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The Psychometric Properties of the Spanish Language Reinforcement Sensitivity Questionnaire (RST-PQ)

Propiedades psicométricas de la versión en español del Cuestionario de Sensibilidad al Reforzador (RST-PQ)

Abstract: Two studies assessed the construct validity of the Spanish language version of the Reinforcement Sensitivity Theory Personality Questionnaire (RST-PQ). In both studies, college student samples obtained from universities located in Mexico City answered the questionnaire. In the first study, a two-step exploratory factor analysis assessed the underlying structure of the RST-PQ. Although the factor structure identified by EFA in previous studies was replicated, cross-loading of items between factors was frequent. The first study also showed problems of internal consistency in one of the factors and lack of measurement invariance in three factors. The second study assessed the underlying structure of the RST-PQ using a one-step confirmatory factor analysis. Fit indexes failed to meet accepted cut-points of RMSEA or CFI. Results replicated findings previously reported in both the English and German language versions of the RST-PQ. The data produced by the studies suggest that the RST-PQ lacks construct validity. The data produced by the studies suggest that this questionnaire requires a thorough revision by its original authors.

Key words: Reinforcement sensitivity theory, RST-PQ, construct validity, factor analysis, Spanish language version, college students.

Resumen: Dos estudios evaluaron la validez de constructo de una versión en español del Cuestionario de Personalidad basado en la Teoría de la Sensibilidad al Reforzador (RST-PQ). En ambos estudios, muestras de estudiantes universitarios de la Ciudad de México contestaron el cuestionario. En el primer estudio, un análisis factorial exploratorio evaluó, en dos etapas discretas, la estructura factorial subyacente del cuestionario. Fue posible replicar la estructura reportada en estudios previos, sin embargo, varios reactivos cargaron en más de un factor. También se encontraron problemas de consistencia interna en un factor y ausencia de invariancia de medida en tres factores. El segundo estudio evaluó la estructura del RST-PQ a través de un análisis factorial confirmatorio conducido en una sola etapa. Los índices de ajuste no alcanzaron límites aceptables de RMSEA o CFI. Los hallazgos confirman los resultados obtenidos en las versiones en inglés y alemán. Sugieren que el RST-PQ carece de validez de constructo. Los estudios sugieren que el cuestionario requiere una revisión a profundidad por sus autores originales.

Palabras clave: Teoría de la sensibilidad al reforzador, RST-PQ, validez de constructo, análisis factorial, versión en español, estudiantes universitarios.

Development of psychological theories of personality is one of the most prolific endeavors conducted within the field of psychology. Most of these theories, however, are developed within the framework of therapeutic one-on-one interventions, and subjective biases cannot be avoided. Some personality theories however, have been developed using powerful experimental designs, and animal subjects. For instance, the Reinforcement Sensitivity Theory of Personality (RST) was developed by Gray (1976, 1981), using the "conditioned inhibition experimental procedure" (Hearst, Besley & Farthing, 1970) in rats. The theory has subsequently been enriched by other experimental procedures (see for instance, Blanchard & Blanchard, 1988). RST is appealing to some behavior scientists, because its origins guarantee objectivity, and its premises can be assessed using the scientific method. Additionally, RST has proven a useful tool in the study and comprehension of anxiety (Beevers & Meyer, 2002; Campbell-Sills, Liverant, Brown, 2004), addictions (Blum et al. 2000; Johnson, Turner & Iwata, 2003), depression (Pinto-Meza et al., 2006; Coplan et al., 2006) and other psychopathologies (see Bijttebier, Beck Claes & Vandereycken, 2009, for a review). Initially, the basis of RST was conceived as two independent and opposing neuropsychological systems. The behavior activation system (BAS) was activated by stimuli associated with reinforcement (or reinforcing stimuli); once activated it elicited approach behaviors. In a similar vein, the behavior inhibition system (BIS) was activated by the presence of stimuli associated with

punishment (also by stimuli associated with the loss of reinforcement). Once "prompted," the system elicited avoidance, or other defensive behaviors. In agreement with RST, the personality of an individual depends on the relative strength of the systems within each individual. For instance, an individual with an active BAS, and comparatively inactive BIS would tend to act in a reckless and impulsive manner (Morgan, Bowen, Moore, & van Goozen, 2014).

