EVALUATION OF THE PERFORMANCE MODEL OF SOCIAL COGNITIVE THEORY OF CAREER: CONTRIBUTIONS OF DIFFERENTIAL LEARNING EXPERIENCES

Evaluación del modelo de rendimiento de la Teoría Social Cognitiva de la Carrera: aportes de las experiencias diferenciales de aprendizaje

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DOI: 10.13042/Bordon.2015.67410
Fecha de recepción: 09/12/2014 • Fecha de aceptación: 22/07/2015
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INTRODUCTION. The aim of this study was to evaluate the structure of the self-efficacy sources scale in Mathematics (Usher & Pajares, 2009) and the academic performance model proposed by the Social Cognitive Career Theory (Lent, Brown & Hackett, 1994), considering the self-efficacy sources, self-efficacy beliefs, outcome expectations, and goals. METHOD. We evaluated 574 Argentinean teenagers (between 12 and 16 years of age, M = 13.73). RESULTS. Confirmatory factor analysis showed that the model fitted the data well. Regarding internal consistency, the four self-efficacy sources reported adequate values (> 0.70). Nevertheless, vicarious experience presented low reliability. Structural equation modeling also indicated that Social Cognitive Career Theory performance model fits adequately to the local population in our study. The contribution of self-efficacy sources to self-efficacy beliefs was consistent with other research. In the case of outcome expectations, there was only a significant contribution from vicarious learning and physiological and emotional states. DISCUSSION. We discuss these results and analyze the limitations in order to propose further studies.

Keywords: Self-efficacy, Self-efficacy sources, Mathematics, Social Cognitive Theory, Social Cognitive Career Theory, academic performance, Argentinean Teenagers.
Introduction

The Social Cognitive Career Theory (hereafter SCCT, Lent, Brown & Hackett, 1994) represents an effort to integrate personal, behavioral, and contextual constructs in order to explain vocational interests, career selection, and academic performance. Based on Bandura's (1986) general social cognitive theory, the SCCT focuses on the triadic interaction among person, environment, and behavior and how this interaction shapes career development. Self-efficacy beliefs (i.e., a person's judgment about his or her ability to properly execute a set of actions), outcome expectations (i.e., imagined consequences of performing particular behaviors), and goals (i.e., determination to engage in a particular activity or affect a particular outcome) are central among these variables. The SCCT also recognizes that personal control is equally affected by environmental supports and barriers. The SCCT is also focused on the causal paths by which additional personal and environmental inputs (e.g., race/ethnicity, culture, gender, ability, personality traits, and educational experiences) influence career outcomes.

The SCCT performance model hypothesizes that cognitive ability influences student performance directly (through academic-related skills) and indirectly (through the mediating paths of self-efficacy beliefs and outcome expectations). College academic achievement, therefore, could be related to abilities and knowledge acquired during the educational and social trajectories of a given student. These trajectories involve a sequence of challenges and key events (such as performance accomplishments) occurring in high school and college, in which students are given the opportunity to develop skills (e.g., studying, taking tests), academic self-efficacy beliefs, and outcome expectations that contribute to academic success. Those students who develop outcome expectations will be more likely to approach (and less likely to avoid) challenging academic tasks (Lent et al., 1994). The SCCT posits that self-efficacy and outcome expectations affect performance through the influence of students' performance goals. Students with stronger self-efficacy beliefs and outcome expectations may set and work toward more challenging academic goals than those with weaker self-efficacy beliefs or less positive outcome expectations.

As highlighted by Lent et al. (1994), antecedents and contextual variables lead subjects to display different learning experiences (also called self-efficacy sources), which will in turn contribute to develop self-efficacy beliefs and outcome expectations. Nevertheless, in general, studies (Tokar, Buchanan, Subich, Hall & Williams, 2012) show a lack of interest in these experiences despite having a fundamental role in learning (Lent & Fouad, 2011). In this regard, some researchers have begun to study mechanisms that contribute to the formation of these beliefs (Lopez & Lent, 1992; Usher & Pajares, 2009; Usher & Pajares, 2006).

