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Metacognitive Beliefs and Metacognitive Capacity: Do They Assess Related Phenomena?

Alexandra Ayala, BS[a,b], **Jessica L. Mickens, MS**[a], **Evan J. Myers, MS**[a], **Danielle B. Abel, MS**[a], **Ceouna M. Hegwood, BS**[a], **Beshaun J. Davis, PhD**[c], **Paul H. Lysaker, PhD**[d,e], **Kyle S. Minor, PhD**[a,*]

[a]Department of Psychology, Indiana University- Purdue University Indianapolis, Indianapolis, IN, United States

[b]Department of Psychology, University of North Texas, Denton, TX, United States

[c]Department of Psychiatry, University of Maryland Medical School, Baltimore, MD, United States

[d]Department of Psychiatry, Indiana University School of Medicine, Indianapolis, IN, United States

[e]Roudebush VA Medical Center, Indianapolis, IN, United States

Abstract

Metacognition has been defined several ways across different fields. In schizophrenia, two primary approaches to assessing metacognition focus on measuring metacognitive beliefs and metacognitive capacity. The degree of association between these two approaches is unclear. In this pilot study, schizophrenia ($n = 39$) and control groups ($n = 46$) were assessed using metacognitive beliefs (Metacognition Questionnaire-30) and metacognitive capacity (Metacognition Assessment Scale-Abbreviated) scales. We also examined how these two approaches predicted quality of life. Results showed anticipated differences for metacognitive beliefs, metacognitive capacity, and quality of life when comparing schizophrenia and healthy control groups. However, metacognitive beliefs and metacognitive capacity were not significantly related and only predicted quality of life in the healthy control group. Although preliminary, these findings suggest these two approaches have a limited relationship with one another. Future studies should test these findings in larger samples and focus on examining associations at different levels of metacognitive functioning in those with schizophrenia.

Keywords

metacognition; schizophrenia; psychotic disorders; quality of life

[*]Corresponding author: Kyle S. Minor, IUPUI School of Science, 402 N. Blackford St., LD 124, Indianapolis, IN, 46202; Phone: (317) 274-2933; ksminor@iupui.edu.

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INTRODUCTION

What comes to mind when you read the term “metacognition”? Do you think of effective strategies for classroom learning? Your level of awareness regarding how you think? Your mental representations of yourself and other people—and how you relate to one another—in the world around you? Given that accepted approaches are highly dependent on one’s discipline, the construct you are imagining is likely tied to your field. The most widely used approach is that metacognition consists of ‘thinking about thinking’ (Mahdavi, 2014). However, other approaches expand on this concept by describing metacognition as the capability to think about and regulate one’s own cognitive processes (Jia et al., 2019) or, expanding further, as the underlying processes that allow people to form an evolving sense of self and others within their community (McLean and Pasupathi, 2012; Semerari et al., 2003). Regardless of the approach, research has shown deficits in metacognition are common in psychopathology (Sun et al., 2020). This extends to schizophrenia, where metacognitive deficits are linked with symptoms (Lysaker et al., 2011b; Minor and Lysaker, 2014) and poor quality of life (Lysaker et al., 2011a; Sellers et al., 2018).

In schizophrenia research, two widely used approaches to assessing metacognition focus on measuring metacognitive beliefs and metacognitive capacity. Regarding metacognitive beliefs, this approach was originally developed within a cognitive framework to measure anxiety disorders. It assesses the beliefs, attitudes, and knowledge that one holds about their cognition (Flavell, 1979; Wells, 1995; Wells, 1999). For example, does a person regard their suspicions of others as something they should embrace or overlook? Metacognitive beliefs can be distinguished as positive or negative, with positive metacognitive beliefs involving the usefulness of worry and negative metacognitive beliefs involve beliefs concerning negative interpretations of thoughts (Wells, 2010). Research has shown that dysfunctional metacognitive beliefs are common in people with schizophrenia (Cotter et al., 2017; Ostefjells et al., 2015). Sellers and colleagues (2018) found that dysfunctional metacognitive beliefs were predictive of emotional distress in those with psychosis—outperforming symptom frequency, anxiety, and depression in predicting negative affect. Different aspects of dysfunctional metacognitive beliefs have been shown to predict empathy and beliefs about auditory hallucinations in schizophrenia (Chuang et al., 2021; van Oosterhout et al., 2013) and are also increased in those expressing subclinical psychotic symptoms (Chan et al., 2015; Welsh et al., 2014).

