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Development of the Problem Solving Inventory With Italian Youth

Laura Nota
University of Padua

Puncky P. Heppner
University of Missouri

Maria Cristina Ginevra and Lea Ferrari
University of Padua

Mary J. Heppner
University of Missouri

Salvatore Soresi
Department of Philosophy, Sociology, Pedagogy and Applied Psychology,
University of Padua, Padua, Italy

The Problem Solving Inventory (PSI) is one of the most widely used applied problem-solving measures in the United States. The purpose of this research was to examine the psychometric properties of the PSI within Italian adolescent samples. Four separate data sets were used in this investigation involving 5,100 Italian adolescents. The first study revealed a similar, but slightly different, PSI factor structure with Italian youth. Using 2 samples, the second study confirmed the multidimensional structure of the PSI–Italian Adolescent and verified the invariance of the factorial structure across gender and age. The third study (fourth sample) established convergent validity estimates of the instrument as well as the stability of the factor structure over time. These results provide strong psychometric support for the PSI–Italian Adolescent among Italian youth.

Keywords: problem-solving appraisal, coping, Italian high school students, scale construction, Adolescent Problem-Solving Inventory

Applied problem-solving is a broad topic that has been the focus of inquiry for many years in psychology (Gagné, 1964; Kohler, 1925; Skinner, 1974). Within the past 2 decades, how people cope with stressful life events has been one of the most heavily researched topics within U.S. psychology (Somerfield & McCrae, 2000). This body of research clearly indicates that how people cope with stressful life events makes a difference in people's lives; for example, those people who cope more effectively tend to also report having better psychological adjustment, more career satisfaction, and greater well-being overall (Folkman & Moskowitz, 2004; Heppner, Witty, & Dixon, 2004; Somerfield & McCrae, 2000).

One rich line of research has focused on how people appraise their problem-solving capacities. This line of research has centered on the Problem-Solving Inventory (PSI; Heppner & Petersen, 1982; Heppner et al., 2004). The PSI is one of the most widely used self-report measures of applied problem-solving (Nezu, Nezu, & Perry, 1989), with more than 130 empirical studies reported in a review published in 2004, and with many more published studies in subsequent years. In essence, the research indicates that there is a pervasive link between the PSI and indices of psychological distress (e.g., de-

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Laura Nota, Department of Philosophy, Sociology, Pedagogy and Applied Psychology, University of Padua, Padua, Italy; Puncky P. Heppner, Department of Educational, School and Counseling Psychology, University of Missouri; Maria Cristina Ginevra and Lea Ferrari, Department of Philosophy, Sociology, Pedagogy and Applied Psychology, University of Padua, Padua, Italy; Mary J. Heppner, Department of Educational, School and Counseling Psychology, University of Missouri; Salvatore Soresi, Department of Philosophy, Sociology, Pedagogy and Applied Psychology, University of Padua, Padua, Italy.

Correspondence concerning this article should be addressed to Puncky P. Heppner, PhD, Department of Educational, School, and Counseling Psychology, University of Missouri, 9 Hill Hall, Columbia, MO 65211. E-mail: heppnerp@missouri.edu

pression, anxiety, suicidal ideation, alcohol abuse, and childhood traumas), various physical health indices, as well as vocational decision-making and adjustment (Heppner et al., 2004). In all, the PSI has been a powerful predictor of human behavior; for example, one study reported almost 70% of the variance in suicidal behavior was predicted by the PSI (Dixon, Heppner, & Rudd, 1994). In addition, a significant amount of the PSI research has been conducted outside the United States, such as Italy, Brazil, Turkey, Hong Kong, South Africa, Australia, Taiwan, Canada, South Korea, and mainland China (Heppner et al., 2004).

Almost all of the previous PSI research has used adult samples; Larson and Heppner (1989) noted a major methodological limitation in this literature has been the restricted population of college students. Moreover, a few studies (Haught, Hill, Nardi, & Walls, 2000; Wright, Carscaddon, & Lambert, 2000) have found significant PSI differences across age levels, which also suggests a need for additional investigation of problem-solving appraisal beyond college students. A population that has received scant attention is adolescents. It has been suggested for some time that problem-solving skills play a crucial role in the etiology of delinquency (Shure & Spivack, 1972; Spivack & Shure, 1974), and various training interventions over the years have incorporated problem-solving skills training as a means of addressing perceived deficits in delinquent adolescents (Guerra & Slaby, 1990). Thus, although problem solving has been implicated as an important variable in adolescent development, problem-solving appraisal, as measured by the PSI, has not received much attention with this population. Thus, the first goal of this study was to assess problem-solving appraisal within adolescents.

Moreover, for some time, a number of scholars have indicated that the previous coping and applied problem-solving research has tended to ignore the cultural context (Chun, Moos, & Cronkite, 2006; Heppner, 2008; Heppner, Wei, Neville, & Kanagui-Munoz, 2013; Utsey, Adams, & Bolden, 2000; Wong, Wong, & Scott, 2006). In essence, coping constructs based on the current U.S. dominant culture "do not tell the whole story about coping for all cultural groups in the U.S." (Heppner, 2008, p. 813). Not surprisingly, a number of studies have found very different coping factors in cultural contexts outside the United States (Heppner et al., 2006). Thus, the second goal of this study was to examine problem-solving appraisal in Italy, and specifically with adolescents.

