (IMS). The IMS [13] is a 27-item questionnaire that consists of four subscales: presence, awareness of self and others, nonjudgmental acceptance, and non-reactivity. Items are rated on a 5-point Likert Scale (1 = Almost never, 5 = Almost always) and include items such as "When I am interacting with another person, I get a sense of how they are feeling". Higher scores indicate higher interpersonal mindfulness. Good test-retest reliability (α = .86) and internal consistency was reported (α = .89).

Results

Statistical analyses were conducted using R Studio, version 1.3.1073 [43]. Hierarchical multiple regression analysis was used to examine if interpersonal mindfulness contributes to SC total scores above and beyond the effect of standard mindfulness. In step 1, any confounding variables were entered in order to serve as control. In step 2, FFMQ total scores were entered into the regression equation. In step 3, IMS total scores were entered into the regression equation. Effect sizes in the regression were measured with Cohen's f^2, as it is one of the most informative standardized measures of effect size for hierarchical linear modeling [44]. A single mediator analysis was conducted to evaluate if emotion regulation mediates the relationship between interpersonal mindfulness and social connectedness using the bootstrapping procedure (1000 resamples).

Prior to inferential analyses, correlation analyses were conducted. The first confirmed that all four variables of interest (FFMQ, IMS, DERS, SCoS-R) were significantly positively associated with each other (see Table 1). The second was conducted to determine if any demographic variables were significantly associated with SC (see Table 2). One variable, the perception that participants had of having enough money (MONEY), was significantly associated with SC and was entered in Step 1 as a control variable. Assumptions were met for normality, homogeneity, additivity and linearity. The residuals were normally distributed along an oval shape. Independent variables were assessed for collinearity as well. Results on the variance inflation factor (all <5.0) and collinearity tolerance (all greater than 0.2) indicated that the estimated βs were well established in the regression model.

Table 1

(Zero Order) Correlation Matrix of Variables of Interest

Variables	1	2	3	4
FFMQ	—			
IMS	.68**	—		
DERS	-.82**	-.59**	—	
ScoS-R	.56**	.19**	-.62**	—
M	122.9	98.56	88.71	76.72
SD	23.69	14.81	27.56	16.79

Note. $^{**}p < 0.01$.

Table 2

Correlation Matrix of Demographic Variables and Social Connectedness

Variable	1	2	3	4	5	6	7	8	9
Age	—								
Sex Orientation	-.20	—							
Relationship Status	.10	.12	—						
Living Situation	-.02	.05	-.16	—					
Employed	-.12	.06	.11	-.01	—				
Enough Money	-.07	.10	.08	-.09	.25	—			
Education	-.12	.05	.04	-.14	.09	.02	—		
Meditation Experience	-.18	-.01	-.03	.07	.10	.05	.02	—	
SC Total	.03	-.1	-.10	-.03	-.03	-.29*	-.08	-.10	—

Note. $^{*}p < 0.05$.

The results from step 1 of the regression analysis suggested that the variable MONEY had a negative statistically significant association with SC (adjusted $R^2 = 0.08223$, $F(1, 436) = 40.15$, $p < 0.001$, $f^2 = .09$) with a medium effect size. The results from step 2 suggested that the added independent variable (FFMQ) had a statistically significant association with SC (adjusted $R^2 = 0.3592$, $F(2, 435) = 123.5$, $p < 0.001$, $f^2 = .44$) with a large effect size. The results from step 3 suggested that added independent variable (IMS) had a statistically significant effect on SC (adjusted $R^2 = 0.3652$,

$F(3, 434) = 84.8$, $p < 0.001$, $f^2 = .01$) with a small effect size.

Eight percent of variance in SC was explained in Model 1, $F(1, 436) = 40.15$, $p < 0.001$. There was a significant negative association between MONEY and SC (B = -5.2574, SE = 0.8297, $t(436)$ = -6.337, $p < .001$). Thirty-six percent of variance in SC was explained in Model 2, $F(2, 435) = 123.5$, $p < 0.001$, which indicates that the FFMQ accounted for 28% additional variance. There was a statistically significant association between standard mindfulness and SC (B = 0.37, SE = 0.0274, $t(435) = 13.76$, $p < 0.001$). Thirty-seven percent of variance in SC was explained by the variables in Model 3, $F(2, 434) = 123.5$, $p < 0.001$, which indicates that the IMS accounted for less than 1% additional variance. There was a significant association between interpersonal mindfulness and SC (B = 0.13, SE = 0.05903, $t(434)$ = 2,266, $p < 0.001$). Results from the hierarchical regression analysis are presented in Table 3.