A second approach focuses on metacognitive capacity, which refers to an individual’s capacity to form complex representations of themselves and others and to use that knowledge effectively (Lysaker et al., 2020). Unlike metacognitive beliefs, metacognitive capacity reflects one’s ability to integrate information and form an ongoing sense of self, others, and the challenges and possibilities they are facing in life (Lysaker et al., 2021). Research has shown that people with schizophrenia experience deficits in metacognitive capacity, as it is often difficult for these individuals to recognize and think about their own mental states or the mental states of those around them (Davis et al., 2022; Kukla et al., 2013). Reduced metacognitive capacity has been linked to poor outcomes in schizophrenia, including low motivation, deficits in empathy, and poor social functioning (Bonfils et al., 2019; Luther et al., 2016; Minor et al., 2022; Vohs et al., 2015). Metacognitive capacity has also been found to predict quality of life in schizophrenia, with greater capacity being associated with better quality of life (Lysaker et al., 2011a).

To date, it is unclear whether these two approaches to assessing metacognition are related to one another in schizophrenia. Popolo and colleagues (2017) examined whether metacognitive deficits are unique to schizophrenia, and also tested relationships between metacognitive beliefs and metacognitive capacity across healthy adult, bipolar disorder, and schizophrenia groups. Across this cohort, small to moderate correlations were observed for overall metacognitive belief and metacognitive capacity scores and negligible to medium relationships were observed between individual scales. Determining the intersection between metacognitive beliefs and metacognitive capacity in separate healthy adult and schizophrenia groups will help us understand if these constructs are measuring something similar about metacognition or unrelated phenomena. In addition to assessing convergence, it is also important to determine if these approaches work together to predict key outcomes in schizophrenia. Quality of life was selected in the current study since both metacognitive beliefs and metacognitive capacity have shown strong ties to it (Lysaker et al., 2011a; Sellers et al., 2018).

This pilot study examined if significant relationships exist between metacognitive beliefs and metacognitive capacity in schizophrenia and healthy control groups. Our goal was to test relationships between super- and sub-ordinate components of these two approaches with the expectation that they would demonstrate small to moderate ($r = -0.10$ to -0.30) relationships in each group. These effect sizes were based on the Popolo and colleagues (2017) study, which found small to moderate effects ($r=-0.01$ to -0.32) between subscales in schizophrenia. Additionally, we examined if metacognitive beliefs and metacognitive capacity predicted quality of life in schizophrenia and control groups. Across groups, we hypothesized that both methods of assessing metacognition would account for significant variance. This is one of first studies to test the association between metacognitive beliefs and metacognitive capacity. By addressing this gap, we seek to replicate findings from Popolo and colleagues (2017) and provide important information about whether these two approaches are measuring similar aspects of metacognition.

METHODS

Participants

Participants were recruited from mental health clinics as part of two larger studies on social functioning in schizophrenia [REDACTED]. Eligibility for the schizophrenia group included: 1) a schizophrenia-spectrum disorder diagnosis (confirmed using the Mini International Psychiatric Interview; Sheehan et al., 1998); 2) being age 18–65; 3) demonstrating English fluency; 4) no change in outpatient status in the 30 days prior to baseline testing; 5) could provide informed consent; 6) had no current substance dependence; and 7) no documented intellectual disability. Criteria were similar in the control group with the exception that participants could have no current mental illness or history of psychotic symptoms. Final samples were 39 in the schizophrenia group and 46 in the control group.

Measures

Metacognitive Beliefs—The Metacognition Questionnaire-30 (MCQ-30; Wells et al., 2004) is a self-report measure that assesses five factors within the metacognitive model of psychological disorders. These five factors include: 1) lack of cognitive confidence (a lack of confidence in memory and concentration); 2) positive beliefs about worry (use of worry as an initial strategy to deal with problems); 3) cognitive self-consciousness (one's tendency to focus attention on and be aware of one's thoughts); 4) negative beliefs and uncontrollability and danger (perceived dangerousness of thoughts); and 5) need to control thoughts (one's perceived need to control thoughts at all times). Each MCQ-30 subscale ranges from 6 to 24 (total scores range from 30 to 120); higher scores indicate greater dysfunctional metacognitive beliefs (Cohen and Calamari, 2004; Huntley et al., 2020). Research has shown that individuals with schizophrenia often endorse more dysfunctional metacognitive beliefs than healthy controls (Han et al., 2021).

