

Theoretical Analyses

Meta-Cognition in Mindfulness: A Conceptual Analysis

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Abstract

Over the last few decades there has been a substantial increase in the research and applications of meta-cognition and mindfulness. The concept of meta-cognition and mindfulness seems different and their research literature evolved independent of each other. However, meta-cognition and mindfulness share many commonalities and are conceptually related in many ways. Evidently, there has been relatively little research addressing this relationship. The research tradition of meta-cognition and mindfulness may strengthen and benefit each other. Specific aspects, such as development of 'meta-awareness' can be integrated with each other in a complementary as well as supplementary manner in applied settings such as psychotherapy. This paper describes the nature of meta-cognition and mindfulness and reviews their conceptual relationships. Finally, theoretical and applied implications of this relationship are discussed.

Keywords: mindfulness, detached mindfulness, meta-cognition, meta-awareness

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Introduction

Over the last few decades there has been a substantial increase in the research and applications of meta-cognition and mindfulness. Psychological research in meta-cognition has originated from two parallel roots: cognitive psychology of the 1960s and post-Piagetian developmental psychology of the 1970s (Schwartz & Perfect, 2004). Mindfulness on the other hand is rooted in Buddhist meditative tradition; though it is also conceptualized in terms of individual disposition independent of meditative practices (Brown & Ryan, 2003). Recently, these concepts have been increasingly applied to psychotherapies. Mindfulness and meta-cognition based psychotherapies are often represented as 'third wave behavioral therapies'. The first wave included behavior therapies based on classical and operant conditioning and second wave included cognitive revolution that lead to the popularization of cognitive behavioral therapies. The concept of meta-cognition and mindfulness seems different and their research literature evolved independent of each other. However, meta-cognition and mindfulness share many commonalities and are conceptually related in many ways. This paper aims to review relevant literature and compare the nature of meta-cognition and mindfulness and clarify their commonalities and relationships.

Nature of Meta-Cognition

Meta-cognition is one of the distinctive characteristics of human mind that enables us to reflect on our own mental states. Metacognition is reflected in many of our day to day activities such as when we realize that strategy X is better than Y to solve a problem or we realize biases in our perception, thinking and judgments. During the last four decades the concept of meta-cognition has become one of the major areas of research particularly in developmental and cognitive psychology. The term meta-cognition was originally coined and popularized by Flavell (1979) especially in the context of developmental and educational psychology. He defined it as “cognition about cognitive phenomena,” or “thinking about thinking” (Flavell, 1979, p. 906). Other subsequent definitions essentially connote this original idea. For example, Kuhn and Dean (2004, p. 270) defined meta-cognition as “Awareness and management of one’s own thought”. Meta-cognition is generally referred to the second order cognition, that is, thoughts about thoughts, knowledge about knowledge or reflections about actions (Papaleontiou-Louca, 2003). Gradually, the concept has been broadened to include various psychological phenomena such as knowledge about own or someone else’s emotions or motives (Papaleontiou-Louca, 2003). Metacognition is related to other concepts like ‘theory of mind’ (Flavell, 1999). Metacognition researchers are primarily interested in developing capacity to think about one’s own thought whereas theory of mind researchers focuses more on the ability to think and make inferences about the thoughts and feelings of other person (Misailidi, 2010). In a sense, theory of mind is prerequisite for metacognition (Al-Hilawani, Easterbrooks, & Marchant, 2002).

