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Assessment of the Behavioral Inhibition System and the Behavioral Approach System: Adaptation and Validation of the Sensitivity to Punishment and Sensitivity to Reward Questionnaire (SPSRQ) in a Chilean Sample

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The goal of the present study is to estimate the psychometric properties of the Sensitivity to Punishment and Sensitivity to Reward Questionnaire (SPSRQ; Torrubia, Ávila, Moltó, & Caseras, 2001) in a sample of Chilean college students. The main hypothesis is that the instrument would show appropriate levels of reliability and validity, in light of previous validation studies. A pilot study was conducted in order to generate the adapted version of the questionnaire, which was then applied to a student sample from different undergraduate careers (n = 434). The results show the expected levels of reliability (test-retest and internal consistency). The factorial validity does not comply with the expected model, suggesting a further consideration of the structure of the questionnaire. External validity is appropriate, as the questionnaire shows the expected correlations with other personality measures. It is concluded that the SPSRQ is adequate for the context of validation, and this study contributes to the generalization of the questionnaire, since the results are consistent with the expected psychometric properties that have been reported in the literature.

Keywords: sensitivity to punishment, sensitivity to reward, personality, validation, adaptation.

El presente estudio tiene como propósito estimar las propiedades psicométricas del Cuestionario de Sensibilidad al Castigo y Sensibilidad a la Recompensa (SCSR; Torrubia, Ávila, Moltó, y Caseras, 2001) en una muestra de estudiantes chilenos, bajo la hipótesis general de que el instrumento presenta niveles apropiados de fiabilidad y validez, acorde a los estudios previos de validación. Para ello, se condujo inicialmente un estudio piloto que permitió generar la versión adaptada del cuestionario, el cual fue posteriormente aplicado a una muestra definitiva de estudiantes pertenecientes a diferentes carreras universitarias (n = 434). Los resultados muestran los niveles esperados de fiabilidad test-retest y consistencia interna. La validez factorial muestra problemas de ajuste de las escalas según el modelo teórico, sugiriendo una revisión de la estructura del cuestionario. La validez externa, sin embargo, es adecuada y el cuestionario muestra las correlaciones esperadas con otras medidas de personalidad. Se concluye la adecuación del cuestionario SCSR en el contexto de validación y la contribución de este estudio a la generabilidad del instrumento, en tanto los resultados son coherentes con la literatura previa en torno a sus propiedades psicométricas.

Palabras clave: sensibilidad al castigo, sensibilidad a la recompensa, personalidad, validación, adaptación.

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Gray's (1982) personality theory, currently called the reinforcement sensitivity theory (RST; Pickering et al., 1997), has been the subject of much discussion in the international literature because of its theoretical and empirical implications. The current version of the RST formulated by Gray and McNaughton (2000) conceives personality as the reflection of individual differences in three brain systems (Corr, 2004, 2008; Smillie, Pickering, & Jackson, 2006): the behavioral inhibition system (BIS), the behavioral activation system (BAS), and the fight-flight-freeze system (FFFS). The BIS is responsible for solving general conflict with goals, by monitoring the focus of danger, providing negative feedback to the organism in order to avoid imminent risky situations. The BAS directs behavior towards appetitive stimuli, both conditioned and unconditioned, by reducing the temporal-spatial distance of the current goal-oriented hedonic state and the final biological reinforcer. Lastly, the FFFS mediates behavior towards all aversive stimuli, conditioned and unconditioned, promoting behaviors of avoidance and escape. The following personality factors, associated with the diverse brain systems, are proposed by the RST: tendency towards concern and anxious rumination (BIS); optimism, orientation towards reward and impulsivity (BAS); and, lastly, tendency towards fear and avoidance (FFFS).

