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### The Argentinian version of the cognitive fusion questionnaire

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Empirical Research

# The Argentinian version of the Cognitive Fusion Questionnaire: Psychometric Properties and the role of cognitive fusion as a predictor of pathological worry

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## Empirical Research

### The Argentinian version of the Cognitive Fusion Questionnaire: Psychometric Properties and the role of cognitive fusion as a predictor of pathological worry

#### Abstract

The Cognitive Fusion Questionnaire (CFQ) consists in an instrument used to measure cognitive fusion. Cognitive fusion can be described as a core process in the psychopathology model of Acceptance and Commitment Therapy (ACT). The purpose of this study was to adapt the CFQ for the Argentinian population, to validate it through a confirmatory factor analysis together with the analysis of its psychometric properties in a local community sample, and to look into the role cognitive fusion plays as a predictor of pathological worry. Three hundred and thirty-three adult participants filled out not only the Argentinian adaptation of the questionnaire (CFQ-VA) but also measures that assessed psychological inflexibility, worry, rumination, mindfulness and psychological well-being. The results indicate that the CFQ's one-factor structure was confirmed. The instrument showed adequate internal consistency, good temporal stability, and significant associations in the expected directions with relevant selected constructs indicating adequate criterion validity. Also, cognitive fusion emerged as a good predictor of worry. In conclusion, the findings confirm that the Argentinian adaptation of the CFQ presents solid psychometric properties.

Keywords: acceptance and commitment therapy; cognitive fusion; measurement; cognitive fusion questionnaire, pathological worry.

#### Compliance with Ethical Standards

#### Conflict of Interest

The authors of the present paper declare that they have no conflicts of interest. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. This manuscript is part of the first author's doctoral thesis.

#### Ethical Approval

All procedures carried out in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

#### Informed Consent

Informed consent was obtained from all individual participants included in the study.

Acceptance and Commitment Therapy (ACT) consists in an approach framed in the so-called “third wave therapies” (Hayes, Follette & Linehan, 2004) and falls within the scope of cognitive-behavioral tradition. Its theoretical roots stem from the Relational Frame Theory (Hayes, Barnes-Holmes & Roche, 2001). The ACT targets emotional avoidance, literal response in excess to cognitive content and the obstacles for keeping behavioral

change commitments (Hayes, 1987; Zettle & Hayes, 1986) with the purpose of diminishing human suffering by training (a) acceptance and mindfulness skills oriented to (b) behavioral change for the sake of (c) valued ends. From this perspective, psychopathology includes processes that reduce behavioral repertoires and makes it difficult for the effective behavior to occur. Among these processes, two of them stand out: (a) *experiential avoidance*, which can be described as the lack of disposition or difficulty to undergo unpleasant personal events and to make efforts to change them, avoid them or control them and (b) *cognitive fusion*, which can be described as the tendency to believe in the literal meaning of thoughts and emotions (Hayes, Strosahl & Wilson, 2011). Cognitive fusion constitutes a natural sub-product of language that occurs when the verbal descriptions of external events acquired the same properties as the event described by the verbal evaluations (Eifert & Forsyth, 2011). Even though cognitive fusion can be useful or necessary in some contexts, it can become problematic when behavior is mainly guided by verbal rules instead of being guided by more useful contingencies, decreasing movement towards valued goals for the person (Blackledge, 2007). The opposite process of cognitive fusion is *cognitive defusion*, which can be defined as the skill of observing thoughts as simple mental events instead of literal representations of reality (Blackledge, 2015). That is to say, defusion is the process that alters the function that thoughts have, to influence behavior and experience, without changing its content or frequency.

An ever-increasing body of research provides evidence that the processes of fusion and defusion are relevant to understand several forms of human suffering (Hayes, Levin, Plumb-Villardaga, Villatte & Pistorello, 2013). In addition, empirical data on cognitive fusion shows that they prove to be of great importance in mediating the impact of ACT

interventions (Zettle, Rains & Hayes, 2011). Cognitive fusion has been put forward as a key psychopathological process, and many studies have shown that higher levels of cognitive fusion are linked to higher levels of depression (Gillanders et al., 2014), anxiety (Eifert et al., 2009; Fergus, Valentiner, Gillen, Hiraoka & Twohig, 2012; Herzberg et al., 2012; Twohig et al., 2014) and burn out, and lower levels of satisfaction with life (Gillanders et al., 2014). Research also found associations among cognitive fusion, eating-related symptoms and negative self-referential thoughts about body shape (Deacon, Fawzy, Lickel & Wolitzky-Taylor, 2011; Potts, Haeger & Levin, 2014), psychotic symptoms (Gaudiano & Herbert, 2006), social anxiety symptoms (Dalrymple & Herbert, 2007), chronic pain (McCracken, Barker & Chilcot, 2014; Mccracken, Dasilva, Skillicorn & Doherty, 2014) rumination (Romero-Moreno, Márquez-González, Losada, Gillanders & Fernández-Fernández, 2014) and worry, where research showed that cognitive fusion fulfils a significant function in the emergence of pathological worry and the symptoms of generalized anxiety disorder (GAD) (Lee & Orsillo, 2014).