Meta-cognition includes two clusters of activities: *knowledge about cognition and regulation of cognition* (Cross & Paris, 1988; Flavell, 1979). Metacognitive knowledge refers to a person’s knowledge or understanding of cognitive processes whereas metacognitive regulation refers to a person’s ability to regulate cognitive processes during problem solving. However, the foundation of meta-cognition is knowledge about cognition as knowledge informs the regulation of cognition as well (Brown, 1987). A person can regulate cognitions only when he/she has knowledge and awareness of that cognition. Several researchers have developed different framework for categorizing knowledge about cognition. For example, according to Flavell (1979), *knowledge about cognition* refers to the knowledge about one’s own cognitive strengths and limitations as well as factors that may interact to affect cognition. More specifically, he proposed three categories of knowledge about cognition: person variables, task variables and strategy variables. Person variables include knowledge and beliefs about human beings as cognitive organisms, such as knowledge and beliefs about interests and abilities about oneself and others. Task variables include knowledge about the demands of different tasks, such as knowledge about which task will be difficult and taxing and which will be easy and less taxing. Strategy variables include knowledge about most useful strategies for any task, such as evaluating whether one will get correct solution of a problem by using a particular strategy. Other researchers have used different framework for categorizing knowledge about cognition. For example, knowledge about cognition has been categorized as declarative and procedural knowledge (Cross & Paris, 1988; Kuhn, 2000). Declarative cognitive knowledge includes an individual’s knowledge about himself/herself as a learner and factors that might influence one’s performance, such as knowledge about the capacity and limitations of one’s memory (Schraw, Crippen, & Hartley, 2006). On the other hand, procedural knowledge refers to the awareness and management of cognition, such as the ability to categorize new information (Cross & Paris, 1988; Kuhn & Dean, 2004; Schraw et al., 2006). *Regulation of cognition* refers to various self-regulatory mechanisms used by a learner which may include activities like planning, monitoring and evaluating, such as doing self-assessment and evaluating one’s efficiency in learning a task (Cross & Paris, 1988; Schraw et al., 2006).

Two constituent elements of meta-cognition (knowledge about cognition and cognitive regulation) are related but have different characteristics (Brown, 1987). Knowledge about cognition is generally stable, storable (communicable), fallible, and late developing whereas cognitive regulation is relatively unstable and independent of age (Brown, 1987). Knowing what (declarative knowledge) is generally stable and it involves reflection and communication. However, it can be fallible in the sense that facts known about our cognition can be incorrect. On the other hand, cognitive regulation is unstable in the sense that one may show self-regulatory behavior in one situation and not in another, such as one may show self-regulation of anger in workplace but not in home. Empirical studies have shown that both elements of meta-cognition (knowledge about cognition and cognitive regulation) are statistically associated and cognitive knowledge facilitates cognitive regulation (Schraw, 1994; Schraw, 1998; Schraw & Dennison, 1994; Sperling, Howard, Miller, & Murphy, 2002; Sperling, Howard, Staley, & DuBois, 2004).

The concept of meta-cognition has been increasingly applied to psychotherapies which are particularly called as meta-cognitive therapies (MCT). The approach of meta-cognitive therapy is fundamentally different from many other conventional psychotherapies. MCT focuses on the human thought processes rather than the content of the thoughts (Fisher & Wells, 2009). In other words, the way a person thinks and controls behavior is more important than what a person thinks for a meta-cognitive therapist. For example, development and maintenance of psychological disorders is usually associated with negative automatic thoughts which typically include uncontrolled, automatic and biased thought patterns. Such thoughts are controlled by metacognitions. Therefore, MCT aims at modifying the underlying mechanisms (such as metacognitive beliefs, attention control and ways of relating with thoughts) involved in the development and maintenance of various psychological disorders (Wells, 2000).

Nature of Mindfulness

The concept of mindfulness originated from eastern meditative practices particularly Buddhism. It is a state of consciousness involving consciously attending one's moment to moment experiences (Brown & Ryan, 2003). Mindfulness involves developing awareness and acceptance of constantly changing experiential phenomena such as cognitions, emotions, sensations and external stimuli (Baer, 2003). For example, in a state of mindfulness one simply becomes conscious to thought processes, emotions, and sensations without reacting to them. The purpose of mindfulness meditation practices is to develop such a state of mind by regular practice. Mindfulness has also been conceptualized as cognitive state grounded in individual's personality disposition where it is considered as a personality disposition that can vary from person to person (Brown & Ryan, 2003; Langer, 1989).

