

On Exploring the Possible Hierarchical Inter-relationships amongst various Criteria for Mindfulness Research in Psychotherapy Using ISM Methodology

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ABSTRACT

There has been a tremendous surge in popularity of mindfulness in psychotherapy. Although there has been several disciplines and practices that can cultivate mindfulness such as Yoga, Tai-chi (Siegel, 2007b), a majority of theoretical writings and empirical research has focused on mindfulness's meditation. Various criteria has been explored and the possible inter-relationships amongst them has been studied with the help of Interpretive Structural Modelling Methodology [ISM].

Keywords: Mindfulness therapy, ISM methodology, Hierarchical interrelationships

Mindfulness has enjoyed a tremendous surge in popularity in the past decade (Didonna, 2009a; Shapiro & Carlson, 2009). It has been believed since long time that virtually every client, and their therapists, would benefit from being mindful (Martin, 1997). Although there are several disciplines and practices that can cultivate mindfulness (e.g., *yoga, tai chi, qigong*) (Siegel, 2007b); Tibetan and Zen buddhist meditation styles (Gunaratana, 2002), the majority of theoretical writing and empirical research on the subject has focused on mindfulness developed by mindfulness meditation.

With the advancement of neurological technology, mindfulness researchers are examining distinct components of mindfulness meditation such as focused attention, open monitoring and loving-kindness compassion practice and their specific physiological outcomes (Lutz, Slagter, Dunne & Davidson, 2008; Lutz *et al.* 2009).

The present research first of all explores the various criteria towards the success and failure of mindfulness research. It thereafter, studies the inter-

relationships amongst them using ISM methodology. The paper is presented as follows. Section 2 presents the literature review on mindfulness research. Thereafter section 3 presents the ISM methodology and section 4, the case example. Conclusions and future directions are presented in section 5.

1. Literature Review

There are interrelationships amongst various constructs of mindfulness i.e. mentalizing, inter-subjectivity, insight and mindfulness. Mindfulness differs from mentalizing in that mindfulness is both being aware of the "reflective self" engaged in mentalizing, and the practice of fully experiencing the rising and falling of mental states with acceptance and without attachment and judgment. On the other hand, inter-subjectivity, has been theorized to relate

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to Buddhist psychology (Epstein, 2007; Surrey, 2005; Wallace, 2001) and to being in the present moment in psychotherapy (Stern, 2004). Mindfulness and inter-subjectivity are similar in that they both enable a sense of connection with others (Thompson, 2001). Finally, insight, the conscious process of making novel connections (Hill & Castonguay, 2007), can be construed as a beneficial outcome of mindfulness practice.

Mindfulness is a process of purposefully cultivating non-judgemental attention to experiences in the present moment (Kabat-Zinn, 2003). Trait mindfulness is associated with increased subjective well-being and reduced psychological symptoms (Keng *et al.* 2011). Mindfulness-based interventions (MBIs) increase trait mindfulness, in turn resulting in psychological health benefits (Gu *et al.* 2015). Among the several interventions that have utilised this principle, mindfulness-based stress reduction (MBSR) and mindfulness-based cognitive therapy (MBCT) are two prominent psychological group-based interventions including primarily mindfulness practice and group discussion of principles (Baer, 2003). Dimidjian *et al.* (2014) trialled Mindful Mood Balance (MMB), a web-based MBCT program, with 100 people with a history of recurrent depression. Moreover, mindfulness involves de-centering from the content of the thoughts and feelings (Chambers *et al.* 2009). Additionally, direct engagement with negative thoughts during mindfulness practice might lead to an escalation of distress and a cycle of negative reinforcement (Bishop, 2002). This results in disengagement from the practice (Lomas *et al.* 2014).

Next section highlights the major success factors related to mindfulness therapy.

2. Benefits of Mindfulness / success factors

2.1 Theorized benefits of mindfulness

2.1.1 Increase self-control and tolerance [ISC&T]: Among its theorized benefits are self-control (Bishop *et al.* 2004; Fulton, 2005; Masicampo & Baumeister, 2007).

2.1.2 Increased emotional intelligence [IEI]: This is the ability to relate to others and one's self with kindness, acceptance, and compassion (Fulton, 2005; Wallace, 2001).