In its most recent form, Gray and McNaughton (2000) suggested that three, instead of two major neuropsychological systems, are the core of RST. Revised RST (or r-RST) suggests that organisms may possess not one but two defensive systems. The BIS is activated when "conflicting stimuli" are presented to the organism (stimuli indicating both the possibility of reinforcement, and punishment). Resolution by the BIS may then activate either the BAS or the "fight-flight-freeze" system (or FFFS). Evidence in favor of r-RST stems mainly (but not exclusively, see for instance, Bijttebier, Beck, Claes & Vandereycken, 2007) from both ethoexperimental research, and factor analysis (FA) of item distribution in RST oriented questionnaires. Regarding the former ethoexperiments have shown that rats exposed to situations were both food and a predator are present, may present anxiety related behavior (vocalizations) and fear related behaviors (fighting, fleeing or freezing), independently (Blanchard, Brain, Blanchard & Parmigiani, 1989; Blanchard, Blanchard, Rodgers, &Weiss 1990). Regarding FA, studies involving self-report measures of RST have frequently produced results that divide BIS items in two different factors. Items in one of these factors are frequently anxiety related; items in the second factor are frequently fear related (see Cooper, Perkins & Corr 2007 for a review).

By stating that RST has been evolving thanks to FA, it should be evident to the reader that self-report questionnaires have played an important part in its research. An important number of questionnaires have been developed to assess both RST and r-RST (see Corr, 2016 for a review). Jackson (2009) developed the "Jackson-5" questionnaire to assess the constructs of r-RST. The instrument is composed of items to measure each one of the five different factors of r-RST (BIS, BAS, Fight, Flight and Freeze). It has received criticism (Corr & Cooper, 2016; Krupić, Corr, Ručević, Križanić, Gračanin, 2016) because it fails to conceive the BAS in a multidimensional way. Specifically, it has been criticized because it fails to subdivide the BAS in a manner congruent with its conceptualization by McNaughton and Corr (2004; 2008). Smederac et al (2014) developed the "Reinforcement Sensitivity Questionnaire" (RSQ). This instrument has also been criticized because of its failure to conceptualize the BAS in a multidimensional way. Additionally, data produced with the RSQ fails to substantiate the assumption that its BIS and FFFS scales are truly independent (Walker, Jackson & Frost 2017). Reuter et al. (2015) designed the "revised Reinforcement Sensitivity Theory Questionnaire" (rRST-Q). It has been criticized for failing to distinguish between different factors of the BAS scale. Additionally some of the correlations between the scales are at odds with the general theory. For instance, the fight scale has a negative correlation with the other scales of the FFFS (Corr, 2016).

In order to overcome the limitations of previous instruments, Corr and Cooper (2016) designed the "Reinforcement Sensitivity Theory of Personality Questionnaire" (RST-PQ). Its authors argue that it reflects both the latest findings from "typical rodent ethoexperimental situations" and qualitative analyses of people's testimonies

regarding their experiences with both punishing and rewarding stimuli. Corr and Cooper also argue that the questionnaire was designed in agreement with the latest conceptualization of RST (specifically with that published by Corr & McNaughton, 2012). This conceptualization not only divides the defensive systems in two dimensions (BIS and FFFS), it also divides the BAS in four factors (Reward Interest (RI), Goal-Drive Persistence (GDP), Reward Reactivity (RR) and Impulsivity (IMP). In their seminal paper, Corr and Cooper (2016) conducted both exploratory factor analyses (EFA), and confirmatory factor analyses (CFA). The data presented by these authors appears to confirm a factor structure of two defensive systems and a BAS divided in four factors. The RST-PQ has also been translated to the German language (Pugnaghi, Cooper, Ettinger & Corr, 2018). These authors suggested that the CFA presented in the study, replicated the six-factor structure with two defensive systems and four BAS factors of the English version RST-PQ. The German language translation of the RST-PQ also showed convergent validity when correlated with other personality questionnaires (NEO-FFI, State-Trait Anxiety Inventory, Fear Survey Schedule, and the Barratt Impulsivity Scale). A short version of the RST-PQ was developed and assessed by Vechione and Corr (2020). The RST-PQ-S consists of 22 items, selected from the original RST-PQ for "theoretical and empirical reasons". The authors argue that CFA showed the expected six-factor structure of two defensive systems (BIS and FFFS) and a BAS subdivided into four factors. The authors also reported that the RST-PQ-S had good convergent validity with other personality questionnaires, (and appropriate internal consistency).

