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Abstract

The individually importance-weighted average (IIWA) model posits that the contribution of specific areas of self-concept to global self-esteem varies systematically with the individual importance placed on each specific component. Although intuitively appealing, this model has weak empirical support; thus, within the framework of a substantive-methodological synergy, we propose a multiple-item latent approach to the IIWA model as applied to a range of self-concept domains (physical, academic, spiritual self-concepts) and subdomains (appearance, math, verbal self-concepts) in young adolescents from two countries. Tests considering simultaneously the effects of self-concept domains on trait self-esteem did not support the IIWA model. On the contrary, support for a normative group importance model was found, in which importance varied as a function of domains but not individuals. Individuals differentially weight the various components of self-concept; however, the weights are largely determined by normative processes, so that little additional information is gained from individual weightings.

Keywords

individually importance-weighted average, self-esteem, substantive-methodological synergy, multiple-item latent approach, William James

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In psychology, as in other areas of research, theory, good measurement, and practice are inexorably related such that the neglect of one undermines the pursuit of the others. The present investigation is guided by a substantive-methodological synergy (Marsh & Hau, 2007) in which we use a multiple-item latent approach, coupled with latent interactions, to evaluate predictions from the individually importance-weighted average (IIWA) model of self-concept formation that dates back to William James (1890/1963). Controversially, research has shown little empirical support for the IIWA model, which posits that the contribution of specific self-domains to global self-esteem is moderated by the individual importance of each domain. Therefore, the critical prediction to support the IIWA model is a positive interaction between self-domains and individual importance. However, research has shown that interaction effects are difficult to find and frequently cannot be replicated (McClelland & Judd, 1993). For this reason, to test interactions, we used a stronger methodology with broad applicability to various areas of psychology, and we propose paradigmatic models integrating state-of-the-art methodology for future studies.

Theoretical Relevance of Interaction Models in Psychology and Methodological Limitations

Although the substantive focus of the present study is on self-concept, the methodological concerns with the estimation of interaction effects and the limitations inherent in traditional tests of interactions effects are important concerns in psychology and the social sciences more generally. Many psychological theories and models explicitly hypothesize interaction effects. For example, some forms

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of expectancy-value theory (Nagengast et al., 2011) hypothesize that resultant motivation is determined by the interaction between expectancy of success and the value placed on the outcome by the individual. Mischel and Shoda (1995) posited that stable personality traits might emerge from the interaction between cognitive and affective processes. In the theory of planned behavior that is used widely in social psychology, a key prediction is the interaction between beliefs regarding the likelihood of consequences associated with a behavior and the perceived desirability of those consequences (Ajzen, 1991). Indeed, there are many other examples from diverse social science disciplines (Cronbach & Snow, 1977; Maccoby & Martin, 1983). However, despite the relevance of interaction effects for the social sciences, such effects are often elusive, especially in applied research. McClelland and Judd (1993) demonstrated that "tests of interactions in field studies have often less than 20% of the efficiency of optimal experimental tests" (p. 376) and are notably hard to detect. One of the reasons for this is that most applied studies of interaction effects use manifest approaches based on scale score aggregates, such as multiple regression analysis and ANOVA. Scale scores are easy to compute (mean or sum of the scores reported by individuals on a set of items that measure the construct of interest) but often include substantial measurement error (Thorndike, Cunningham, Thorndike, & Hagen, 1991) that attenuates the observed relations. This problem is exacerbated because measurement error in interactions is a multiplicative function of each of the variables involved in the interaction and is likely to be substantial unless first-order (main effect) variables are almost perfectly reliable. This problem can be partially resolved using latent approaches to interactions (Coenders, Batista-Foguet, & Saris, 2006; Little, Bovaird, & Widaman, 2006; Marsh, Hau, Wen, Nagengast, & Morin, in press; Marsh, Wen, & Hau, 2004; Marsh, Wen, Hau, & Nagengast, in press; Moosbrugger, Schermelleh-Engel, & Klein, 1997). The use of multiple indicators to assess each latent construct provides stronger tests of the underlying factor structure of each variable and allows researchers to control for unreliability (Bollen, 1989), not only in the constructs themselves but also in their interactions. For instance, historically, the expectancy × value theory was based on interaction assumptions. Indeed, the theory posits that motivation will be high only if both the expectancy of success and the value attributed to the outcome are high. However, Nagengast et al. (2011) noted that this expectancy × value interaction mysteriously disappeared from published research more than 25 years ago, mostly due to repeated failure to find significant interaction effects with traditional approaches. Using more appropriate latent interaction models, they provide cross-cultural support for the theory and the otherwise elusive interaction effect, showing how stronger methodology can help in addressing important substantive and theoretical issues.