Bandura (1997) emphasizes that self-efficacy beliefs develop according to the interpretation that subjects make of the information arising from four self-efficacy sources: mastery experience, vicarious learning, social persuasions, and physiological and emotional states. The mastery is considered the most important source of self-efficacy, which refers to the previous successful experiences achieved by the student in a particular area. A second source is vicarious learning in which students evaluate their abilities by comparing their performance with their peers' and by how peers judge their own academic abilities. Social persuasion is the third source and contributes by messages that come from people who are truthful for the student, reinforcing effort and self-confidence. Lastly, physiological and emotional states such as anxiety, stress, fatigue, and positive moods, among others, may affect subject's performance. Students learn to interpret their physiological activity as an indicator of the personal...
deal with these difficulties and with the lack of coherence among sources assessment, Usher and Pajares (2009) figured out a new version of the scale of self-efficacy sources in Mathematics. The scale has internal structure studies (i.e., exploratory and confirmatory factorial analysis) and temporal stability. According to the authors, some previous studies had used items assessing the previous performance to study the source of mastery, disregarding a relevant measure: students’ interpretation on their own achievements. In regard to vicarious learning, some instruments apply only to the modeling that peers or adults can pose, limiting the contribution made by both together, whereas the attempts to assess the physiological-emotional states have only been based on measures of anxiety, ignoring other emotional states. Furthermore, some research have been undertaken using alternative measures for sources of self-efficacy, and instruments that have been not published in the literature (Bates & Khasawneh, 2007; Johnson, 2005).

In our context, researchers have adapted the scale proposed by Usher & Pajares (2009). Item translation studies, exploratory and confirmatory factorial analyses, reliability studies, and predictive validity of self-efficacy beliefs in mathematics studies have been carried out with a pilot sample (n=163) (Cupani, Zalazar-Jaime & Garrido, 2010; Zalazar-Jaime, Aparicio, Ramirez Flores & Garrido, 2011). Results have shown satisfactory values of reliability for mastery experience, physiological and emotional states and social persuasion subscales, but not for vicarious learning. The four sources structure was confirmed when items grouped by the content, by statistics, and by aleatory form were used as subtest indicators, but not when each item was used as indicator (Cupani, Zalazar-Jaime & Garrido, 2010).

Much of the research has been carried out with American teenagers, attending high school and college courses in the areas of science, engineering, and mathematics (Usher & Pajares, 2008;
López et al., 1997; O’Brien, Dukstein, Jackson, Tomlinson & Kamatuka, 1999; Ferry, Fouad & Smith, 2000; Lent et al., 2001), whereas a few studies have replicated results in other cultures and ethnic groups (Klassen, 2004; Usher & Pajares, 2006; Stevens, Olivarez, & Hamman, 2006; Blanco, 2011). For instance, some studies have highlighted that certain characteristics such as the country, social inequality, and cultural values could be associated with academic performance, directly or indirectly, through family and motivation (Chiu & Xihua, 2007). Indeed, in the framework of the SCCT, the transcultural perspective has gained impulse due to the need of considering how the different constructs and models develop in each particular context (Lent & Sheu, 2010; Lent, Brown, Nota, & Soresi, 2003; Lent, Paixao, Da Silva & Leitao, 2010). Even if there are current studies that have evaluated the model of academic performance proposed by the SCCT in our context (Cupani & Gnavi 2007; Cupani & Lorenzo, 2010; Cupani, Richaud de Minzi et al., 2010; Cupani & Pautassi, 2013), no research has sought to determine how self-efficacy sources contribute to beliefs development.

Therefore, in the present study, we seek to evaluate the internal structure of the Sources of Self-efficacy in Mathematics Scale (SSMS; Usher & Pajares, 2009) and its reliability. Besides, this study also intends to evaluate the academic performance model within the framework of the SCCT, taking into account self-efficacy sources, self-efficacy beliefs, outcome expectations, and goals. In order to do this, participants from public and private educational centers in the city of Córdoba (Argentina) were selected. The work is focused, particularly in Mathematics because of students’ poor performance level in the national assessment programme (Operativo Nacional de Evaluación; ONE, 2010) as well as in international programmes (Programme International Student Assessment; PISA, 2009). Besides, both programmes emphasize the importance of this field of knowledge that is necessary for subjects adapting to modern societies (Allexsaht-Snider & Hart, 2001; Middleton & Spanias, 1999). In fact, knowledge about the construction of ideas, application of procedures, and abilities to solve problems are critical for learning (Jaafar & Ayub, 2010).