Table 3

Hierarchical Multiple Regression Analysis on the Effect of Standard and Interpersonal Mindfulness on Social Connectedness

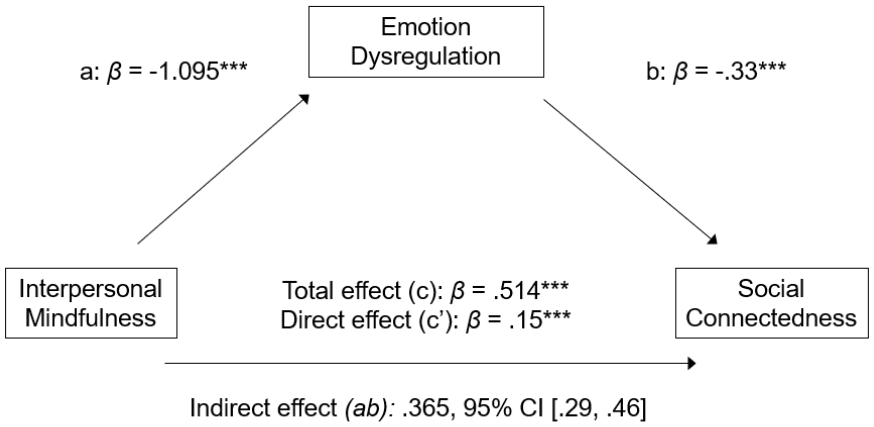
Variable	Step 1				Step 2				Step 3			
	B	*SE*	*b*	*t*	*B*	*SE*	*b*	*t*	*B*	*SE*	*b*	*t*
Money	-5.257	.830	-.290	-6.34	-3.93	3.79	-.217	9.82	-3.85	4.71	-.213	6.56
FFMQ					.37	.027	.532	13.76	.321	.037	.452	8.68
IMS									.13	.059	.118	2.66
R^2_{adj}			.082				.359				.365	

Note. All results = $p < 0.001$

A single mediation analysis was conducted to test the mediational role of emotion regulation in the relationship between interpersonal mindfulness and SC (see Figure 1 for model illustration). Results revealed that emotion regulation partially positively mediated the relationship between interpersonal mindfulness and SC. The estimated fully standardised indirect effect was .365 (SE = 0.30; $p < .001$; 95% CI= [.29, .46]). This indicates that an increase of one standard deviation in IMS yields an increase of 0.30 standard deviation on DV SC through changes in the mediator (emotion regulation), which can be interpreted as a small-to-medium indirect effect.

Figure 1

Model illustration of the relationship between interpersonal mindfulness and social connectedness, mediated by emotion dysregulation.



Discussion

The present study aimed to explore the relationship of interpersonal mindfulness with social connectedness and emotion regulation. The objective was to determine if interpersonal mindfulness positively related to SC above and beyond standard mindfulness, and if this association was mediated by ER. Results supported our first hypothesis. Although the relationship was small, when controlling for standard mindfulness, interpersonal mindfulness was significantly positively associated with SC beyond standard mindfulness. Results also supported our second hypothesis as ER partially positively mediated the relationship between interpersonal mindfulness and SC.

Hypothesis 1

In regard to the first hypothesis, the present findings lend support to previous studies highlighting the relationship between standard mindfulness and SC [45, 46]. A study by Trautwein, Naranjo, and Schmidt found a causal relationship between Loving-Kindness Meditation, a form of mindfulness meditation, and "self-other connectedness", a sense which is fundamental to empathy, social bonding and compassion [47]. Additionally, results from the study also showed a simultaneous decrease in self-centeredness during the increase in self-other connectedness. This suggests that perhaps SC works like a balance: the more socially connected we feel, the less self-centered we become. Previous research also supports that standard mindfulness relates to other social outcomes.