Specifically, people with GAD tend to fuse with thoughts of uncertainty about the future and when that happens they tend to use avoidance strategies such as worry (Ruiz, Langer Herrera, Luciano, Cangas & Beltrán, 2013). Borkovec defines worry as a connected series of thoughts and images difficult to control and charged with negative emotions that anticipate potential negative events in the future and their consequences and that involve mental efforts of problem solving (Borkovec, Robinson, Pruzinsky & DePree, 1983). Worry can be conceptualized as a form of experiential avoidance and some studies have shown that increasing cognitive defusion can predict the decreasing of worry (Arch,

Wolitzky-Taylor, Eifert & Craske, 2012). However, the role of cognitive fusion as a predictor of worry has not been explored independently.

In order to study cognitive fusion as an independent process and to determine the impact ACT interventions have on cognitive fusion, a valid measure of this construct was needed. Before the CFQ was developed (Gillanders et al., 2014) other measures had been used to assess cognitive fusion. Most of them have limitations such as operationalizing fusion as *believability* excluding other relevant aspects, and/or being oriented to specific clinical population, restricting its use for wider populations, and/or including other variables (or processes) so they cannot be used to measure cognitive fusion independently. The CFQ was designed to overcome these limitations. The CFQ is a unidimensional 7-item self-report questionnaire. Items are broad and generic enough for the scale to be used in a broad array of contexts and populations to measure cognitive fusion as an independent construct. In the development process of the CFQ, the scale was administered to 7 samples consisting of 1800 participants. The progressive improvement in the CFQ's initial pool of items (42) led to the final 7-item version. Exploratory and Confirmatory Factor Analyses had been conducted in the original study showing a final unifactorial structure with an adequate model fit. The original CFQ showed adequate internal consistency across different samples, good temporal stability, construct, incremental, and discriminant validity, as well as sensitivity to treatment effects (Gillanders et al., 2014). Giving its shortness, it is not time-consuming, and it is not necessary to be familiarized with the construct.

There exist CFQ versions in different languages, e.g. Italian (Dell'Orco, Prevedini, Oppo, Presti & Moderato, 2012), Catalan (Solé et al., 2015) with an adolescent sample of 308 participants showing adequate internal consistency ( $\alpha = .79$ ), and Persian (Soltani,

Momenzadeh, Hoseini, & Bahrainian, 2016) with a sample of 324 students showing adequate internal consistency ( $\alpha = .86$ ). There is also a Dutch version of the CFQ (Batink & De Mey, 2011) consisting in a previous version of 13 items showing good internal consistency ( $\alpha = .80$ ). Most recently, a Brazilian version was published (Lucena-Santos, Carvalho, Pinto-Gouveia, Gillanders & Silva Oliveira, 2017). Particularly, there are also two publications of adaptations of the CFQ to Spanish language (Romero-Moreno et al., 2014; Ruiz, Suárez-Falcón, Riaño-Hernández & Gillanders, 2017). The Spanish version (Romero-Moreno et al., 2014), validated in Spain with a fairly small sample consisting of dementia patients' caregivers ( $N = 179$ ), showed good internal consistency ( $\alpha = .87$ ). The Colombian version (Ruiz et al., 2017) was tested in a total sample of 1763 participants and internal consistency throughout the different samples proved to be adequate (Cronbach's alpha between .89 and .93). The data obtained for both Spanish versions are in line with the one-factor model from the original scale.

However, there was not a valid instrument to assess cognitive fusion in the Argentinian population and the importance of having valid instruments adapted for local populations has been highlighted several times in the scientific literature (van de Vijver & Tanzer, 2004; Muñiz, Elosua & Hambleton, 2013). Specifically, there is a need for analyses aimed at exploring the CFQ properties in more varied samples and different Spanish-speaking countries. Argentinian culture differs significantly from Colombian or Spanish culture and there are specific language nuances. It is also important to consider that to use self-report measures as a reliable instrument, their scores need to be validated in advance in the specific context they are going to be applied (Urbina, 2014). Besides, the measurement invariance analysis across different cultural samples is relevant to investigate if the scale is measuring the same process, and measurement invariance enhances the confidence in the



measure (Elosua, Mujika, Almeida & Hermsilla, 2014; Widaman & Reise, 1997). Also, from a contextual behavioral science's framework, adaptations of measures to different cultural settings are consistent with the relevance given to the role of context on influencing behavior. In this sense, measures are useful or not depending on the goals and the context in which they are being used (Ciarrochi et al., 2016).

This study aimed at linguistically and conceptually adapting the CFQ to the Argentinian population and validating it through a confirmatory factor analysis and the analysis of its psychometric properties in a local community sample. This study had six aims: 1) to conceptually adapt the instrument to Argentinian Spanish, 2) to run a descriptive analysis of the items of the CFQ, to explore for any differences between male and female participants on the CFQ's scores, and to explore the relationship between the CFQ's scores and age, 3) to analyze the CFQ's internal consistency and test-retest reliability, 4) to confirm the CFQ's unifactorial structure, 5) to analyze the criterion validity of the CFQ through examining its relations with relevant constructs, and 6) to explore the role cognitive fusion plays as a predictor of pathological worry.

