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# The flow metacognitions questionnaire (FMQ): A two factor model of flow metacognitions

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ABSTRACT

This paper presents the development and validation of the Flow Metacognitions Questionnaire (FMQ) for measuring metacognitions of flow. Flow is a state of deep cognitive absorption that makes a person feel fully immersed in an activity. Flow metacognitions had been defined as people's awareness of and beliefs on the flow state, its consequences, and strategies for achieving and maintaining flow (Wilson & Moneta, 2012). Exploratory factor analysis of the pilot FMQ yielded a two-component solution, based on a sample of 204 UK university students. The two FMQ sub-scales were labelled 'Beliefs that Flow Fosters Achievement' (FMQ-1) and 'Confidence in Ability to Self-Regulate Flow' (FMQ-2). Confirmatory factor analysis on a convenience sample of 159 international workers confirmed the two sub-scales of the final 12-item FMQ. The FMQ's predictive validity was supported in a series of hierarchical regression analyses. Confidence in Ability to Self-Regulate Flow predicted the intensity of flow in work better than measures of maladaptive and adaptive metacognitions. It also predicted the frequency and percentage of time spent in flow in work above and beyond established measures of flow, highlighting the usefulness of the FMQ as a research tool.

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## 1. Introduction

Flow is an optimal state of deep cognitive absorption and intrinsic enjoyment. Flow research originated in the 1970s (Csikszentmihalyi, 1975) and subsequently played an integral part within the eudaimonic approach to optimal functioning in the field of positive psychology (Seligman & Csikszentmihalyi, 2000). Flow can be validly measured as a state, a disposition, and a domain specific disposition (e.g., Jackson & Eklund, 2002). Measures of dispositional flow in study or work contexts were found to correlate positively with measures of other dispositional constructs, such as attentional control (Cermakova, Moneta, & Spada, 2010), positive affect in studying or work (Rogaten & Moneta, 2015; Fullagar & Kelloway, 2009), and work engagement (Moneta, 2015a). However, these correlations were only moderate, indicating that flow stands as an independent construct in a well-established nomological network. Experiencing flow intensely and frequently was found to have important implications for fostering subjective well-being (Moneta, in press; Asakawa, 2010) and performance, particularly in work (Bakker, 2008) and studying (Engeser & Rheinberg, 2008).

While most standardized flow questionnaires measure flow in its components and assess what might be considered the intensity of the flow experience, little is known about people's beliefs on flow as a state of optimal functioning. Moneta (in press) and Wilson and Moneta (2012) have highlighted the potential for measuring people's metacognitive knowledge of and beliefs about flow as a state of consciousness, i.e., 'flow metacognitions'. This paper presents the development and validation of a short scale measuring metacognitions on flow and includes initial evidence that such metacognitions may help individuals to self-regulate the intensity and frequency of flow.

The study of metacognition has a long tradition in a variety of disciplines with origins in developmental and cognitive psychology (e.g., Flavell, 1979) and recent developments in positive psychology (Beer & Moneta, 2010, 2012). Flavell (1979) described general metacognitions as 'knowledge and cognition about cognitive phenomena' (p. 906), with them having a potentially causal effect on cognition and behaviour (Koriat, 2002). In the clinical context, Wells and Matthews (1994) developed a theoretical framework of the function of maladaptive metacognitions in the persistence of mental disorder. Maladaptive metacognitions were found to be associated with a range of psychological dysfunctions such as obsessive-compulsive disorder and generalized anxiety disorder (e.g., Wells, 2000).

Beer and Moneta (2010) studied metacognitions from a positive psychology angle and provided initial evidence for general adaptive metacognitive traits, which people exhibit during demanding encounters. Adaptive metacognitions correlated negatively but moderately with maladaptive metacognitive traits and were found to correlate with indicators of well-being, such as intrinsic motivation and adaptive

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coping (Beer & Moneta, 2010, 2012). Beer (2011) further suggested that they could have potential adaptive functions on flow, for which preliminary evidence was found by Moneta (2015b) in a worker sample. Here, adaptive metacognitions fostered flow in work both directly and indirectly via the mediation of positive affect.

This paper builds upon Beer and Moneta's (2010) assumption of psychological adaptation being fostered by adaptive metacognitions. As flow is predominantly a cognitive phenomenon, it was hypothesised that people who tackle demanding tasks, would not only activate general adaptive metacognitions, but also activate metacognitions specific to the flow state, which in turn would facilitate the experience of flow. As such, flow-specific metacognitions should predict the occurrence of flow over and above general metacognitions. These hypotheses were tested by developing (Study 1) and validating (Study 2) a new measure, the Flow Metacognitions Questionnaire (FMQ). Furthermore, Study 2 assessed the FMQ's ability to predict the occurrence and frequency of flow. Study 1 measured flow as a non-domain specific disposition, Study 2 measured flow as a disposition specific to the domain of work.

## 2. Study 1: scale development

Pilot scale items were derived from a qualitative analysis based on a convenience sample of 371 highly educated British workers, who had completed the Flow Questionnaire (Csikszentmihalyi & Csikszentmihalyi, 1988). Additionally, semi-structured interviews were conducted with a sample of 13 UK professionals. The interviews focused on the interviewees' overall flow experience at work, but also on the strategies they employed to achieve and maintain flow. Data coding was based on thematic analysis (e.g., Braun & Clarke, 2006) and informed by the literature on metacognition and flow theory (Wilson & Moneta, 2012).