2.2 Empirically Supported Benefits of Mindfulness

2.2.1 Increased Metacognition awareness [IMA]: Corcoran *et al.* (2010) theorize that mindfulness meditation promotes metacognitive awareness, decreases rumination via disengagement from perseverative cognitive activities, and enhances attentional capacities through gains in working memory.

2.2.2 Effective emotional regulation [EER]: There is evidence that mindfulness helps develop effective emotion regulation in the brain (Corcoran *et al.* 2010; Farb *et al.* 2010; Siegel, 2007b; Chambers, Lo, & Allen, 2008; McKim, 2008; Ramel *et al.* 2004).

2.2.3 Decreased rumination [DR]: Chambers *et al.* (2008) finding that mindfulness training decreased rumination is consistent with research with participants having chronic mood disorders. Ramel *et al.* (2004) found that participants in an 8-week MBSR training had significantly less reflective rumination compared to: (a) participants' initial rumination scores, and (b) a control group matched on age, gender, and initial depressive symptoms.

2.2.4 Decreased ongoing anxiety, depression and chronic pain [DOA]: Hoffman *et al.* (2010)'s findings of 39 studies are consistent with evidence that mindfulness meditation leads to increased positive effect and decreased anxiety and negative effect (Davidson *et al.* 2003; Erisman & Roemer, 2010; Farb *et al.* 2010; Jha *et al.* (2010); Way *et al.* 2010). Participants exposed to MBSR displayed significantly less anxiety, depression, and somatic distress relative to the control group (Farb *et al.* 2010).

2.2.5 Ability to express oneself [AEO] in various social situations: Empirical evidence suggests that mindfulness is positively associated with the ability to express oneself in various social situations (Dekeyser *et al.* 2008), and predicts relationship satisfaction (Barnes *et al.* 2007; Wachs & Cordova, 2007).

2.2.6 Relationship satisfaction [RS]: Evidence indicates that trait mindfulness predicts relationship satisfaction, ability to respond constructively to relationship stress, skill in identifying and communicating emotions to one's partner, amount of relationship conflict, negativity, and empathy (Barnes *et al.* 2007; Wachs & Cordova, 2007).

2.2.7 Increased self-insight, morality and fear modulation [ISI]: Mindfulness has been shown to enhance functions associated with self-insight, morality, intuition, and fear modulation (Siegel, 2007b, 2009).

2.2.8 Less emotional stress [LES]: Barnes *et al.* (2007) found that people with higher trait mindfulness reported less emotional stress in response to relationship conflict and entered conflict discussion with less anger and anxiety.

2.3 Health benefits of mindfulness

2.3.1 Increased immune functioning [IIF]: There is also evidence that mindfulness meditation has numerous health benefits including increased immune functioning (Davidson *et al.* 2003; Grossman, Niemann, Schmidt & Walach, 2004)

2.3.2 Alteration in brain physical structure and functioning [ABPS]: Regular mindfulness meditation practice alters the brain’s physical structure and functioning (Davidson *et al.* 2003; Lazar *et al.* 2005; Siegel, 2007a; Vestergaard-Poulsen *et al.* 2009). Changes in the structure of the brain include thicker brain regions associated with attention, sensory processing and sensitivity to internal stimuli (Lazar *et al.* 2005), distinct gray matter concentrations (Hölzel *et al.* 2008) and thicker brain stems, which may account for positive cognitive, emotional and immune-reactive benefits (Vestergaard-Poulsen *et al.* 2009).

3. ISM Methodology

Interpretive Structural Modeling (ISM) is an interactive learning process in which a set of unique, interrelated variables are structured into a comprehensive model presented as a hierarchy graph. Suggested by Warfield (1974), ISM works with the following steps: It starts with identifying the relevant elements and pair-wise establishing the contextual relationship amongst them. Thereafter,

a structural self-interaction matrix (SSIM) may be developed between two variables i.e. *i* and *j* establishing a “Lead to” relationship between criteria. Four symbols viz. *V*, *A*, *X* & *O* are used for establishing the relationships. Using SSIM matrix, initial reachability matrix can be formed, it has all values in binary form. Decision-maker must check for rule of transitivity. After that final reachability matrix is formed after checking the rules for transitivity. After that, a level partition matrix can be obtained based on establishing the precedence relationships and arranging the elements in a topological order. A Mic-Mac analysis is performed categorizing the variables in to autonomous, dependent, driver and linkage category. Finally, a diagram can be obtained.