Regarding differences between male and female participants on the CFQ results, previous research on the topic suggests some differences could be found. In this sense, some empirical studies suggest that females present more cognitive fusion than males (Dinis, Carvalho, Pinto-Gouveia & Estanqueiro, 2015). Additionally, research showed a positive association between clinical depressive symptoms and scores related to cognitive fusion, solely for female caregivers (Romero-Moreno et al., 2014), and differences in mean scores were also found in the validation process of the CFQ in Catalan (Solé et al., 2015) and in Colombian Spanish (Ruiz et al., 2017). For the Colombian version, a difference of

statistical relevance was found between males and females' CFQ scores in one ( $N = 762$ ) of three samples. Regarding the relationship between age and CFQ's scores, data were not reported in previous research on CFQ's psychometric properties among different cultural contexts. However, some recent research explored the relationship between these two variables (Edwards, 2019) where results indicate that cognitive fusion mediates the relationship between mental health and age. Also, some previous studies had looked into the relationship between age and different components of psychological flexibility (McCracken and Yang, 2006; McCracken et al., 2007; McCracken and Velleman, 2010). In this sense, and being cognitive fusion a main component of psychological flexibility, the relationship between CFQ's scores and age has been explored in this study.

We hypothesized that the Argentinian version of the CFQ would be internally consistent, that a confirmatory factor analysis would be in favor of the one-factor solution, that the CFQ scale score would be positively linked to measures of rumination, worry, and psychological inflexibility and associated in a negative way with mindfulness and psychological well-being measures, and that the level of cognitive fusion would significantly predict the level of pathological worry.

## **Method**

### **Design**

This study constitutes an empirical study with quantitative methodology included in the Instrumental Studies category (Montero & León, 2007) which had two stages. The first stage consisted in the translation and adaptation of the CFQ into Argentinian Spanish. The second stage consisted of the Argentinian CFQ's psychometric properties analysis.

### **Stage 1: Translation and Adaptation steps**

The original author of the questionnaire gave his consent and the first author of this study translated the questionnaire into Argentinian Spanish language. Eight backup items were also selected from the original pool of items of the CFQ, in case the original seven items did not work in our sample. Then, the original English items and the Argentinian ones were sent to three bilingual experts to evaluate the linguistic equivalences. All the seven items were scored between four and five, five being the higher level of linguistic equivalence. As a means of control, we asked for a back translation as suggested by Brislin, Lonner and Thorndike (1973). Immediately afterwards, the original author assessed such back translation. Finally, the instrument was sent to five experts in the field to determine the items adequacy regarding the construct of cognitive fusion. To determine the items adequacy to measure the construct, Aiken's V coefficient was calculated. This statistic represents a zero to one scale, with one representing a perfect agreement between experts (Aiken, 1980). The seven items of the CFQ obtained Aiken's V values between .9 and 1, showing high content validity. The Argentinian CFQ's final version (named CFQ-VA from now on) was agreed and the data collection in Stage 2 was initiated.

### **Stage 2: Analysis of the psychometric properties**

#### **Participants**

The sample consisted of 333 adult participants from the general population, male and female, residents of Buenos Aires City and Conurbano Bonaerense. The mean age of the total sample was 36.5 years ( $SD = 11.8$ ). Regarding sex, 67.7% of the participants were female and 32.3% were male. Regarding marital status, 47.4% were single, 38.7% were

married/cohabiting, 12.3% were divorced and 1.6% were widowed. The participants were mostly literate, 52.6 % with complete university studies, 18.1% with some/incomplete university studies, 22.1% with complete secondary education and 7.2% with incomplete secondary education or less. Additionally, most of the participants were employees (63.2%), followed by freelancers (27.4 %) and unemployed (9.4%).

## Measures

*Cognitive Fusion Questionnaire* (CFQ; Gillanders et al., 2014) in its Argentinian version (CFQ-VA). The CFQ-VA measures the level of cognitive fusion that a person shows for a variety of proposed situations. It is a seven-item self-report measure in which the participants are asked to endorse the extent to which they agree on each item (e.g. “I over-analyze situations to the point where it’s unhelpful to me”) using a seven-point Likert scale (from 1 = “Never true” to 7 = “Always true”). Higher scores represent greater fusion. Cronbach's Alpha values for the original version were adequate among different samples ( $\alpha = .88$  to  $.93$ ) as the model fit ( $.962 < CFI < .991$ ;  $.049 < SRMR < .086$ ) across different samples (Gillanders et al., 2014).

*Mindful Attention Awareness Scale* (MAAS; Brown & Ryan, 2003) in its Spanish version (Barajas & Garra, 2014). The MAAS is a unidimensional scale composed of 15 items (e.g. “I tend to walk quickly to get where I’m going without paying attention to what I experience along the way”) using a six-point Likert Scale (from 1 = “Almost always” to 6 = “Almost never”) to evaluate “trait” mindfulness in everyday life. Higher scores signify higher levels of mindful awareness. The Cronbach's Alpha of the original scale was  $\alpha = .87$  and  $\alpha = .88$  for the Spanish version. The Spanish version possesses a one-factor structure

and showed significant negative correlations among experiential avoidance, anxiety, and depression.