Substantive Issues: The Jamesian Model of Importance-Weighted Averages

James (1890/1963) claimed that a person cannot be all things; thus, each individual must select carefully "the strongest, truest, deepest self . . . on which to stake his salvation" (p. 310). This would mean that self-concepts in different domains contribute to a greater or lesser extent to the prediction of global self-esteem, depending on the relative importance of each individual attribute to various self-domains; domain-specific self-concepts would be weighted by their individual importance. Thus, the influence of self-perceptions on self-esteem in a particular domain is purportedly moderated by (interact with) the importance placed on that domain by the individual. Domains perceived to be more important by an individual thus would make a greater contribution to global self-esteem: positively if self-perceptions in the most important domains are good and negatively if the self-perceptions are poor.

Multidimensional-Hierarchical Self-Conceptions

The IIWA model was proposed a century ago, but interest in it has been renewed by the development of a multidimensional and hierarchical model of self-concept. This model (Marsh & Craven, 2006; Shavelson, Hubner, & Stanton, 1976) portrays self-concept as a pyramid, with global self-esteem at the apex, specific self-domains (e.g., physical self-concept) in the middle, and more specific subdomains at the bottom (e.g., physical appearance).

Adolescence clearly represents a crucial developmental period in the formation and organization of multidimensional and hierarchical self-conceptions (Coleman & Hendry, 1999). One of the crucial developmental tasks facing adolescents is the reorganization of their self-conceptions according to their developing identities, the multiple biopsychosocial transformations that mark adolescence, normative peer pressure, and the standards of the adult society that they will soon need to join (Crain, 1996; Marsh, 1989; Shapka & Keating, 2005). According to the multidimensional model of self-concept, self-domains become increasingly more differentiated in response to these different forms of influence, particularly during early adolescence following the onset of puberty (Harter, 1999; Marsh, 1989; Shavelson et al., 1976). Early adolescence thus represents a core period for identity development that may likely exert lasting impact on youths' global self-esteem and multidimensional self-conceptions.

Weighted Average Importance Approaches

We consider three alternative models of how the importance attributed to each self-concept domain is weighted in the formulation of self-esteem (Figure 1).