Gray initially based his model on the modification of Eysenck's personality theory, establishing that individual variations in the degree of activation of the BIS and the BAS are reflected in personality differences in anxiety and impulsivity, respectively (Gray, 1987). The relations between the two theories have been supported by diverse investigations that have used personality measures to assess anxiety and impulsivity, correlating them with Eysenck's dimensions (Corr, Pickering, & Gray, 1997; Diaz & Pickering, 1993; MacAndrew & Steele, 1991; Torrubia & Tobeña, 1984). Nevertheless, such measures are not directly based on Gray's theory but instead on personality models that share a general theoretical perspective, which could be a source of measurement error (Caseras, Ávila, & Torrubia, 2003; Torrubia, Ávila, Moltó, & Caseras, 2001). With the aim of generating personality measures directly derived from the RST, various efforts have been made to create scales to assess the functioning of the BIS and BAS, among which the following are noteworthy: the Sensitivity to Punishment Scale (Torrubia & Tobeña, 1984), the Gray-Wilson questionnaire (Wilson, Barret, & Gray, 1989), the Generalized Reward and Punishment Expectancy Scales (GRAPES; Ball & Zuckerman, 1990), and the BIS/BAS scales (Carver & White, 1994).

One of the best instruments to assess the BIS and BAS is the Sensitivity to Punishment and Sensitivity to Reward Questionnaire (SPSRQ; Torrubia et al., 2001), due to its strong grounding in Gray's theory and its psychometric properties. The SPSRQ appraises the functioning of the BIS with the Sensitivity to Punishment (SP) scale and the functioning of BAS by means of Sensitivity to Reward (SR) scale, establishing individual differences in sensitivity to punishment (i.e., general situations that involve novelty or possible aversive consequences) and sensitivity to reward (i.e., performing behaviors to achieve positive reinforcement, such as a sexual partner, money, and social situations, among others). It is a self-report measure with 48 items, of which 24 assess SP and 24 assess SR. Items are rated Yes/No, and 1 point is assigned to each positive response. The total score of each scale can range between 0 and 24, with means that vary between 10 and 12 points in each scale. The SP and SR scales are orthogonal and they present adequate psychometric properties. Internal consistency (Cronbach's alpha) of the SP scale varies between .83 and .82 for men and women, respectively; and in the SR scale, it ranges between .78 and .75 for men and women, respectively. Test-retest reliability ranges between .89 for the SP scale and .87 for the SR scale within a three-month time interval, with the values decreasing over a three-year interval (Torrubia et al., 2001).

Convergent and discriminant validity of the SPSRQ was obtained with other personality measures. With regard to Eysenck's dimensions, the SP scale correlated positively with Neuroticism and negatively with Extraversion, whereas the SR scale correlated positively with Extraversion and Neuroticism and moderately with Psychoticism. However, there is a positive relation between the SP scale and the Trait-Anxiety of the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970) and a positive correlation with the Impulsivity Scale (Eysenck & Eysenck, 1978), as well as with Zuckerman's Sensation Seeking Scale (Zuckerman, Eysenck, & Eysenck, 1978), which correlates negatively with SP (Torrubia et al., 2001). With regard to other direct measures of the BIS and BAS, Caseras et al. (2003) have shown that the SP scale correlates highly and significantly with the BIS scale of the BIS/BAS, with the BIS scale of MacAndrew and Steele (1991), and with the Reward Expectancies scale of the GRAPES. The SR scale correlates positively with the Reward Responsiveness, Drive, and Fun-Seeking scales of the BIS/BAS and with the Punishment Expectancies scale of the GRAPES.

Lastly, the review of the literature to date reveals the existence of several works of adaptation and validation of the SPSRQ, among which we underline the two carried out in English (Cogswell, Alloy, van Dulmen, & Fresco, 2006; O'Connor, Colder, & Hawk, 2004), one in French (Caci, Deschaux, & Baylé, 2007), and one in Romanian (Sava & Sperneac, 2006). Although these works have generally emphasized the theoretical quality of the questionnaire, they usually present problems of factor adjustment to the expected model. These problems of factor validity have suggested the need to replicate the assessment of the instrument and to introduce modifications in its content in order to achieve a better measurement of the underlying

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constructs. Nevertheless, it may be somewhat premature to incorporate these observations into a re-elaboration of the questionnaire; therefore, in the present study, we note the importance of continued assessment of the instrument, in this case, in its complete version.

The present investigation is part of a more extensive study whose general purpose is to adapt and validate diverse measures of affect in a sample of Chilean students, and this work presents the results obtained for the SPSRQ. We hypothesize that the instrument has high internal consistency and a two-factor structure, according to previous evidence. Likewise, we expect to find significant relations between the subscales of the questionnaire and other measures of affect in accordance with the theoretical and logical profiles expected for each one of them. The importance of this study lies in (a) having an instrument duly adapted and validated in the Chilean context that will allow us to study the level of functioning of the BIS and BAS in samples of similar characteristics as those studied herein; and (b) to obtain psychometric measures of the questionnaire that contribute to increasing the generalizability of the results obtained in previous investigations, if they are comparable with our findings.