Interestingly, interpersonal mindfulness also related to SC beyond standard mindfulness. Interpersonal mindfulness especially brings one's attention to the social exchanges they're having, enhancing the presence they bring to their conversation partner [12]. Findings from research

suggest that social presence promotes the growth of social interaction quality amongst students, which in turn promoted the development of a sense of community [48]. Higher presence also augments interpersonal interaction quality [49]. This is in par with the current literature supporting that, while controlling for standard mindfulness, higher interpersonal mindfulness scores were related to higher friendship quality [50] and relationships quality [13], two variables that are also influenced by interpersonal interaction quality [51, 52, 53]. This indicates that future research may want to explore if interpersonal mindfulness would have a stronger association towards social variables that are more influenced by social interaction quality.

Results that the IMS only added a small contribution to SC when controlling for the FFMQ could be interpreted as unsurprising considering the similarities between standard mindfulness and interpersonal mindfulness. Indeed, standard mindfulness scales such as the FFMQ typically measure general mindfulness skills that may serve as stepping stones to other more specialized ways of using mindfulness. For example, certain items in the FFMQ include: "I think before reacting under stressful situations." or "I can easily talk about my thoughts and opinions". Such behaviours may not be satisfactory direct measurements of mindfulness during interpersonal exchanges, but they may serve as some form of prerequisites, as non-reactivity, self-awareness and honesty generally also benefit interpersonal outcomes such as relationship quality [54, 55].

Results may also support low practical implications of interpersonal mindfulness to increase social connectedness in comparison to standard mindfulness. This would mean that to increase social connectedness, training people through techniques that cultivate standard mindfulness (such as breathing meditations, body scans, etc.) [5] would have a similar effect than training them in interpersonal mindfulness techniques (such as mindful listening) [12]. However, experimental research supporting that increases interpersonal mindfulness and standard mindfulness similarly increase SC would be needed to support this interpretation.

Hypothesis 2

In regard to the second hypothesis, results are consistent with previous research indicating positive relationships between standard mindfulness and ER, as well as between ER and SC. Since no previous research has yet studied the association between interpersonal mindfulness and ER or SC, findings with standard mindfulness were used to elaborate our hypothesis instead. As previously mentioned, the literature strongly supports an association between standard mindfulness and ER. Findings of this study supported that ER and interpersonal mindfulness are also separate constructs considering (1) no multicollinearity was found between the IMS and the DERS (2) the indirect effect suggested a partial but not full mediation between interpersonal mindfulness and SC through ER.

Additionally, research supports that higher levels of standard mindfulness related to lower scores on the DERS, even after controlling for symptoms of stress, anxiety, and depression [36]. Considering interpersonal mindfulness may make use of abilities measured in standard mindfulness scales, the positive relationship it has with ER is consistent with the literature. Interpersonal mindfulness may relate to SC through ER through the similar scales dimensions it shares with ER. ER involves an awareness of and acceptance of emotional response, as well as an impulse control when experiencing negative emotions [24]. Similar abilities are measured by interpersonal mindfulness through its awareness of self and others, non-judgemental acceptance and nonreactivity facets.

Findings are also in par with a study showing a negative relationship between lack of ER and SC measures in patients with traumatic brain injury [40]. Research on ER has shown that it has a positive effect on other social outcomes, such as relationship quality [56] and relationship satisfaction [57]. Interpersonal mindfulness may possibly enhance ER, which may have an effect on SC. However, more research would be needed to support this hypothesis.

Limitations and Future Directions

As little research has yet been conducted on interpersonal mindfulness, this study is more exploratory in nature. In consideration, some limitations are bear mentioning. Foremost, due to the cross-sectional nature of the study, it is not possible to infer causation from these results. Longitudinal data would be necessary to explain the effect interpersonal mindfulness would have on SC. Moreover, the study sample was restricted to voluntary participants from the Montreal region and was predominantly female. It also holds WEIRD characteristics, which in the literature has been labelled as problematic as it limits generalizability to the general population [44]. In addition, no known exclusion criteria were applied considering data was originally collected for a scale validation study, where exclusion criteria are not mandatory. Future studies examining gender-balanced samples with appropriate exclusion criteria (such as exclusion of individuals with mental disorders to not confound clinical and non-clinical populations) are warranted.

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