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SUMMARY

This paper presents a French short version of the Bem Sex-Role Inventory (Bem, 1974), meant specifically for teenagers. Translation and validation procedures followed the steps for trans-cultural validation of psychometric instruments as advocated by Vallerand (1989). Four studies involving 1,204 teenagers were carried out, in order to translate the items and evaluate their clarity (Study 1), to assess (a) the concurrent validity (Study 2), (b) the construct validity (factor structure) and reliability (internal consistency and test-retest reliability) (Study 3), and to analyze (c) the psychological construct correlates (Study 4), and to produce statistical norms. By and large, the results confirm the strong psychometric properties of the BSRI French short version analyzing Masculinity and Femininity constructs among French teenagers. The gender-related self-concept, as measured by the instrument, is made up of 5 factors grouped together on two higher-order structures : Masculinity and Femininity. This hierarchical organization is congruent with current works on the self.

RÉSUMÉ

Cet article présente une version courte du "Bem Sex-Role Inventory" (Bem, 1974), pour adolescents français. La procédure de traduction et de validation a respecté les étapes d'une validation trans-culturelle d'outils psychométriques préconisées par Vallerand (1989). Quatre études ont été réalisées auprès de 1204 adolescents avec pour objectif : la traduction et l'évaluation de la clarté des items (Étude 1), l'évaluation (a) de la validité concomitante (Étude 2), (b) de la validité de construit (structure factorielle) et de la fidélité (consistance interne et stabilité temporelle) (Étude 3), et (c) des corrélats du construit psychologique (Étude 4). Des repères statistiques sont apportés. Dans l'ensemble, les résultats attestent de la validité de l'instrument avec une population d'adolescents français. Le concept de soi lié au genre - tel que mesuré par l'instrument - est constitué de 5 facteurs qui se regroupent sur 2 structures d'ordre supérieur : masculinité et féminité. Cette organisation hiérarchique est conforme aux travaux actuels sur le Soi.

Key words :
Trans-cultural validation, scale, masculinity, femininity, gender-roles, self-concept.

Mots clés :
Validation transculturelle, échelle, masculinité, féminité, rôles sexuels, concept de soi.

Over the last twenty years, a significant amount has been written about the conceptualization and the measurement of gender-typed (social) roles. The fundamental theoretical hypothesis is that each culture dictates and encourages certain behaviors, traits and activities considered as characteristics specific to each gender. This is why masculinity and femininity concepts are used to refer to roles or psychological traits linked respectively to men and women. Once these different roles are internalized they constitute gender-related "self-schemas" (Bem, 1981 ; Cross & Madson, 1997) which are at the same time cognitive filters in order to interpret events and to dictate behaviors.

If, in previous theoretical statements, it was presumed that masculinity and femininity concepts are positioned at the two extremes of a single continuum, there now exists a widespread consensus around the hypothesis of Constantinople (1973) according to which masculinity and femininity represent two independent dimensions. Each individual can have a more or less higher level of these two traits, whatever the biological gender (for a review refer to : Alain, 1996 ; Blanchard-Fields, Suhrer-Roussel & Hertzog, 1994 ; Marsh & Myers, 1986). This new theoretical representation has led to the development of instruments intended to measure the different gender-related roles of which the best known and most used is the Bem Sex-Role Inventory (BSRI) (Bem, 1974). Made up of 40 items of

which 20 measure Femininity (F) and 20 Masculinity (M), this questionnaire assesses four gender-related "profiles" (Bem, 1981) : (a) Masculine (scoring high on M and low on F), (b) Feminine (scoring high on F and low on M), (c) Androgyne (high scores on M and F) and (d) Undifferentiated (low scores on M and F).

This instrument and its theoretical/methodological presuppositions have led to numerous questions and controversies. In particular, like certain contemporary works concerning self-concept (e.g., Marsh & Shavelson, 1985) the BSRI bidimensionality (M/F) is strongly contested in favor of a multidimensionality : different first-order factors (e.g., "sensitivity to others", "self-assurance", "independance", "leadership", etc.) would constitute two global second-order factors : Masculinity and Femininity (Blanchard-Fields et al., 1994 ; Campbell, Gillapsy & Thompson, 1997; Marsh, 1985 ; Marsh & Myers, 1986 ; Spence & Hall, 1996). Only Confirmatory Factor Analyses (CFA) allow us to test the hypothesis of a hierarchical organization of the gender-related self-schema, but there are currently still few studies using this kind of statistical methodology (Blanchard-Fields et al., 1994 ; Campbell et al., 1997).

The purpose of this paper is two-fold. Firstly, to propose a French validation of a BSRI short version intended for teenagers. Even though there are several versions of this instrument in French (Alain, 1987 ; Durand-Delvigne, 1992 ; Gana, 1995 ; Hurtig & Pichevin, 1986), none to our knowledge has undergone a rigorous validation procedure. Taking into account the influence of culture in constructing gender-typed (social) roles (Cross & Madson, 1997), simply translating the BSRI into French gives no indication of its validity and reliability within the French culture (Vallerand, 1989). On the other hand, as pointed out by Blanchard-Fields et al. (1994), the age of subjects constitutes one of the factors likely to change the BSRI factor structure. It thus seems particularly appropriate to be sure of the validity of the instrument for the age range of respondents. Finally, using a BSRI short-version seems to be essential for the research on gender-typed (social) roles (Blanchard-Fields et al., 1994 ; Campbell et al., 1997 ; Gana, 1995 ; Lorenzi-Cioldi, 1994).