**Methodology**

**Participants**

Participants were 574 secondary students from public (31.5%) and private (68.5%) schools in Córdoba (Argentina) because we attempt to represent mid-low and mid-high socioeconomic levels. The sample comprised 341 girls (59.4%) and 233 boys (40.6%), attending 8th and 9th grade of the General Basic School. The age range of students was 12 to 16 years ($M = 13.73$ years; $DS = 0.84$). Participants were ethnically homogeneous (mestizos) and were recruited on a voluntary basis, after obtaining research permission to administer the scales from the authorities of the schools (accidental sample; Kumar, 2005).

**Materials**

**Sources of Self-efficacy in Mathematics Scale** (SSMS; Usher & Pajares, 2009). This scale comprised 24 items that assess the four sources of self-efficacy (mastery experience, vicarious learning, social persuasion and physiological and emotional states). Participants are asked to respond by using a likert-type scale with five answer options where gradation goes from 1 “In total disagreement” to 5 “In total agreement”. The original version of the scale has reliability studies ($\alpha$ ranging from .84 to .88), internal consistency validity studies (exploratory and confirmatory factor analysis), and convergent validity evidence (Usher & Pajares, 2009). In a previous study, the instrument was adapted to our context (Zalazar-Jaime et al., 2011) and internal consistency ranged from $\alpha = .61$ to $\alpha = .83$.
Math outcome expectations scale (MOES). The MOES is a Spanish adaptation (Cupani, 2010) of the Math/Science Outcome Expectations Scale (MSOES; Fouad, Smith, & Enochs, 1997). The scale comprised nine items that assess middle school students’ beliefs about the potential consequences of achievement in math-related courses and activities. Participants rated each item (e.g., “If I learn math, I will have more options when choosing my major”) on a 5-point scale, ranging from 1 (totally agree) to 5 (totally disagree). The original version of this instrument (Fouad et al., 1997) has reported adequate values for internal consistency (α = .88). Studies on the Spanish version (see Cupani, 2010 for a review) show evidence of internal structure (exploratory and confirmatory factor analysis) and internal consistency (α = .85). Reliability was acceptable in the present study, Cronbach’s alpha was .84 for MOES scores.

Math Performance Goals Scale (MPGS). The MPGS is the Spanish adaptation (Cupani, 2010) of the subscale for Math/Science Intentions and Goals Scale (Fouad et al., 1997). The test has 10 items that assess middle school students’ intentions to pursue and persist in math-related courses in high school. Participants rated each item (e.g., “This year I propose to get good grades in math”) on a 5-point scale, ranging from 1 (totally agree) to 5 (totally disagree). The original version of this instrument has reported adequate values for internal consistency (α = .84). Previous studies on the Spanish scale (Cupani, 2010) have indicated that the test is reliable (α = .86) and valid (exploratory and confirmatory factor analysis). The Cronbach’s alpha in this study was .86 for MPGS scores.

Logical-Mathematical Self-efficacy Scale (LMSS). The LMSS has six items, and participants are asked to rate each item (e.g., “To solve math equation”) on a 10-point scale, ranging from 1 (“I am not confident at all in doing this”) to 10 (“I am completely confident about carrying out this activity successfully”). The LMSS belongs to the revised version of the Multiple Intelligences Self-Efficacy Inventory (MISEI; Pérez & Cupani, 2008). This test measures adolescents’ self-efficacy beliefs with regard to academic activities associated with the Multiple Intelligences Model (Gardner, 1999). The revised version can be applied during adolescence (i.e., 13 to 16 years olds). The MISEI-R has adequate reliability (α = .76 to .92) and evidence of internal structure validity through exploratory and confirmatory factor analysis. In the present study, Cronbach’s alpha was .88 for LMSS scores.