Method

Participants

Pilot sample. The pilot sample was made up of 104 psychology students, mean age 19.7 years (*SD* = 2.14) and of whom 27.9% were men.

Final sample. In the definitive study, 434 undergraduate students participated (46.31% men and 53.69% women) from the following careers: psychology, commercial engineering, journalism, accounting, and publicity. Their mean age was 20.08 years (*SD* = 1.89). In both studies (pilot and final), the participants were ensured of the confidentiality and anonymity of the study.

Procedure

Pilot study. In the first stage, the questionnaire was adapted from its Spanish version (Pinto, 2004) to the Chilean context, adapting linguistic aspects. Thus, we generated a pilot version of the instrument which was administered along with other measures of affect to the initial sample of students. When applying the instruments, we left a space for the participants to write down any difficulty with the drafting or comprehension of the items, which we subsequently took into account along with the reliability to generate the definitive version of the questionnaire.

Final study. After the definitive version of the questionnaire had been elaborated, it was administered along with a series of scales. Each participant received a package of six questionnaires, which included the SPSRQ and the other two instruments of interest. Likewise, each participant randomly received three out of five scales that were administered to obtain information about the validity. The scales were administered during normal class schedule by the professor, who read the protocolized administration instructions. The reliability and convergent/divergent validity analyses were carried out, and factor validity was performed with LISREL 8.51.

Results

Pilot Study

The SP scale had a mean of 9.66 (*SD* = 5.04) and the SR scale had a mean of 10.25 (*SD* = 4.40). Internal consistency was adequate in both cases (SP α = .84, SR α = .78). Some items of the SR scale were slightly modified on the basis of the participants' comments, mainly to clarify the meaning of the item. The final drafting of the modified items was as follows: Item 2; "Can the opportunity to earn money motivate you strongly to do things?"; Item 4: "Are you often motivated by the possibility of achieving acknowledgement of your merits at work, in your studies, with your friends, or family?"; Item 6: "Do you often meet people you find sexually attractive?"; Item 8: Do you like to consume some drugs (alcohol, cigarettes or others) because of the pleasure they produce?"; Item 20: "Do you often take advantage of the occasions you encounter to establish relations with the opposite sex?"; Item 24: "Does the possibility of achieving social acknowledgement drive you to act even though it may not be fair play?"

Definitive Administration

Reliability. Reliability was obtained with Cronbach's alpha and test-retest administration of the questionnaire to a sample of 82 participants, with an 8-week interval between the first and second administration. The means were lower both in men and women for SP than for SR and, in SR, women had a significantly lower mean than men, $t(432) = .677$, $p < .001$; therefore, the sexes were analyzed separately. Likewise, internal consistency was somewhat higher for SR. Table 1 presents a summary of the results of the definitive administration and compares them with those obtained in the original validation study (Torrubia et al., 2001).

Table 2 shows the test-retest correlation between the SP and SR scales, which was high and significant in both cases and sexes.

Interrelations between the subscales. One of the requirements established by Torrubia et al. (2001) for an adequate assessment of the BIS and BAS is that the scales should be orthogonal, reflecting the independence

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Table 1
Mean Values for the SRSPQ Scales of the Present Study and the Report of Torrubia et al. (2001)

	SP				SR			
	Chile		Spain		Chile		Spain	
	Men	Women	Men	Women	Men	Women	Men	Women
n	201	233	468	1090	201	233	470	1093
Mean	9.55	9.78	11.65	11.98	13.77**	11.08	12.18	10.11
SD	4.90	5.22	5.27	5.06	4.34	3.93	4.48	4.05
Median	9	10	12	12	14	11	11	9
Mode	10	13	10	12	12	9	12	9
Kurtosis	-.79	-.78	-.73	-.70	-.34	-.47	-.60	-.14
Skewness	.27	.22	.05	-.02	-.030	.17	.00	.40
Alpha	.81	.84	.83	.83	.77	.72	.78	.75

**$p < .001$.

Table 2
Test-retest Reliability of each SRSPQ Scale by Sex

	Men	Women
SP	.867**	.909**
SR	.863**	.835**

** $p < .01$.

attributed to both subsystems. The correlation observed between SP and SR, was $r = .193$, $p < .01$ (men) and $r = -.009$, *ns* (women). Therefore, the result was partially similar to that reported by Torrubia et al. (2001), who observed a correlation of, $r = .08$, *ns* (men) and $r = .005$, *ns* (women) between the scales.