Four studies involving 1,204 teenagers were carried out to validate the instrument. The approach followed the steps for trans-cultural validation of psychometric instruments as advocated by Vallerand (1989) : (1) finalizing a preliminary version, (2) evaluation of the preliminary version, (3) evaluation of the clarity of items by members of the target population, (4) evaluation of the questionnaire's concurrent validity, (5) evaluation of the internal consistency and the test-retest reliability of the instrument, (6) evaluation of the questionnaire's construct validity by the analysis of its factor structure, and the study of its consequences (correlates), (7) establishing norms.

The second purpose of this paper is to make a contribution to the current debate concerning the organization of the gender-related self-schema. In order to test the validity of the hypothesis of this construct hierarchical organization, CFAs were carried out using the LISREL VIII program (Jöreskog & Sörbom, 1993).

Study 1

The objective of this study was (1) to propose a BSRI preliminary version in French and (2) to evaluate the clarity of this version's items for the target population. The back-translation technique was chosen to develop the preliminary version of the questionnaire (Brislin, 1986).

Method

The BSRI preliminary version was developed by the authors with the advice of a bilingual psychology researcher. It was submitted to three bilingual experts - with no knowledge of the original version - who retranslated it into English. These translators were three professors of English, aged 45, 50 and 52, all having lived at least ten years in the United States. The evaluation of the preliminary version was carried out by a committee made up of the three translators, the psychology researcher and the authors. The criteria were (a) conformity with the original questionnaire's intention, (b) clarity of the items in French and (c) understanding of the items by teenagers. The few disagreements concerned details that were easily handled.

In order to test the clarity of the preliminary version's items for the target population, 13 girls and 13 boys enrolled at a suburban Parisian junior high school (average age = 14.91 years, SD = 0.65) were asked to fill out the questionnaire and to express during an interview their interpretation of the meaning of the items. To this end, they had to answer the questions : "How do you understand this item?" and "What does it make you think of?"

Preliminary version of the instrument

The questionnaire is made up of 40 self-descriptive adjectives (e.g. "Confiant/confident", "Indépendant/ independent", "Sportif/athletic", etc.). The subject is asked to indicate for each item if it is particularly appropriate to describe him. The answers are written down on a 7-point Likert scale : (1) "Never true", (7) "Always true".

Results and discussion

All the subjects answered the questionnaire without noticeable difficulty. Nonetheless, the interview phase allowed us to uncover two problems. First of all, some items seem ambiguous (e.g., "Parler doucement/soft spoken") or not understood (e.g., "Accommodant/accomodating", "Compatissant/compassionate" and "Crédule/gullible"). To overcome these problems a reformulation was carried out in the first case ("Parler d'une voix douce/to speak with a soft voice"), and dictionary definitions were used in the second case. The second problem is linked to the difficulty for some teenagers to associate each adjective to a personal characteristic. In order to resolve this problem, it was decided, following the example of Boldizar (1991), to present

each item by using a verb conjugated in the first person singular (e.g., "Avoir confiance en soi/to be self-confident" was changed to : "J'ai confiance en moi/I am self- confident" ; see Table I). Moreover, the questionnaire instructions were changed to better involve the subject[1].

Study 2

This study's objective was to evaluate the concurrent validity of the BSRI preliminary version by a comparison of answers obtained with the original version and the translated version, with bilingual subjects. A high congruence (indeed a lack of differences) between the two versions would testify to the concurrent validity of the French version (Spielberger & Sharma, 1976).

Method

Eight totally bilingual English teachers (4 men and 4 women with an average age of 38.31 years old, SD = 3.73) volunteered to participate in this study. The subjects were asked to take successively the BSRI in its French version then in its American version. The items were presented in different order in the two versions, and the first questionnaire was immediately collected once completed, so that the subjets could not compare answers.

Results and discussion

The correlation coefficients for the two subscales are r = .93 and .87, $p < .01$, respectively for scale M and F. Two *t* tests for paired samples were carried out for each scale (Triandis & Davis, 1965) ; none is significant for $p = .05$.

These results, revealing a sufficient similarity between the two BSRI original and translated versions, seem to attest to the concurrent validity of the instrument.

Study 3

The objective of this study was to develop a short version of the preliminary questionnaire, valid and reliable for a population of French teenagers. A three-step approach was used intentionally.

First step : development of a shortened version. The total population was split up into two groups. Two series of analyses were performed on the first group. The first serie was intended to eliminate the items correlating the least with each of the two scales F or M, and the second one, to examine the remaining items factor structure by exploratory factor analyses (EFA). Just as in recent studies, we think a multifactor structure more likely than a two-factor structure : Masculine/Feminine (Blanchard-Fields et al., 1994 ; Campbell et al., 1997 ; Marsh, 1985 ; Marsh & Myers, 1986 ; Spence & Hall, 1996).

Second step : confirmation of the factor structure using a CFA. The objective is to "confirm" with the remaining population, the factor structure of the questionnaire developed in the preceeding step. Using a CFA should also allow testing the hypothesis of a BSRI multidimensional factor and hiearchical structure (Blanchard-Fields et al., 1994 ; Marsh, 1985 ; Marsh & Myers, 1986).

Third step : reliability of the questionnaire. The reliability of the questionnaire was tested by analyzing its internal consistency and its test-retest reliability (Vallerand, 1989).

Method

Subjects

The total population consists of 720 volunteer individuals, randomly assigned to two groups : group 1 (175 girls and 145 boys ; average age = 15.75 years old, SD = 1.03), group 2 (200 girls and 200 boys ; average age = 15.44 years old, SD = 0.76). The subjects came from 7 junior high schools in the suburbs of Paris and from 2 junior high schools in outlying districts. Twenty per cent come from the upper social class, 60% from the middle social class, and 20% from the lower social class.