Metacognitive Capacity—The Metacognition Assessment Scale-Abbreviated (MAS-A; Lysaker et al., 2002) is a rating scale that assesses the ability to form complex and integrated representations of self and others on the basis of a narrative interview (Lysaker et al., 2020). The MAS-A contains four subscales: 1) self-reflectivity, which refers to one's ability to think about themselves; 2) awareness of the mind of the other, which measures the awareness of the thoughts and mental states of others; 3) decentration, which refers to the ability to see a situation from multiple perspectives; and 4) mastery, which assesses the ability to use knowledge regarding oneself and others to respond to psychosocial challenges (Lysaker et al., 2020). For each scale, higher scores reflect greater ability to perform intricate metacognitive tasks; total scores range from 0–28. In this study, MAS-A ratings were made on the basis of the Indiana Psychiatric Illness Interview (IPII; Lysaker et al., 2002). The IPII is a semi-structured interview intended to produce a sample of how individuals think about their psychiatric and related challenges (see Davis et al., 2020; Lysaker et al., 2019). Using the MAS-A and IPII jointly allows for tailored understanding of one's metacognitive capacity in clinical and non-clinical samples (Cheli et al., 2021).

Quality of Life—The Quality-of-Life Scale (QLS; Heinrichs, Hanlon and Carpenter, 1984) was developed to assess quality of life in patients with schizophrenia. The QLS is a 21-item scale with a 7-point rating for each item. It has four subscales: 1) intrapsychic foundations (the person's sense of purpose and motivation); 2) interpersonal relations (social relationships); 3) instrumental role (role functioning given the person's potential); and 4) common objects/activities (engagement with regular activities). Higher ratings indicate greater functioning. All QLS scores presented in this study reflect the mean for the total score or scores within a subscale.

Statistical Analysis—Data analyses were completed in three steps. First, we compared demographic and clinical characteristics in the schizophrenia and control groups. This analysis included comparisons of metacognitive beliefs, metacognitive capacity, and quality of life using independent *t*-tests. Second, we calculated Pearson correlations of super- and sub-ordinate components of the metacognitive capacity with metacognitive belief scales to examine the relationship between these two constructs within schizophrenia and control groups. Finally, we calculated multivariate simultaneous regressions in each group to explore whether these two metacognitive constructs predicted quality of life.

RESULTS

Demographic and Clinical Comparisons

As shown in Table 1, the schizophrenia group had less education and were less likely to be married than the control group. No significant differences were observed for age, gender, or race. As expected, those with schizophrenia scored lower on measures assessing metacognitive beliefs, metacognitive capacity, and had significantly lower quality of life than the control group. They also exhibited lower scores than the control group on all subscales across these constructs with the exception of the cognitive self-consciousness subscale on the MCQ-30.

Relationship Between Metacognitive Beliefs and Metacognitive Capacity

Next, we explored relationships between metacognitive beliefs and metacognitive capacity within each group (Table 2). These approaches were not significantly associated in the schizophrenia ($r = 0.15$) or healthy control ($r = -0.25$) group. The observed correlation in the schizophrenia group was in the opposite direction as expected. In the healthy control group, the observed relationship approached, but did not reach, the hypothesized correlation ($r = -0.30$).

When subscales of the two metacognition measures were compared, MAS-A mastery was positively associated with MCQ-30 need to control beliefs in the schizophrenia group. In the healthy control group, overall capacity and mastery were inversely associated with cognitive-self-consciousness on the beliefs measure. Significant relationships between other scales were not observed. Based on these findings, our expectation that metacognitive beliefs and metacognitive capacity would be moderately correlated were not supported in either group.

Metacognitive Beliefs, Metacognitive Capacity, and Quality of Life

Finally, we investigated how metacognitive beliefs and metacognitive capacity predicted quality of life in each group (Table 3). In the schizophrenia group, models containing these two approaches did not predict quality of life or any quality-of-life domain, with models accounting for 2–11% of the variance in quality-of-life domains. The expectation that metacognition would account for significant variance in quality of life was not supported in this schizophrenia cohort.