The Spanish language is the fourth-most spoken language in the world, with nearly 500 million native speakers. As the RST-PQ may be a useful psychometric

tool, and has shown interesting psychometric properties, the purpose of the present study was develop a Spanish-language version of this questionnaire.

First Study

Corr and Cooper's initial analysis of the RST-PQ consisted an EFA of the dimensions of the questionnaire. EFA allowed the examination of the number of factors that best described the questionnaire. It also permitted its authors to determine the items that belong to each factor. Based on factor loadings, it was also possible to identify items that cross-loaded or did not load on their designated factor. Thus, the first study reported in this paper, also describes the results of EFA. In order to further compare the results of the Spanish language RST-PQ, with the original English version, the first study also presents the correlation between the factors of the RST-PQ. The first study also includes and analysis of measurement invariance across sexes (this analysis is absent in Corr & Copper's seminal paper).

Method

Participants

A non-probabilistic sample of 463 undergraduate college students participated in the study. The sample was predominantly female (65.4%), with and average age of 21.4 years and a *SD* of 2.1 years. Most students lived with their original families (86.1%). Data were collected during the month of September 2020, using the "Google-Forms" digital platform. Participation was voluntary, previous reading and digital signing the informed consent letter. The research and ethics departments of the institutions involved consensually approved the study.

Instruments

The RST-PQ was recovered from an open access Internet web page, developed by one of the authors of the questionnaire (http://www.philipcorr.net/rst-pg77.html). It consists of 65 items that are answered using a four point Likert-type scale that ranges from "Not at all", to "Highly". In agreement with Corr and Cooper's (2016) seminal study, the RST-PQ is divided into six correlated factors. Four of these factors are hypothesized to belong to the Behavioral Approach System (Reward Interest, RI; Goal Drive Persistance, GDP; Reward-Reactivity, RR; and Impulsivity, IMP). Two additional factor assess the Fight, Flight, Freeze system (FFFS) and the Behavioral Inhibition System (BIS). In general de BAS may be conceptualized as a system that "moves the organism" in the direction of reinforcing stimuli. The RI may be described as the "radar" that "scans the environment for reinforcement opportunities (e.g. I regularly try new activities just to see if I enjoy them). Goal Drive Persistence (GDP) may be understood as the active pursuit of reward, event when reinforcement is not immediately available (e.g. I put in a big effort to accomplish important goals in my life). Reward-Reactivity refers to the positive feelings derived from achieving goals or sub goals (Sometimes even little things in life can give me great pleasure). Impulsivity refers to the constraint (or lack off) that may be observed in an individual, when it is "finally" in the presence of reinforcing stimuli (e.g. I think I should 'stop and think' more instead of jumping into things too quickly. At times organisms are exposed to punishing stimuli, and immediate responses are required to avoid danger; at this times de FFFS operates (e.g. I would be frozen to the spot by the sight of a snake or spider). Finally, in its revised form, the BIS may be understood as a conflict resolution mechanism that operates whenever the organism is exposed

to situation where both reinforcing and punishing stimuli are present (e.g. I feel sad when I suffer even minor setbacks).

Three bilingual licensed psychologists translated the RST-PQ from the English to the Spanish language. Once this objective was achieved, another three, equally prepared psychologists, received the translated questionnaire. They then attempted to translate the Spanish RST-PQ to the English language. When this process resulted in an identical phrasing of the items, they were considered "successfully translated." When this was not the case, all six translators debated amongst themselves to reach a consensus.

Once the questionnaire was considered finished, it was uploaded into a Google-forms format. This format, in addition to the consent letter and a general demographic data questionnaire, were sent to college undergraduate students from Mexico City.

Procedure

The project to assess the psychometric properties of the RST-PQ to the Spanish language was submitted to the Dean of Research of the School of Psychology of the Universidad Anáhuac. Once the project was approved, we received access to the email accounts of the undergraduate students. The students received the invitation to participate in the study (together with de Google-forms link to the questionnaire). The invitation to participate was sent only once. Data from the students was recovered throughout the month of September 2020. A total of 463 complete questionnaires were obtained and processed. Incomplete questionnaires or those were the consent form was not digitally signed, were omitted from the analysis.