Procedure

The questionnaire was submitted to small groups of 15 subjects, in a classroom. Parental consent had been required beforehand. The instructions for the questionnaire were read aloud by an experimenter, then the subjects answered the items at their own pace. It was pointed out to them that this was not a test, and thus that there were no right or wrong answers. Anonymity was guaranteed ; only the sex and the birthdate were noted. The session did not exceed 20 minutes. For 178 subjects, the questionnaire was submitted a second time a month later (test-retest). The subjects' data, sex and birthdate, allowed comparison of answers across sessions.

Results

Item correlation with the sum of the items constituting M and F subscales.

Means, standard deviations and correlations of each item with gender, and with the items sum of the M or F scales, are presented together in Table I. We decided to keep an item only if its correlation coefficient with the total sum of the scale to which it belongs (without the item itself) was greater than .20. Seven items of the F scale and 4 items of the M scale were eliminated. As several authors recommend (e.g., Blanchard-Fields et al., 1994), items 20 and 40 were also eliminated because they measure mostly biological sex rather than gender (Table I).

[1] The new opening to the questionnaire is as follows : We are trying to find out what, *for you*, constitute the significant traits of your personality. Answer each of the questionnaire phrases below by using the provided scale. Circle (7) if you consider that this phrase perfectly matches your character ; circle (1) if you consider that this phrase never matches your character. Furthermore, there is an option for each of the intermediate values of the scale : (2) "almost never true", (3) "not often true", (4) "I don't really know", (5) "sometimes true", and (6) "almost always true".

Table I : *Means, standard deviations, correlations of each item with the sum of the scale (without the item), and correlation of each item with sex.*

Item [a]	BSRI subscale [b]	Mean	SD	*r* with scale sum	*r* with sex [c]
1. J'ai confiance en moi	M	4.77	1.39	.48	-.26**
2. J'aime rendre service	F	4.88	1.43	.37	.08
4. Je défends mes opinions	M	5.81	1.30	.35	.05
5. Je suis quelqu'un de gai(e)	F	5.56	1.27	.14	.11*
7. Je suis indépendant(e)	M	5.02	1.61	.19	.02
8. Je suis timide	F	4.22	1.86	.11	.08
10. Je suis sportif(ve)	M	4.98	1.86	.37	-.36**
11. Je suis affectueux(se)	F	5.44	1.32	.52	.06
13. Je suis sûr(e) de moi	M	4.47	1.60	.44	-.25**
14. Je suis sensible aux compliments	F	5.66	1.36	.25	.10
16. J'ai une forte personnalité	M	4.88	1.50	.43	.10
17. Je suis loyal(e)	F	5.40	1.37	.15	-.04
19. Je suis énergique	M	5.37	1.40	.46	-.14*
20. Je suis féminin(e)	F	3.55	2.35	.38	.79**
22. Je suis quelqu'un de réfléchi(e)	M	4.99	1.33	.15	.03
23. Je suis toujours prêt(e) à écouter les autres	F	5.86	1.31	.54	.31**
25. J'ai des qualités de commandement	M	4.06	1.78	.48	-.12*
26. Je suis attentif(ve) aux besoins des autres	F	5.34	1.29	.61	.33**
28. J'accepte de prendre des risques	M	5.05	1.53	.39	-.10
29. Je suis compréhensif(ve)	F	5.55	1.17	.45	.19**
31. Je prends facilement des décisions	M	4.24	1.57	.40	-.12*
32. Je suis sensible aux peines et aux problèmes des autres.	F	5.23	1.28	.41	.14*
34. Je suis quelqu'un d'autonome	M	5.31	1.37	.27	.05
35. Je suis prêt(e) à consoler les gens	F	5.66	1.50	.58	.34**
37. Je suis dominateur(trice)	M	3.22	1.76	.46	-.13*
38. Je parle d'une voix douce	F	3.42	1.84	.08	-.04
40. Je suis masculin(e)	M	4.23	2.36	.32	-.77**
41. Je suis chaleureux(se)	F	5.23	1.23	.39	.04
43. Je prends volontiers position (pour des idées)	M	5.44	1.40	.28	-.03
44. Je suis tendre	F	5.29	1.34	.58	.12*
46. Je suis agressif(ve)	M	3.63	1.73	.15	.08
47. Je suis quelqu'un de facile à tromper	F	3.62	1.80	.00	-.03
49. Je me comporte en chef	M	2.63	1.63	.45	-.28**
50. Je suis naïf(ve)	F	3.09	1.73	.12	.11*
52. Je suis individualiste	M	3.75	1.71	.15	-.12*
53. Je ne parle pas grossièrement	F	3.91	1.72	.06	.01
55. J'ai l'esprit de compétition	M	4.66	1.94	.35	-.24**
56. J'aime les enfants	F	5.69	1.72	.44	.25**
58. Je suis ambitieux(se)	M	5.43	1.41	.43	-.03
59. Je suis doux(ce)	F	5.20	1.46	.64	.24**

Notes : [a] The numbers associated with the items are the same as in the original Bem Sex-Role Inventory (Bem 1974).
[b] M = Masculine, F = Feminine.
[c] The code for sex is : 1 = Boys, 2 = Girls. * $p < .05$, ** $p < .001$.