In Buddhism, mindfulness is considered as one of the fundamental meditation technique to increase our awareness by training our mind to pay attention to moment to moment thought processes and experiences without reacting to them. Kabat-Zinn (2003, p. 145), one of the central founders of mindfulness in western psychology defined mindfulness as "the awareness that emerges through paying attention on purpose, in the present moment, and non-judgmentally to the unfolding of the experience moment by moment. Mindfulness involves moment to moment awareness of thoughts and experiences and paying attention to our thoughts and feelings without judging them. Consequently, the practice of mindfulness helps us to remain in the present moment without the ruminative thoughts about past and future. Bishop et al. (2004), in their operational definition of mindfulness included two features of attention associated with mindfulness: Self-regulation of attention towards the present moment and an orientation of curiosity, openness and acceptance. Shapiro et al. (2006) extended the two component model of mindfulness of Bishop et al. (2004) and included a third component 'intention'. According to them, intention or the motivation behind the mindfulness practice should also be considered; as outcome of mindfulness practice

might depend on the intention of the practitioner. Within psychology, mindfulness has emerged as an important concept and therapy in the last three decades primarily due to the work of Kabat-Zinn and other colleagues. They first developed the Mindfulness Based Stress Reduction Program (MBSR) in the University of Massachusetts Medical Center in 1979 to help people to cope with stress and illnesses by strengthening the ability of mindfulness. This program now finds place in hundreds of healthcare institutions in USA and Europe to help people cope with physical pain, physical illnesses and mental illnesses (Santorelli, 1999). However, recently mindfulness has been used as an adjunct to, or in combination with cognitive behavioral therapy (Malinowski, 2008). Both of these approaches are sometimes combined to address wider mental issues and bring about long term changes. Cognitive behavioral therapies are used to educate and provide insights to the participants about the contents of the thoughts and depression (Manicavasgar, Parker, & Perich, 2011). Mindfulness training helps participants to become aware of their automatic and intrusive thoughts and feelings without attachment and reacting to them (Hofmann, Sawyer, & Fang, 2010).

Mindfulness has been found to be related to various positive outcomes such as physical health, psychological well-being, work and relationships (Brown & Ryan, 2003). Hölzel et al. (2011) made an insightful integration of the existing literature of mindfulness and found four mechanisms by which mindfulness exert its effects: (a) attention regulation, (b) body awareness, (c) emotion regulation, and (d) change in perspective on the self. *Attention regulation* is one of the basic components of many meditation practices where attention is trained to focus on some objects. Practice of mindfulness generally starts with training of mind to focus attention on a single object or sensation (such as focusing our attention on the sensation of incoming and outgoing breaths in nostrils). Once the practitioner masters the focused attention, he/she is encouraged to practice more detached attention where attention is more open without any identification with any particular internal or external objects, such as just becoming aware of the streams of thoughts, sensations or feelings as a neutral observer without attaching to them. This kind of attention helps in the development of a non-reactive mind which is the hallmark of mindfulness. *Body awareness* involves noticing sensations of the body. Mindfulness practice requires practice of objective observation of various body sensations especially subtle sensations associated with deeper emotions, such as sensations of tightness or discomfort in the lower abdomen associated with fear. Body awareness increases emotional awareness as emotions are always associated with certain body sensations. Mindfulness practice helps in *emotion regulation*. Emotional outbursts (especially destructive emotions) are often associated with lack of awareness and mindfulness. Increased awareness and alertness associated with mindfulness leads to better emotional awareness and regulation. Finally, *change in the perspective of self* is associated with mindfulness practice. One of the central propositions of Buddhism is the concept of non-self (there is no permanent sense of self). Mindfulness practice helps us to experience non self. Mindfulness practice develops meta-awareness that facilitates detachment from the static sense of self. Consequently, the practitioner observes the sense of self as another object in the field of consciousness rather than an objective reality.

Meta-Cognition in Mindfulness

Several researchers have theoretically related mindfulness with meta-cognition (Bishop et al., 2004; Teasdale, 1999; Teasdale et al., 2002; Wells, 2005). Many classic definitions of mindfulness implicitly refer meta-cognition in defining mindfulness. For example, Kabat-Zinn (2003, p. 145) defined mindfulness as “the awareness that emerges through paying attention on purpose, in the present moment, and non-judgmentally to the unfolding of

experience moment by moment". This definition assumes that the state of mindfulness involves a metacognitive level of mind that is aware of the cognitions or contents of the mind.