Procedure

The measures and the authorizations were collected during the same semester. The tests were administrated by the authors to the whole classes during the course of a regular school day. Participants received instructions about how to solve the questionnaires and they respond to all the questions. The different measures were taken with complete classes in three separate sessions, according to the theoretical and causal relations proposed by the SCCT: (1) SMSS, (2) LMSS, MOES, and (3) MPGS.

Analysis

SPSS software for Windows version 19.0 was used to prepare the data. Patterns of missing values were analyzed firstly in order to estimate if the distribution was at random (Tabachnick & Fidell, 2011). Medium average, standard deviation, distribution, asymmetry, and kurtosis were calculated for each item. To assess the index of skewness and kurtosis, the values over ±1.00 were considered as excellent while values less than ±2.00 as adequate (George & Mallery, 2011). Atypical univariate cases were identified by inspecting the z-score of each variable (z > ±3.29 was considered atypical). At the second step, confirmatory factor analysis was conducted to evaluate the feasibility of the model proposed with the four sources of self-efficacy.
Mastery Experience). Because the cases did not exceed 5%, missing data imputation was accomplished by mode substitution (Schafer, 1999). This imputation method was selected due to it allows to consider the 5 options (discrete) self-response scale, whereas other methods (e.g. estimation by maximization) tend to introduce continuous variables, changing the original distribution (Dominguez Lara, 2014). Just one atypical case was found (item 5, social persuasion). Skewness and kurtosis analysis for each item were made in order to check assumptions of normality within the sample. As a result of the study, 19 items showed higher levels of kurtosis and skewness ± 2.00, regarded as inappropriate (George & Mallery, 2011), and they were considered in posterior analysis.

CFA results showed an acceptable fit to the data (CFI .93, TLI .92, WRMR 1.53, RMSEA .08, RMSEA 90% CI .071 to .080). Standardized regression coefficients ($p \leq .01$) of Mastery Experience factor fluctuated from .66 to .87, the coefficient of Social Persuasion factor ranged from .69 to .81, coefficients for Physiological and Emotional States were from .63 a .75, and the standardized regression coefficient of Vicarious Learning ranged from .41 to .60 (see Figure 1).

Besides, composite reliability was estimated for each subscale of the instrument because this method uses items loads and weights, following the subjacent structural model, so that it presents less error variance. Values equal or greater than .70 were considered as acceptable (Nunnally, 1978). Value for mastery experience was $\rho = .89$, for vicarious experience was $\rho = .70$, for social persuasion was $\rho = .90$, and for emotional-physiological states was $\rho = .84$.

Evaluation model

Missing cases were analyzed. The results revealed that the percentage ranged between 5.1% (MHSS) and 8.5% (MPGS). Little’s proof (1988)
coefficient was carried out with the purpose of figuring out the relationships between the sources (Table 1). According to literature, self-efficacy is associated with mastery experience (.68) and vicarious learning (.36) whereas it is negatively associated with physiological and emotional states (-.55).

indicated that the pattern was completely missing at random (MCAR; \( \chi^2 = 31.12, \text{df} = 37, p \geq .741 \)). Raw scores for each subscale were then imputed using the multiple imputation method (n = 5). There were no values of skewness, kurtosis or outliers above the cut-off point. A bivariate analysis considering Pearson correlation

![Figure 1. Confirmatory Factor Analyses. Measurement Model for the 24-Item Sources of Middle School Mathematics Self-Efficacy Scale. All path coefficients were statistically significant (**p<.01).](image-url)
experience (.40), social persuasion (24), vicarious learning (.09) and, negatively, from physiological and emotional states (.21). Only vicarious learning (.28) and physiological and emotional states (.11) explained 31% of the variance in Math outcome expectations. The residuals were also moderate (median = .20, range = −.03 to .46). Figure 2 depicts the path coefficients for the proposed relationships among the variables in the theoretical model.

**Discussion**

The aim of this study was to assess the factorial structure of the self-efficacy sources scale and to evaluate the model of achievement proposed by the SCCT. We focused on Math because of the poor performance obtained by Argentinean secondary students and the concern to address how the different constructs of the SCCT operates in a particular context.