Data Analysis

Exploratory factor analysis (EFA) was conducted to assess the distribution of the items, using the Mplus 6.12 (Muthén & Muthén, 2010). The factors were extracted using a Robust Weighted Least Squares Estimator, and were rotated using an oblique Geomin rotation. This method was selected for two reasons. First, it was the method employed in the seminal study of the RST-PQ, conducted by Corr and Cooper, 2016. Additionally, our data did not show multivariate normality (Mardia Skewness and Kurtosis analyses were considerably below de .05 cut-point; the Henze-Zirkler test was also way below the .05 cut-point). In addition, Likert-type scales are considered by many authors' ordinal measures (see Flora & Curran, 2004 for a review). In order to replicate the seminal study as closely as possible, we conducted two separate EFA. In the first one, we observed the distribution of BIS/FFFS items. The second one was designed to observe, exclusively, BAS item distribution.

Results

The first table shows the results of the EFA. Specifically it shows item distribution for the BIS and FFFS factors. Only those items with positive factorial weights of .400 or higher were reported (Matsunaga, 2010). Items that loaded in more than one factor were assigned to the dimension where its factor weight was higher; these items are identified in the table by an asterisk. Each item is presented together with the factor that its original authors suggested for each one (in parenthesis). Item number corresponds to that presented in Corr's free-access website.

Table 1. EFA BIS and FFFS Factors.

Factor 1 Eigen-V.=12.61 %Variance=.39%	Factor 2 Eigen-V.=2.31 %Variance=.07%
R77/.664 (FFFS)	R7/.882 (BIS)
R64/.641 (FFFS)	R28/.855 (BIS)
R61/.639 (FFFS)	R79/.732 (BIS)
R81/.569 (FFFS)	R2/.710 (BIS)
R56/.564 (BIS)	R8/.687 (BIS)
R10/.560 (FFFS)	R11/.681 (BIS)
R24/.550 (FFFS)	R76/.516 (BIS) *
R62/.542 (BIS) *	R80/.511 (BIS) *
R52/.532 (FFFS)	R75/.482 (BIS) *
R78/.531 (FFFS)	R83/.468 (BIS)
R69/.521 (FFFS)	R37/.453 (BIS) *
R55/.508 (BIS)	R1=.442 (BIS) *
R60/.506 (FFFS)	
R23/.491 (BIS)*	
R42/.470 (BIS) *	
R41/.425 (BIS) *	*Cross-loading
Cronbach's α =.873	Cronbach's α =.911

Table 1 suggests that items characterized by its authors as belonging to the BIS dimension, also load in the FFFS (at least 6 items). The data also suggest that some items load both on the FFFS and the BIS factors (at least 9 items).

The second table shows the results of the EFA. Specifically it shows item distribution for the BAS factor (and its four subscales). Item organization and presentation, follow the same directives described in the first table.

Table 2. EFA BAS Factor.

Factor 1. Eigen-V.=10.83 %Variance=.34%	Factor 2. Eigen-V.=3.05 %Variance=.09%	Factor 3. Eigen-V.=1.97 %Variance=.06%	Factor 4. Eigen-V.=1.52 %Variance=.05%
R17/.884 (RI) *	I71/.847 (GDP)	I35/.578 (IMP)	I19/.561 (RR) *
R15/.765 (RI) *	I54/.818 (GDP)	I36/.474 (IMP)	I32/.537 (RR) *
R40/.764 (RI) *	I39/.744 (GDP)		I4/.439 (RR)
R12/.691 (RI) *	I84/.743 (GDP)		I47/.435 (RR)
R44/.548 (RI)	I5/.627 (GDP) *		
R30/.515 (RR)	I38/.567 (RR) *		
R9/.507 (RR)	I13/.493 (GDP) *		

R33/.487 (RI)	I45/.466 (RR)		
R18/.486 (RI)	I25/.410 (GDP)		*Cross-loading
Cronbach's α =.835	**Cronbach's α =.860**	**Cronbach's α =.539**	**Cronbach's α =.724**

Table 2 shows the same problems identified in the first one. Some factors load items belonging to different categories (the first factor loads both RI and RR items, while the second factor loads both GDP and RR items). Additionally, at least nine items load on more than one factor. Table 2 shows also and additional problems, specifically only two IMP items show positive and. 400 or higher factor weights.

Table 3 shows Spearman correlation coefficients between all six scales of the RST-PQ. Significant coefficients are indicated with asterisks. Spearman, rather than Pearson correlation was used for the reasons argued in the data analysis section.