Mindfulness includes at least two levels of cognition, that is, a lower level qualia occurring in the present moment such as perceptions and thoughts; and a higher level meta-cognition constituted by the awareness of the flowing qualia (Jankowski & Holas, 2014). In his meta-cognitive model of psychological disorder, Wells (2000) proposed that meta-cognition of the internal events such as thoughts was the basic feature of mindfulness and several meta-cognitive processes and skills were necessary for attaining a state of mindfulness. Several other researchers (such as Teasdale et al., 2002; Watkins, Teasdale, & Williams, 2000) also proposed that mindfulness facilitated meta-cognitive insights and significantly reduced risk of psychological disorders such as depression relapses. Although meta-cognitive therapy and mindfulness based cognitive therapy are different systems, they have many commonalities and strive for same goal. Both foster a change in client's relationship with their thoughts and emotions by facilitating detachment (Morck, 2009). In this connection, Teasdale et al. (2002, p. 285) posited that in the state of meta-cognitive awareness "thoughts are seen as passing events in the mind rather than as inherent aspects of self or as necessarily valid reflections of reality". This state is very similar to the description of the mindfulness. Mindfulness activates and strengthens meta-cognitive mode of information processing and facilitates cognitive restructuring (Wells, 2002). Mindfulness facilitates cognitive restructuring by facilitating disengagement from an established stress appraisal and negative thought patterns and promoting adaptive appraisals and thought patterns.

Meta-Cognitive Model of Mindfulness

Recently, Jankowski and Holas (2014) made a meticulous and insightful attempt to integrate existing literature on meta-cognition and mindfulness and proposed five hypotheses. They used the description of mindfulness from the clinical tradition of Kabat-Zinn. A brief summary of their description of these hypotheses are presented below-

(1) Metacognitive, multilevel processing of information is inherent to a mindfulness state

The state of mindfulness includes at least two levels of information processing in hierarchy. Higher meta-level (awareness or consciousness) monitoring and controlling lower object level (contents of consciousness such as perceptions, thoughts and emotions). Furthermore, meta-level may have many subsequent levels of meta-cognition. This means that one meta-level can become object level for a higher next level and so on. Therefore, mindfulness state includes multilevel meta-cognitive processing of information.

(2) Mindfulness depends on dynamic cooperation of three main components of the metacognition: meta-cognitive knowledge, metacognitive experiences and metacognitive skills

Metacognitive knowledge, experiences, and skills are mutually associated with each other and each of them may affect the state of mindfulness. The state of mindfulness involves objective and neutral observation of the contents of the mind without attachment and reacting to them. This state of mindfulness can be realized with specific metacognitive knowledge such as "I am aware and observer of my depressive thoughts" rather than "I am depressed". Similarly, mindfulness has been associated with specific metacognitive experiences such as freshness, interest, curiosity about thought processes and experiences; metacognitive insights, and compassion towards the self (Jankowski & Holas, 2014). Furthermore, several meta-skills are necessary to achieve a state of mindfulness. Mindfulness is related to attentional processes. More specifically, increased alertness and sustained attention. According to Jankowski and Holas (2014), increased alertness specifically intrinsic alertness is regulated intentionally by self-directed instructions (such as I am going to remain alert and pay attention to my thoughts). Intrinsic

alertness also depends on the meta-experiences related to mindfulness such as feelings of novelty and curiosity. Such meta-experiences increase the level of alertness. The relationship between the intrinsic alertness and meta-experiences is reciprocal as alertness facilitates meta-experiences and vice-versa. A second attentional process that is necessary in mindfulness is *sustained attention* for a prolonged period of time. Sustained attention like intrinsic alertness is also related to intentional self-directed instructions and meta-experiences of curiosity. Other meta-skills that may be temporarily involved in mindfulness include *inhibition and task-switching*. Inhibition may help in decreasing meta-cognitions that activates opposing processes like rumination and mind wondering. Switching tasks allows returning back to the earlier mindfulness practice. During the practice of mindfulness, one may relapse back to the mode of automatic thoughts and mind wondering. Therefore, the ability to become aware and stop engaging with such mind wondering (inhibition) and switching attention to earlier mode of mindfulness are necessary skill that are required for successful mindfulness practice.

(3) Mindful meta-level is always conscious while the other meta-levels of cognition can occur implicitly.

Meta-cognition may also include implicit and unconscious processes. Empirical evidence suggests that meta-cognitive monitoring and control may be partially unconscious but more conscious processes are involved in higher level of meta-cognition (Jankowski & Holas, 2014). Mindfulness is at the highest level of meta-cognition and therefore it is always a conscious activity. The major purpose of mindfulness is to cultivate consciousness towards our experiences, mental processes and actions. Therefore, meta-cognitions associated with mindfulness are always conscious.

