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Measurement invariance of self-continuity strategies: Comparisons of early adolescents from Brazil, Canada and Colombia

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Data from 655 early adolescents from three contexts (Curitiba, Brazil; Montreal, Canada and Barranquilla, Colombia) were used to test for measurement invariance in the constructs of essentialism and narrativism. These two different strategies have been proposed to explain the perceptions of stability of self-continuity over time. Essentialism predicates self-continuity on some fundamental, unchanging aspect of the self. In contrast, narrativism is an understanding of self-continuity as a result of one's cumulative experiences and decisions. Previous research using interview methods have found that these two strategies are mutually exclusive expressions of self-continuity. The current study sought to test this conceptualization using a questionnaire that assessed the underlying structural relation between essentialism and narrativism. The analyses supported a two factor model with measurement invariance across samples

allowing for a comparison of mean differences across language and cultural barriers. As a whole, these findings highlight the need to examine developmental changes in warranting strategies for self-continuity.

Two different approaches have been proposed to explain how individuals account for connections between themselves in the past, present and future, and develop a strategy for perceiving their sameness in light of inevitable change (Chandler, Lalonde, Sokol, & Hallett, 2003). The first, essentialism, predicates self-continuity on some fundamental, unchanging aspect of the self. In contrast, narrativism is an understanding of self-continuity contingent on one's cumulative experiences and decisions. Chandler and colleagues observed that healthy conceptualizations of self-continuity were associated with better mental health overall and lower suicidal ideation specifically. This previous research using interview methods, however, has found that these two strategies are mutually exclusive expressions of self-continuity. The current study sought to test this conceptualization using self-reports in early adolescent samples from three different cultural contexts.

What is self-continuity and why it is important developmentally?

This concept of self-continuity, like children's more general sense of self, becomes more complex as children develop (Chandler, Boyes, Ball, & Hala, 1987). Over the course of development, however, individuals go through a number of iterative changes in their specific strategies for self-continuity (see Chandler et al., 2003, for a review). This iterative change results in points in development at which children and adolescents lack a clear strategy for personal continuity, as they have rejected a previous strategy and have yet to develop another one to replace it. Therefore the study of these differing strategies is of developmental significance and, as detailed below, of contextual significance as well.

Importance of cross-cultural validation of this construct

Underscoring this, Michael Chandler and colleagues' research (2003) among First Nations communities in western Canada aimed to identify nuanced cultural differences in the expression of self-continuity. In particular, compared to Canadians of European descent who used more essentialist strategies, adolescents from First Nations communities employed more narrativist strategies of self-continuity. These findings underscore nuanced

differences between cultural contexts in conceptualizations of the self. However, beyond this initial study of differences between cultural groups in a North-American context, cross-cultural patterns in self-continuity have yet to be investigated in a systematic fashion.

The current study

The current study aimed to test the measurement equivalence of essentialism and narrativism across three different contexts (Montreal, Barranquilla and Curitiba). In particular, by using a small number of items assessing each construct (based on previous pilot testing), we constructed latent factors measuring these two aspects of self-continuity. By first demonstrating measurement invariance, we could then make comparisons of group mean differences.

METHOD

Participants

The sample consisted of 655 early adolescents ($M_{age} = 12.32$ years, $SD = 1.76$; 64.2% female) from Montréal, Canada ($n = 180$), Barranquilla, Colombia ($n = 150$) and Curitiba, Brazil ($n = 325$). Respondents attended mixed-sex schools (two in Montréal, two in Barranquilla and three in Curitiba). These samples were chosen for their range, geographically and culturally yet were homogeneous in their school structure and peer networks (see Santo et al. in press, for a more detailed description of the comparisons between the samples in Montréal and Barranquilla).

Procedure

Recruitment varied depending on the location of the data collection. In Montréal, permission was first obtained from the relevant school board, then from school principals. Active consent was required from parents of potential participants; over 80% of parents provided consent for their children and children provided assent. In Barranquilla and Curitiba, permission for participation was obtained from school principals. Participants were then informed of the purposes and procedures of the study in their classrooms and provided assent. Using this recruitment procedure, a participation rate of approximately 95% was obtained (with the exception of children who were absent on the day of testing).

The questionnaire was group administered to participating students during their homeroom class time. Montreal children participating in the study completed an English version of the questionnaires while Colombian

children completed a Spanish version and Brazilian children completed a Portuguese version. The original English version of the scales was pilot tested in a North-American sample (Santo, Martin-Storey, Recchia, & Bukowski, 2009) and then given to psychologists in Barranquilla and Curitiba, who assessed their meaning and relevance. The questionnaire was translated into Spanish and Portuguese by translators working in the fields of education and psychology, and then back-translated into English by a separate group to ensure that the meaning of items was retained in the translation.