Table 3. Spearman correlations between the scales of the RST-PQ

Scales	RI	GDP	RR	IMP	FFFS	BIS
RI	1.0					
GDP	.495 **	1.0				
RR	.551 **	.560 **	1.0			
IMP	.466 **	.244 **	.457 **	1.0		
FFFS	.112 *	.139 **	.306 **	.279 **	1.0	
BIS	.138 **	.093 *	.279 **	.437 **	.566**	1.0
	*´p<.05	**p<.01				

Table 3 shows that all correlations are direct and significant. In general, correlations within domains (approach or defensive) are higher than those observed between them.

Table 4 assessed measurement invariance of the RST-PQ by sex. Mann-Whitney test were used, for the reasons previously argued in the data analysis section.

Table 4. Mann-Whitney tests between mean-ranks. Men vs Women.

Scale	Mean Rank, Men	Mean Rank, Women	M-W. Test
RI	247.7	223.7	Z= 1.84, p=.07
GDP	243.1	226.2	Z=1.29, p=.19
RR	217.6	289.6	Z=1.68, p=.09
IMP	249.5	222.8	Z=2.05, p=.04 *
FFFS	159.4	270.3	Z=8.49, p<.001 **
BIS	182.9	257.9	Z=5.74, p<.001 **
	*p<.05	**p<.01	

Table 4 shows that three scales of the RST-PQ show statistically significant differences between men and women (IMP, FFFS and BIS).

Discussion

In general, although the results agree with the hypothesis that the defensive dimensions of the questionnaire divide into two factors (and that the BAS dimensions divides into four), they do not support the idea that the Spanish language translation of the RST-PQ complies with the model suggested by its authors. This conclusion is offered to the reader, based on at least two mayor findings. First, the frequent overlap of items belonging to putatively different factors on both the defensive (FFFS, BIS) and BAS dimensions of the questionnaire. At least six items from the BIS dimension, load in the FFFS factor. In a similar way, at least two factors of the BAS dimension load items belonging to putatively different subscales of the BAS (Factor 1 contains both RI and RR items, while and Factor 2 shows both GDP and RR items). The Spanish language version of the RST-PQ may also be considered at odds with its original model, because an important number of items, load on more than one factor (nine items in the defensive dimensions, and a similar number on the BAS subscales). Other problematic issues arise from the results. For instance, at least one BAS factor has only two items, and shows poor internal consistency. In addition, at least 5 BIS items fail to produce factorial-weights above the .400 established cut point. A similar problem occurs with the RR and IMP subscales of the BAS (3 items on the former and 6 in the latter, fail to reach the established cut

point). Regarding the correlations between the factors of the RSTP-PQ, our results agree with those presented by Corr & Cooper (2016), in the sense that correlations within domains (defensive or BAS) are higher than those between them. They are also at odds because our correlations are all positive, and substantially higher. Finally, the data produced in the first study suggest lack of measurement invariance in at least three factors of the RST-PQ (IMP, FFFS, and BIS). Apparently, impulsivity is higher in men; FFFS and BIS are higher in women. This finding is in disagreement with the original author's claims regarding the opposite.

Second Study

Corr and Cooper (2016) complemented EFA with confirmatory factor analysis (CFA) of the RST-PQ. Their data, in their own words "showed a robust 6-factor structure" with two unitary defensive factors and four BAS factors. This conclusion was based on the same model analysis employed for the EFA (conducting separate analysis, for the defensive factors (BIS/FFFS) and for the BAS dimension). Regardless of their conclusions, both RMSEA and CFI indexes reported in the study are "below a rule of thumb cut-off points" (CFI=.87<.90, RMSEA=.052>.05). The German language version of the RST-PQ was also analyzed using CFA, and separate analyses for the defensive factors and the BAS dimension. Although its authors (Pugnaghi, Cooper, Ettinger & Corr, 2018), suggest that their CFA "confirmed the six-factor structure" hypothesized for the RST-PQ, the CFI index was well below the cut-off point (CFI=.082<.90). In conclusion, in spite of the optimistic claims of previous research, it is still unclear if the six-factor model sustaining the RST-PQ is indeed an appropriate model. The data produced by our first study, is

