**Name of Journal:** *World Journal of Psychiatry*

**Manuscript NO:** 39586

**Manuscript Type:** ORIGINAL ARTICLE

***Observational Study***

**Role of rumination in the relationship between metacognition and shyness**

Palmieri S *et al*. Rumination, metacognition and shyness

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**Author contributions:** Palmieri S wrote the drafts of the manuscript, completed the literature searches; Mansueto G wrote the drafts of the manuscript, run the statistical analyses; Scaini S wrote the drafts of the manuscript and revised the statistical analyses; Fiore F, Sassaroli S, Ruggiero GM, Borlimi R and Carducci BJ revised the final version of the manuscript and coordinated the data collection;all authors approved the final version of the manuscript.

**Institutional review board statement:** The study was conducted according to the Declaration of Helsinki and the ethical guidelines established by the Italian Association of Psychology.

**Informed consent statement:** All participants provided informed consent.

**Conflict-of-interest statement:**The authors of this study have no conflict of interests to disclose.

**STROBE statement:** The guidelines of the STROBE Statement have been adopted.

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**Manuscript source:** Invited manuscript

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**Received:** April 30, 2018

**Peer-review started:** April 30, 2018

**First decision:** July 10, 2018

**Revised:** July 24, 2018

**Accepted:** s

**Article in press:**

**Published online:**

**Abstract**

***AIM***

To explore the association between metacognitive beliefs, rumination and shyness in a non-clinical sample of adults.

***METHODS***

One hundred and three healthy subjects from the general population were enrolled in the study. Shyness was evaluated using the Revised Cheek and Buss Shyness Scale, rumination was assessed using the Ruminative Response Scale, metacognition was evaluated using the Meta-Cognitions Questionnaire 30, and anxiety levels were measured using the State Trait Anxiety Inventory form Y. Correlation analyses, mediation models and 95% bias corrected and accelerated (BCaCI) bootstrapped analyses were performed. Mediation analyses were adjusted for sex and anxiety.

***RESULTS***

Shyness, rumination and metacognition were significantly correlated (*P* < 0.05). The relationship between metacognition and shyness was fully mediated by rumination (Indirect effect: 0.20; 95% BCaCI: 0.08-0.33).

***CONCLUSION***

These findings suggest an association between metacognition and shyness. Rumination mediated the relationship between metacognition and shyness, suggesting that rumination could be a cognitive strategy for shy people. Future research should explore the relationship between these constructs in more depth.

**Key words**: Social anxiety; Shyness; Metacognitive beliefs; Rumination; Post-event

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**Core tip:** No previous studies have explored the relationship between metacognitive belief, rumination and shyness in a sample of adults. This research, based on the self-regulatory executive function model, explores the association between metacognitive beliefs, rumination and shyness. Results show a correlation between shyness, rumination and metacognition. Moreover, the relationship between metacognition and shyness was fully mediated by rumination. These findings have important implications in terms of strengthening of social skills for shy persons.

Palmieri S, Mansueto G, Scaini S, Fiore F, Sassaroli S, Ruggiero GM, Borlimi R, Carducci BJ. Role of rumination in the relationship between metacognition and shyness. *World J Psychiatr* 2018; In press

**INTRODUCTION**

The self-regulatory executive function model (S-REF)[1] has been proposed by Well and Matthews to describe dysfunctional cognition in psychological distress. The S-REF model posits that psychological dysfunction may be maintained by a combination of attentional focusing on threat, rumination, worry, and dysfunctional behaviours, which constitute the Cognitive Attentional Syndrome (CAS)[2]. CAS is activated and maintained by metacognitive beliefs, defined as the information that an individuals has about his/her own cognition and coping strategies, which impact on CAS[2]. Metacognitive beliefs take two forms: positive and negative. Positive metacognitive beliefs motivate the use of CAS. Negative metacognitive beliefs concern the significance, uncontrollability and danger of thoughts[3]. In the S-REF model, CAS is considered problematic because it causes negative thoughts and emotions to persist, leading to failures to modify dysfunctional metacognitive beliefs and stably resolve self-discrepancies[4].

The importance of metacognitive beliefs can be explained with reference to the generalized anxiety disorder (GAD)[5]. In the presence of a trigger (*e.g.,* an intrusive thoughts and/or external factors), positive metacognitive beliefs about the usefulness of worrying as a coping strategy toward a threat are activated and persist until the person achieves a desired internal feeling state. Positive beliefs are not sufficient to lead to GAD, the development of negative beliefs about worrying contributes to an intensification of anxiety symptoms[5].

Rumination is one of the component of the CAS and it has been defined, in the context of social anxiety, as repetitive thoughts about subjective experiences during a recent social interaction, including self-appraisal and the external evaluations of partners and other details of the event[6].