One previous study by Nota, Heppner, Soresi, and Heppner (2009) found that the PSI had a similar, but slightly different, factor structure within an Italian cultural context; moreover, they found significant PSI differences across both gender and intelligence, which have been rarely found in U.S. samples. Although most of the previous PSI research has not found differences by gender, a few studies have reported meaningful gender differences (Heppner, Cook, Strozier, & Heppner, 1991; Sabourin, Laporte, & Wright, 1990). In essence, surprisingly little is known about sex differences across various problem-solving activities (Ptacek, Smith, & Zanas, 1992), leading Heppner et al. to conclude that the PSI literature "may be greatly enriched by the additional focus on the generalization to other subgroups, populations, and cultures" (p. 405). Similarly, other research on cognitive and personality variables has underscored the necessity to examine gender differences (Feingold, 1994). Findings from Nota et al. (2009) underscored the necessity to examine the cultural validity of problem-solving appraisal specifically within Italy, and particularly by gender. Thus, the purpose of this study was to examine the psychometric properties of the PSI within Italian adolescent populations, and thereby extending the cultural validity of the PSI not only in Italy, but also with male and female adolescents.

More specifically, three studies using four separate samples (a combined total of 5,100 Italian adolescents) examined the utility of the PSI with Italian adolescents. The first study examined the factor structure of the PSI with a large sample of Italian adolescent youth. The second study examined the stability of that Italian adolescent PSI factor structure across another large sample; a third sample of Italian youth was also used to examine measurement invariance of the PSI across age and gender. Finally, the third study using a fourth sample provided additional reliability estimates as well as estimates of convergent validity.

Study 1: Initial Examination of the PSI–Italian (Adolescent) Factor Structure

The purpose of the first study was to examine the factor structure of the Problem-Solving In-

ventory–Italian Adolescent (PSI-IT [Adol]). Specifically, we predicted that the factor structure would be similar to the three-factor model previously reported by Heppner and Petersen (1982) and Nota et al. (2009), who used college students in the United States and Italy: (a) self-efficacy in one's problem-solving ability (Problem-Solving Confidence), (b) an inclination to approach or avoid difficult situations/problems (Approach Avoidance Style), and (c) an individual's belief in his or her ability to control emotions and behaviors while solving problems (Personal Control). In addition, we expected that the internal consistency estimates for the PSI-IT (Adol) factors would be satisfactory (e.g., at least 0.80; Nunnally & Bernstein, 1994).

Method

Participants. Participants were 2,151 Italian adolescents, 882 (41%) boys and 1,269 (59%) girls; data from 49 students were excluded due to their failure to respond to a validity check item, which asked respondents to "Circle the No. 2 for this item." These participants consisted of: (a) 176 who were attending middle school from grade 6 to 8 (8.2% of total sample, 82 boys and 94 girls; M_{age} = 12.1, SD = 1.1); (b) 666 who were attending high school from grade 9 to 11 (31% of the total sample, 245 boys and 421 girls, M_{age} = 16.0, SD = 0.8); and (c) and 1,309 who were attending high school from grade 12 to 13 (60.9% of the total sample, 555 boys and 754 girls, M_{age} = 17.0, SD = 0.6). Moreover, the adolescents attending high schools were currently in lyceums (n = 717, 36.3%), technical school (n = 817, 41.4%), and training school (n = 441, 22.3%).

Instrument development. The PSI-IT (Adol) was patterned after the original PSI (Form B; Heppner, 1988), both in terms of the content of the 35 items as well as the 6-point Likert scale (1 = *strongly agree*, 6 = *strongly disagree*). In addition, the original PSI language was previously reduced to a fifth grade reading level (Manley, Heppner, Perez, & Dixon, 1993), which was followed for the development of the PSI-IT (Adol). A wide range of data indicates that the PSI is a highly valid and reliable instrument in the United States as well as in several other countries/cultures (Heppner et al., 2004).

More specifically, each of the PSI items were first independently translated into Italian by two native Italian speakers fluent in English (the third and the fourth authors of the study), and then after discussion, achieved a common Italian translation of each item. Those items were then independently back-translated by a professional Italian–English translator. Finally, the Italian–English translator along with a third native Italian fluent in English (the first author of the study) compared each back-translated item with the original PSI item. Three items required minor revisions. In addition, to further evaluate the clarity of the Italian items and the instrument as a whole, 21 Italian youth were asked to provide feedback on the newly translated items. Specifically, the participants were asked to respond to all of the translated PSI items, and then following Hambleton, Merenda, and Spielberger (2005), they were asked to comment on the overall presentation of the instrument and the clarity of the items. This procedure resulted in two slightly revised items, but still accurately reflected the original PSI items. Eleven other Italian youth were asked to comment on the clarity of the entire inventory as well as each item; at this point, the data suggested that both the Italian translation and the presentation format of the PSI were satisfactory.

Procedure. The PSI-IT (Adol) was administered to adolescents who voluntarily participated (97% signed the consent form) in a variety of school-based guidance activities aimed at their future career planning. The adolescents were asked to complete the PSI, and later given a personalized report of their results that could be used in future career-planning activities.

Results

Preliminary analysis. An examination of the asymmetry and kurtosis values revealed all 35 items were satisfactory (all values were ≤ 1). In addition, the normal distributions and congruence of the medians and means per item showed adequate values (Table 1).