Measures

The Strategies for Self-Continuity Scale (SSCS) was originally created based on responses to interview questions reported by Chandler et al. (2003) to measure the two different strategies that adolescents use to explain their self-continuity. As alluded to above, a larger number of items were pilot tested so that the two-factor scale (each with four indicators) might be used to measure essentialism and narratives in the current sample. Participants were asked rate their agreement to each item as to why they remain the same over time using a 5-point Likert scale ranging from "*Strongly disagree*" to "*Strongly agree*". The essentialism items comprised of the following: "... because I have the same brain (item 1)"; "... because I like the same things (item 3)"; "... because I have the same personality (item 5)"; and "... because I look the same" (item 7). The narrativism items comprised of the following: "... because my choices show who I am" (item 2); "... because of the things I have done" (item 4); "... because of what happened to me in the past" (item 6); and "... because of things that happen to me" (item 8).

RESULTS

For the analyses, multi-group structural equation modelling was used to compare the factor structures across samples (Muthén & Muthén, 2006). An initial model (model 1) was tested using all eight indicators loaded onto a single factor using the full sample (see Table 1 for fit indices). While it was an acceptable fit to the data (for a description of acceptable fit indices see Kline, 2010), the purpose of this was to test whether a two-factor solution (model 2) represented a better fit. In accordance to our expectations, the less parsimonious two-factor solution (Figure 1) fitted the data significantly better, $\Delta\chi^2(1) = 8.38$, $p < .05$. However, contrary to expectations based on the literature (using interviews; Chandler et al., 2003), these constructs were strongly correlated ($r = .86$, $p < .05$). Nevertheless, this strong association replicates past work using Likert scales (Santo et al., 2009). It is worth noting that modifications indices suggested correlating the error terms of the

TABLE 1
Summary of model fit indices

Model description	χ^2	df	AIC	CFI	RMSEA	SRMR
1. Single factor model: Full sample	34.64	19	16,214.36	.97	.04	.03
2. Two factor model: Full sample	26.26	18	16,207.97	.99	.03	.03
3. Constrained factor loadings (Metric invariance model)	95.79*	66	15,983.84	.96	.05	.06
4. Constrained intercepts/thresholds	119.85*	66	16,007.91	.93	.06	.07
5. Scalar invariance model	143.82*	78	16,007.87	.91	.06	.07
6. Full measurement invariance (All error variances constrained)	295.65*	94	16,127.70	.73	.10	.17
7. Partial measurement invariance (Half of variances constrained)	164.34*	86	16,012.39	.90	.07	.09
8. Factor covariance invariance model	169.05*	88	16,013.11	.90	.07	.09

Note: * Denotes significant chi-squared values ($p < .05$).
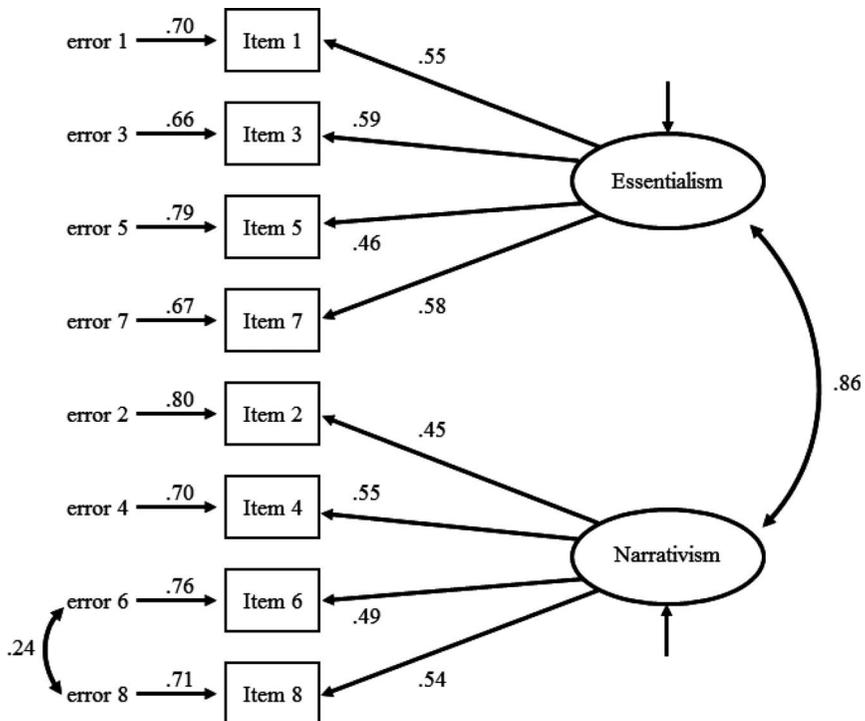

Figure 1. Confirmatory factor analysis results for the full sample. Notes: Standardized coefficients are reported. $\chi^2(18) = 26.26$; $p > .05$; $CFI = .99$; $RMSEA = .03$; $SRMR = .03$.

last two indicators of narrativism, $\Delta\chi^2(1) = 20.54$, $p < .05$. Given the similarity in the wording of the items (specifically items 6 and 8), we added the covariance.