Factor Validity. In order to establish adequate comparability with the validation studies, we conducted an exploratory factor analysis (EFA) for the entire sample. The results without rotation and using the maximum likelihood extraction method indicated the presence of 15 factors that explained 56.99% of the variance, according to the Kaiser-Guttman rule (Guttman, 1953; Kaiser, 1960). However, using Cattell's (1966) scree test, we could consider three factors with Eigenvalues higher than 2 that explained 19.04% of the variance. After rotation, the first (F1) and third factor (F3) were found to be related to the SP scale (F1: Items 7, 17, 35, 37; F3: Items 3, 9, 15, 25), whereas the second factor (F2) grouped items from the SR scale (F2: Items 4, 10, 12, 14, 18, 22, and 46).

As the results obtained did not behave according to the theoretical two-factor model, we carried out factor analysis with Promax rotation, assessing the fit to the model with three and two factors, including the total sample. The first analysis was justified by the results of the scree test and the second one was oriented towards the theoretical model proposed by Torrubia et al. (2001). The first factor analysis, specifying three factors, yielded a significant correlation between two of the three factors (which grouped items from the SR scale, $r = .333$, $p = .001$); in view of this antecedent, we assumed that they measure a similar construct. When specifying two factors in the factor analysis, we obtained a correlation of $r = -0.13$, *ns*, which is more adequate for the two-factor model, so we then conducted confirmatory factor analysis (CFA) with two factors. For the sample of men, the fit indexes were: comparative fit index (CFI) = .64, root mean square error of approximation (RMSEA) = .052, $\chi^2(1033) = 1593.28$, $p = .001$ and in women: CFI = .607, RMSEA = .053, $\chi^2(1034) = 1716.60$, $p = .000$, which conjointly explained 34.34% and 29.83% of the variance in the sample of men and women, respectively.

These results do not adequately substantiate the two-factor structure suggested by Torrubia et al. (2001), as we observed some items with low factor loadings (considering as the minimum criterion a loading of 0.3) in men and women (see Table 3). With a view to examining the problematic items, we conducted a total CFA integrating both samples, which allowed us to determine these items both in men and in women, as well as to compare the items with previous studies that have carried out factor analysis on a conjoint sample. For the total sample, we found items with a factor loading of less than .30 and we obtained fit indexes of CFI = .65, RMSEA = .050, $\chi^2(1080) = 2244.10$, $p = .001$ revealing a better fit to the model, given the lower value of RMSEA. Nevertheless, in view of the items with low factor loadings, we performed a new EFA, eliminating the problematic items, of which four (Items 8, 32, 34, and 36) had previously been reported as having low factor loadings (see Cogswell et al., 2006; O'Connor et al., 2004; Torrubia et al., 2001). We found that the first factor explained 19.13% of the variance (SC: $M = 9.7$, $SD = 5.1$,

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Table 3
Factor Loadings Corresponding to the Two-factor Solution of the SRSPQ by Sex