Confirmatory factor analyses. A confirmatory factor analysis (CFA) was initially conducted using Lisrel 8.7 software package (Jöreskog & Sörbom, 2004) to examine the U.S.-based correlated three-factor structure mentioned previously (Heppner & Petersen, 1982). The fit indices for the model with three

Table 1
Items, Factor Loadings, and Communality Estimates

Items	1	2	3	h^2	*Mdn*	*M*	*SD*
Factor 1: Problem-Solving Engagement (PSE)							
20. Sometimes before I carry out a certain plan, I try to guess what might happen	.668	−.135	−.117	.453	2	2.32	1.27
35. When I have a problem, one of the first things I do is try to learn exactly what the problem is.	.643	.094	.044	.441	2	2.13	1.22
28. I carefully compare different solutions to solve problems	.628	.100	−.223	.524	3	2.88	1.25
31. When faced with a problem, I first look at the situation to get all the important pieces of information	.611	.073	−.027	.404	2	2.49	1.20
18. When solving a problem, I think about the effects of all possible solutions. Then I compare the solutions to each other	.613	−.169	−.243	.436	3	2.84	1.48
16. When I have a problem, I stop and think about it before deciding on a next step	.610	−.017	−.254	.480	2	2.41	1.33
7. I think of as many possible ways to handle a problem until I can't come up with any more ideas	.560	−.013	−.066	.323	3	2.78	1.46
8. When I have a problem, I always look at my feelings. That helps me to learn what's going on	.538	−.123	.095	.277	2	2.66	1.38
23. If I spend enough time and effort, I can solve most of my problems	.531	.251	.244	.399	2	2.40	1.24
6. Sometimes, I solve a problem in one way. Then I compare what really happened to what I thought should have happened	.517	−.119	.069	.254	3	3.01	1.4
5. Usually, I can think up new and useful ways to solve a problem	.452	.142	.012	.250	3	3.05	1.4
12. When solving a problem, I make decisions that I am happy with later	.440	.165	.231	.266	3	2.70	1.24
2. When I have a big problem, I don't get information to help me understand the problem	.401	.200	−.119	.244	2	1.93	1.21
Factor 2: Self-Assurance (SA)							
32. Sometimes I get so upset, I can't think of ways to solve my problem	−.179	.658	−.040	.424	4	4.02	1.54
25. While working on a problem, I sometimes get confused. Then I don't concentrate on the real problem	−.180	.651	−.137	.450	4	3.79	1.37
34. When faced with a problem, I am not sure I can handle the situation	.006	.638	.058	.399	3	3.34	1.38
29. When I think of ways of handling a problem, I don't put different ideas together	.165	.600	−.070	.451	2	2.68	1.27
21. When I try to think of possible ways to solve a problem, I don't come up with very many answers	.122	.585	−.113	.427	3	3.14	1.34
3. When I can't solve a problem, I question if I can solve it at all	.077	.575	.054	.347	3	3.05	1.4
11. Many of my problems are too big and hard for me to solve	.064	.567	.129	.330	3	2.83	1.41
30. When faced with a problem, I don't usually see the things around me that may make my problem worse	.020	.522	−.244	.384	3	3.11	1.39
Factor 3: Methodical Thinking (MT)							
17. When solving problems, I usually use the first good idea that I think of	−.014	−.038	−.722	.511	4	3.56	1.42
13. When I have a problem, I usually do the first thing I think of to solve it	.133	.044	−.714	.565	3	3.13	1.54
15. I don't take time to think if other solutions to a problem will work	.186	.241	−.551	.502	3	3.19	1.41
14. Sometimes, I don't take enough time to solve my problems carefully	−.040	.243	−.512	.398	4	3.58	1.37

correlated factors ($\chi^2(df = 462, n = 2{,}151) = 6{,}574.61$; $p = 001$; Comparative Fit Index (CFI) = .87; Non-normed Fit Index (NNFI) = .86; Root Mean Square Error of Approximation (RMSEA) = .092 [90% Confidence Interval for the RMSEA (CI90) = .090–.093]; Standardized Root Mean Square Residual (SRMR) = .091) indicated there was not a good fit with the data. We conducted a second CFA comparing the three-factor structure of the Italian PSI

(Nota & Soresi, 1999); again there was not a good fit with that data ($\chi^2(df = 296, n = 2{,}151) = 3971.02$; $p = 001$; CFI = .88; NNFI = .87; RMSEA = .086 [CI_{90} = .084–.088]; SRMR = .077).

Exploratory factor analyses. We subsequently conducted exploratory factor analyses (EFA) with the total sample. The Kaiser–Meyer–Olkin measure of sampling adequacy was .92 (Tabachnick & Fidell, 2001). Preliminary analyses of the correlation matrix indicate moderate Pearson correlation coefficients (e.g., .3 and above), and the determinant of the correlation matrix (0.00008) was greater than the necessary value of 0.00001. We then used EFA to explore the underlying dimensionality of the PSI items. Both the scree plot (Cattell, 1966) and parallel analysis tests (Horn, 1965) suggested an initial three-factor solution that was subsequently carefully examined with an EFA with an oblique rotation (direct oblimin) because the factors were expected to be correlated. To help identify a target item pool, item loadings below .40 and/or with cross-loadings on other factors exceeding .255 were deleted (Pett, Lackey, & Sullivan, 2003); consequently, nine items (1, 4, 9, 10, 19, 24, 26, 27, and 33) were deleted. A second EFA with maximum likelihood estimation and direct oblimin rotation was conducted on the remaining 25 items; again a scree plot and parallel analysis tests confirmed a three-factor solution, which accounted for 39.77% of the total variance. The 39.77% reflects the amount of shared variance explained out of the total variance in the original items by the extracted factors, which suggests that there is considerable shared variance among the original items that was attributable to the factors. In addition, the low to moderate correlations between factors suggest that the three factors are not redundant, and thus these factors are useful in and of themselves. Table 1 shows the total sample factor loadings for the three-factor model, factor loadings, and communality estimates.