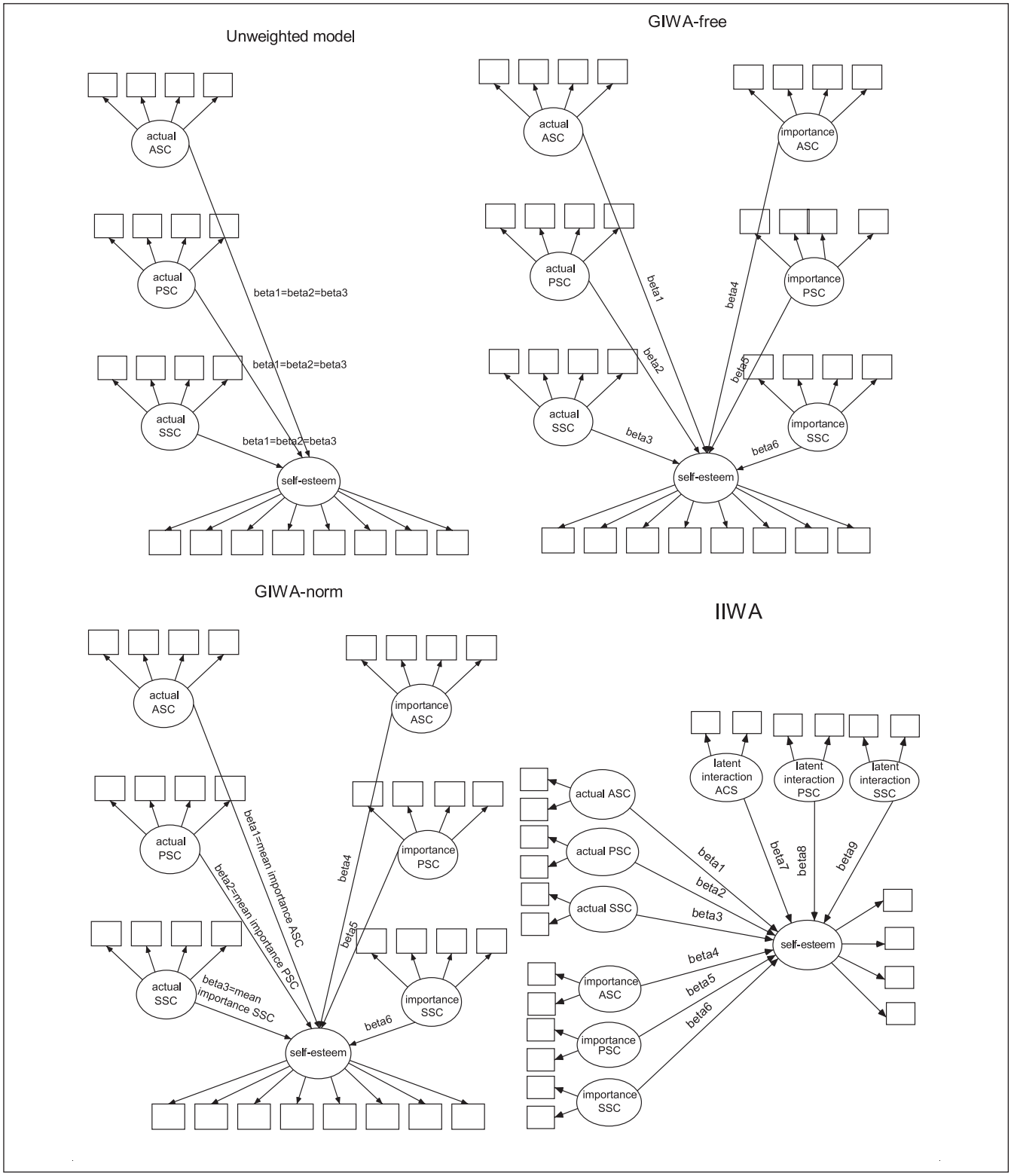

Figure 1. Importance-weighted models

Note: ASC = academic self-concept; PSC = physical self-concept; SSC = spiritual self-concept; Unweighted model = model with all self-concept paths to self-esteem constrained to be equal (no importance factors); GIWA-free = group importance-weighted approach with free estimates for the regression paths of each self-domain to self-esteem; GIWA-norm = group importance-weighted approach with regression paths of each self-domain to self-esteem constrained to the corresponding group importance latent mean; IIWA = individually importance-weighted approach, with free estimates for the regression paths of each self-domain, importance and interactions factors to self-esteem. To keep the model clear, we have drawn fewer indicators than were used to run the model. Indeed, the same number of indicators has been used for all the importance models. Measurement errors have been included in all the models.

Simple-unweighted approach. This model considers the weights to be constant across all self-concept domains and individuals. For example, this approach requires that physical appearance self-concept and math self-concept are each given the same weight in the prediction of global self-esteem and that this same weight is applied to all individuals. Support for this model would argue against the Jamesian hypothesis.

Group importance-weighted approach (GIWA). This model allows weights to differ according to the self-concept domain but not according to the importance that an individual places on each domain, because the weights are not determined individually for each person. For example, using information about importance, physical appearance self-concept can be weighted more than math self-concept, but the same (larger) weight must be assigned to all individuals for physical appearance self-concept and the same (smaller) weight must be assigned to all individuals for math self-concept. The weights for each self-concept can be assigned in various ways, leading to different specifications of the model. For example, they can be established empirically as freely estimated weights from regression models (hereafter called GIWA-free) or they can be derived on the basis of group average importance ratings/aggregates of each self-concept, hereafter called GIWA-normative (GIWA-norm).

IIWA. In this model, weights differ across self-concept domains and individuals. For example, math self-concept can be weighted more than physical appearance self-concept for Person A (who values math competence), but physical appearance self-concept can be weighted more than math self-concept for Person B (who values physical appearance). As with the GIWA, different indices have been used in the literature (e.g., ipsative scores by Marsh, 1993; within-person profile similarity index by Pelham & Swann, 1989); they all share an idiographic spirit (a within-person approach vs. a between-person approach). Therefore, the IIWA model is inherently idiographic because all the weights are allowed to differ across individuals, in contrast to GIWA models, which are nomothetic.