Several studies have found a significant correlation between metacognitive beliefs and rumination in both clinical and non-clinical samples[7-9].

Metacognitive beliefs and rumination have been found to be positively correlated with a wide range of psychological disorders[4,10-12] including social anxiety[13,14].

Patients with social anxiety focus their attention onto an “observer” image of themselves in social circumstances by engaging in ruminative activities after social encounters[5]. The post-event involves ruminating about what happened in the social situation, is focused on both negative emotions and image of oneself, and leads to reinforced beliefs about one’s poor social performance and negative self-perceptions[5].

In comparison with a non-clinical control group, patients with social anxiety reported higher levels of negative metacognitive beliefs regarding the uncontrollability and dangerousness of thoughts[15]. For those in clinical samples with beliefs about the need to control thoughts[16], positive and negative metacognitive beliefs were positively associated with social anxiety symptoms[13]. Similarly, in non-clinical sample a positive correlation was reported between positive metacognitive beliefs about post-event rumination and negative metacognitive beliefs and social anxiety[13].

Although it has been hypothesised that shyness could be qualitatively different from social anxiety[17], some evidence places shyness and social anxiety on a continuum or spectrum in which social anxiety is conceptualised as ‘‘extreme shyness”[6,17-19]. Such a conceptualisation also suggests that the two may share similar features at the somatic, behavioural and cognitive level[17,20,21], even though that shyness is not pathological[17]. More specifically, it might be assumed that shy and social anxious subjects also share similar features in terms of metacognitive beliefs and ruminative processes. An evaluation of whether rumination and metacognitive beliefs are associated with shyness could enrich the literature on the possible aetiological factors of shyness. Although it might be considered as a source of limited evidence to support this specific assumption, Vassilopoulos *et al*[22] have suggested that during preadolescence, shyness might be correlated with post-event processing. However, to date no studies have explored the proposed relationship between metacognitive belief, rumination and shyness in a sample of adults.

Based on the S-REF model[2], this study aims to explore the association between metacognitive beliefs, rumination and shyness in non-clinical sample of adults. We hypothesised that higher levels of metacognitive belief and rumination would be associated with higher levels of shyness.

**MATERIALS AND METHODS**

***Participants***

103 healthy subjects were recruited from the general population on the basis of the following inclusion criteria: being at least 18 years of age and fluent in Italian. In terms of exclusion criteria, individuals with personality disorder were excluded on the basis of a diagnostic interview conducted by psychologists who assessed demographic data, past or current emotional disorders or psychological and/or psychopharmacological treatments. All participants provided informed consent.

***Instruments***

Shyness was evaluated using the Revised Cheek and Buss Shyness Scale (RCBS)[23] a 14-item self-report scale. Each item is rated on a five-point Likert scale. Higher scores indicate greater levels of shyness. The RCBS possesses good psychometric properties[24,25]. The official Italian translation of the RCBS by Marcone and Nigro[24] was used.

Rumination was measured by the Ruminative Response Scale (RRS)[26] a 22-item self-report scale assessing the propensity to ruminate in response to depression. Respondents are required to indicate the degree to which they engage in a ruminative thinking style when they feel depressed. Each item is rated on a four-point scale ranging from one (almost never) to four (always). Higher scores indicate higher levels of rumination. The RRS possesses good psychometric properties[27]. The English version of the RRS was back-translated into Italian by a native Italian speaker who was not familiar with the questionnaire.

Metacognition was assessed using the Meta-Cognitions Questionnaire 30 (MCQ-30)[28] a 30-item self-report instrument assessing individual differences in metacognitive beliefs, judgments and monitoring tendencies. Higher scores indicate greater levels of maladaptive metacognitive beliefs. The MCQ-30 possesses good psychometric properties[28,29].

Anxiety levels were measured using the State Trait Anxiety Inventory form Y (STAI)[30] for assessing trait anxiety. The STAI-Y is a 40-item self-report scale in which participants rate the extent to which they experience various manifestations of anxiety. The STAI possesses good psychometric properties[30].

***Statistical analysis***

In order to evaluate the association between shyness, rumination and metacognition, Pearson’s correlation analyses were performed. Mediation models[31] were tested in order to evaluate the mediating role of rumination on the association between metacognition and shyness. In accordance with Baron and Kenny[31], a correlation analysis was used before evaluating the mediation effects to ensure that metacognition (independent variable IV), shyness (dependent variable DV) and rumination (mediator) correlated with each other. The mediation model was tested according to Baron and Kenny’s criteria[31], which assume that a fully or partially mediating relationship occurs when the relationship between the IV and DV is non-significant or still significant, respectively, after controlling for the effect of the mediator. In this study, the mediation model was performed using the SPSS macros for bootstrapping[32] as provided by Preacher and Hayes[34]. The indirect effect was tested using a bootstrapping procedure[32,33]. Mediation analyses were controlled for sex and anxiety. Statistical analyses were performed using SPSS 21.