*Acceptance and Action Questionnaire-II* (AAQ-II; Bond et al., 2011) in its Spanish version (Ruiz, Langer Herrera, Luciano, Cangas & Beltrán, 2013). The AAQ II is a seven-item self-report instrument that measures psychological inflexibility (e.g. “I’m afraid of my feelings”). The respondent used a seven-point Likert scale to answer (from 1 = “Never true” to 7 = “Always true”). Higher scores signify greater psychological inflexibility. The Cronbach's Alpha of the original scale was  $\alpha = .84$  and  $.75 < \alpha < .93$  among different samples for the Spanish version used in the present study. The Spanish version possesses a one-factor structure and shows statistically significant differences between clinical and non-clinical samples.

*Penn State Worry Questionnaire* (PSWQ; Meyer, Miller, Metzger & Borkovec, 1990) in its abbreviated and adapted Argentinian version (Rodríguez-Biglieri & Vetere, 2011). The original PSWQ is a bi-dimensional scale composed of 16 items. The Argentinian version is a unidimensional self-report scale composed of 11 items (e.g. “I am always worrying about something”) using a five-point Likert Scale (from 1 = “Not at all typical of me” to 5 = “Very typical of me”) to evaluate trait symptoms of pathological worry: an individual’s disposition to worry, and the frequency, intensity and the tendency for worry to be generalized across situations. Higher scores signify higher levels of pathological worry. The Cronbach's Alpha of the original scale was ranged from  $\alpha = .86$  to  $.93$  for anxiety disorder patients and from  $\alpha = .87$  to  $.95$  for community samples. The Cronbach's Alpha of the Argentinian version was  $\alpha = .94$ . The Argentinian PSWQ also revealed appropriate test-

retest reliability over a four-week period ( $r = .86$ ), and good convergent and discriminant validity.

*Cognitive Emotion Regulation Questionnaire* (CERQ; Garnefski & Kraaij, 2006, 2007) in its adapted and validated Argentinian version (Medrano, Moretti, & Ortiz, 2013). In this study, only the 4-item *Rumination sub-scale* was used (e.g. “I want to understand why I feel the way I do about what I have experienced”). The CERQ is a 36-item self-report instrument with nine dimensions that measures the extent to which people use cognitive strategies of emotion regulation in the context of unpleasant events. The respondent answers by means of a 5-point Likert scale (from 1 = “Almost never” to 5 = “Almost always”). The Cronbach's Alpha of the original *Rumination sub-scale* was .83 and .70 for the Argentinian version.

*Psychological Well-being Scale* (BIEPS-A; Casullo & Castro Solano, 2000; Casullo, 2002): The BIEPS-A is a four-dimension scale composed of 13 items (e.g. “I am capable of having projects in life”) using a three-point Likert Scale (from 1 = “Disagree” to 3 = “Agree”) to evaluate psychological well-being. The four dimensions are Acceptance/Control, Autonomy, Relationships, and Projects. Higher scores signify higher levels of psychological well-being. The Cronbach's Alpha was  $\alpha = .70$  for the total scale.

*Socio-Demographic/Descriptive Information.* Participants were asked to provide information regarding their age, sex, level of education, marital status and employment situation.

## **Procedure**

The sample was a convenience sample from the general population recruited by the first author. Participants were encouraged to participate in the study in one of Buenos Aires' central Train Stations and in Retiro's Bus Station (a major transportation hub in the center of Buenos Aires city), while they were waiting for their train/bus. All participants received a general description of the research procedures and were asked for their consent. All participants provided Informed Consent. Subsequently, participants completed the protocol -administered on paper- including all the measures.

The sample size was appropriate for the analyses that were conducted (Hair, Black, Babin & Anderson, 2010). So as to avoid the influence of a sequencing effect, three protocols were created, including the same measures in a different order. The protocols were administered in a random manner.

A small sub-sample was selected from the total sample to evaluate the test-retest reliability. This reassessment process took part four weeks later. Those participants who volunteered for the retest made the selection. To maintain anonymity, each participant chose a particular way of identifying their protocols using marks, symbols or drawings to recognize them four weeks later. A total of 38 participants completed the re-assessment.

## **Data Analysis**

First, a descriptive analysis of the CFQ-VA items (means, standard deviations, and measures of dispersion) was conducted followed by an independent samples't-test. Such t-test was carried out with the purpose of testing for any differences between male and

female participants on the CFQ-VA results. Also, Pearson's correlations have been calculated to analyze the relationship between CFQ-VA scores and age.

A Confirmatory Factor Analysis (CFA) was performed to test the fit of the CFQ-VA's unifactorial structure. Different goodness-of-fit indexes were used to determine the model's adjustment: Chi-square ( $\chi^2/df$ ), Comparative Fit Index (CFI), Iterative Fit Index (IFI), Root Mean Square Error of Approximation (RMSEA), and Standardised Root Mean Residual (SRMR), following the cut of criteria of Hu and Bentler (1998) ( $< .06$  for RMSEA;  $< .08$  for SRMR;  $> .95$  for the CFI and IFI are indicative of adequate model fit).