A range of relevant constructs emerged, two of which were here selected for further investigation as they seemed particularly important for the initiation, maintenance, and outcome of flow. First, participants reflecting on the flow state, attributed a “usefulness” to being in flow, i.e., a belief that being in flow is improving their performance. Second, individual differences in the self-regulation of flow emerged with some participants experiencing flow as “random events” while others expressed awareness of the conditions under which flow occurs for them and a belief that it could, at least partly, be initiated and self-regulated. A pool of 53 questionnaire items was developed and subjected to exploratory factor analysis (EFA), hypothesising a two-component structure.

### 2.1. Method

#### 2.1.1. Participants and procedure

An opportunity sample of 305 students of London universities was recruited. Of these, 204 experienced flow and completed the pilot FMQ. The mean age was 26.2 years (SD = 6.8, range = 18–62, age was unknown for four participants); 64% were female and 35% male, sex was unknown for 1% of participants. The large majority of the sample was Caucasian (84%). A university ethics committee approved the study, and all participants provided informed consent.

#### 2.1.2. Material

Participants were asked if they recognized the flow experience described by an abridged version of the quotes presented in the Flow Questionnaire (Csikszentmihalyi & Csikszentmihalyi, 1988; Han, 1988, pp. 139–140):

> ‘My mind isn't wandering. I am totally involved in what I am doing and I am not thinking of anything else. My body feels good. The world seems to be cut off from me. I am less aware of myself and my problems.’‘My concentration is like breathing. I never think of it. When I start, I really do shut out the world’.‘I am so involved in what I am doing. I don't see myself as separate from what I am doing’.

If the answer was yes, participants continued to list up to five flow activities. Of these, they selected a work/study activity (or if none of these was specified, a leisure activity) most representative of the flow experience. This was followed by the pilot FMQ preamble, which asked participants to read each item and imagine themselves while they were carrying out the activity. Items were scored on a 4-point Likert-like scale (1 = do not agree, 2 = agree slightly, 3 = agree moderately, 4 = agree very much).

### 2.2. Results

#### 2.2.1. Exploratory factor analysis on pilot FMQ

Exploratory factor analysis (EFA; direct oblimin rotation) was carried out on the 53-item pilot FMQ. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was .79 (above the cut-off value of .6 recommended by Kaiser (1974)) and Bartlett's Test of Sphericity (Bartlett, 1954) (chi-square = 4261.5, $p < .001$) was significant, indicating good factorability of the data. The scree plot indicated two components (Component 1 = 17.1%; Component 2 = 10.4%). Component 1 captured beliefs about the usefulness of being in flow. Component 2 captured beliefs about the self-regulation of flow. Parallel analysis suggested a four component solution (Watkins, 2000). However, components 3 and 4 were not pursued further due to their relatively low percentages of variance explained (5.3% and 4.5%, respectively) and their items being conceptually related to Components 1 and 2.

#### 2.2.2. Scale shortening

Items with factor loadings of less than 0.5 on one factor or more than 0.2 on both factors were rejected. Retained items were further subjected to a survey shortening procedure via Hayes (2005) ALPHAMAX macro for SPSS, following the steps outlined by Hayes (2005). The resulting optimal subscale for Component 1 comprised six questions, with good Cronbach's alpha coefficients of .84 for the development and .83 for the crossvalidation sub-sample. The chosen subscale for Component 2 comprised six questions also, with good Cronbach's alpha values of .82 for the development and .79 for the crossvalidation sample.

#### 2.2.3. Exploratory factor analysis on final FMQ

The final 12-item FMQ was then re-submitted to EFA via principal component analysis (direct oblimin rotation). The Kaiser-Meyer-Olkin value was .82 and Bartlett's Test of Sphericity was highly significant, supporting statistical dimension reduction. Principal component analysis indicated that the 12 items loaded onto two main components, which were weakly intercorrelated (r = .06). Consistent with the terminology used to label general metacognitive traits (Beer & Moneta, 2010; Wells & Cartwright-Hatton, 2004), these were labelled FMQ-1 ‘Beliefs that Flow Fosters Achievement’ and FMQ-2 ‘Confidence in Ability to Self-Regulate Flow’. They explained a total of 52.4% of the variance, 28.3% for Component 1 and 24.1% for Component 2. See Table 1 for pattern, structure coefficients and communalities.

## 3. Study 2: scale validation

Construct validity was further assessed via confirmatory factor analysis (CFA), aiming to corroborate the FMQ's underlying two-factor structure. The FMQ's concurrent validity was tested via its association with established measures of flow and metacognition. The FMQ's usefulness as a research tool was ascertained by assessing its ability to predict the intensity of flow above and beyond maladaptive and adaptive metacognitions (*hypothesis 1*). Furthermore, it was hypothesised that flow metacognitions would outperform established measures of flow and adaptive metacognition in predicting the frequency of flow (*hypothesis 2*). Study 2 focussed specifically on dispositional flow at

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