Exploratory Factor Analysis

The factor structure of the 27 items remaining from the first step were analyzed by principal components analyses. Presuming inter-factor correlations (Blanchard-Fields et al., 1994), an Oblimin rotation was performed. We decided that (1) the number of factors retained would be equal to the number of eigenvalues being greater than one (Guttman, 1954), (2) we would keep only the factors accounting for at least 5% of the variance, and (3) we would eliminate the items correlating simultaneously on several factors or those not attaining a minimum loading of 40% on one factor. The items were spread over 7 factors accounting for 60% of the variance. The 7th factor is made up of item 14 only and accounts for less than 5% of the total variance. Items 31and 58 do not attain a loading of more than .40 on any of the factors. Items 28, 29 and 34 attain a loading greater than .40 on two factors. Given the defined rules, a second EFA was conducted without these 6 items. The 21 items remaining were spread over 6 factors accounting for 62.1% of the variance. As can be seen in Table II, four factors - designated as "Athlétique/athletic", "Leadership/leadership", "Détermination/assertiveness" and "Confiance en soi/self-confidence" - group masculine items together, and two factors - designated "Sensibilité à autrui/sensitivity to others" and "Tendresse/tenderness" - group feminine items together. The inter-factor correlations are positive and high (from .24 to .33) between the factors "Athlétique/athletic", "Leadership/leadership", and "Confiance en soi/self-confidence", and (.44) between the factors "Sensibilité à autrui/sensitivity to others" and "Tendresse/tenderness". Unexpectedly, the factor "Détermination/assertiveness" has a positive correlation (from .16 to .28) with all the other factors.

Table II : *Results of the factorial analysis of the short French version of the BSRI (Oblimin rotation).*

Items of the short BSRI	Factor 1 : Sensibilité à autrui	Factor 2 : Athlétique	Factor 3 : Leadership	Factor 4 : Tendresse	Factor 5 : Détermination	Factor 6 : Confiance en soi
2. J'aime rendre service	**.43**	.19	-.16	.15	.12	.02
23. Je suis toujours prêt(e) à écouter les autres	**.79**	-.13	-.04	-.08	.10	-.001
26. Je suis attentif(ve) aux besoins des autres	**.68**	.04	-.03	.14	.12	-.13
32. Je suis sensible aux peines et aux problèmes des autres.	**.79**	-.07	.18	-.05	-.20	.14
35. Je suis prêt(e) à consoler les gens	**.65**	-.08	-.02	.11	.16	-.02
10. Je suis sportif(ve)	-.10	**.86**	-.09	-.01	-.05	.00
19. Je suis énergique	.05	**.66**	-.12	.08	.07	.28
55. J'ai l'esprit de compétition	.03	**.75**	.16	-.001	-.05	-.11
25. J'ai des qualités de commandement	.15	.13	**.81**	-.01	.03	-.12
37. Je suis dominateur(trice)	-.03	-.13	**.76**	-.03	.14	.05
49. Je me comporte en chef	-.10	-.03	**.86**	.01	-.10	.18
11. Je suis affectueux (se)	-.001	.01	.03	**.82**	-.08	-.06
41. Je suis chaleureux(se)	.05	-.06	-.05	**.58**	.10	.25
44. Je suis tendre	.06	-.03	-.04	**.83**	-.04	.05
56. J'aime les enfants	-.07	.16	.09	**.59**	.18	-.21
59. Je suis doux(ce)	.18	-.05	-.03	.77	-.13	.04
4. Je défends mes opinions	.04	-.14	-.05	-.07	**.77**	.18
16. J'ai une forte personnalité	.01	.08	.17	.04	**.67**	-.02
43. Je prends volontier position	.01	.01	-.01	.03	**.80**	-.15
1. J'ai confiance en moi	-.07	.07	.04	.15	.002	**.79**
13. Je suis sûr(e) de moi	.05	.01	-.01	-.11	-.002	**.93**
Eigenvalues	4.81	3.35	1.83	1.37	1.24	1.09
% explained variance	21.8	15.2	8.3	6.2	5.6	5.00
Correlations between factors						
Factor 2	-.03					
Factor 3	-.17	.26				
Factor 4	.44	.05	-.04			
Factor 5	.16	.17	.28	.21		
Factor 6	-.03	.33	.24	.18	.24	-

Table III : *Goodness of fit indices for the different models of the Confirmatory Analysis.*

Models		Goodness of fit indices χ^2	DDL	p	GFI	TLI	CFI	ECVI
M1	Two factor model F and M (10+11 items)	1044.81	188	$p<.001$	.78	.69	.72	2.83
M2	Six factor model (EFA of the study 3)	431.51	174	$p<.001$	.91	.90	.92	1.37
M3	Hierarchical model with six first order factors : The factors "Sport", "Leadership", "Détermination" and "Confiance en soi" on a second-order factor (M), and the factors "Sensibilité à autrui" and "Tendresse" on a second-order factor (F).	491.07	182	$p<.001$	.90	.88	.90	1.48
M3 bis	Idem M3, with the Détermination factor on M et F	477.50	181	$p<.001$	.90	.89	.90	1.45
M4	Two factor model F and M (without the 3 items of the factor Détermination)	859.90	135	$p<.001$	.78	.69	.73	2.35
M5	Five factor model	326.19	125	$p<.001$	.92	.91	.93	1.05
M6	Hierarchical model with five first-order factors (idem 3 without the factor Détermination)	353.27	129	$p<.001$	.91	.90	.92	1.10

Confirmatory Factor Analysis

To test the hypothesis of the questionnaire's multidimensional and hierarchical nature, several competing models underwent CFA.

Model 1. This model posits two factors that can be correlated, with the two factors grouping together respectively the 10 feminine items, and the 11 masculine items.

Model 2. This model posits six independent factors that can be correlated ; this validates the factor structure resulting from the first step EFA.

Model 3. This model posits two second-order factors : the Masculine factor resulting from the factors "Sport/sports", "Leadership/leadership", "Détermination/assertiveness" and "Confiance en soi/self-confidence", and the Feminine factor resulting from the factors "Sensibilité à autrui/sensitivity to others" and "Tendresse/tenderness".