	SC				SR			
Items	Men	Women	T_1	T_2	Men	Women	T_1	T_2
S1	.18	.40	.33	.34	-.11	.09	-.03	.01
S2	.38	.01	.21	.20	.28	.27	.37	.38
S3	.59	.56	.58	.58	-.12	.11	.01	.03
S4	.34	-.17	.05	.05	.42	.33	.35	.36
S5	.58	.71	.64	.65	-.17	.06	-.19	-.18
S6	.19	-.04	.06	.05	.45	.31	.52	.51
S7	.53	.52	.53	.53	-.42	-.17	-.26	-.26
S8	.14	-.17	-.05	-	.16	.01	.13	-
S9	.34	.57	.53	.53	-.27	.15	-.04	-.03
S10	.52	.02	.31	.29	.63	.73	.70	.71
S11	.50	.43	.49	.49	.02	.26	.20	.21
S12	.31	.01	.20	.20	.55	.71	.54	.55
S13	.56	.53	.55	.55	-.23	.15	-.06	-.06
S14	.34	.07	.20	.20	.60	.59	.55	.56
S15	.65	.54	.63	.62	-.31	.17	-.11	-.11
S16	.41	.20	.32	.32	.52	.52	.31	.31
S17	.51	.73	.60	.61	-.31	-.39	-.41	-.40
S18	.46	-.02	.21	.21	.40	.56	.58	.59
S19	.67	.61	.67	.67	-.40	-.08	-.23	- .22
S20	-.08	-.24	-.14	-.15	.66	.50	.63	.62
S21	.47	.53	.51	.51	-.25	-.01	-.11	- .09
S22	.22	.06	.18	.17	.47	.56	.58	.57
S23	.30	.30	.32	.32	.22	.18	.13	.13
S24	.28	.19	.22	.20	.25	.61	.56	.55
S25	.35	.61	.49	.50	-.09	.04	-.09	- .09
S26	.32	.08	.15	.14	.34	.46	.48	.47
S27	.26	.45	.39	.40	-.19	-.03	-.13	- .12
S28	.22	.02	.14	-	.09	.17	.24	-
S29	.20	.40	.33	.33	.03	.17	.10	.12
S30	.06	.14	-.01	-.01	.55	.65	.67	.68
S31	.44	.60	.49	.50	.29	.24	.12	.15
S32	.08	.14	.06	-	.16	-.08	-.04	-
S33	.50	.58	.53	.54	-.23	.07	-.11	- .10
S34	-.04	.00	-.09	-	.41	-.19	.05	-
S35	.62	.63	.60	.61	-.39	-.29	-.37	-.36
S36	.28	-.08	.14	-	.02	.04	.14	-
S37	.60	.80	.72	.73	-.39	-.07	-.25	-.24
S38	.29	-.08	.12	.11	.55	.43	.55	.55
S39	.64	.74	.70	.71	-.18	.05	-.16	- .15
S40	.25	.26	.29	.28	.18	.41	.30	.29
S41	.37	.39	.38	.37	.12	.08	.03	.02
S42	.14	-.26	.03	.02	.32	.47	.55	.54
S43	.75	.67	.71	.71	-.06	.11	.03	.04
S44	-.02	.11	-.02	-.03	.50	.58	.62	.63
S45	.56	.60	.63	.63	-.28	.28	-.02	.00
S46	.48	.00	.24	.23	.53	.61	.59	.60
S47	.77	.79	.78	.10	-.16	-.03	-.11	-.10
S48	.03	-.16	.02	.01	.33	.55	.53	.54

Note. T_1: Total sample for complete scales; T_2: Total sample for scales without problematic items.

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α = .83) and the second one, 14.4% (SR: M = 9.5, SD = 4.0, α = .74). In the CFA for the new model, we observed slightly improved fit indexes; total sample: CFI = .68, RMSEA = .053, $\chi^2(859) = 1905.87$, $p = .001$; men: CFI = .68, RMSEA = .056, $\chi^2(860) = 1412.45$, $p = .001$; women: CFI = .55, RMSEA = .062, $\chi^2(860) = 1637.91$, $p = .001$

Convergent and Divergent Validity. This validity was obtained with the complete form of the SP and SR scales, because the purpose of this study is to adapt the scales to the Chilean context in the format proposed by Torrubia et al. (2001). Both scales were correlated with other measures of affect previously adapted and validated to the context under study. Below are briefly described the goals of each one of the validation instruments selected and we present the internal consistency reached in the present sample. Then, we present the hypotheses established for the expected associations among the SP and SR scales and the diverse subscales that make up the other affective measures, based on the expected relations from a theoretical and logical viewpoint.

Rosenberg's Self-esteem Scale (RSE; Rosenberg, 1965). This short instrument (10 items) was designed to obtain a global rating of the individual's efficacy with regard to others (self-assessment) and his or her self-acceptance. The Chilean adaptation was carried out by Fernández, Celis-Atenas, and Vera-Villarroel (2006) and, in the current investigation, the internal consistency was .86.