In model 3, the factors loadings were constrained to be equal in each group. Following that, model 4 constrained the intercepts. More interestingly, in model 5 the factor loadings and intercepts were constrained to be equal in each group. While the model fit significantly decreased compared to model 2, $\Delta\chi^2(60) = 115.56$, $p < .05$, the resulting fit indices were still acceptable. Next, model 6 constrained all factor loadings, intercepts and error variances to be equal across groups. Again, this led to a significant decrease in the model fit statistics, $\Delta\chi^2(16) = 151.83$, $p < .05$, but the resulting model had less than acceptable overall fit indices. As such, a partial error variance model (model 7) was tested in which the error variances of two out of the four indicators for each latent construct was freed (allowed to vary across groups). Though this still reflected a significant decrease in the model fit, $\Delta\chi^2(8)$ 20.52, $p < .05$, the result fit indices were acceptable. Thus, based on these results, only partial error variance invariance may be assumed in the current sample. Nevertheless, support exists to suggest that the groups can still be compared based on their latent means (Steinmetz, Schmidt, Tina-Booh, Wieczorek, & Schwartz, 2009; Van de Schoot, Lugtig, & Hox, 2012).

In the last step, the correlation between essentialism and narrativism was fixed to be equal across groups (model 8). The additional constraint did not significantly worsen the model, $\Delta\chi^2(2) = 4.71$, $p > .05$, and the resulting fit statistics were acceptable. Thus, this final model revealed interesting mean differences in essentialism and narrativism (Figure 2). Contrary to expectations, the South-American samples reported significantly higher essentialism. For narrativism, the sample in Curitiba reported significantly higher values than the Montreal and Barranquilla groups. It is worth noting that subtle differences in the factor variances were observed in that the Montréal and Barranquilla samples had almost twice the variability in essentialism compared to the Curitiba group.

DISCUSSION

The current study was designed to test for measurement equivalence in two varying strategies of self-continuity among early adolescents from three different samples. Our rationale was that understanding differences in these constructs from a contextual perspective would bolster the potential of obtaining measurement equivalence when studying these constructs longitudinally. As such, the support for the overarching measurement model offers the opportunity to explore long-term changes in self-continuity.

The findings from the current study demonstrated that early adolescents' essentialist and narrativist strategies for self-continuity were reliably
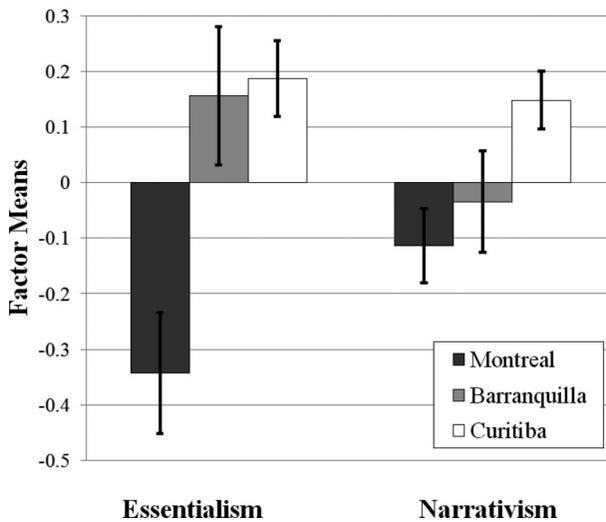
Figure 2. Latent factor means of essentialism and narrativism as a function of sample. *Note*: Error bars reflect the 95% confidence intervals.

measurable using self-report Likert scales. Interestingly, these two factors were measurably distinct from each other and were not necessarily mutually exclusive as evidenced by the strong correlation between them. More importantly however, the measurement of these two strategies was largely comparable between the Montréal, Barranquilla and Curitiba samples (with structural, scalar, metric, partial error variance and factor covariance invariance). These tests of measurement invariance allowed for the comparisons of differences in the factor means and variances across samples with some interesting differences between the three testing sites. The observed mean differences however were not in the expected directions. These findings suggest that nuanced cross-cultural differences may elucidate the processes behind the mean comparisons. In particular, the current study illustrates the potential ecological fallacy critique of assuming that South-American populations are inherently homogeneous. Alternatively, given the noticeable variability (of means and standard deviations) in self-continuity strategies, future researchers should consider the implications of measuring these constructs in a groupwise (i.e., classroom) based format such that aspects of the classroom context like peer groups or teachers may explain some of this variability.

Given the overall findings of this study, future research should aim to replicate these results and more importantly account for the contextual

differences observed herein. Lastly, these findings highlight the need to now examine developmental changes in warranting strategies for self-continuity among early adolescents.

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