Model 4. This model is identical to the first, but the 3 items of the "Détermination/assertiveness" factor have been eliminated (there remain 10 items for the Feminine factor and 8 items for the Masculine factor).

Model 5. This model posits five independent factors that can be correlated (Model 2 without the "Détermination/assertiveness" factor).

Model 6. This model is identical to model 3, but the "Détermination/assertiveness" factor has been eliminated. The CFAs were conducted with the LISREL VIII program (Jöreskog & Sörbom, 1993) using the maximum likelihood method, and a variance/covariance matrix (available upon request from the first author). In order to evaluate the validity of the proposed models, several fit indices were used: the chi-square χ^2 (Jöreskog & Sörbom, 1993), the goodness-of-fit index (GFI ; Jöreskog & Sörbom, 1993), the comparative-fit index (CFI ; Bentler, 1990), the Tucker-Lewis index (TLI ; McDonald & Marsh, 1990), and the single-sample cross-validation index (ECVI ; Browne & Cudeck, 1989). The χ^2, being an indicator of the correspondence level between a given factor structure and the collected data, should mostly be used as a fit index rather than as a null hypothesis test, since its sensitivity to the number of variables and to the number of subjects is currently acknowledged (see Marsh, Balla, & McDonald, 1988). Even if there do not exist null hypothesis tests for GFI, CFI and TLI, a commonly accepted empirical rule considers the model to be adequate when its indices are greater or equal to .90. The ECVI essentially allows comparing certain models among themselves. Browne and Cudeck (1989) recommend selecting the model with the lowest ECVI.

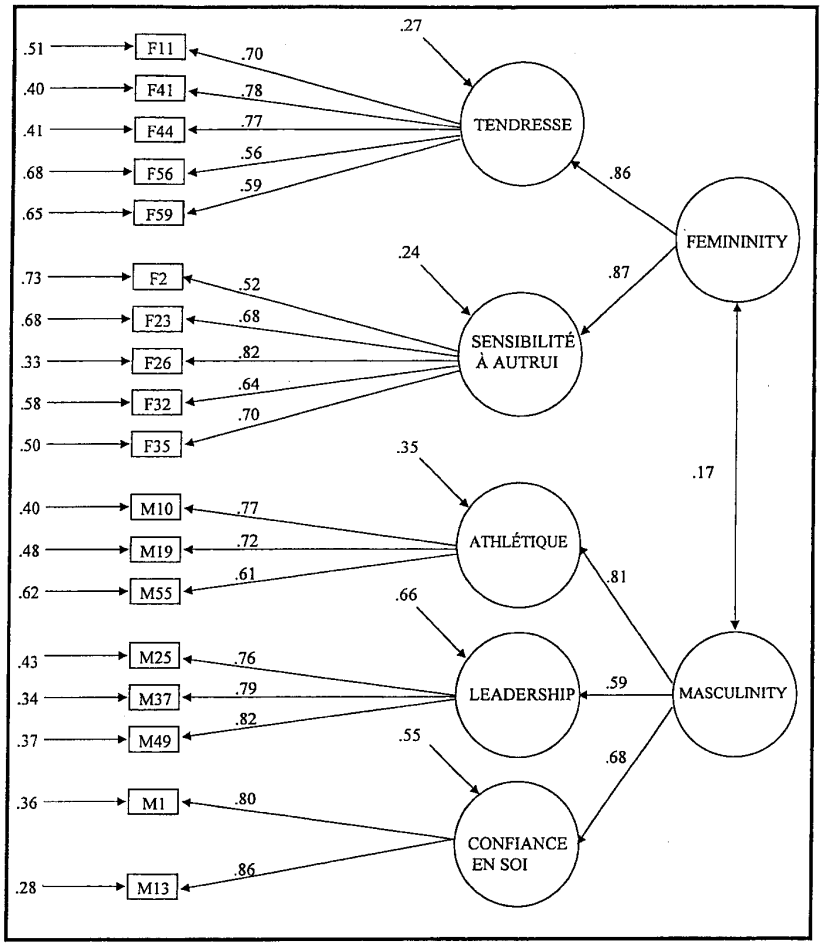
Table III presents the fit indices of the six models tested. Models 1 and 4 which posit the existence of two unique factors (M and F) fit the data poorly. Model 2 fits the data reasonably well. This fit is even better for model 5. Models 2 and 5 provide an interesting basis for comparing hierarchical models, knowing that none of these hierarchical models would fit better than the five or six factors models, because they dictate restrictions within first-order factors covariances, based on second-order factors specifications ; models 2 and 5 do not deal with these restrictions since the covariances could be freely estimated (Rindskopf & Rose, 1988). Model 6 fits the data better than model 3, or model 3-b (suggested by the software's modification indices) which compels the "Détermination/assertiveness" factor to load on the two second-order factors.

Figure 1 reports the standardized regression coefficients of model 6 ; all are significant for $p < .05$. As we can note, the correlation between the two second-order factors - after checking measurement errors (Bentler, 1980) - is low and not significant (.17).

Internal consistency and test-retest reliability

The internal consistency of the F and M subscales was evaluated with the Cronbach alpha coefficient (1951). The test-retest reliability over one month was assessed with Bravais-Pearson correlation coefficients. The alpha

Figure 1 : *Regression structural model (standardized coefficients and errors measures) for the first and second order hierarchical organization of the French short version of the BSRI (all the path coefficients are significants, p < .05).*



coefficients for the test (N = 720) and the retest (N = 178) are respectively .86 and .87 for the F scale, and .83 and .81 for the M scale. Without the "Détermination/assertiveness" subscale, the internal consistency of the M scale was respectively .81 and .80. The test-retest correlation coefficients are .78 for the F scale, .73 for the 11 items M scale and .73 for the M scale without the items of the "Détermination/assertiveness" subscale (8 items).