4. Case Example

Around 12 benefits or success factors *viz.* Increase self-control and tolerance [ISC&T]; Increased emotional intelligence [IEI]; Increased Metacognition awareness [IMA]; Effective emotional regulation [EER]; Decreased rumination [DR]; Decreased on-going anxiety, depression and chronic pain [DOA]; Ability to express oneself [AEO]; Relationship satisfaction [RS]; Increased self-insight, morality and fear modulation [ISI]; Less emotional stress [LES]; Increased immune functioning [IIF]; Alteration in brain physical structure and functioning [ABPS] have been determined described in section 3 above have been identified through literature survey over search engines such as google scholar, Research gate, academia.edu etc. can be studied further for possible inter-relationships using ISM methodology.

4.1 Structural Self-Interaction Matrix [SSIM]

This matrix gives the pair-wise relationship between two variables i.e. *i* and *j* based on VAXO. SSIM has been presented in Table 1.

Table 1: SSIM matrix for pair wise relationship amongst success factors of mindfulness therapy

Sl. No.	Barriers	1	2	3	4	5	6	7	8	9	10	11	12
		ISC&T	IEI	IMA	EER	DR	DOA	AEO	RS	ISI	LES	IIF	ABPS
1	ISC&T		X	V	V	V	V	V	V	V	V	V	V
2	IEI			V	V	V	V	V	V	V	V	V	V
3	IMA				V	V	V	V	V	V	V	V	V
4	EER					V	V	V	V	V	V	V	V
5	DR						X	V	X	V	V	V	V

6	DOA							X	X	V	V	V	V
7	AEO								V	V	V	V	V
8	RS								V	V	V	V	V
9	ISI									V	V	V	V
10	LES										V	V	V
11	IIF											V	V
12	ABPS												V

Table 2: Initial reachability matrix for pair wise relationship amongst success factors of mindfulness therapy

Sl. No.	Barriers	1	2	3	4	5	6	7	8	9	10	11	12
		ISC&T	IEI	IMA	EER	DR	DOA	AEO	RS	ISI	LES	IIF	ABPS
1	ISC&T	1	1	1	1	1	1	1	1	1	1	1	1
2	IEI	0	1	1	1	1	1	1	1	1	1	1	1
3	IMA	0	0	1	1	1	1	1	1	1	1	1	1
4	EER	0	0	0	1	1	1	1	1	1	1	1	1
5	DR	0	0	0	0	1	1	1	1	1	1	1	1
6	DOA	0	0	0	0	0	1	1	1	1	1	1	1
7	AEO	0	0	0	0	0	0	1	1	1	1	1	1
8	RS	0	0	0	0	0	0	0	1	1	1	1	1
9	ISI	0	0	0	0	0	0	0	0	1	1	1	1
10	LES	0	0	0	0	0	0	0	0	0	1	1	1
11	IIF	0	0	0	0	0	0	0	0	0	0	1	1
12	ABPS	0	0	0	0	0	0	0	0	0	0	0	1