In healthy controls, models containing both approaches significantly predicted overall quality of life and all quality-of-life domains with the exception of common objects/activities. These models accounted for 13–31% of the variance across domains. Metacognitive beliefs was a significant predictor in two of five models (overall quality of life, instrumental role). Metacognitive capacity was a significant predictor in four of five models (all but common objects/activities). Our hypothesis that models containing these two approaches would account for significant variance in quality of life was supported in the control group.

DISCUSSION

In this pilot study, we examined whether metacognitive beliefs and metacognitive capacity were related to one another and if they had similar relationships to quality of life in healthy controls and people with schizophrenia. We observed three primary findings. First, expected differences were found for metacognitive beliefs, metacognitive capacity, and quality of life when comparing groups. Interestingly, metacognitive beliefs and metacognitive capacity differentiated groups at nearly identical effect sizes. Second, assessments of metacognitive beliefs and metacognitive capacity were generally not significantly related to one another despite the fact that they differed between groups. Third, metacognitive beliefs and metacognitive capacity predicted quality of life in healthy controls but not in schizophrenia. The latter result differs from past schizophrenia studies (Lysaker et al., 2011; Sellers et al., 2018).

The failure to find a significant relationship between metacognitive beliefs and capacity may suggest several possibilities. As noted by Moritz and Lysaker (2018, 2019), metacognition is a multifaceted construct that may involve relatively independent processes. Results here may suggest that while metacognitive beliefs and capacity both assess how people think about themselves, they also tap into dissociable processes that measure different types of reflections. Thus, the lack of significant associations between approaches suggests that one's beliefs about their metacognitive abilities has little influence on how people actually use these abilities to integrate information to make sense of their experiences. These findings should be interpreted with caution given the limited sample size (i.e., null findings should not be interpreted to mean that relationships do not exist between these constructs). Still, these preliminary findings have implications for research studies. Namely, findings from studies examining metacognitive beliefs may not translate to studies investigating metacognitive capacity—and vice versa. Researchers should be systematic about their approach to assessing metacognition and select measures that best represent the specific construct they are targeting.

In schizophrenia, the lack of significant associations between metacognitive beliefs and metacognitive capacity was particularly striking. Notably, the only observed association was in the opposite direction as expected—despite both approaches differentiating schizophrenia and control groups at similar, large effect size levels. This again points to assessments of metacognitive beliefs and metacognitive capacity measuring different phenomena. One's subjective thoughts about their cognitive processes and emotions (Wells et al., 2004) have few links to their ability to synthesize fragmented psychological experiences into cohesive wholes in schizophrenia (Lysaker et al., 2020). Although associations between constructs were not significant in either group, the smaller observed association in schizophrenia—a group with metacognitive deficits—could signify that a baseline level of metacognition must be present for larger associations to emerge between approaches.

In line with this explanation, we observed that metacognitive beliefs and metacognitive capacity combined to predict quality of life in healthy controls, but not in schizophrenia. This is particularly surprising given that past studies have found these associations (Lysaker et al., 2005). It could be that a certain level of neurocognitive or metacognitive ability is needed to accurately respond to questions about one's metacognitive beliefs. Quality of life is based on the person's perception and their capability to self-report their lived experiences/relationships. Thus, a person who possesses lower insight (e.g., metacognitive capacity) may not be able to report their feelings, experiences, or social functions precisely (Tan et al., 2019). Past studies have shown that links between neurocognition and metacognition break apart at relatively low levels of symptom severity (Minor et al., 2015). Thus, those with schizophrenia may struggle to accurately respond to subjective metacognitive beliefs measures due to cognitive deficits and poor insight inherent to their disorder (Davis et al., 2020; Woodberry et al., 2008). Although this might explain why beliefs did not predict quality of life in schizophrenia, it does not explain why capacity—an interviewer-rated measure—would not account for significant variance. For capacity, there is evidence that metacognitive capacity and insight are inversely associated with quality of life (Davis et al., 2020). Given findings here were inconsistent with past studies (Lysaker et al., 2011a), future work should test relationships between metacognitive capacity and quality of life with larger schizophrenia samples.