The theoretical structure of the four sources of self-efficacy model was corroborated as feasible.

**Table 1. Reliability Coefficients (RC), Means (M), Standard Deviations (SD), and Correlations Among Measures**

<table>
<thead>
<tr>
<th>Variable</th>
<th>RC</th>
<th>M</th>
<th>SD</th>
<th>MA</th>
<th>VE</th>
<th>SP</th>
<th>PS</th>
<th>LMSS</th>
<th>MOES</th>
<th>MPGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mastery Experience (MA)</td>
<td>.89 a</td>
<td>18.96</td>
<td>5.53</td>
<td>1.00</td>
<td>.39 **</td>
<td>.67 **</td>
<td>-.56 **</td>
<td>.68 **</td>
<td>.30 **</td>
<td>.33 **</td>
</tr>
<tr>
<td>Vicarious Learning (VL)</td>
<td>.70 a</td>
<td>18.7</td>
<td>4.14</td>
<td>1.00</td>
<td>.41 **</td>
<td>-.34 **</td>
<td>.36 **</td>
<td>.39 **</td>
<td>.37 **</td>
<td></td>
</tr>
<tr>
<td>Social Persuasions (SP)</td>
<td>.90 a</td>
<td>16.87</td>
<td>5.77</td>
<td>1.00</td>
<td>-.46 **</td>
<td>.60 **</td>
<td>.33 **</td>
<td>.29 **</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physiological and Emotional States (PS)</td>
<td>.84 a</td>
<td>14.89</td>
<td>5.34</td>
<td>1.00</td>
<td>-.55 **</td>
<td>-.22 **</td>
<td>-.24 **</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logical-Mathematical Self-Efficacy (LMSS)</td>
<td>.88 a</td>
<td>39.01</td>
<td>1.46</td>
<td>1.00</td>
<td>.45 **</td>
<td>.39 **</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Math Outcome Expectations (MOES)</td>
<td>.84 a</td>
<td>31.26</td>
<td>6.70</td>
<td>1.00</td>
<td>.42 **</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Math Performance Goals (MPGS)</td>
<td>.86 a</td>
<td>35.47</td>
<td>6.79</td>
<td>1.00</td>
<td></td>
<td></td>
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</table>

**confirming the Measurement Model.** Three latent variables were included in the measurement model together with nine indicators as observed variables. The quantity of indicators per factor was three. The indices showed the model had an optimal fitness (CFI = .99, TLI = .98, RMSEA = .05 90% CI .030 .064, SRMR = .03, χ² = 52.800, df = 24, p = .00) and all factors significantly loaded on to latent variables. Therefore, the fitness of the model appears strong enough to allow report and interpretation of the standardized path estimates (Browne, MacCallum, Kim, Anderson, & Glaser, 2002). The standardized path (p ≤ .05) ranged from .83 to .87 for Self-efficacy; from .76 to .86 for Math Outcome Expectations; and from .77 to .85 for Math Performance Goal.

**Partial Model Evaluation.** Results indicated the model fit the data well (CFI = .97, TLI = .95, RMSEA = .06 90% CI .049 .072, SRMR = .04, χ² = 152.89, df = 52, p = .00), and it explains 27% of the variance in Math Performance Goal. Besides, learning experiences explain 57% of the variance in self-efficacy beliefs in Mathematics and there is a contribution from mastery experience (.40), social persuasion (24), vicarious learning (.09) and, negatively, from physiological and emotional states (.21). Only vicarious learning (.28) and physiological and emotional states (.11) explained 31% of the variance in Math outcome expectations. The residuals were also moderate (median = .20, range = −.03 to .46). Figure 2 depicts the path coefficients for the proposed relationships among the variables in the theoretical model.
for our population (confirmatory factor analysis). However, these results differ from those already reported in our context (Cupani, Zalazar-Jaime et al., 2010), in which the four sources and 24 indicators (items) model do not properly fit the data. We believe that this difference is due to the parameters estimation used in this study. In fact, AFC studies generally used the maximum likelihood method (ML). Although this technique considers that the observed variables are continuous and normally distributed, these requirements are not met when the observed data are discrete (ordinal variables, for instance). Consequently, it could generate problems in model fit: the chi-square is enlarged, the parameters are underestimated, and standard error estimates tend to be biased downward (Muthén & Kaplan, 1985, 1992). By contrast, the robust minimum weighted squares (WLS) method (used in our study) is considered the most appropriate to deal with categorical (Likert scales, for example) or not normally distributed data (Raykov & Marcoulides, 2006), and when the sample size is not large enough (≥ 200) (Muthén, du Toit, & Spisic., 1997; Flo- ra & Curran, 2004).