Table 3: Final reachability matrix for pair wise relationship amongst

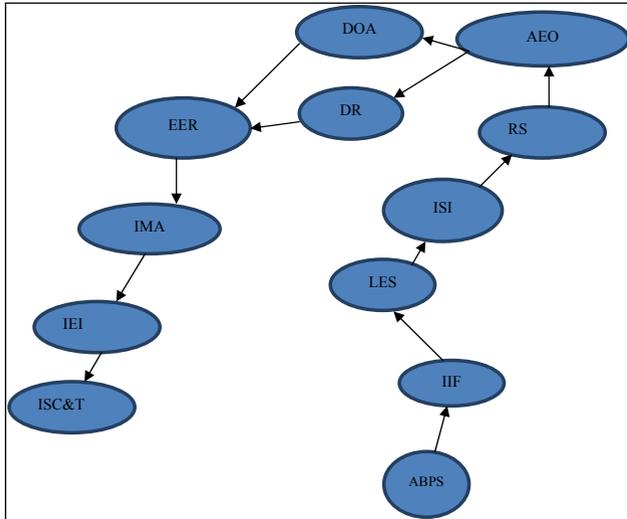
Sl. No.	Barriers	1	2	3	4	5	6	7	8	9	10	11	12	
		ISC&T	IEI	IMA	EER	DR	DOA	AEO	RS	ISI	LES	IIF	ABPS	D.P
1	ISC&T	1	1	1	1	1	1	1	1	1	1	1	1	12
2	IEI	0	1	1	1	1	1	1	1	1	1	1	1	11
3	IMA	0	0	1	1	1	1	1	1	1	1	1	1	10
4	EER	0	0	0	1	1	1	1	1	1	1	1	1	9
5	DR	0	0	0	0	1	1	1	1	1	1	1	1	8
6	DOA	0	0	0	0	0	1	1	1	1	1	1	1	6
7	AEO	0	0	0	0	0	0	1	1	1	1	1	1	6
8	RS	0	0	0	0	0	0	0	1	1	1	1	1	5
9	ISI	0	0	0	0	0	0	0	0	1	1	1	1	4
10	LES	0	0	0	0	0	0	0	0	0	1	1	1	3
11	IIF	0	0	0	0	0	0	0	0	0	0	1	1	2
12	ABPS	0	0	0	0	0	0	0	0	0	0	0	1	1
	De.P	1	2	3	4	6	6	7	8	9	10	11	12	

4.2 Driving power and dominance diagram

Table 4.2.1: Driving Power & Dominance Diagram (MICMAC analysis)

	12	ISC&T													
	11		IEI												
	10			IMA											
	9				EER										
Driving power →	8		Drivers			DR			Linkage						
	7														
	6					DOA	AEO								
	5								RS						
	4		Autonomous						Dependent	ISI					
	3														
	2											LES			
	1													IIF	
		1	2	3	4	5	6	7	8	9	10	11	12	ABPS	
		Dependence power →													

4.5 ISM DIAGRAM



CONCLUSION

The following research work discusses the major benefits of using mindfulness therapy in India. It further explores the hierarchical interrelationships amongst them using ISM methodology.

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REFERENCES

Adele, M.H. and Feldman, G. 2004. Clarifying the construct of mindfulness in the context of emotion regulation and the process of change in therapy. *Clinical Psychology*, **11**: 255–262.

Baer, R.A. 2003. Mindfulness training as a clinical intervention: a conceptual and empirical review. *Clinical Psychology: Science and Practice*, **10**(2): 125–143.

Barnes, S., Brown, K.W., Krusemark, E., Campbell, W.K. and Rogge, R.D. 2007. The role of mindfulness in romantic relationship satisfaction and responses to relationship stress. *Journal of Marital and Family Therapy*, **33**: 482–500.

Bishop, S.R. 2002. What do we really know about mindfulness-based stress reduction? *Psychosomatic Medicine*, **64**(1): 71–83.

Bishop, S.R., Lau, M.A., Shapiro, S.L., Carlson, L., Anderson, N.D., Carmody, J. and Devins, G. 2004. Mindfulness: A proposed operational definition. *Clinical Psychology*, **11**: 230–241.

Brown, K.W., Ryan, R.M. and Creswell, J.D. 2007. Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry*, **18**: 211–237.

Carmody, J. and Baer, R.A. 2008. Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction program. *Journal of Behavioral Medicine*, **31**: 23–33.

Carson, J.W., Carson, K.M., Gil, K.M. and Baucom, D.H. 2006. Mindfulness-based relationship enhancement (MBRE) in couples. In R.A. Baer (Ed.), *Mindfulness-based treatment approaches: Clinician's guide to evidence base and applications* (pp. 309–331). Burlington, MA: Elsevier.

Chambers, R., Lo, B.C.Y. and Allen, N.B. 2008. The impact of intensive mindfulness training on attentional control, cognitive style, and affect. *Cognitive Therapy and Research*, **32**: 303–322.