A key study takeaway is that researchers and clinicans interested in the assessment, treatment, and diagnosis of individuals with schizophrenia should be mindful of how they define metacognition: one size does not fit all. This again points to the importance of carefully selecting assessments. Failure to do so could lead to incorrect interpretations of clients' metacognitive abilities. Clinicians and researchers should also be mindful of how poor metacognition can impair one's ability to respond accurately to self-report measures of metacognition or quality of life, and take this into consideration during assessments. This should not be interpreted to mean that all indivduals with schizophrenia are impaired on self-reports of these constructs, but that one's level of metacognition should be considered if these findings are replicated.

Strengths of this study include measuring metacognition using two different approaches and relating them to quality of life, an important real-world construct. One study limitation pertains to the different modalities of assessing metacognition. Metacognitive beliefs were assessed using a self-report measure, whereas metacognitive capacity was measured using an interviewer-rated scale that evaluates metacognitive function from narratives. This difference may have lessened true associations between constructs, as the administration and interpretation methods are remarkably varied. A second limitation is the relatively small sample size, which was only adequately powered to observe moderate effects and may have increased the possibility of Type I error. The cross-sectional nature and secondary analysis of this study are additional limitations. Future research is needed to replicate study findings. One avenue is to recruit a sample with enough power to target people with schizophrenia at different levels of metacognitive functioning. This would allow researchers to test if links between different approaches to assessing metacognition exist and predict constructs such as quality of life in people with mild, moderate, and severe metacognitive deficits.

CONCLUSIONS

Approaches used to assess metacognition hold important implications for healthy adults and people with schizophrenia. The lack of significant association between metacognitive beliefs and metacognitive capacity across groups may suggest that these approaches measure relatively unrelated phenomena. When approaches were combined to predict a real-world outcome, we observed that metacognitive beliefs and capacity accounted for significant variance in healthy adults, but not in schizophrenia. Future work should replicate findings in schizophrenia samples that are adequately powered to test associations at different levels of metacognitive functioning.

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Table 1

Participant Data Across Schizophrenia and Control Groups.

	Schizophrenia (*n* = 39)	**Control (*n* = 46)**	**Test of Significance**	**Effect Size (Cohen's *d*)**
Age (*SD*)	45.74 (10.44)	45.24 (13.12)	$t(83) = -0.19$	−0.04
Gender (*n*, %)			$X^2(1) = 2.42$	
Male	23, 59.0%	20, 43.5%		
Female	16, 41.0%	26, 56.5%		
Race			$X^2(2) = 2.96$	
Black	22, 56.4%	12, 26,1%		
White	14, 35.9%	31, 67.4%		
Asian	0, 0.0%	1 2.2%		
Multiracial	3, 7.7%	2, 4.3%		
Education			$X^2(2) = 16.17^{***}$	
<High School	10, 25.6%	1, 2.2%		
High School/GED	8, 20.5%	6, 13.0%		
>High School	21, 54.8%	39, 84.8%		
Marital Status			$X^2(2) = 14.29^{**}$	
Never Married	21, 53.8%	18, 39.1%		
Married	3, 7.7%	21, 45.7%		
Divorced	15, 38.5%	7, 15.2%		
MCQ-30[a] total	70.79 (18.83)	53.87 (11.43)	$t(83) = -4.90^{***}$	−1.11
Lack of cogn. confidence[b]	13.38 (4.35)	9.80 (3.34)	$t(83) = -4.29^{***}$	−0.93
Positive beliefs on worry	11.31 (5.55)	8.17 (3.74)	$t(83) = -2.99^{**}$	−0.67
Cogn. Self-consciousness[c]	17.00 (4.35)	16.20 (5.51)	$t(83) = -0.75$	−0.16
Negative beliefs[d]	13.62 (5.23)	8.59 (3.67)	$t(83) = -5.04^{***}$	−1.13
Need to control thoughts	15.10 (5.44)	11.11 (3.48)	$t(83) = -3.95^{***}$	−0.89
MAS-A[e] total	11.04 (3.11)	15.42 (4.85)	$t(83) = 5.03^{***}$	1.06
Self-reflectivity	4.41 (1.41)	5.65 (1.71)	$t(83) = 3.67^{***}$	0.79
Other	2.85 (0.91)	3.90 (1.19)	$t(83) = 4.63^{***}$	0.99
Decentration	0.77 (0.82)	1.32 (0.88)	$t(83) = 2.95^{**}$	0.64
Mastery	3.01 (1.39)	4.55 (1.98)	$t(83) = 4.20^{***}$	0.89
QOL[f] avg	3.07 (0.83)	5.27 (0.64)	$t(83) = 13.80^{***}$	3.00
Interpersonal relations	3.13 (1.11)	5.28 (0.74)	$t(83) = 10.33^{***}$	2.32
Instrumental role	1.78 (1.62)	5.05 (1.30)	$t(83) = 10.13^{***}$	2.25
Intrapsychic foundations	3.60 (0.95)	5.33 (0.81)	$t(83) = 9.00^{***}$	1.99
Common objects/activities	3.63 (0.92)	5.11 (0.76)	$t(83) = 8.11^{***}$	1.77