Discussion

Based on the preliminary questionnaire, the objective of this study was to develop a short version, valid and reliable for French teenagers. The successive statistical procedures (correlation with the items sum of the scale they belong to, and EFA) led to the elimination of 19 items. The results of the different factor analyses match on several points some previous works. Firstly, they show that a BSRI short-version gives a better factor structure than the original long version (Blanchard-Fields et al., 1994 ; Campbell et al., 1997 ; Gana, 1995 ; Lorenzi-Cioldi, 1994). Next, the results argue in favor of the BSRI multidimensional and non bi-factorial nature : the instrument is not made up of two factors (M/F), but of several first-order factors (Blanchard-Fields et al., 1994 ; Campbell et al., 1997 ; Marsh, 1985 ; Marsh & Myers, 1986 ; Spence & Hall, 1996). This questionnaire multifactorial nature has been validated by the CFAs conducted with another population : models with 5 or 6 factors fitted the data better than models with 2 factors (M/F) (Table III). Finally, the CFAs results back up the thesis of a BSRI hierarchical organization (Blanchard-Fields et al., 1994 ; Marsh, 1985 ; Marsh & Myers, 1986). The factors "Athlétique/athletic", "Leadership/leadership", and "Confiance en soi/self-confidence" load on a second-order factor designated Masculinity, and the factors "Tendresse/tenderness" and "Sensibilité à autrui/sensitivity to others" load on a second-order factor designated Femininity (Figure 1). A 6th first-order factor (designated "Détermination/assertiveness") is problematic in several respects. First of all, it has a positive loading on two second-level factors. Therefore, it does not seem to constitute a specifically masculine characteristic. Next, the fit to the data seems even better when this factor is eliminated (cf. model 6 *vs* model 3 in table III). Even model 3b, allowing the factor "Détermination/assertiveness" to simultaneously load on the M and F factors, shows worse fit indices than model 6. These two observations induce us to eliminate the "Détermination/assertiveness" factor's items from the questionnaire's short version.

The results of this study prove a good reliability of the instrument. The subscales' internal consistency, measured at two different times, is satisfactory ($\alpha \geq .80$), as is their test-retest reliability over the period of one month ($r \geq .73$). The elimination of the 3 items of the "Détermination/assertiveness" factor, does not affect the reliability of the Masculinity subscale. The alpha goes from .83 to .81, and the test-retest correlation is unchanged. These results make up an additional argument for the elimination of these 3 items.

Finally, the low and non-significant correlation between the two F and M factors (figure 1), constitutes an additional indicator of the questionnaire's construct validity (Vallerand, 1989). In fact, this result matches the theory (Constantinople, 1973), and previous studies (Blanchard-Fields et al., 1994).

Study 4

The objective of this study is to evaluate the construct validity of the BSRI short-version by an analysis of the psychological construct's effects or correlates. The procedure consists of replicating the results published in the English-language literature (Vallerand, 1989). We are concerned with finding a link between the BSRI scores and two other variables : on the one hand "Estime de Soi/self-esteem" and on the other hand, "Pratique ou non d'un sport compétitif/practising or not competitive sport". Many studies have shown that, whatever their biological sex, "Estime de Soi/self-esteem" is higher in individuals rating a high score on the Masculinity scale (Cate & Sugawara, 1986 ; Lundy & Rosenberg, 1987 ; O'Heron & Orlofsky, 1990 ; Whitley, 1983). On the other hand, the theory states that gender-related self-schemas are used as cognitive filters influencing how information is perceived and treated, and dictating behaviors (Bem, 1981 ; Cross & Madson, 1997 ; Markus & Wurf, 1987). Sports practice being rather a masculine type activity (Davisse & Louveau, 1998 ; Eccles & Harold, 1991 ; Messner, 1988), the individuals having a gender-related self-schema characterized by strong Masculinity are more prone to practice a sport than those characterized by strong Femininity (Csizma, Wittig, & Schurr, 1988 ; Koivula, 1995 ; Matteo, 1988 ; Uggucioni & Ballantyne, 1980).

Method

Subjects and procedure

Four hundred fifty eight students (203 boys, 255 girls) from eight French schools, with an average age of 15.38 years (SD = 0.89), volunteered to fill out a questionnaire. Parental consent had been required beforehand. The parents' social class level is more or less equivalent to that of the previous study, as was the procedure of administering the questionnaires.

Questionnaire

The questionnaire was made up of 3 parts.

Gender-related self-schema

The BSRI short-version resulting from the previous study (10 + 8 items) was used to evaluate the subjects' gender-related self-schema. A confirmatory factor analysis was conducted on this questionnaire in accordance with the theoretical model presented in Figure 1. The fit indices revealed a good adequacy between the model and the data [χ^2 (129) = 344.240, p < .001, GFI = .92, TLI = .92, CFI = .94, ECVI = 0.94], confirming the questionnaire's construct validity. For this study, the subscales' internal consistency turned out to be satisfactory (α = .80 et .88, respectively for Masculinity and Femininity scales).

Self-esteem

The "Estime de Soi/self-esteem" scale (EES) of Vallières and Vallerand (1990) was used to measure the teenagers' self-esteem. The instrument is made up of 10 items which evaluate the extent to which an individual considers himself a worthy person and not as being bound to fail, useless or good-for-nothing. The answers are assigned on a 7-point Likert scale : (1) "Totally disagree", (7) "Totally agree". In this study, the alpha coefficient of the scale was .85.