Cronbach's Alpha was used in order to assess internal consistency and test-retest reliability was performed by computing the Pearson correlation for a four-week interval. We used Pearson's correlations to assess criterion validity. We hypothesized the CFQ-VA to be positively associated with AAQ-II, PSWQ and Rumination CERQ sub-scale, and to be negatively associated with BIEPS-A and MAAS.

Finally, a simple linear regression was carried out to explore the role cognitive fusion plays as a predictor of pathological worry, assessed with the PSWQ. We also performed a multiple linear regression, including AAQ II as a second independent variable to explore if AAQ II would demonstrate any incremental validity in predicting worry by adding to the variance explained by the CFQ-VA.

Descriptive statistics and correlations, reliability analysis and linear regressions were conducted using the SPSS 20 software (v.20; SPSS Inc., Chicago, IL; Castañeda, Cabrera, Navarro & de Vries, 2010). Confirmatory factor analysis (CFA) was performed using AMOS 20 software (v.20; SPSS Inc., Chicago, IL).



## Results

### Descriptive Statistics and Reliability of CFQ-VA

Histograms and measures of Skewness and Kurtosis pointed out that the distributions of the seven CFQ-VA items closely approximate the normal distribution considering the strict criteria -values between: -1.4 a 1.4- (Botella, León & San Martín, 1993) as shown in Table 1.

**-Insert table 1 here-**

Participants' mean score for the total scale was 22.69 ( $SD = 8.90$ ). We found similar results for the original version of the scale (Gillanders et al., 2014;  $M = 22.28$ ;  $SD = 8.30$ ), and for the Spanish (Romero-Moreno et al., 2014;  $M = 25.28$ ;  $SD = 9.68$ ), Colombian (Ruiz et al., 2017;  $M = 23.80$ ;  $SD = 10.36$ ) and Brazilian (Lucena-Santos et al., 2017;  $M = 22.28$ ;  $SD = 8.30$ ) versions of the CFQ.

#### *Internal consistency*

The Cronbach's Alpha was  $\alpha = .89$  for the total sample, and the item-total correlation for each item was estimated from .58 to .78, so it was possible to conclude that all items contribute to the scale, showing good discrimination power (Hair et al., 2010). Also, the alpha, if item was deleted, showed that all items contributed to the internal consistency of the entire scale (Table 1).

#### *Test-retest reliability*

Test-retest reliability was estimated by computing the Pearson correlation for a four-week interval. For the retest, participants' mean score for the total scale was 23.81 ( $SD =$

6.77). The results indicated good temporal stability for the CFQ-VA over said period of time ( $r = .76; p < .001$ ).

### **Confirmatory factor analysis (CFA)**

The aim of the CFA was to confirm the unifactorial structure of the CFQ-VA. First, we specified a model where all seven items compose a single factor (Figure 1). All items showed high values of factor weights.

**-Insert figure 1 here-**

The model showed an adequate model fit. The chi-square ( $\chi^2$ ) statistic value was significant but this result is highly probable due to its sensitivity to sample size and it can be considered excessively conservative (Brown, 2006), so five additional goodness-of-fit indexes were selected following the usual recommendations (Bentler, 1990; Brown, 2006; Byrne, 2010) and the solutions were applied in the original study (Gillanders et al., 2014). The normed chi-square showed good fit presenting a value under five which represents an adequate model fit (Hair et al., 2010). The CFI and IFI showed adequate fit, with values above .95 (Hu & Bentler, 1998). The RMSEA showed a value barely above the range described as “acceptable” (Hair et al., 2010) so the RMSR was estimated showing good model fit. The results of CFA are shown in Table 2.

**-Insert table 2 here-**

### **Criterion validity**

To begin with, the internal consistency of each measure we have included in the study was calculated, as not all of them were validated for our population (i.e. MAAS and AAQ-II). Each instrument showed good internal consistency (Table 3).

**-Insert table 3 here-**

The criterion validity of the CFQ-VA was evaluated through Pearson correlations using different measures. Pearson correlation coefficients between the CFQ-VA and other psychological measures are shown in Table 3. The CFQ-VA correlated highly and in predicted directions with measures of psychological inflexibility, rumination, and worry. The CFQ-VA also showed moderate correlations in predicted directions with measures of mindfulness and psychological well-being. These results point out that the CFQ-VA has adequate criterion validity.

A *t*-test performed in independent samples was used to test for any differences between male and female participants on the CFQ-VA results. This comparison allowed us to see significant differences between scores ( $t_{(316)} = 2.45, p < .05$ ), with significantly higher scores for female ( $M = 23.57, SD = 8.75$ ) than male ( $M = 20.95, SD = 9.04$ ; Cohen's  $d = .29$ ). Also, a small correlation was found between the CFQ-VA scores and age ( $r = -.12; p < .05$ ).