The first factor consisted of 13 items, accounted for 17.45% of the variance after rotation, and seemed to refer to a general tendency to approach and engage in a wide range of problem-solving activities. This factor was labeled Problem-Solving Engagement (PSE) and reflects proactively approaching and actively engaging in various aspects of the problem-solving process, such as reflecting on one's feelings, collecting relevant information, thinking about different alternative strategies, and considering consequences of different actions. Although 9 of the 13 items of the original PSI Approach-Avoidance factor loaded on this factor, PSE seemed to more accurately describe this particular constellation of 13 items (see highest factor loadings in Table 1). Thus, it seems that in the perceptual processes of both adults and youth, an important problem-solving activity is engaging or approaching problems, as opposed to avoiding or disengaging from the problem-solving process.

The second factor consisted of eight items, accounted for 13.57% of the variance after rotation, and refers to a general tendency to feel efficacious and self-assured in the problem-solving process. This factor was labeled Self-Assurance (SA), and reflects a belief in oneself to successfully respond to difficult and stressful problems, a confidence in one's problem-solving ability, and an agentic tendency to organize and integrate thoughts, put ideas together, and develop successful solutions (see items in Table 1).

The third factor consisted of four items, accounted for 8.74% of the variance after rotation, and refers to being methodical, systematically engaging in the problem-solving process, and taking time to think about potential strategies and solutions, versus impulsive ways of responding to problems (see items in Table 1). In short, this factor seems to depict a person's ability to systematically and methodically think about problem-solving, and thus was labeled Methodical Thinking (MT).

Descriptive information. The means and standard deviations of each factor and the total were as follows: PSE: $M = 33.6$, $SD = 9.7$; SA: $M = 26.0$, $SD = 6.9$; MT: $M = 13.5$, $SD = 4.1$; Total PSI: $M = 73.0$, $SD = 15.7$. It is important to note that the total PSI score consists of three domains that have overlapping variance; individual differences based on the total score do not necessarily show individual differences in the three factors.

Internal consistency. Internal consistency estimates of the three factors were as follows: PSE = .83, SA = .77, MT = .69, and Total PSI = .85. Thus, two of the three PSI-IT (Adol) factors as well as the PSI Total exceed or are close to .80, as suggested by Nunnally and

Bernstein (1994). The internal consistency of MT was a bit lower in this sample, which also tends to be the case with the factor in the U.S.-based PSI with which it is most similar, Personal Control; both factors have only four or five items, respectively, which likely contribute to the lower alpha score.

Intercorrelations among factors. The intercorrelations among the three factors ranged from .29 to .40, which indicates some overlap, but still distinct factors, and are consistent with the original PSI (Heppner et al., 2004). Thus, the data suggest that the three factors do overlap some, but the total PSI score in and of itself can be used to facilitate comparison of individuals.

Conclusion

In summary, the results of Study 1 suggest that 25 items loaded on three distinct factors that were similar to, but slightly different from, the original U.S.-based adolescent version of the PSI; the loadings on the three factors ranged from .40 to .72, with all cross-loadings <.255.The three factors on the PSI-IT (Adol) were labeled: PSE (13 items), SA (8 items), and MT (4 items). On the basis of this study, the factors appear to be moderately interrelated (.29–.40) and to have marginal to acceptable levels of internal consistency (.69–.83). In addition, the means and standard deviations suggest an absence of ceiling or floor effects, and the standard deviations of 4.12 to 9.74 reflect considerable variation in the adolescents' responses around the midpoint. Thus, the initial results from Study 1 suggest a psychometrically sound PSI with three distinct constructs that seems appropriate for a broad range of Italian adolescents; additional research is needed to verify the initial psychometric properties of this inventory. In addition, the study provides new information, as the problem-solving constructs based on Italian youth are similar to, but slightly different from, those found with U.S. adolescents. Perhaps the most noticeable differences between the two countries emerge on the SA and MT factors. Major school-career choices are required when Italian youth are in middle school, which requires them to think about their future relatively early, and which results in quite different career pathways for these youth (Howard, Ferrari, Nota, Solberg & Soresi, 2009). Within this context, SA and MT may reflect a different context for adolescent problem-solving than in the United States. Additional research is needed to examine these findings in greater detail.

Study 2: Additional CFA

The first goal of Study 2 was to test the stability of the Italian PSI factor structure using CFA with a totally different sample. Specifically, we used a maximum likelihood estimation method in Lisrel 8.7 software package (Jöreskog & Sörbom, 2004) to compare two models for the internal structure of the PSI. The hypothesized model (H: 25–3) predicted that the three-factor model best characterizes adolescent problem-solving versus an alternative model (A2: 25–1) that hypothesized that all 25 items are best depicted as a single factor.