**RESULTS**

Kolmogorov-Smirnov tests indicated that the distribution of variables was normal. Sixty per cent of the sample was female, the average age: 35.8 (SD ± 5.98), the mean school education: 13.70 years (SD ± 3.66). Significant correlations were found between shyness, rumination and metacognition (Table 1). Rumination mediated the association between metacognition and shyness (Table 2 and Figure 1).

**DISCUSSION**

In this study we examined the link between metacognition and shyness and the mediation role of rumination. To our knowledge, no study has addressed this important issue despite its obvious relevance and potential in reducing the negative effects of extreme shyness on human well-being. Rumination is known to be a crucial correlate of metacognition[2] and has recently been shown to be related to shyness and social anxiety[5,22]. Building on previous research, the core finding of the present study was the mediating role of rumination in explaining the relationship between metacognition and shyness. In this regard, rumination could be a helpful cognitive strategy for shy persons.

The second important finding of the present research was the significant association between metacognition and shyness. Such results are in accordance with previous studies on social anxiety[5], a similar construct to shyness. The results of this study seem to indicate that rumination as a mediator explains only a small percentage of variance in predicting shyness. Thus, future studies should investigate other possible factors that might also serve to mediate the relationship between metacognition and shyness, such as worry. In support of such reasoning, several studies have shown high levels of ruminative thinking about future difficulties and strategies by shy people in order to avoid anxiety-provoking situations (for a review see Cowden[34]). In this negative circle, it seems that positive metacognitive processes induce the belief that worry could be useful to solve problems and helping to prevent negative future events[35]. Thus, metacognition causes an increase in worry and rumination becomes a problem. Worry could contribute to the development of negative perceptions of events that shy individuals avoid. Moreover, while shy individuals are worrying about the opinions of and impressions they make on others, such cognitive interference may result in them missing important information and cues from the environment, which could reduce their ability to execute the social skills needed to perform successfully during social situations.

It is also possible that metacognition directly influences shyness. Such data highlights the pressing need for a longitudinal investigation of these constructs to confirm the proposed relationship. The failure of shy individuals to respond appropriately in social situations is considered to be associated with the non-adaptive control of cognitive beliefs and type of metacognitive beliefs (*e.g.*, the tendency for shy individuals to make internal attributions in response to interpersonal failures)[36], rather than to the usual schemas’ content (*e.g.*, the more general self-serving attribution bias to make external attributions for personal failures)[37].

The present research constitutes a novel contribution to the literature, given that the association between metacognition, rumination and shyness has not previously been addressed. We have only just begun to unravel the mechanisms through which metacognition and shyness are linked, and more research is needed to explore the relationship between these constructs.

***Limitations and implications of the research***

Some limitations of the present work must be acknowledged. The first limitation is its cross-sectional design. A longitudinal study would be a more appropriate design for investigating the causal relationship between metacognition, rumination, shyness and their association over time. Secondly, although ours could be considered a sizeable sample, a larger one would have allowed us to go beyond our current level of analysis to explore, for example, gender or age differences. A third, more technical limitation of this study is to do with shared-method variance, as a result of using (only) self-administered instruments for variables of interest. However, as these variables are internal and subjective processes, self-report measures seemed appropriate. Furthermore, our study focused on metacognitive beliefs and did not investigate cognitive errors[38], and therefore should be considered exploratory.

We believe that the different patterns of associations to have emerged have important practical implications for shy individuals. Starting from the position that shyness is neither a disease nor a psychiatric disorder[39], these results could be relevant in helping individuals to understand the nature and dynamics of shyness by addressing its cognitive components[40,41]. Carducci[42] and Sirikantraporn *et al*[43] have previously noted the value of examining the cognitive-related self-selected strategies used by shy individuals to deal with their shyness as a means of helping them to more effectively understand and respond to their shyness. Furthermore, with respect to the implications based on the results of the present study, the metacognitive model[44] should be a potentially valuable framework for improving the social skills of shy subjects. Based on the metacognitive model[44], the evaluation of metacognitive beliefs and the ruminative thinking could be considered in shy subjects given that this model is mainly focused on the modification or reduction of these aspects[44].

**ARTICLE HIGHLIGHTS**

***Research background***

Metacognitive beliefs and rumination are correlated with social anxiety, which is located on a continuum of shyness. To our knowledge, no studies have explored the association between metacognitive beliefs, rumination and shyness in non-clinical sample of adults.

***Research motivation***

In order to add to current knowledge about the association between metacognitive beliefs, rumination and shyness.