### **Cognitive fusion as a predictor of pathological worry**

A simple linear regression indicated that cognitive fusion was positively associated with worry and could predict it in a statistically significant manner ( $\beta = .58; p < .001$ ). The results showed that  $R^2$  value was .34, so we can conclude that cognitive fusion as the independent variable can explain 34% of the variance of worry as the dependent variable (Table 4).

A multiple linear regression was also tested, including psychological inflexibility measured with AAQ II as an independent variable to test if AAQ II may improve the

prediction power of the CFQ-VA. The results indicated that changes in the explained variance were non-significant ( $R^2 = .035$ ). Adding AAQ II did not improve the prediction power of the CFQ-VA (Table 4). The CFQ-VA is a good predictor of worry by itself.

**-Insert Table 4 here-**

### **Discussion**

The results in this study indicate that the Argentinian adaptation of the Cognitive Fusion Questionnaire (CFQ-VA) has adequate psychometric properties, including an adequate internal consistency, good temporal stability, and associations in the expected directions with other relevant variables. Reflecting consistency with the original study (Gillanders et al., 2014), results point to a 7-item single-factor scale for the Argentinian adaptation of the CFQ, as this one-dimensional model showed good overall model fit. The factor analysis was particularly relevant because instruments can produce different factor structures in different populations (Bolderston, 2013). In this direction, the present study provides further evidence of CFQ's unifactorial structure across several language versions, and in very different samples. The high positive correlation between the CFQ-VA and the PSWQ ( $r = .58, p < .001$ ) deserves some further consideration as this relation was not explored in the original study (for a complete discussion on correlations between the CFQ and the AAQ II, Rumination and Mindfulness see: Gillanders et al., 2014; Lucena-Santos et al., 2017; Romero-Moreno et al., 2014).

Worry and rumination had been theoretically related as they are both linked to the presence of dysphoric repetitive thinking experienced as uncontrollable (Fresco, Frankel, Mennin, Turk, & Heimberg, 2002) and they had been highly correlated in several studies

(e.g. Hervás, 2008), so it was hypothesized to find a strong positive correlation between cognitive fusion measured with CFQ-VA, worry and rumination.

It is worth considering that cognitive fusion and worry are both normal phenomena of human experience and that it is their level or context of occurrence which defines their problematic consequences. Worry has been proposed as a way of avoiding anxiety (Borkovec, Robinson, Pruzinsky & DePree, 1983), as a form of experiential avoidance (Roemer & Orsillo, 2002) and a way of reducing uncertainty (Dugas, Gagnon, Ladouceur & Freeston, 1998). Considering worry as a particular form of experiential avoidance, it is not surprising to find powerful associations of that variable with cognitive fusion, as experiential avoidance and fusion are highly related constructs and their associations had been highlighted in several studies (e.g. Bardeen & Fergus, 2016; Hayes, Wilson, Gifford, Follette & Strosahl, 1996; Gillanders et al., 2014). Considering the well-established body of research on the relevance of worry and cognitive fusion as transdiagnostic processes, it is important to understand how the constructs of worry and cognitive fusion relate one another. One step in this direction was the linear regression analysis estimated in the present study which showed that cognitive fusion as the independent variable can explain 34% of the variance of worry as the dependent variable, concluding that cognitive fusion measured with CFQ-VA constitutes a good predictor of worry. More research is needed to continue to investigate how cognitive fusion measured with the CFQ relates to worry and how each of them influences other variables.

The CFQ-VA also showed moderate correlation with psychological well-being measured with the BIEPS-A ( $r = -.40, p < .001$ ) in the expected direction. Similar results were found with related variables like life satisfaction and quality of life (Gillanders et al.,

2014; Romero-Moreno et al., 2014). The BIEPS-A (Casullo, 2002) was specially chosen for this study as it was developed based on a multidimensional perspective of psychological well-being (Ryff & Keyes, 1995), including dimensions of life meaning and personal growth. From the ACT perspective, living according to personal values and adopting an aware attitude of observation and distance regarding private experiences are precursors of psychological well-being (Hayes et al., 2011). In this direction, if cognitive fusion is a problem, it is only in the case that it may become an obstacle in valuing living, so it was expected to find that higher levels of cognitive fusion are linked to lower levels of psychological well-being.

The differences found between male and female participants in the CFQ-VA's results with significantly higher scores for female than male also deserve further consideration. Related results were found in different studies using the CFQ: one study found out a positive association between clinical depressive symptoms and scores related to cognitive fusion, solely for female caregivers (Romero-Moreno et al., 2014), and differences in mean scores were also found in the validation process of the CFQ in Catalan (Solé et al., 2015). Initially, it is important to consider that male participants were under-represented in the sample; only 32.3% ( $n = 107$ ) of the participants were male, so some caution is necessary when generalizing these results. Second, it is plausible that social desirability may have generated a bias in the responses by male participants, who may have more difficulties in reporting thought influence over behavior. Third, several studies have reported higher levels of worry in females than in males (Molina & Borkovec, 1994; Robichaud, Dugas & Conway, 2003; Rodríguez-Biglieri & Vetere, 2011; Dugas, Freeston, & Ladouceur, 1997) so the results are not surprising considering that cognitive fusion is

strongly associated with worry. There is a need for more research to clarify this subject. Regarding the relationship between CFQ-VA's scores and age, the results have shown a small correlation so it is necessary to continue exploring this relationship in future research.