Our second goal was to further examine the PSI-IT (Adol) with regard to age and gender differences with a large sample of Italian adolescents. Although problem-solving appraisal has been frequently conceptualized within a social–cognitive/learning model (Heppner et al., 2004), there has been an absence of a developmental perspective on problem-solving appraisal in general, and especially across individual differences such as gender. Moreover, research and related cognitive and personality variables suggest that examining gender differences can provide a more nuanced understanding of psychological constructs (Feingold, 1994). Based on one previous Italian study (Nota et al., 2009), we predicted that the boys would score more positively than girls in their problem-solving confidence. In addition, we expected more positive scores for older adolescents, which also has some support in previous age-related research in the United States (Wright et al., 2000). The instrument and procedures were the same as those described in Study 1.

Methods

Participants. The sample consisted of 1,265 Italian adolescents, 581 (45.9%) boys and 684 (54.1%) girls; the data from 21 adolescents were excluded because of invalid responses to the validity check item. In addition: (a) 104 were attending middle school from grade 6 to 8 (8.2% of total sample, 43 boys and 61 girls; M_{age} = 12.1, SD = 1.0); (b) 414 participants

were attending high school from grade 9 to 11 (32.7% of the total sample, 178 boys and 236 girls; M_{age} = 16.0, SD = 0.8); and (c) 747 participants were attending high school from grade 12 to 13 (50.1% of the total sample, 360 boys and 387 girls; M_{age} = 17.0, SD = 0.7). In addition, the high school adolescents were attending lyceums (n = 392, 34.8%), technical schools (n = 466, 41.4%), and training schools (n = 269, 23.9%).

Results

Confirmatory factor analysis. The hypothesized three-factor correlated model showed acceptable fit on most indices: $\chi^2(272, n = 1{,}265) = 1692.4$; $p = .001$; CFI = .92; NNFI = .91; RMSEA = .068 (CI_{90} = .066–.071); SRMR = .065. The one-factor alternative model had the following fit: $\chi^2(275, n = 1{,}265) = 3356.51$; $p = .001$; CFI = .82; NNFI = .81; RMSEA = .12 (CI_{90} = .12–.12); SRMR = .094. In short, the three-factor model fits the data better than the one-factor alternative model ($\Delta\chi^2(3) = 1{,}664.08$, $p = .001$).

Descriptive information. The means and standard deviations of each factor and the total in Study 2 were as follows: PSE: M = 34.1, SD = 9.6; SA: M = 25.8, SD = 9.8; MT: M = 13.4, SD = 4.2; Total PSI: M = 73.3, SD = 15.6. An analysis of variance (ANOVA) was conducted to examine score stability in the PSI-IT (Adol) scores in the first and second study. No significant differences were observed for PSE: $F(1, 3{,}415) = 1.916$, $p = .166$; SA: $F(1, 3{,}415) = .387$, $p = .534$; MT: $F(1, 3{,}415) = .040$, $p = .841$: Total PSI: $F(1, 3{,}415) = .281$, $p = .596$.

Differences between boys and girls, and between middle and high school students. A multivariate ANOVA was conducted to briefly examine gender and/or age differences with respect to the PSI factors. The multivariate ANOVA indicated no significant interactions for Gender × Age, Wilks' Λ = .98, $F(6, 2{,}514) = .18$, $p = .982$. However, a significant main effect for gender was found (Wilks' Λ = .98, $F(3, 1{,}257) = 9.42$, $p = .001$, η^2 partial = .022). Moreover, the gender differences were statistically significant on two PSI factors: boys (M = 25.01, SD = 6.34) scored lower on average (more positively) than girls (M = 26.48, SD = 6.76) on SA ($F(1, 1{,}264) = 11.92$; $p = .01$, η^2 partial = .005); conversely, girls (M = 13.04, SD = 4.37) scored lower on average (more positively) than boys (M = 13.89, SD = 3.91) on MT ($F(1, 1{,}264) = 7.66$; $p = .01$, η^2 partial = .006).

There were also PSI main-effect differences for age (Wilks' Λ = .973, $F(6, 2{,}514) = 5.768$, $p = .001$, η^2 partial = .014) on PSI scores. Specifically, we found statistically significant differences on: (a) SA ($F(2, 1{,}264) = 11.919$, $p = .001$, η^2 partial = .019; middle school students M = 28.18, SD = 6.94; high school grade 9–11 students M = 26.49, SD = 6.36; high school grade 12–13 M = 25.09, SD = 6.84), and (b) MT ($F(2, 1{,}264) = 7.411$, $p = .001$, η^2 partial = .012; middle school students M = 14.49,SD = 4.09; high school grade 9–11 students M = 13.75, SD = 4.13; high school grade 12–13 M = 13.11, SD = 4.20). A post hoc analysis compared all pairs of the PSI factor means. Using a Bonferroni-adjusted level of significance of $p = .016$, the results revealed that middle school students tended, on average, to score higher (more negatively) on SA than all grades of high school students, as well as higher on MT than the high school grades 12–13.