Corcoran, K.M., Farb, N., Anderson, A. and Segal, Z.V. 2010. Mindfulness and emotion regulation: Outcomes and possible mediating mechanisms. In A.M. Kring & D.M. Sloan (Eds.), *Emotion regulation and psychopathology: A transdiagnostic approach to etiology and treatment* (pp. 339–355). New York: Guilford Press.

Davidson, R.J., Kabat-Zinn, J., Schumacher, J., Rosenkranz, M., Muller, D., Santorelli, S.F. and Sheridan, J.F. 2003. Alterations in brain and immune function produced by mindfulness meditation. *Psychosomatic Medicine*, **66**: 149–152.

Dekeyser, M., Raes, F., Leijssen, M., Leyson, S. and Dewulf, D. 2008. Mindfulness skills and interpersonal behavior. *Personality and Individual Differences*, **44**: 1235–1245.

Didonna, F. 2009b. Mindfulness and obsessive-compulsive disorder: Developing a way to trust and validate one's internal experience. In: F. Didonna (Ed.), (2009). *Clinical handbook of mindfulness* (pp. 189–219). New York: Springer.

Didonna, F. (Ed.). (2009a). *Clinical handbook of mindfulness*. New York: Springer.

Dimidjian, S., Beck, A., Felder, J.N., Boggs, J.M., Gallop, R. and Segal, Z.V. 2014. Web-based mindfulness-based cognitive therapy for reducing residual depressive symptoms: an open trial and quasi-experimental comparison to propensity score matched controls. *Behaviour Research and Therapy*, **63**: 83–89.

Epstein, M. 1995. *Thoughts without a thinker*. New York: Basic Books.

Epstein, M. 2007. *Psychotherapy without the self: A Buddhist perspective*. New Haven: Yale University Press.

Erismann, S.M. and Roemer, L. 2010. A preliminary investigation of the effects of experimentally induced mindfulness on emotional responding to film clips. *Emotion*, **10**: 72–82.

Farb, N.A.S., Anderson, A.K., Mayberg, H., Bean, J., McKeon, D. and Segal, Z.V. 2010. Minding one's emotions: Mindfulness training alters the neural expression of sadness. *Emotion*, **10**: 25–33.

Fulton, P.R. 2005. Mindfulness as clinical training. In: C.K. Germer, R.D. Siegel, & P.R. Fulton (Eds.), *Mindfulness and psychotherapy* (pp. 55–72). New York: Guilford Press.