also at odds with the proposed six-factor model. When scientist attempt to replicate previous research, it is fundamental that their procedures and statistical analyses closely resemble those employed by previous authors (Fabrigar & Wegener, 2016). We have done this on the first study, but the data obtained so far suggests that this research avenue is rather pointless. Revised RST is basically a model of animal behavior, where three neuropsychological entities interact to produce a behavioral outcome (Gray & McNaughton, 2000); as such, it is unclear to the present authors why a questionnaire designed to assess this model should be analyzed separating its defensive and BAS dimensions. Additionally psychometric theory suggests that the construct validity of a questionnaire should be determined by the similarity between its hypothesized elements, and item distribution in EFA and CFA (Arias & Sireci, 2021; Cronbach & Meehl, 1955; Strauss & Smith, 2009). Thus conducting separate analyses for different parts of the questionnaire appears to us a questionable psychometric practice. Model assessment used in the seminal studies of the RST-PQ also appears arbitrary (Corr & Cooper could just as well have assessed any one of six (or more) different combinations of the three dimensions of the model). Thus, in order to determine the construct validity of the RST-PQ in agreement with its seminal model, (and in consensus with good psychometric practices), we decided to analyze the six-factor model of the RST-PQ in a single analysis (that is forfeiting a two-step procedure where defensive dimensions are analyzed separated from the BAS dimension). All other statistical aspects of the statistical analyses were identical to those used by Corr and Cooper (2016).

Method

<u>Participants</u>

A total of 503 undergraduate college students from Mexico City participated in the study. Most participants were males 62.2% with an age average of 20.7 years and a *SD* of 2.1 years. Most students lived with their families 87.1%. Participation in the study was voluntary, prior digital signing of the informed consent form. The research and ethics departments of the institutions involved consensually approved the study.

Instruments

The same instruments used in the first study were used in the second one.

Procedure

The same procedure used in the first study was used in the second one.

Data Analysis

All CFA were conducted using the Mplus 6.12 program (Muthén & Muthén, 2010). Three models were tested, a one-factor model (from which we expected a poor fit because it does not represent r-RST) and a three-factor model with no separation of the BAS dimensions (we also expected a poor model fit, because the model suggests that the BAS dimension divides into four correlated factors). Finally, we assessed a three-factor model with the BAS dimension divided into four correlated factors (from which we expected a good fit as it exactly mirrors r-RST theory). An adjusted (mean and variance) weighted least squares estimation of the covariance matrix was used. We selected this analysis because we found no evidence of multivariate normality in the data (Mardia Skewness and Kurtosis analyses were considerably below de .05 cut-point; the Henze-Zirkler test was also way below the .05 cut-point). This analysis strategy was also chosen because Likert-type scales are considered ordinal measurements (Flora & Curran, 2004). We assessed a correlated model, because both r-RST and the data obtained in the first study,

suggest all factors to be correlated. Only complete questionnaires were analyzed. Model fit was determined using the root mean error of approximation (RMSEA, Steiger, 1990). RMSEA values of .05 or less are considered indicative of good fit. The comparative fit index (CFI, Bentler, 1990) was also used. CFI indexes above .95 are considered indicative of good fit). Other fit indexes, such as RMR, GFI and AGFI, were not reported, because they were basically redundant to CFI and RMSEA.

Results

As expected, a one-factor model was a poor fit for the data (RMSEA=.094, and CFI=.400). A three-factor model with no division of the BAS dimension, showed some improvement (RMSEA=.067, and CFI=.699). Finally, a three-factor model with the BAS divided into four correlated factors showed still more improvement (RMSEA= .065 and CFI=.716). However, neither model was even remotely close to the accepted cut-points for RMSEA (.05) or CFI (.95).

Discussion

When the factorial structure of the RST-PQ is assessed in agreement with its theoretical foundations (Corr & McNaughton, 2012), model fit indexes still fail to reach accepted cut points in CFA. This finding is in basic agreement with the data produced by both the English and German language versions of the questionnaire (where defensive and BAS factors were studied in separate CFA analyses). Taken together, it is difficult (not impossible) to identify translation issues as culprits for the lack of construct validity of the Spanish Language RST-PQ. The present authors recognize that fit indexes in the CFA were slightly better on both the Corr and Cooper (2016) and Pugnaghi, Cooper, Ettinger & Corr, (2018) studies (however all three studies fail to reach accepted CFA cut-points). Future research may help determine

if differences between the studies have to do with: a) the translation of the questionnaire, b) the statistical approach used when conducting the CFA, or c) other issues.