Discussion and Conclusion

The results of Study 2 provide strong empirical support for the stability of three distinct PSI-IT (Adol) factors as well as the comparability with the means and standard deviations obtained in Study 1. Moreover, Study 2 suggests that there are significant mean differences between the Italian boys and girls on two of the PSI factors (with boys tending to score more positively on SA, and girls tending to score more positively on MT). In addition, the results also suggest significant differences by age of the Italian youth (i.e., middle school students tended to show less SA and MT). These preliminary results suggest that both gender and age may be important considerations for understanding problem-solving appraisal in Italian youth. Parenthetically, we used a multiple-group confirmatory factor analytic approach (Jöreskog, 1971) with a third sample of 1,200 Italian youth to assess whether these PSI constructs were perceived in the same manner across groups. The configural invariance showed acceptable fit ($\chi^2(1{,}572, n = 1{,}200) = 2{,}814.06$; $p = .001$; CFI = .92; NNFI = .91;

RMSEA = .061 [CI_{90} = .057–.065]). For the weak and strong invariance, no significant fit changes were observed based on the RMSEA Model Test (e.g., the RMSEA value of the nested model fell within the 90% RMSEA confidence interval of the comparison model; Little, Card, Slegers, & Ledford, 2007) and using the CFIΔ test (i.e., CFIΔ: <.01; Cheung & Rensvold, 2002) (weak invariance: $\chi^2(1{,}682, n = 1{,}200) = 2944.$; $p = .001$; CFI = .92; NNFI = .91; RMSEA = .061 [CI_{90} = .057–.065]; strong invariance: $\chi^2(1{,}792, n = 1{,}200) = 3285.38$; $p = .001$; CFI = .92; NNFI = .91; RMSEA = .065 [CI_{90} = .061–.068]). Instead, the variance and covariance homogeneity and latent mean invariance, evaluated with χ^2 difference test, were not established (homogeneity: $\Delta\chi^2$ (30, $n = 1{,}200) = 58.41$, $p = .001$; latent mean: $\Delta\chi^2$ (15, $n = 1{,}200) = 69.20$, $p = .001$]. Thus, the results suggest that although the problem-solving constructs are perceived similarly across age and gender groups, the means across these groups differ. Additional research is needed not only to replicate these findings, but also perhaps to extend our understanding of the differential development of problem-solving appraisal over time with Italian youth.

Study 3: Examination of Test–Retest Reliability and Construct Validity

The purpose of this study was to provide additional reliability and validity estimates by examining both the temporal stability as well as convergent validity of scores on the adolescent Italian PSI. First, we hypothesized that test–retest scores on the PSI-IT (Adol) would be reasonably stable over a 4-week interval. Second, based on past U.S.-based research, problem solving appraisal scores have been predictive of both indices of psychological adjustment as well as vocational adjustment (Heppner et al., 2004) and, consequently, support an array of theoretical formulations on psychological and vocational adjustment. More recent coping theories, such as the Cultural and Contextual Model of Coping (Heppner, Wei, Neville, Kanagui-Munoz, 2013), hypothesize that both psychological and career adjustment outcomes are associated with multiple factors (e.g., personality variables, family and school variables, characteristics of various stressors) and only partially predicted by coping and problem-solving activities. Thus, in line with the Cultural and Contextual Model of Coping theory, we hypothesized that students' scores on the Italian adolescent PSI would have statistically significant but only low to moderate correlations with scores of the adolescents' quality of life and career decision-making.

Method

Participants and procedures. The participants consisted of a fourth sample consisting of 484 adolescents, 150 middle school students and 334 high school students; the data from 12 adolescents were excluded from the analyses because of failure to accurately complete the validity check item. The middle school students (n = 150, 31% of the total sample) consisted of 78 boys and 72 girls (M_{age} = 11.1, SD = 0.7). High school students from grade 9 to 13 (n = 334, 69% of the total sample, 114 boys and 220 girls; M_{age} = 16.0, SD = 0.9) were attending lyceums (n = 127, 38%), technical schools (n = 123, 36.8%), and training schools (n = 84, 25.2%). In addition, 50 adolescents from the larger sample (24 boys and 26 girls; M_{age} = 17.2, SD = 0.4) were randomly selected to assess the test–retest stability of the PSI.

In the first session of various school-based vocational guidance activities, all participants were asked to complete the PSI, as well as measures assessing the students' quality of life and career decidedness. Data were collected in small groups by psychologists, as well as in classrooms and in various vocational training contexts. Adolescents were informed that they would be given a personalized report of their results. On completion of the questionnaires, 50 adolescents were randomly identified and provided with a date to return for their second session, 4 weeks later. During the second session, all 50 participants were asked to complete the PSI again.

Instruments

My Life as a Student. The My Life as a Student (MLS) assesses the quality of life as experienced by Italian students; the study used both the middle school students' version (Soresi & Nota, 2001a) *as well as a high school version* (Soresi & Nota, 2003a). The 36-item middle school MLS asked students to rate every item from 1 (*does not describe me at all*) to 5 (*de-*

scribes me very well). A series of EFA and CFA provided support for a six-factor structure (alphas ranged from .68 to .73), accounting for 52% of the total variance (Soresi & Nota, 2001a). The factors are as follows: (a) Satisfaction with Life Setting (7 items), (b) Satisfaction with the Opportunity of Making Decisions Autonomously (9 items), (c) Perception of Emotional Well-being (4 items), (d) Satisfaction with one's own Situation (3 items), (e) Satisfaction with School Experience (10 items), and (f) Satisfaction with Relationships with Classmates (3 items). Higher scores indicated a higher quality of life. Ferrari (2005) found correlations between .39 and .45 with a distress inventory that measured agitation, sleep problems, feelings of anxiety and depression, eating problems, and physical problems (Solberg et al., 1998).