Reliability rates in this study were satisfactory and the factors presented values higher than ≥ .80 (Nunnally, 1978), except from vicarious learning even if its reliability factor was acceptable (.70). These findings are also consistent with previous studies (Lent et al., 1991). A plausible explanation could be related to the multidimensional nature of the sources self-efficacy construct, which cannot be assessed through an unique subscale (Usher & Pajares, 2008).

Moreover, as suggested by Bandura (1997), another possible explanation could be the fact that teenagers may be less likely to be influenced by learning models, giving little relevance to them. Thus, future studies in our context should consider the influence of the social support that comes from parents, teachers, close friends, and classmates as separate factors. According to the literature, close friends and classmates may have a more important role than adults (teachers and parents) because of the similarity in personal characteristics (such as age and sex; Demaray & Malecki, 2002). Furthermore, despite the importance of one source or another, they all together have a differential effect on students’ academic performance (Kenny, Blustein, Chaves, Grossman & Gallagher, 2003; Baker, 1999; Schultheiss, Palma, Predragovich, & Glasscock, 2002).

On the other hand, structural equation model indicated that the model proposed by Lent et
al. (1994) fits adequately to the local population in our study. In fact, as observed by Bandura (1997) and other researchers (Lent, Brown, Cover, & Nijjer, 1996, Lent et al, 1991; Lent, Lopez, Brown, & Gore, 1996), the self-efficacy sources contributed to explain an important percentage of the variance in Math self-efficacy beliefs: mastery experience, social persuasion, and vicarious learning contributed positively, whereas physiological and emotional states negatively.

The SCCT consider that the sources of self-efficacy contribute to develop the outcome expectations. In this study, we partially corroborate the assertion. Indeed, the vicarious learning sources and the physiological and emotional states showed a contribution to the outcome expectations development. As it has been observed in other local studies (Cupani & Lorenzo, 2010, Cupani & Pautassi, 2013) and international research (Ferry et al., 2000; Navarro, Flores & Worthington, 2007), the mastery experience did not contribute significantly to expectations. These contradictory results could be explained by the lack of articulation between learning experiences and outcome expectations within the Social Cognitive Theory (Bandura, 1986) and the SCCT (Lent et al., 1994).

Another plausible explanation could be related to the way in which outcome expectations is operationalized. As Fouad & Guillen (2006) have argued, the measures only consider the symbolic dimension, excluding self-evaluation (e.g., If I do well in Mathematics or Science, I’ll feel better), and physiological aspects (e.g., I will be anxious if I don’t do well in Mathematics or Science) and focusing mainly on the positive results of actions at the expense of the negative aspects (Swanson & Gore, 2000). Future research should explore how these sources of self-efficacy contribute to develop outcome expectations using a scale that measures different dimensions of the construct. Despite the fact that the sample was accidental and not probabilistic, other aspects should be kept in mind as potential limitations to generalize these results. One potential limitation is that part of the students belongs to private rather than public institutions. It should be noted that public education in Argentina is characterized as free and unrestricted, while private education requires payment of a monthly fee and, generally, has a higher workload and infrastructure. Thus, these distinctive features could suggest that the degree of parental involvement and students’ commitment in the learning processes may be greater in private schools than in public schools (Beltran, 2012). Likewise, these particular aspects could support the idea that the education provided by private schools may have higher quality and students could find more learning opportunities. However, this assumption was not supported by other studies (Suarez, Torella, Perazza, & Yacov, 2011). A third limitation is that the associations found in this study between sources of self-efficacy and self-efficacy beliefs cannot be generalized to other academic domains. In other words, the sources that contribute to enhance confidence in mathematics can be different from those sources needed to enhance confidence in other academic domains, such as writing or learning a foreign language (Usher & Pajares, 2009).