As regards limitations of this study, a number of them should be taken into consideration. In relation to the sample, most participants were female and there were no adolescents. All participants were residents of Buenos Aires City and surroundings, so the study did not include participants from other provinces of Argentina. Also, the participants were fairly educated, so it would be of interest to explore the results in a less educated sample, in particular to test the understanding of the CFQ-VA statements. Another limitation constitutes the small size of the sample to test CFQ-VA's temporal stability so the results should be taken carefully in this sense. In terms of data analysis, a Confirmatory Factor Analysis (CFA) was performed and no alternative structural models were evaluated, which constitutes another limitation of the study. In this sense, it was our purpose to test if the CFQ's unifactorial structure was invariant across different language versions, and in a very different sample. In terms of variables' limitations, this study did not include clinical variables such as anxiety or depression, so the relations between these variables and the CFQ-VA are unknown. This could be of interest to future research. In terms of measures, some of the instruments we used to explore the construct validity of the CFQ-VA lacked formal validation in Argentinian samples (i.e. MAAS and AAQ II). However, their internal consistencies have been calculated, and they proved to be adequate. Another limitation of this study is that all measures used were self-report measures. Although this is not necessarily a problem itself as self-report measures are not inherently superior or inferior to other behavioral methods (Ciarrochi et al., 2016), future research could develop and include

different behavioral measures of cognitive fusion in order to gain further understanding of this process.

Future research can also contribute to explore the power of the CFQ-VA in discriminating between clinical and non-clinical populations, and also to explore the sensitivity to the instrument's treatment, as there is already evidence of this in previous research (Gillanders et al., 2014). In addition to this, future studies focusing on the CFQ-VA should continue exploring the relations between cognitive fusion and worry. Finally, future research could also explore the psychometric properties of the State Cognitive Fusion Questionnaire (SCFQ) (Bolderston et al., 2018) in our population to have different instruments in the future to measure change after particular defusion interventions in lab settings.

In conclusion, this study provides a valid cognitive fusion measure for Argentinian population, which could be administered in both clinical and research settings. Also, this study provides insight into a better understanding of the relations between cognitive fusion and pathological worry, along with other important transdiagnostic processes.



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## Appendix CFQ-VA

### *Versión Argentina del Cuestionario de Fusión Cognitiva*

A continuación se presentan algunas afirmaciones. Por favor, indique hasta qué punto se aplican a usted o lo definen utilizando la siguiente escala.

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>				
	<b>Nunca</b>	<b>Muy rara vez</b>	<b>Rara vez</b>	<b>Alguna vez</b>	<b>Con frecuencia</b>	<b>Casi siempre</b>	<b>Siempre</b>				
<b>1. Mis pensamientos me provocan malestar o dolor emocional</b>					1	2	3	4	5	6	7
<b>2. Me siento tan atrapado/a en mis pensamientos que soy incapaz de hacer las cosas que realmente quiero hacer</b>					1	2	3	4	5	6	7
<b>3. Tiendo a analizar demasiado las situaciones hasta el punto en que me resulta de poca ayuda</b>					1	2	3	4	5	6	7
<b>4. Suelo luchar contra mis pensamientos</b>					1	2	3	4	5	6	7
<b>5. Me enojo conmigo mismo/a por tener determinados pensamientos</b>					1	2	3	4	5	6	7
<b>6. Tiendo a enredarme mucho en mis propios pensamientos</b>					1	2	3	4	5	6	7
<b>7. Me resulta muy difícil dejar pasar los pensamientos desagradables, aun cuando sé que eso sería útil para mí</b>					1	2	3	4	5	6	7

## Tables and Figures

Table 1  
*Means, Standard deviations, Skewness and Kurtosis of the CFQ-VA items*

Items	<i>M</i>	<i>SD</i>	Skewness	Kurtosis	<i>α.-x</i>
CFQ1. Mis pensamientos me provocan malestar o dolor emocional	3.34	1.48	.25	-.46	.88
CFQ2. Me siento tan atrapado/a en mis pensamientos que soy incapaz de hacer las cosas que realmente quiero hacer	2.69	1.46	.72	.00	.88
CFQ3. Tiendo a analizar demasiado las situaciones hasta el punto en que me resulta de poca ayuda	3.36	1.68	.36	-.81	.89
CFQ4. Suelo luchar contra mis pensamientos	3.22	1.66	.35	-.70	.88
CFQ5. Me enojo conmigo mismo/a por tener determinados pensamientos	3.13	1.64	.33	-.76	.88
CFQ6. Tiendo a enredarme mucho en mis propios pensamientos	3.59	1.77	.14	-.91	.87
CFQ7. Me resulta muy difícil dejar pasar los pensamientos desagradables, aun cuando sé que eso sería útil para mí	3.35	1.60	.32	-.58	.87