The 26-item high school MLS asks students to rate every item from 1 (*not at all*) to 5 (*very much*); higher scores reflect higher adolescent quality of life. A series of EFA and CFA provided support for a seven-factor structure (alphas ranged from .65 to .86) (Soresi & Nota, 2003a): (a) Satisfaction with School Experience (7 items), (b) Satisfaction with Opportunities to Make Decisions Autonomously (5 items), (c) Satisfaction with Relationships with Classmates (3 items), Satisfaction with Current Life Conditions (4 items), (d) Satisfaction with Relationships with Family Members (4 items), (e) Satisfaction with Praise Received when Due (2 items), and (f) Satisfaction with Help Availability (2 items). High scores reflect higher adolescent quality of life. Low to moderate convergent validity correlations indicated that students who reported lower levels of quality of life also reported being more undecided and unsure of themselves (Nota, 1999) and had lower ratings of self-efficacy and social skills (Nota, Soresi, Ferrari, & Wehmeyer, 2011).

Ideas and Attitude on School and Career Future. The Ideas and Attitude on School/Career Future (IASCF) assesses career indecision, and consists of a middle school version (Soresi & Nota, 2001b) and a high school version (Soresi & Nota, 2003b). *The 17-item middle school IASCF asks students to rate their usual way of thinking and behaving about career indecision from 1 (does not describe me at all)* to 5 (*describes me very well*). A series of EFA and CFA provided support for a three-factor structure (alphas = .64, .61, and .62, respectively), accounting for 45.4% of the total variance (Nota & Soresi, 1999; Soresi & Nota, 2001b). The three factors assess: (a) Level of Assurance Associated with Self-knowledge and Academic/Career Reality (9 items), (b) Level of Commitment to and Involvement in Choice (5 items), and (c) Level of Certainty Associated with One's Professional Identity (3 items). Convergent validity estimates indicated moderate correlations with hope (r = .32; Snyder et al., 1989), personal direction (r = .37; Wessman, 1973), and the Achievability of Future Goals (r = .35; Ferrari, Nota, & Soresi, 2010).

The 16-item high school IASCF (Soresi & Nota, 2003b) assesses adolescents' ideas, attitudes, and behaviors regarding their future, as it relates to school and career decision-making. Students rate the items from 1 (*does not describe me at all*) to 5 (*describes me perfectly*). A series of EFA and CFA provided support for a three-factor structure (alphas = .92, .71, and .67, respectively), accounting for 60.86% of the total variance (Soresi & Nota, 2003b): (a) Level of Decision and Assurance Related to One's School/Career Future (10 items), (b) Level of Locus of Control Associated with Professional Problem Solving (4 items), and (c) Ability to Gather Information Useful to Making a Choice (2 items). Convergent validity estimates indicate low to moderate correlations with career decision-making (Soresi & Nota, 2003b).

Results and Discussion

The results with another group of Italian youth indicate that the PSI-IT (Adol) scores were stable across a 4-week interval (PSE = .88, SA = .80, MT = .72, Total = .88). In addition, the results also provide strong estimates of convergent validity for both middle school and high school Italian youth on career decision-making and quality of life. More specifically, the results (Tables 2 and 3) suggest that a more positive problem-solving appraisal tended to be associated with higher levels of satisfaction with several major life dimensions (i.e., life in general, decision-making, overall well-being, school life, and peer relationships) for both middle and high school students (median correlation = −.23 and −.12, respectively). In addition, the results in Tables 2 and 3 indicate that more positive problem-solving appraisal tended to be associated with better career decision-making in high school students (median correlation = −.24),

Table 2
Correlations for Middle School Students Between PSI and MLS and IASCF

Factors	SLS	SOMDA	PEW	SS	SCE	SRC	LAS	LCIC	LCPI
1. Problem-Solving Engagement (PSE)	−.25**	−.21**	−.01	−.17*	−.46**	−.07	−.02	−.15	−.02
2. Self-Assurance (SA)	−.28**	−.25**	−.42**	−.21**	−.24**	−.11	−.25**	−.34**	−.19*
3. Methodical Thinking (MT)	−.26**	−.12	−.30**	−.12	−.28**	−.01	−.01	−.28**	−.01

Note. Median correlation: PSI and MLS = −.23; PSI and IASCF = −.15. SLS = satisfaction for the life setting; SOMDA = satisfaction for the opportunity of making decisions autonomously; PEW = perception of emotional well-being; SS = satisfaction for one's own situation; SCE = satisfaction for the school experience; SRC = satisfaction for relationships with classmates; LAS = level of assurance associated with self-knowledge and academic/career reality; LCIC = level of commitment to and involvement in choice; LCPI = level of certainty associated with one's professional identity.
* $p = .05$. ** $p = .01$.

but less so in middle school students (median correlation = −.15). Although additional research is needed, the latter findings may suggest developmental differences in career indecision among Italian youth. In sum, the results of this study provide strong support for the stability of the PSI scores across 4 weeks, and confirm relations between the PSI and both psychological and vocational adjustment (Heppner et al., 2004).