In summary, results encourage further research. In fact, the sources of self-efficacy scale appear to be a feasible option to assess self-efficacy among Argentinean adolescents. In future studies, it could be relevant to focus on comparing how self-efficacy sources contribute to the development of self-efficacy beliefs in mathematics across different groups (considering separately gender, skills, and socioeconomic level as grouping factors). Moreover, forthcoming studies should adapt this scale to other domains, such as language and science, and explore how other variables (i.e. personality traits) contribute indirectly to self-efficacy beliefs development.
References


Evaluación del modelo de rendimiento de la Teoría Social Cognitiva de la Carrera: aportes de las experiencias diferenciales de aprendizaje

INTRODUCCIÓN. El propósito de este estudio consistió en evaluar la estructura de la escala de fuentes de autoeficacia en matemática (Usher & Pajares, 2009) y el modelo de rendimiento académico propuesto por la Teoría Social Cognitiva de la Carrera (SCCT, Lent, Brown & Hackett, 1994), considerando las fuentes de autoeficacia (también denominadas como experiencias diferenciales de aprendizaje), creencias de autoeficacia, expectativas de resultado y metas. MÉTODO. Participaron 574 adolescentes argentinos (edades comprendidas entre 12 a 16 años, $M = 13.76$ años). RESULTADOS. El análisis factorial confirmatorio indicó un ajuste aceptable a los datos. Respecto de la consistencia interna, se observó que las cuatro fuentes de autoeficacia mostraron valores apropiados ($>.70$). Sin embargo, tal como sucede en otros estudios, la fuente de experiencia vicaria continúa presentando bajos coeficientes de confiabilidad. Por su parte, el modelo de ecuaciones estructurales indicó que el modelo de rendimiento propuesto por la SCCT se ajusta adecuadamente a la población local de estudio. La contribución de las fuentes de autoeficacia sobre las creencias de autoeficacia fue consistente con lo reportado por la literatura. En el caso de las expectativas de resultados, se observó que solo las fuentes de aprendizaje vicario y estados fisiológicos y emocionales presentaron...
contribuciones significativas. **DISCUSIÓN.** Se discuten los resultados, analizan las limitaciones y se proponen nuevos estudios.

**Palabras claves:** Autoeficacia, Fuentes de autoeficacia, Matemática, Teoría Social Cognitiva, Teoría Social Cognitiva de la Carrera, Rendimiento académico, Adolescentes argentinos.

**Résumé**

Evaluation d’un modèle de performance académique d’après la théorie sociale cognitive d’orientation scolaire et professionnelle. Contributions des expériences d’apprentissage différentiel


**MÉTHODE.** Notre échantillon était composé de 574 adolescents argents (âgés de 12 à 16 ans, M = 13,76 ans). **RÉSULTATS.** L’analyse factorielle confirmatoire a indiqué un ajustement acceptable aux données. En ce qui concerne la cohérence interne, les quatre sources de l’auto-efficacité ont montré des valeurs appropriées (> 0,70). Pourtant, de la même manière que dans des autres études, la source de l’expérience indirecte présente un coefficient de fiabilité faible. De son côté, le modèle d’équation structurelle a indiqué que le modèle proposé par la théorie SCCT s’adapte convenablement à l’étude de la population locale. La contribution des sources de croyances d’auto-efficacité aux croyances d’auto-efficacité a été cohérent avec ce qui est rapporté dans la littérature. Dans le cas des résultats, seules les sources d’apprentissage indirect et les états physiologiques et émotionnels ont montré des conclusions significatives. **DISCUSSION.** Les résultats sont discutés, les limitations sont analysés et des études complémentaires sont proposées.

**Mots clés:** Auto-efficacité, Sources d’auto-efficacité, Mathématiques, Théorie de la cognition sociale, Théorie sociale cognitive de l’orientation scolaire et professionnelle, Résultats scolaires, Adolescents argentins.

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