General Discussion

Taken together, the results of the present studies suggest that the Spanish language version of the RST-PQ lacks severely in construct validity. Regardless of the optimistic claims expressed by the authors of both the English and German language versions of the questionnaire, their results also, show problems in the same area. The first study showed that item grouping, as determined by EFA, is in agreement with the two-factor defensive dimensions theory. In a similar vein, item grouping for the BAS dimension, in four correlated factors also agrees with the RST-PQ's structural model. However, in both the defensive and the BAS, there is a considerable amount of item cross-loading within dimensions (the BAS dimension also presents a dimension with poor internal consistency). Other problems highlighted by the first study are lack of measurement invariance, and correlations between factors of the RST-PQ that do not entirely agree with r-RST. The second study showed that when CFA is carried in strict adherence to r-RST model, fit is poor.

When a psychometric endeavor fails to produce an instrument with adequate construct validity, it invites questioning, (regarding both item development and translation). It also opens the door to questions regarding the theoretical foundations of the construct (Cronbach & Meehl, 1955; Strauss & Smith, 2009). Given that, other questionnaires designed to measure r-RST have shown robust evidence of construct

validity (albeit not always in agreement with the Corr & McNaughton, 2012 model), one may be tempted to suggest that other questionnaires have had success, because the basic premises of r-RST are correct, (and Corr & McNaughton's interpretation incorrect). Should this possibility be studied by other scientists, it is important to take in consideration the great amplitude of Corr and McNaughton's interpretation of r-RST. This interpretation borrows from basic and applied research; it borrows from psychometric research and also from classical and operant conditioning literatures. Considering the later, a great influence for Corr and McNaughton, appears to be the ethoexperimental research based on the general methods and ideas proposed by Blanchard & Blanchard, 1988. Ethological-based research is interesting because the basic premises of operant conditioning may be tested in natural settings. However, under these circumstances, the basic variables of operant conditioning may become confounded, (Zeiler, 1977) and false conclusions reached. In any case, the results of the present studies suggest that the Spanish language version of the RST-PQ lacks construct validity and should be avoided in professional practice. The data produced, regarding the English and German language versions of the RST-PQ, lead the present author to a similar conclusion. However, the data from the first study also suggests that some items and factors may have interesting psychometric properties, and thus a short version of the questionnaire could be developed and assessed. The original authors of the RST-PQ seem to have reached a similar conclusion, as they recently produced a short version of this questionnaire (Vecchione & Corr, 2020). As no attempts have been made, so far, to replicate the seemingly optimistic results produced by the short version of the RST-PQ, the present author can only suggest other scientists to "use

it at their own risk." Pending more research that may help understand the problems underlying the factor structure of the RST-PQ, there are other questionnaires developed to measure r-RST. Corr and Cooper (2016) have criticized these questionnaires for different reasons; however, none of these appears as important as the lack of construct validity evidenced in the present studies (and in other studies).

Throughout this paper, we have tried to be objective and critical to unsubstantiated claims in the scientific literature we have reviewed. Thus, it is only natural that we should handle ourselves in a similar way towards our own study. The present study has severe shortcomings regarding the sample procedure. First, non-probabilistic convenience samples such as the ones used in the study make it difficult to ascertain that the entire population is adequately represented. This first issue is further aggravated by the exclusive use of undergraduate students in the studies. The sampling procedure is also an important issue in the interpretation of our studies, because in the first one, females were prevalent (65.4%); the second one was conformed predominantly by males (62.2%). We must also recognize that by using a digital platform for the application of the questionnaires, it was difficult to monitor closely how the individuals approached the answering process. The digital platform also made it difficult to answer questions in a timely manner. We must also recognize that the translation of the questionnaire was a real challenge, (even to English language native speakers). The challenge comes in the way the items are formulated. Instead of clear-cut statements regarding the individual's experiences, they are formulated as "isolated trains of thought" that the person may utter as if he/she were talking to himself/herself. The present author offers (as did Corr &

Cooper, 2016) his own version of the RST-PQ to other scientists, (so that they may examine our translation). The Spanish language RST-PQ may be requested freely at the email of the present author. We suggest other scientists review our translation; we also suggest other studies regarding the RST-PQ use a probabilistic stratified sampling method.

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