***Research objectives***

The main aim was to explore the association between metacognitive beliefs, rumination and shyness in a non-clinical sample of adults.

***Research methods***

This was an observational study, comprising a sample of 103 healthy subjects recruited from the general population.

***Research results***

Shyness, rumination and metacognition were significantly correlated (*P* < 0.05). The relationship between metacognition and shyness was fully mediated by rumination (Indirect effect: 0.20; 95% bias corrected and accelerated: 0.08-0.33). These results build on previous research.

***Research conclusions***

To our knowledge, no other study has investigated the link between metacognition and shyness and the mediating role of rumination. The core findings of the study are: (1) The significant association between metacognition and shyness; and (2) the mediating role of rumination in explaining the relationship between metacognition and shyness. These results could have important implications for shy people. Although shyness is not a disease, the findings could be relevant in helping individuals to understand the nature of their shyness by addressing its cognitive components.

***Research perspectives***

Our research appears to indicate that future studies should investigate longitudinally the causal relationship between metacognition, rumination and shyness. Moreover, future studies should explore other possible factors, in addition to rumination, that might explain the relationship between metacognition and shyness.

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**P-Reviewer:** Chakrabarti S, Hosak L, Seeman MV **S-Editor:** Cui LJ **L-Editor: E-Editor:**

**Specialty type:** Psychology

**Country of origin:** Italy

**Peer-review report classification**

Grade A (Excellent): 0

Grade B (Very good): B

Grade C (Good): C, C

Grade D (Fair): 0

Grade E (Poor): 0

**Table 1 Correlation analyses**

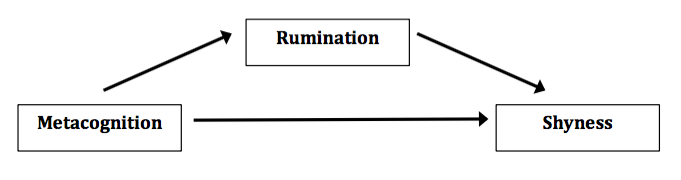
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **STAI-Y anxiety** | **RCBS-shyness** | **MCQ-metacognition** | **RRS-rumination** |
|  | **r (p)** | **r (p)** | **r (p)** | **r (p)** |
| STAI-Y anxiety | 1 |  |  |  |
| RCBS-shyness | 0.022 (0.82) | 1 |  |  |
| MCQ-metacognition | 0.19 (0.05) | 0.223 (0.02) | 1 |  |
| RRS-rumination | 0.071 (0.47) | 0.413 (< 0.001) | 0.734 (< 0.001) | 1 |

STAI-Y: State trait anxiety inventory form Y; RCBS: Revised cheek and buss shyness scale; RRS: Ruminative response scale; MCQ: Meta-cognitions questionnaire 30.

**Table 2 Mediating effects of rumination in the relationship between Metacognitive Beliefs and Shyness (controlled for sex and anxiety)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **B** | **SE** | **p** | **95%BCaCI** |  |
|  |  |  |  |  |  |
| Step 1 |  |  |  |  |  |
| Sex | 2.32 | 2.43 | 0.34 | -0.15-0.34 |  |
| Anxiety | 0.09 | 0.12 | 0.46 | -0.15-0.34 |  |
| Metacognition (IV) | 0.11 | 0.05 | 0.02 | 0.01-0.21 |  |
| Shyness (DV) |  |  |  |  |  |
| Step 2 |  |  |  |  |  |
| Sex | 4.11 | 1.78 | 0.02 | 0.57-7.65 |  |
| Anxiety | 0.12 | 0.09 | 0.19 | -0.06-0.30 |  |
| Metacognition (IV) | 0. 41 | 0.03 | < 0.001 | 0.33-0.48 |  |
| Rumination (M) |  |  |  |  |  |
|  |  |  |  |  |  |
| Step 3 |  |  |  |  |  |
| Sex | 0.28 | 2.33 | 0.90 | -4.35-4.93 |  |
| Anxiety | 0.03 | 0.11 | 0.77 | -0.20-0.26 |  |
| Metacognition (IV) | -0.08 | 0.06 | 0.23 | -0.22-0.06 | Total Effect: 0.11; BC: 0.01-0.22; p: 0.02 |
| Rumination (M) | 0.49 | 0.12 | <.001 | 0.23-0.75 | Direct Effect: 0-0.08; BC:-0.22-0.05; p: 0.23 |
| Shyness (DV) |  |  |  |  | Indirect Effect: 0.20; CB: 0.08-0.33 |

IV: Independent variable; DV: Dependent variable; M: Mediator; 95%BCaCI: 95% bias corrected and accelerated.



**Figure 1 Mediating role of rumination in the association between metacognition and shyness (controlled for sex and anxiety).**