- Grossman, P., Niemann, L., Schmidt, S. and Walach, H. 2004. Mindfulness-based stress reduction and health benefits: A meta-analysis. *Journal of Psychosomatic Research*, **57**: 35–43.
- Gu, J., Strauss, C., Bond, R. and Cavanagh, K. 2015. How do mindfulness-based cognitive therapy and mindfulness-based stress reduction improve mental health and wellbeing? A systematic review and meta-analysis of mediation studies. *Clinical Psychology Review*, **37**: 1–12.
- Hoffman, S.G., Sawyer, A.T., Witt, A.A. and Oh, D. 2010. The effect of mindfulness-based therapy on anxiety and depression: A meta-analytic review. *Journal of Consulting and Clinical Psychology*, **78**: 169–183.
- Hölzel, B.K., Ott, U., Gard, T., Hempel, H., Weygandt, M., Morgen, K. and Vaitl, D. 2008. Investigation of mindfulness meditation practitioners with voxel-based morphometry. *Social Cognitive and Affective Neuroscience*, **3**: 55–61.
- Jha, A.P., Stanley, E.A., Kiyonaga, A., Wong, L. and Gelfand, L. 2010. Examining the protective effects of mindfulness training on working memory capacity and affective experience. *Emotion*, **10**: 54–64.
- Kabat-Zinn, J. 1982. An outpatient program in behavioral medicine for chronic pain patients based on the practice of mindfulness meditation: theoretical considerations and preliminary results. *General Hospital Psychiatry*, **4**(1): 33–47.
- Kabat-Zinn, J. 2003. Mindfulness-based interventions in context: past, present, and future. *Clinical Psychology: Science and Practice*, **10**(2): 144–156.
- Keng, S.L., Smoski, M.J. and Robins, C.J. 2011. Effects of mindfulness on psychological health: a review of empirical studies. *Clinical Psychology Review*, **31**(6): 1041–1056.
- Lazar, S.W., Kerr, C.E., Wasserman, R.H., Gray, J.R., Greve, D.N., Treadway, M.T., and Fischl, B. 2005. Meditation experience is associated with increased cortical thickness. *Neuroreport: For Rapid Communication of Neuroscience Research*, **16**: 1893–1897.
- Leary, M.R. and Tate, E.B. 2007. The multi-faceted nature of mindfulness. *Psychological Inquiry*, **18**: 251–255.
- Lesh, T.V. 1970. Zen meditation and the development of empathy in counselors. *The Journal of Humanistic Psychology*, **10**: 39–74.
- Lomas, T., Cartwright, T., Edginton, T. and Ridge, D. 2014. A qualitative analysis of experiential challenges associated with meditation practice. *Mindfulness*, **6**: 1–13.
- Lutz, A., Slagter, H.A., Dunne, J.D. and Davidson, R.J. 2008. Attention regulation and monitoring in meditation. *Trends in Cognitive Sciences*, **12**: 163–169.
- Lutz, A., Slagter, H.A., Rawlings, N.B., Francis, A.D., Greischar, L.L. and Davidson, R.J. 2009. Mental training enhances attentional stability: Neural and behavioral evidence. *The Journal of Neuroscience*, **29**: 13418–13427.
- Ostafin, B.D., Chawla, N., Bowen, S., Dillworth, T.M., Witkiewitz, K. and Marlatt, G. A. 2006. Intensive mindfulness training and the reduction of psychological distress: A preliminary study. *Cognitive and Behavioral Practice*, **13**: 191–197.
- Ramel, W., Goldin, P.R., Carmona, P.E. and McQuaid, J.R. 2004. The effects of mindfulness meditation on cognitive processes and affect in patients with past depression. *Cognitive Therapy and Research*, **28**: 433–455.
- Shapiro, S.L. and Carlson, L.E. 2009. *The art and science of mindfulness: Integrating mindfulness into psychology and the helping professions*. Washington, DC: American Psychological Association.
- Siegel, D.J. 2007a. Mindfulness training and neural integration: Differentiation of distinct streams of awareness and the cultivation of wellbeing. *Social Cognitive and Affective Neuroscience*, **2**: 259–263.
- Siegel, D.J. 2007b. *The mindful brain: Reflection and attunement in the cultivation of well-being*. New York: Norton.
- Siegel, D.J. 2009. Mindful awareness, mindsight, and neural integration. *The Humanistic Psychologist*, **37**: 137–158.
- Strauss, C., Cavanagh, K., Oliver, A. and Pettman, D. 2014. Mindfulness-based interventions for people diagnosed with a current episode of an anxiety or depressive disorder: a meta-analysis of randomised controlled trials. *PLoS One*, **9**(4): e96110.
- Vestergaard-Poulsen, P., van Beek, M., Skewes, J., Bjarkam, C.R., Stubberup, M., Bertelsen, J. and Roepstorff, A. 2009. Long-term meditation is associated with increased gray matter density in the brain stem. *Neuro report: For Rapid Communication of Neuroscience Research*, **20**: 170–174.
- Wachs, K. and Cordova, J.V. 2007. Mindful relating: Exploring mindfulness and emotion repertoires in intimate relationships. *Journal of Marital and Family Therapy*, **33**: 464–481.
- Wallace, B.A. 2001. Inter-subjectivity in Indo-Tibetan Buddhism. *Journal of Consciousness Studies*, **8**: 209–230.
- Way, B.M., Creswell, J.D., Eisenberger, N.L. and Lieberman, M.D. 2010. Dispositional mindfulness and depressive symptomatology: Correlations with limbic and self-referential neural activity during rest. *Emotion*, **10**: 12–24.
- Warfield, J.N. 1974. Developing interconnection matrices in structural modelling, *in the proceedings of IEEE Transactions on System, Man, and Cybernetics*, **4**(1): 81-87.