Figure 1. *Standardized factor weights of the seven items from CFQ-VA*

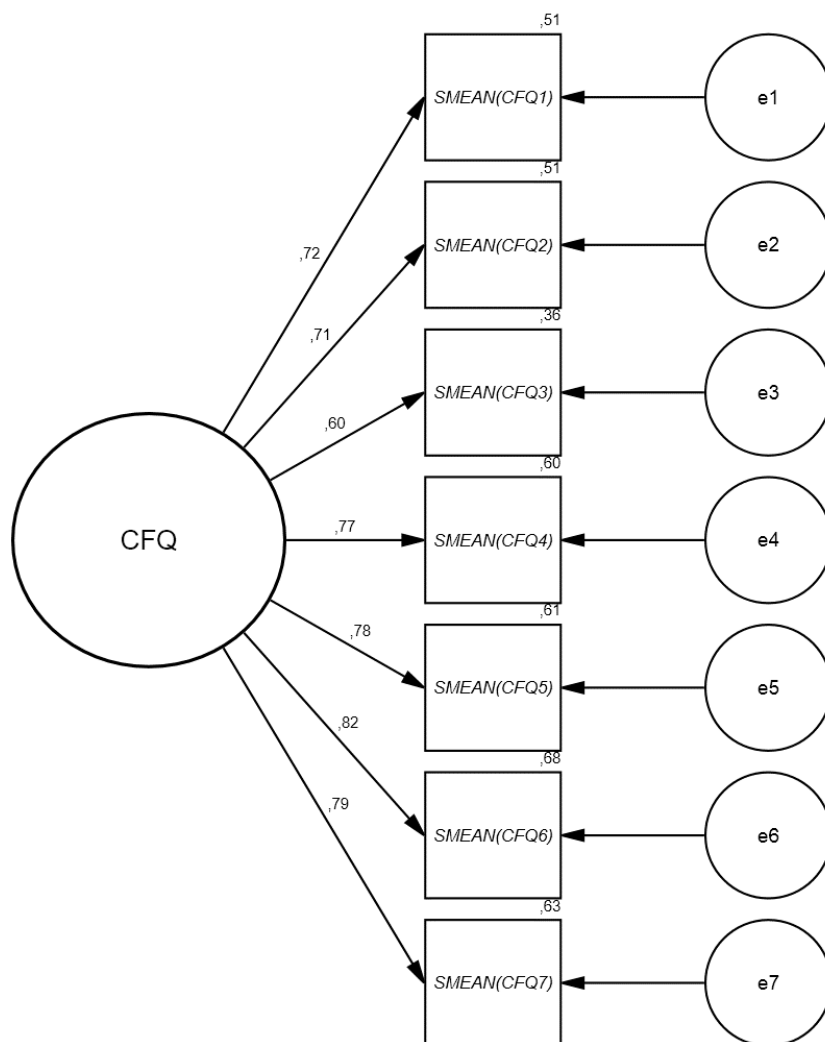


Table 2

*Confirmatory factor analysis of the CFQ-VA*

$\chi^2$	df	NC ( $\chi^2/\text{df}$ )	CFI	IFI	RMSEA	SRMR
49.88***	14	3.56	.97	.97	.08	.03

\*\*\* .  $p < .001$



Table 3  
*Cronbach's Alpha and Correlations Between CFQ-VA and Other Constructs*

	$\alpha$	1	2	3	4	5	6
1. CFQ-VA	.89	-	-.40**	.74**	.59**	.45**	-.40**
2. MAAS	.88		-	-.34**	-.37**	-.18**	.28**
3. AAQ II	.90			-	.57**	.39**	-.45**
4. PSQW	.94				-	.44**	-.25**
5. CERQ	.86					-	-.07
6. BIEPS-A	.69						-

*Note:* CFQ-VA: Cognitive Fusion Questionnaire Argentinian Version; MAAS: Mindful Attention Awareness Scale; AAQ II: Acceptance and Action Questionnaire-II; PSQW: Penn State Worry Questionnaire; CERQ: Rumination Subscale Cognitive Emotion Regulation Questionnaire; BIEPS-A: Psychological Wellbeing in Adults Scale.

\*\*  $p < .01$ .

Table 4  
*Linear Regression*<sup>a</sup>

Model	$F_{(1,303)} = 159.89, p < .001$				
	$R^2$	<i>Adjusted R<sup>2</sup></i>	$\beta$	$t$	$p$
1. CFQ <sup>b</sup>	.34	.34	.58	12.64	< .001
2. CFQ			.38	5.60	< .001
AAQtotal	.38	.37	.28	4.11	< .001

a. dependent variable: PSQW

b. predictor variable: CFQ

**Highlights**

- The Argentinian validation of The Cognitive Fusion Questionnaire (CFQ-VA) is presented reporting its psychometric properties.
- The CFQ-VA possessed a strong unifactorial structure and an adequate internal consistency.
- The CFQ-VA presented associations in the expected directions with other relevant variables.
- Cognitive fusion predicts worry in a significant manner.