(4) Intentionally practiced mindfulness leads to decreases in dissociations between meta and object levels

Meta-cognition implies at least two levels of dissociations between meta- and -object levels: temporal and translational dissociations. Temporal dissociation means lack of meta-awareness of current experiences. Mind wondering and daydreaming are examples of temporal dissociation. Translational dissociation occurs between object and meta-level when recoding of experiences by meta-cognition is distorted from the object level due to interference. Defense mechanisms and stereotyping are examples of translational dissociations. Defense mechanisms represent motivated misrepresentation and stereotyping represents false interpretation due to inconsistency of meta-knowledge with actual experience. Such translational dissociation may result in memory problems, misattribution and maladaptive self-regulation. Cultivation of mindfulness tends to decrease these dissociations by increasing alertness and reducing information distortions from the object level.

(5) Components of mindful meta-level of cognition develop and change during continuous practice

The primary assumption of mindfulness in the tradition of Kabat-Zinn is that mindfulness is not an everyday phenomenon as it requires practice and evolves over time. Generally, mindfulness practice begins with focusing of attention on specific experience such as sensations of incoming and outgoing breaths. Then the practitioner learns to direct his attention on thoughts, sensations and emotions and observe them without attachment. As the practice continues, the practitioner develops newer metacognitive knowledge, insights and experiences. For example, practitioner may develop the capacity to observe the contents of mind without attachment and gain newer insights such as 'thoughts are transitory events in mind rather than objective reality'. Such metacognitive insights play vital role in the process of disengagement from the negative automatic thought patterns and facilitates adaptive coping abilities. Therefore, metacognitive knowledge and experiences associated with mindfulness changes and evolves with continuous practice. A practitioner may need to pass through many intermediate stages to reach a clear state of mindfulness.

Conclusion and Implications

It is very clear that meta-cognition and mindfulness share many commonalities and are closely related. However, both mindfulness and meta-cognition based therapies have developed and applied independent of each other. It is very clear that both traditions will benefit each other and facilitate theoretical and applied research. For example, a specific aspect of meta-cognition such as 'meta-awareness' can explain the basic mechanism of the effectiveness of mindfulness in promoting human well-being. In this direction, [Hurk, Giommi, and Barendregt \(2012\)](#) reported that although many psychological mechanisms (such as attention regulation, emotion regulation, body awareness, and change in the perspective on the self) have been proposed to explain the effectiveness of mindfulness based therapies, one fundamental mechanism that has not been studied explicitly is 'meta-awareness'. They explained meta-awareness in terms of awareness of mental stimuli and processes and the ability to maintain a non-reactive attitude towards them. Becoming reactive to the mental contents ends the process of meta-awareness. They proposed that meta-awareness is the fundamental mechanism sub serving all the other mechanisms explaining effectiveness of mindfulness. For example, meta-awareness plays central role in both attention regulation and emotion regulation. Attention regulation and emotion regulation requires objective and detached observation of the contents of the mind and emotion without getting caught up with those contents of awareness. Similarly, certain specific aspect of mindfulness such as 'detached mindfulness' can explain the working mechanisms of meta-cognitive therapy. For example, [Wells and Matthews \(1994\)](#) introduced the concept of detached mindfulness in their meta-cognitive analysis of emotional disorders. Detached mindfulness involves detached or objective awareness of continuous automatic flow of internal events such as thoughts in the absence of conceptual analysis and goal directed responses ([Wells, 2005](#)). It is associated with 'cognitive de-centering' which means thoughts are seen as objects in the mind and are separate from reality. According to [Wells \(2005\)](#), detached mindfulness has characteristics such as meta-awareness (consciousness of thoughts), cognitive de-centering, attentional detachment (flexible attention that is not anchored to any particular event), low conceptual processing and low goal directed coping. Detached mindfulness is used as a tool in meta-cognitive therapy. Therefore, both the tradition of meta-cognitive therapy and mindfulness based therapy may strengthen and benefit each other. Certainly, specific aspects of each tradition can be integrated with each other in a complementary as well as supplementary manner.