[a]Metacognition Questionnaire-30

[b]Lack of cognitive confidence

[c]Cognitive self-consciousness

[d]Negative beliefs and uncontrollability and danger

[e]Metacognition Assessment Scale-Abbreviated

[f]Quality of Life Scale

** $p < 0.01$

*** $p < 0.001$

Table 2

Correlations Between Metacognitive Beliefs and Metacognitive Capacity in Schizophrenia and Control Groups.

	Schizophrenia (n = 39)					Control (n = 46)				
	MAS-A[a]	**Self**	**Other**	**Decen**[b]	**Mastery**	**MAS-A**	**Self**	**Other**	**Decen**	**Mastery**
MCQ-30[c]	0.15	0.14	−0.01	−0.09	0.26	−0.25	−0.20	−0.12	−0.25	−0.26
Cogn. confid.[d]	0.01	0.02	−0.02	−0.05	0.03	−0.04	0.02	−0.01	−0.11	−0.06
Positive belief[e]	0.07	−0.03	−0.15	−0.03	0.31	−0.05	−0.08	0.07	−0.05	−0.03
Cog. self-con.[f]	0.02	0.11	−0.09	−0.01	−0.01	−0.32*	−0.28	−0.23	−0.25	−0.31*
Neg. belief[g]	0.05	0.12	−0.07	−0.22	0.17	−0.09	−0.04	−0.08	−0.17	−0.07
Need control[h]	0.30	0.19	0.20	−0.09	0.40*	−0.13	−0.11	−0.03	0.03	−0.21

[a] Metacognition Assessment Scale-Abbreviated

[b] Decentration

[c] Metacognition Questionnaire-30

[d] Lack of cognitive confidence

[e] Positive beliefs about worry

[f] Cognitive self-consciousness

[g] Negative beliefs and uncontrollability and danger

[h] Need to control thoughts

* $p < 0.05$

Table 3

Summary of Metacognition Linear Regression Analyses for Quality of Life.

	Schizophrenia (*n* = 39)				Control (*n* = 46)			
Overall Quality of Life	R^2	*B*	*SE B*	*β*	R^2	*B*	*SE B*	*β*
Step 1	0.04				0.31***			
Metacognitive Beliefs		0.00	0.01	−0.04		−0.18	0.07	−0.32*
Metacognitive Capacity		0.05	0.04	0.19		0.50	0.17	0.38**
Int Relations	R^2	*B*	*SE B*	*β*	R^2	*B*	*SE B*	*β*
Step 1	0.02				0.22**			
Metacognitive Beliefs		0.00	0.01	−0.04		−0.01	0.01	−0.18
Metacognitive Capacity		0.06	0.06	0.16		0.06	0.02	0.39**
Inst Role	R^2	*B*	*SE B*	*β*	R^2	*B*	*SE B*	*β*
Step 1	0.02				0.28***			
Metacognitive Beliefs		0.01	0.01	0.12		−0.04	0.02	−0.39**
Metacognitive Capacity		0.01	0.09	0.02		0.07	0.04	0.27*
Intra Found	R^2	*B*	*SE B*	*β*	R^2	*B*	*SE B*	*β*
Step 1	0.11				0.22**			
Metacognitive Beliefs		−0.01	0.01	−0.13		−0.02	0.01	−0.27
Metacognitive Capacity		0.10	0.05	0.32		0.05	0.02	0.32*
Common Obj	R^2	*B*	*SE B*	*β*	R^2	*B*	*SE B*	*β*
Step 1	0.03				0.13			
Metacognitive Beliefs		−0.01	0.01	−0.14		−0.01	0.01	−0.14
Metacognitive Capacity		0.04	0.05	0.12		0.05	0.02	0.30

* $p < 0.05$

** $p < 0.01$