Table IV : *Results of the multiple regression analysis for relation between subjects BSRI subscales scores and self-esteem .*

Populations	Independents variables	β	F (or t)	*ddl*	$p<$	R^2
All (N= 448)	Femininity	-.10	-2.46	1, 445	.05	
	Masculinity	.51	12.45	1, 445	.0001	
	R Multiple	-	80.96	2, 445	.0001	.27
Girls (N= 251)	Femininity	-.02	-0.40	1, 248	*ns*	
	Masculinity	.46	8.03	1, 248	.0001	.21
	R Multiple	-	32.23	2, 248	.0001	
Boys (N= 197)	Femininity	-.15	-2.33	1, 194	.05	
	Masculinity	.54	8.60	1, 194	.0001	
	R Multiple	-	37.25	2, 194	.0001	.28

Note : ns = non significant

Sports practice

The third part of the questionnaire concerned sports practice. The subjects had to indicate if they practiced sports, the context of this sports activity (in a club, on their own, etc.), how many times per week, and the type (competitive, leisure, etc.). Individuals were considered as a "Sportif(ve)/sportsperson" (SP) if they practiced regularly within a club, and competitively. In the other cases, the subject was considered as "Non Sportif(ve)/not a Sportsperson" (NSP).

Results

Relationships between the BSRI scores and sports practice

Two types of analyses were carried out : (1) MANOVAs, by taking the score on the two M/F scales as dependent variables, and (2) a chi-square (χ^2) test in order to analyze the SPs and NSPs distribution according to the four gender-related profiles (Bem, 1981). The median-split procedure was used to constitute the groups (Bem, 1981).

A MANOVA, conducted with sports practice (SP versus NSP) as an independant variable (IV), and the score on the two subscales as dependant variables (DV) presented a significant multivariate effect : *Wilks Lambda* (2, 455) = .91, p <.0001. The univariate tests display (a) a significant effect upon the Femininity scale : F (1, 445) = 6.69, p < .01, the SPs (M = 5.16) obtain a lower score on this scale than the NSPs (M = 5.41), and (b) a significant effect upon the Masculinity scale : F (1, 445) = 36.23, p < .0001, the SPs (M = 4.88) obtain a higher score on this scale than the NSPs (M = 4.28). Similar results were found by separately sampling girls and boys. However, for these latter, the univariate effect upon the Femininity scale is not significant [F (1, 201) = 0.24, p = .62][2].

The subjects distribution according to their gender-related profile on the one hand, and to their practice or not of sports on the other hand, deviates significantly from the theoretical distribution : χ^2 (3, N = 458) = 22.47, p <.0001. The analysis of the *a posteriori* cells contribution (adjusted residuals' calculation) reveals an over-representation of Masculine profiles and an under-representation of Feminine profiles among the SPs, and the opposite among the NSPs. There is no difference as far as the Androgynes and the Undifferentiated are concerned.

Relationships between subjects BSRI scores and self-esteem

Ten subjects were excluded from the analyses because they had not totally filled out the EES. Two types of analyses were carried out : (1) multiple regression analyses, by taking the score on the two BSRI subscales as IV and the score on the EES as DV, and (2) an ANOVA 2 (gender) x 4 (gender-related profile) by taking the EES as DV.

Table IV presents the different multiple regression analyses carried out on the total population, and on boys and girls sampled separately. For the total population and for the boys alone, (a) the multiple R is significant and predicts 27 and 28% of the self-esteem variance, (b) the Femininity scale is linked negatively to self-esteem, and (c) the Masculinity scale is linked positively to self-esteem. For the population of girls, only the Masculinity scale predicts self-esteem[3].

The ANOVA reveals : a significant effect of the "gender" factor [F (1, 440) = 8.23, p <.01], the boys (M = 5.01) having a self-esteem superior to that of the girls (M = 4.56); (b) a significant effect of the "gender-related profile" factor [F (3, 440) = 18.12, p <.0001], the *post hoc* Scheffé tests uncover a difference (p <.01) between profiles with strong masculine orientation and those with weak masculine orientation [Masculine (M = 5.24) and Androgyne (M = 5.18) have a significantly higher self-esteem than Feminine (M = 4.28) and Undifferentiated (M = 4.51)] ; (c) a non-significant "gender" x "gender-related profile" interaction [F (1, 440) = 1.32, p =.27].

[2] We might think that the items of the "Athlétique/athletic" subscale, of the Masculinity scale, are responsible for the observed differences. The calculations performed with these items removed did not change the results presented here at all.

[3] We might think that the items of the "Confiance en soi/self-confidence" subscale, of the Masculinity scale, are responsible for the observed differences. The calculations performed with these items removed did not change the results presented here at all.

Discussion

According to Vallerand (1989), if a measurement instrument is linked to variables in accordance with the theory (predictive validity or construct correlates), then the instrument's construct validity is confirmed by complementary proof. The objective of this study was precisely to reproduce the results published in the literature in order to test the construct validity of the BSRI short-version.

Several studies have shown a link between the gender-related profile and the participation in practices socially assigned to both sexes. Competitive sports practice being rather a masculine activity (Davisse & Louveau, 1998 ; Eccles & Harold, 1991 ; Messner, 1988), we expected that Masculine "type" individuals would practice a competitive sport more, during their leisure time, than Feminine "type" individuals, as a number of works have shown (Csizma et al., 1988 ; Koivula, 1995 ; Matteo, 1988 ; Uggucioni & Ballantyne, 1980). The results of this study have corroborated these works. They have shown that in comparison to those not practicing a competitive sports activity, those who do have a weaker orientation on the Femininity scale and a higher orientation on the Masculinity scale. These results provide specific support for the gender-related self-schema theory developed by Bem (1981). According to that author, the schematic subjects (i.e. Masculine and Feminine) have a tendency to choose activities complying with their gender role and to reject those that do not, contrary to aschematic subjects (i.e., Androgyne and Undifferentiated) making less stereotyped choices. In this study, the Masculines were over-represented in the group practicing sports, while the Feminines were under-represented in this group. As for the Androgynes and the Undifferentiated, they were not significantly differentiated for one category.