Trait-Anxiety scale from the State-Trait Anxiety Inventory (STAI-T; Spielberger, Gorsuch, & Lushene, 1970). This scale is made up of 20 items that measure people's general and stable tendency to perceive stimuli as threatening. In Chile, it was validated by Vera-Villarroel, Celis-Atenas, Cordova-Rubio, Buela-Casal, and Spielberger, (2007), and in the present sample, the internal consistency was .86.

Buss-Perry Aggression Questionnaire (BPAQ; Buss & Perry, 1992). This instrument, made up of 29 items, assesses people's general aggressiveness and is divided into four subscales: physical aggressiveness (PhA), verbal aggressiveness (VA), anger (A), and hostility (H). The Chilean version was adapted in 2005 by Figueroa Rey, Ramírez Troncoso, and Santis Doyhamboure and, in the present study, we observed an internal consistency of .85.

Social Avoidance and Distress Scale (SAD; Watson & Friend, 1969). This 28-item scale was created to assess anxiety that emerges in interpersonal relations and avoidance of social situations. The Chilean standardization was performed by Pérez and Sepúlveda (1991), and in the current study, internal consistency reached .88.

Behavioral Inhibition System/Behavioral Activation System (BIS/BAS; Carver & White, 1994). This 28-item scale was developed to assess the activity of the behavioral inhibition system, by means of the BIS scale, and the behavioral activation system, by means of BAS scale. The BAS scale is made up of three subscales: Reward-Responsiveness (RR), Fun Seeking (FunS), and Drive (D). The Chilean adaptation was carried out by Castro, Huenchullán and Jofré (2003), and in the present study, internal consistency was .64 (BIS), .68 (RR), .62 (FunS), and .75 (D).

Positive Affect and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). This measure is made up of the PA and NA scales, and they assess the degree of activity, enthusiasm, and alertness, as well as distress and unpleasant participation, respectively, for diverse time intervals. It has 20 items, rated on a Likert scale ranging from 1 (very slightly or not at all) to 5 (extremely). It was recently validated and adapted to the Chilean population (Dufey & Fernández, 2009) and for the present sample, reliability ranged between .60 and .82 for general time and at present.

Based on the underlying theoretical assumptions of the diverse scales used and on previous studies that have correlated BIS and BAS measures with diverse affective traits, we propose that: given that a high level of the BIS activity would imply a tendency towards anxiety, with difficulties in interpersonal functioning and social avoidance, we expected SP to correlate positively with BIS (Caseras et al., 2003; Sava & Sperneac, 2006), STAI-T (Caseras et al., 2003), NA (Harmon-Jones, 2003; O'Connor et al., 2004), H and A (Harmon-Jones, 2003), and SAD (in view of the associations found with anxiety disorders, including social anxiety, by Johnson, Turner, & Iwata, 2003), and negatively with RSE (Heimpel, Elliot, & Wood, 2006). Given that higher sensitivity of the BAS would lead to seeking pleasant events, social participation, and positive affect, we hypothesize that high SR scores would be positively and significantly related to the BAS subscales of BIS/BAS (Caseras et al., 2003), RSE (Heimpel et al., 2006), PA (Fullana, Caseras, & Torrubia, 2003; O'Connor et al., 2004), but also with PhA and VA, as shown by recent studies (Harmon-Jones, 2003; Smits & Kuppens, 2005). Table 4 shows the results of the correlations among the SP and SR scales and the other measures of affect, separately by sex. In general, the predictions are met for SP, whereas for SR, confirmation of the predictions is partial, finding higher associations between SR, BAS, and its subscales and SR and PhA in women.

Discussion and Conclusions

We have reported the results of the Chilean adaptation of the SRSPQ in this article. Our findings indicate that the instrument presents adequate psychometric properties, so we conclude that its use in the validation context is pertinent. It presents high reliability in terms of temporal stability and internal consistency. However, in the sample of men, we observed a low, albeit significant, association between SP and SR, in contrast to the assumption of orthogonality established by Torrubia et al. (2001). Nevertheless, we note the existence of increasing discussion that has

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Table 4
Correlations between SP and SR Scales and other Measures of Affect, for each Sex