General Discussion

The combined results of our three studies provide strong psychometric support for the adolescent version of the Italian PSI. More specifically, the 25-item PSI-IT (Adol) constitutes three distinct, but slightly different, problem-solving factors than those found in the U.S.-based PSI. The factor structure was developed and replicated across large samples of Italian adolescent youth, and there was stability across Italian subpopulations, all of which provide evidence for the stability of the findings. The PSI-IT (Adol) factors also have acceptable estimates of internal consistency across samples, as well as stable estimates over 4 weeks. Moreover, the PSI-IT (Adol) differences found across gender and different age-groups of Italian youth encourage more extensive and nuanced examination within the problem-solving literature. Finally, the results also support previous research linking the PSI with psychological adjustment and vocational decision-making. In short, the results of this investigation consisting of 5,100 Italian youth provide promising psychometric support of the adolescent form of the Italian PSI.

Contrary to most of the previous research in the United States, our study found significant mean differences between girls and boys on particular factors of problem-solving appraisal. Specifically, boys, on average, showed higher levels of SA than girls, which is consistent with an earlier finding that Italian men tend to appraise their problem-solving confidence more positively than Italian women (Nota et al., 2009). These results are also consistent with other research showing that Italian female (as opposed to male) students reported

Table 3
Correlations for High School Students Between PSI and MLS and IASCF

Factors	SSE	SOMDA	SRCM	SLC	SRFM	SPR	SHA	LDASC	LLC	AGI
1. Problem-Solving Engagement (PSE)	−.17**	−.17**	−.04	−.16**	−.11	−.17**	−.14**	−.19**	−.29**	−.20**
2. Self-Assurance (SA)	−.15**	−.12*	−.08	−.23**	−.08	−.25**	−.11	−.33**	−.37**	−.27**
3. Methodical Thinking (MT)	−.12*	−.06	−.03	−.07	−.06	−.21**	−.05	−.14**	−.24**	−.17**

Note. Median correlation: PSI and MLS = −.12; PSI and IASCF = −.24. SSE = satisfaction with the School experience; SOMDA = satisfaction with opportunities to make decisions autonomously; SRCM = satisfaction with relationships with class mates; SCLS = satisfaction with current life conditions; SRFM = satisfaction with relationships with family members; SPR = satisfaction with praise received when due; SHA = satisfaction with help availability; LDASC = level of decision and assurance related to one's school/career Future; LLC = level of locus of control associated with professional problem solving; AGI = ability to gather information useful to making a choice.
* $p = .05$. ** $p = .01$.

lower mean self-efficacy in their pursuit of school/career goals (Nota, Ferrari, & Soresi, 2005). More extensive research within the Italian cultural context is needed to examine PSI gender differences and, if replicated, potential causal factors for these differences. Such research on gender issues with the PSI is long overdue.

Research with the PSI in the United States has consistently demonstrated a strong relationship between problem-solving appraisal and a host of career indices, such as career maturity, career decisiveness, goal directedness, and job satisfaction (Heppner et al., 2004). Thus, a particularly important form of construct validity for the adolescent version of the Italian PSI is its relationship to career indecision. In essence, Italian students who appraised their problem solving more positively, also tended to report a greater sense of self–knowledge about their academic or career circumstances, level of commitment and involvement in their career planning, and level of certainty related to their future professional identity. At this time, the unemployment rate of Italian youth is among the highest in the Eurozone (36.9%; European Commission, 2012). Problem solving training outcome studies have indicated that it is possible to enhance participants' problem solving appraisal (Heppner et al., 2004), that is, problem-solving appraisal is a malleable construct. Thus, it would seem promising to enhance the problem-solving appraisal of Italian youth, and particularly targeted toward outcomes such as career planning and securing employment. Research is needed to examine efficacy and effectiveness problem-solving training methods for Italian youth not only to improve their career-related knowledge and skills, but ultimately to improve their employability.

Although the results of this study provide new information about problem solving appraisal in Italian youth, and problem solving appraisal in general, the study also highlights important methodological issues in assessing psychological constructs. There seem to be central and perhaps unique dimensions of problem-solving appraisal in Italian youth. Thus, the results of our investigation suggest that it is necessary to administer an inventory that has been developed and validated within the Italian cultural context to identify the nuances of problem solving appraisal within the Italian cultural context. It would most likely be misleading, if not unethical, to use the U.S.-based PSI to assess problem-solving appraisal in Italian youth. It is important for culturally competent researchers and practitioners to be aware of these culture-specific findings not only in Italy, but beyond Italy as well. Moreover, it is important for researchers to be cautious about the generalizability of psychological constructs in the absence of culture-specific psychometric evidence; the different constellations of items, as found in this study, may measure the same or slightly different constructs across different cultural contexts. In other words, our research clearly demonstrates that problem solving appraisal in U.S. adolescents looks different than problem solving appraisal in Italian youth.

Finally, the results of this study with Italian youth, as well as similar results found in several other countries such as South Africa, England, Taiwan, China, Canada, and the United States, all suggest that how one appraises his or her problem-solving capabilities is related to important outcomes such as psychological adjustment and career and decision-making. Even in collectivistic cultures such as Taiwan and mainland China, problem-solving appraisal (as measured by slightly different versions of the PSI) is predictive of psychological adjustment (Tian, Heppner, & Hou, 2013). Thus, even though problem solving appraisal may look slightly different in different cultural contexts, its relationship with important psychological outcomes, such as psychological and vocational adjustment, remain constant. This supports both the generalizability and power of problem-solving appraisal in people's lives across different cultural contexts, and underscores the need for additional examination studies of problem solving appraisal in less well-understood cultures and countries.

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