On another level, studies have shown that self-esteem was higher in individuals having a high score upon the Masculinity scale (Cate & Sugawara, 1986 ; Lundy & Rosenberg, 1987 ; O'Heron & Orlofsky, 1990 ; Whitley, 1983). The results of this study corroborate these works also. Whether taking the gender-related profile (Bem, 1974, 1981), or doing a multiple regression as advocated by Taylor and Hall (1982), self-esteem is higher in subjects having a high score upon the Masculinity scale. As far as the Femininity scale, it is associated rather with weak self-esteem.

Overall, these results, in accordance with the literature data, make up an argument in favor of the instrument construct validity.

General Discussion

The main objective of the studies carried out in this article consisted in developing and validating a BSRI short-version for French teenagers. This led us to carry out four studies involving 1,204 subjects, in order to follow the steps for trans-cultural validation of psychometric instruments as advocated by Vallerand (1989).

In its definitive version, the questionnaire is made up of two subscales designated Masculinity and Femininity constituted respectively by eight and ten items. Even if the instrument's assessment has to be followed up within other research studies , the current results argue in favor of its reliability and validity. The concurrent validity was tested by the lack of difference between answers given by bilingual subjects to the original and translated versions. The questionnaire's construct validity was evidenced by (a) exploratory and confirmatory factor analyses, (b) the lack of connection between the subscales, as foreseen by the theory, and (c) correlates to the constructs in accordance with the theory and with previous works. More precisely, a positive linkage was found between Masculinity and sports practice on the one hand, and self-esteem on the other hand; Femininity being rather linked negatively to self-esteem and sports practice. The questionnaire's reliability was demonstrated by sufficient internal consistency and test-retest reliability in the mid-term.

From a theoretical point of view, this Bem questionnaire French version confirms the multidimensionality and the hierarchical organization of the gender-related self-concept, as the recent works on the Self suspected (e.g., Marsh & Shavelson, 1985). Nonetheless, until now, few studies had corroborated this type of organization for the gender-related self-concept (Blanchard-Fields et al., 1994 ; Campbell et al., 1997 ; Martin & Ramanaiah, 1988). In this study, the different adjectives used by the teenagers to describe themselves, have been grouped together on factors expressing several personal characteristics : "Tendresse/tenderness", "Sensibilité à autrui/sensitivity to others", "Athlétique/athletic", "Leadership/leadership", and "Confiance en soi/self-confidence". These personal characteristics are grouped together on two second-order structures : Femininity and Masculinity (Figure 1). These groupings - bringing to the fore characteristics culturally specific to men and women - are in accordance with previous works carried out in occidental countries in general (e.g., Cross & Madson, 1997). These works have shown that competitivity, leadership, and physical activity were rather masculine characteristics, while preserving social relationships and being attentive towards others constituted rather feminine characteristics.

The instrument validation procedure did not include the final step of norms definition, advocated by Vallerand (1989). In fact, we were not able to achieve conformity with the norms published in the literature, because this type of work has not, to our knowledge, been done with a population similar to the one of this study. Consequently, the heterogeneity of the populations, in number, sex and age, as well as the different methods used to define the gender-related profiles, make any comparisons between the studies risky (Blanchard-Fields et al., 1994). Furthermore, achieving this conformity would demand in-depth work going far beyond the framework of this validation. Rather than presenting norms, Tables V and VI provide a set of statistical reference points that were established on the total

Table V : *Means, standard deviations, medians for the subjects' Masculinity and Femininity scores.*

	Masculinity scale			Femininity scale		
	Mean	SD	Median	Mean	SD	Median
Girls (N = 630)	4.31	1.08	4.38	5.63	0.82	5.70
Boys (N = 548)	4.91	1.05	5.00	4.73	1.00	4.80
All (N = 1178)	4.59	1.10	4.63	5.21	1.01	5.30

Table VI : *Repartition of the subjects in the four gender categories (for all the subjects and for each sex).*

	Masculine	Feminine	Androgynous	Undifferentiated
Girls (N = 630)	64 (10.16%)	233 (36.98%)	200 (31.75%)	133 (21,11%)
Boys (N = 548)	257 (46.90%)	35 (6.39%)	109 (19.86%)	147 (26.82%)
All (N = 1178)	321 (17.25%)	268 (22.75%)	309 (26.23%)	280 (23.77%)

population of this study. They should allow a beginning of a generalization for the French teenagers population. Table V presents the descriptive statistics concerning the scores upon the Masculinity and Femininity scales, for each gender and for the entire population. Table VI presents the subjects' distribution over the four gender-related profiles, according to gender and for the entire population.

Researchers interested in the gender-related self-concept would be able to use this BSRI shortened version, validated for French teenagers, whether to study the antecedents (e.g., the impact of a differential socialization for girls and boys) or the consequences (e.g., affective, cognitive or behavioral) of this construct. The limited number of terms makes the instrument easier to use than the original version. As we have shown, several approaches might be envisioned : by distributing the subjects according to their gender-related profile, but also by using the techniques of variance analysis or multiple regression, as certain authors recommend (Taylor & Hall, 1982 ; Marsh & Myers, 1986); what is important is to mention the theoretical approach used in preference (Spence & Hall, 1996).

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