	SP		SR	
Scales	Men	Women	Men	Women
RR	-.159*	-.147*	.248**	.247**
FunS	-.147*	-.243**	.216**	.385**
D	-.179*	-.320**	.311**	.407**
BIS	.408**	.484**	.222**	.070
RSE	-.537**	-.439**	-.051	.055
VA	-.056	-.138	.106	.184
PhA	-.153	.212	.199	.444**
A	.305*	.361*	.232	.337*
H	.583**	.469**	.326*	.316*
SAD	.586**	.572**	.025	.032
STAI-T	.697**	.637**	.222**	.125*
NA-gen	.506**	.459**	.151	.017
NA-pres	.339**	.174	.077	.230*
PA-gen	-.242*	-.469**	.151	.225*
PA-pres	-.347*	-.244**	.077	.172

Note. RR, FunS, D, BIS: Reward Responsiveness, Fun Seeking, Drive, and BIS scales of the BIS/BAS, respectively; RSE: Rosenberg's Self-esteem Scale; PhA,VA, A, and H: scales of physical aggressiveness, verbal aggressiveness, anger, and hostility from the Buss-Perry Aggressiveness Questionnaire ; SAD: scale of Social Avoidance and Distress; STAI-T: Trait Anxiety Inventory; NA-gen, NA-pres, PA-gen, and PA-pres: scales of general negative affect, present negative affect, general positive affect, and present positive affect of the PANAS, respectively.
* $p < .05$. ** $p < .01$.

queried the assumed functional independence between the BIS and the BAS, observing a facilitating or antagonist activation between the subsystems in diverse experimental situations in which there could be interaction among environmental and individual hedonic factors (Corr, 2004). In the case of our study, it is difficult to clarify the reason for the correlation obtained in men; sample bias due to the nonprobabilistic extraction method used may have generated a group with certain emotional characteristics that biased the independence of the participants' responses to the SP and the SR. This could be potentially supported by the fact that the male sample obtained significantly higher scores than the women in the general PA scale, as well as lower scores in the STAI-T (data not shown but available upon request to the authors).

Convergent/divergent validity shows coherence between our findings and previous reports that have used measures of the BIS and BAS, mainly the BIS/BAS scales and other studies with the SRSPQ. In the case of the SP scale, the predictions for both men and women are met. The SR scale shows the expected relation with the BAS subscales of the BIS/BAS, suggesting convergence in the measure of the construct, which contributes important theoretical validation to the SR scale, as they derive from a common theoretical framework. SR only correlated with PA in the case of the women, the same as PhA. In Chile, we found no epidemiological studies of prevalence of aggression in adult population that could explain the sex differences in PhA; in fact, in women, we found a correlation between SR and A, which reinforces the association between these variables in this group. We expect that a future study could explain the association between SR and aggression differentially by sex. Likewise, the absence of an association between PA and SR in the sample of men could be attributed to the affective features of this group, as mentioned above. In any event, this possibility should be confirmed in future studies that assess the relation between SR and PA. Lastly, the absence of a convergent association between RSE and SR poses questions about the type of expected relation between efficacy and participants' general self-concept and their sensitivity to reward. The literature on personality and individual differences with regard to SR does not study in depth the association between self-esteem and SR, but our results show a lack of evidence for this relation with the RSE.

The CFA shows a lack of fit to the model in the analyses by sex and for the total sample, both in the complete version of the questionnaire and when the items with factor loading problems were eliminated, specifically, from the SR scale. Previous studies have reported similar results (i.e., Caci et al., 2007; Cogswell et al., 2006; O'Connor et al., 2004). The drafting of four eliminated items was modified, which could mean that this altered their relation with the

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total scale. However, previous studies have systematically revealed poor factor loadings in these items, among others. Therefore, it can be inferred that the difficulties with these items are not due to their comprehension, as this was addressed in the pilot study, or to cultural factors, given the consistency of this result in various countries. As previously observed, factor adequacy of the SRSPQ will probably not be achieved by simply removing items (Caci et al., 2007; O'Connor et al., 2004). It might be relevant to review the structure of the questionnaire taking into account an organization of items based on different factors from those originally specified, as both this study and prior reports show the existence of a larger number of factors than that theoretically specified.

Summing up, by means of the present study, we verified the strength of the SRSPQ in terms of reliability and convergent/divergence with other theoretically related measures, and possible specifications of the scope of the SP and the SR with other individual trait constructs. Nevertheless, we note the need to review the factor structure of the instrument.

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