There are other advantages of understanding meta-cognitive processes in mindfulness. Meta-cognitive processes can explain as well as unify diverse conceptualization and operationalization of mindfulness. For example, the main difference between the clinical (or meditative) conceptualization of mindfulness and other approaches focusing on individual differences without meditative practices can be explained with meta-cognition. According to [Jankowski and Holas \(2014\)](#), the main difference between different conceptualization of mindfulness lies in the number of meta-level involved in the mindfulness; as there can be many meta-levels one higher than other in a hierarchy. They further proposed that clinical or meditative mindfulness involves highest level of meta-cognition whereas other conceptualization involves lower levels of meta-cognition. Lower level of mindfulness can occur without conscious intention and meditative practice (as one can be mindful of internal and external events without having awareness of such mindset). However, higher level of meditative mindfulness is generally not possible without conscious intention and practice.

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References

- Al-Hilawani, Y. A., Easterbrooks, S. R., & Marchant, G. J. (2002). Metacognitive ability from a theory-of-mind perspective: A cross-cultural study of students with or without hearing loss. *American Annals of the Deaf*, *147*(4), 38-47. doi:10.1353/aad.2012.0230
- Baer, R. A. (2003). Mindfulness training as a clinical intervention: A conceptual and empirical review. *Clinical Psychology: Science and Practice*, *10*(2), 125-143. doi:10.1093/clipsy.bpg015
- Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., . . . Devins, G. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science and Practice*, *11*(3), 230-241. doi:10.1093/clipsy.bph077
- Brown, A. L. (1987). Metacognition, executive control, self-regulation and other even more mysterious mechanisms. In F. E. Weinert & R. H. Kluwe (Eds.), *Metacognition, motivation, and understanding* (pp. 65-116). Hillsdale, NJ: Lawrence Erlbaum.
- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, *84*(4), 822-848. doi:10.1037/0022-3514.84.4.822
- Cross, D. R., & Paris, S. G. (1988). Developmental and instructional analyses of children's metacognition and reading comprehension. *Journal of Educational Psychology*, *80*(2), 131-142. doi:10.1037/0022-0663.80.2.131
- Fisher, P., & Wells, A. (2009). *Metacognitive therapy: Distinctive features*. Hove, United Kingdom: Routledge.
- Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist*, *34*(10), 906-911. doi:10.1037/0003-066X.34.10.906
- Flavell, J. H. (1999). Cognitive development: Children's knowledge about the mind. *Annual Review of Psychology*, *50*, 21-45. doi:10.1146/annurev.psych.50.1.21
- Hofmann, S. G., Sawyer, A. T., & Fang, A. (2010). The empirical status of the "new wave" of cognitive behavioral therapy. *The Psychiatric Clinics of North America*, *33*(3), 701-710. doi:10.1016/j.psc.2010.04.006
- Hölzel, B. K., Lazar, S. W., Gard, T., Schuman-Olivier, Z., Vago, D. R., & Ott, U. (2011). How does mindfulness meditation work? Proposing mechanisms of action from a conceptual and neural perspective. *Perspectives on Psychological Science*, *6*(6), 537-559. doi:10.1177/1745691611419671
- Hurk, P., Giommi, F., & Barendregt, H. (2012). *Meta-awareness as fundamental working mechanism in mindfulness meditation* [Draft]. Retrieved from <http://ftp.science.ru.nl/CompMath.Found/FG.LWS.pdf>
- Jankowski, T., & Holas, P. (2014). Metacognitive model of mindfulness. *Consciousness and Cognition*, *28*, 64-80. doi:10.1016/j.concog.2014.06.005

- Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice*, 10(2), 144-156. doi:10.1093/clipsy.bpg016
- Kuhn, D. (2000). Metacognitive development. *Current Directions in Psychological Science*, 9(5), 178-181. doi:10.1111/1467-8721.00088
- Kuhn, D., & Dean, D., Jr. (2004). Metacognition: A bridge between cognitive psychology and educational practice. *Theory into Practice*, 43(4), 268-273. doi:10.1207/s15430421tip4304_4
- Langer, E. J. (1989). *Mindfulness*. Cambridge, MA: Da Capo Press.
- Malinowski, P. (2008). Mindfulness as psychological dimension: Concepts and applications. *The Irish Journal of Psychology*, 29(1-2), 155-166. doi:10.1080/03033910.2008.10446281
- Manicavasgar, V., Parker, G., & Perich, T. (2011). Mindfulness-based cognitive therapy vs. cognitive behaviour therapy as a treatment for non-melancholic depression. *Journal of Affective Disorders*, 130(1-2), 138-144. doi:10.1016/j.jad.2010.09.027
- Misailidi, P. (2010). Children's metacognition and theory of mind: Bridging the gap. In A. Efklides & P. Misailidi (Eds.), *Trends and prospects in metacognition research* (pp. 279-291). Berlin, Germany: Springer.
- Morck, R. C. (2009). *Are metacognition and mindfulness related concepts?* (Unpublished doctoral dissertation). Örebro University, Örebro, Sweden.
- Papaleontiou-Louca, E. (2003). The concept and instruction of metacognition. *Teacher Development*, 7(1), 9-30. doi:10.1080/13664530300200184
- Santorelli, S. F. (1999). *Mindfulness-based stress reduction: Qualifications and recommended guidelines for providers*. Worcester, MA: University of Massachusetts Medical School, Center for Mindfulness in Medicine, Health Care, and Society.
- Schraw, G. (1994). The effects of metacognitive knowledge on local and global monitoring. *Contemporary Educational Psychology*, 19(2), 143-154. doi:10.1006/ceps.1994.1013
- Schraw, G. (1998). Promoting general metacognitive awareness. *Instructional Science*, 26(1-2), 113-125. doi:10.1023/A:1003044231033
- Schraw, G., Crippen, K. J., & Hartley, K. (2006). Promoting self-regulation in science education: Metacognition as part of a broader perspective on learning. *Research in Science Education*, 36(1-2), 111-139. doi:10.1007/s11165-005-3917-8
- Schraw, G., & Dennison, R. S. (1994). Assessing metacognitive awareness. *Contemporary Educational Psychology*, 19(4), 460-475. doi:10.1006/ceps.1994.1033
- Schwartz, B. L., & Perfect, T. J. (2004). Introduction: Toward an applied metacognition. In T. J. Perfect & B. L. Schwartz (Eds.), *Applied metacognition* (p. 2-14). Cambridge, United Kingdom: Cambridge University Press.
- Shapiro, S. L., Carlson, L. E., Astin, J. A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology*, 62(3), 373-386. doi:10.1002/jclp.20237
- Sperling, R. A., Howard, B. C., Miller, L. A., & Murphy, C. (2002). Measures of children's knowledge and regulation of cognition. *Contemporary Educational Psychology*, 27(1), 51-79. doi:10.1006/ceps.2001.1091

- Sperling, R. A., Howard, B. C., Staley, R., & DuBois, N. (2004). Metacognition and self-regulated learning constructs. *Educational Research and Evaluation, 10*(2), 117-139. doi:10.1076/edre.10.2.117.27905
- Teasdale, J. D. (1999). Metacognition, mindfulness and the modification of mood disorders. *Clinical Psychology & Psychotherapy, 6*(2), 146-155. doi:10.1002/(SICI)1099-0879(199905)6:2<146::AID-CPP195>3.0.CO;2-E
- Teasdale, J. D., Moore, R. G., Hayhurst, H., Pope, M., Williams, S., & Segal, Z. V. (2002). Metacognitive awareness and prevention of relapse in depression: Empirical evidence. *Journal of Consulting and Clinical Psychology, 70*(2), 275-287. doi:10.1037/0022-006X.70.2.275
- Watkins, E., Teasdale, J. D., & Williams, R. M. (2000). Decentring and distraction reduce overgeneral autobiographical memory in depression. *Psychological Medicine, 30*(4), 911-920. doi:10.1017/S0033291799002263
- Wells, A. (2000). *Emotional disorders and metacognition: Innovative cognitive therapy*. Chichester, United Kingdom: John Wiley & Sons.
- Wells, A. (2002). GAD, metacognition, and mindfulness: An information processing analysis. *Clinical Psychology: Science and Practice, 9*(1), 95-100. doi:10.1093/clipsy/9.1.95
- Wells, A. (2005). Detached mindfulness in cognitive therapy: A metacognitive analysis and ten techniques. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 23*(4), 337-355. doi:10.1007/s10942-005-0018-6
- Wells, A., & Matthews, G. (1994). *Attention and emotion*. Hove, United Kingdom: Lawrence Erlbaum.

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