The Generalized Multiple Regression Approach

These models (Figure 1) can be contrasted to test the validity of the Jamesian model of importance. As argued by Marsh (2008), "The critical test of the individual-importance hypothesis is whether self-concepts weighted by individual perceptions of importance [IIWA] are substantially better able to predict self-esteem than the self-concept ratings alone" (p. 1084). To test this, Marsh (1986) initially proposed a generalized multiple regression approach applied to scale scores in which the different sets of scores (self-concepts, importance ratings, interaction between the two) are used as predictors of self-esteem in different blocks; thus, the increment in explained variance (R^2) for the model, including the interaction terms, can be examined. The importance-by-self-concept domain interaction is a critical test of the Jamesian IIWA model. Support for the IIWA model requires significant and positive interaction effects on self-esteem (Figure 2). Furthermore, it is critical to consider the difference between the GIWA and IIWA models (Marsh, 2008), because only the IIWA model (based on intraindividual differences) supports the Jamesian hypothesis. A potentially important limitation in much research is the failure to differentiate between IIWA and GIWA models.

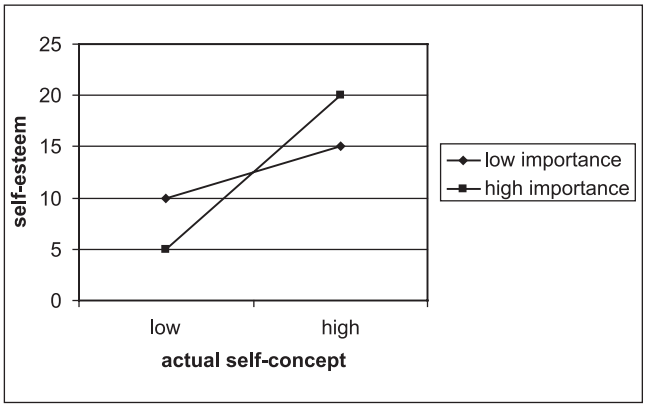

Figure 2. Predictions based on William James's individual model of importance

Methodological Issues and Empirical Results on Weighted Importance Models

Most evaluations of the Jamesian hypothesis based on the generalized multiple regression approach failed to support the IIWA model for the determination of global self-esteem levels (Marsh, 1986, 1993, 1994, 1995; Pelham, 1995; Pelham & Swann, 1989), although previous research provided some support for the GIWA model (Marsh, 1986, 1993). Pelham and Swann (1989) claimed that a differential importance index based on the IIWA moderated the relationship between self-views and self-esteem, at least in subjects with low self-views. However, a reanalysis of Pelham and Swann data based on hierarchical multiple regressions provided no support for the IIWA model (Marsh, 1993). In a longitudinal study, Shapka and Keating (2005) found that weighting self-concepts by the importance each adolescent places on a specific domain did not improve the ability of specific domains to predict global self-esteem, and thus the IIWA model was not supported.

Developments in Empirical Research on the IIWA Model

An important limitation of the literature on importance-weighted models is the use of single items to evaluate

importance in different self-domains (e.g., Farmer, Jarvis, Berent, & Corbett, 2001, Hardy & Moriarty, 2006; Hoge & McCarthy, 1984; Marsh, 1993, 2008; Pelham & Swann, 1989). Hardy and Moriarty (2006), using multiple items, proposed a discounting method based on an idiographic approach. They found that the three most important domains predicted a larger unique portion of the variance in self-esteem than did the three least important scales. However, in a reanalysis of Hardy and Moriarty's data, Marsh (2008) demonstrated that the discounting method confounds the normative importance effect with the idiographic individual effect. Indeed, the high–low differences in normatively important self-concepts (for all participants) were significantly related to self-esteem, whereas those based on individual-importance ratings were not, thus supporting the normative models of importance.

To address reliability limitations, multiple items can be used to test structural equation models based on latent variables that allow for the control of measurement error (Marsh, 2008; Scalas & Marsh, 2008). To some extent, this approach was used recently by Lindwall, Aşçi, Palmeira, Fox, and Hagger (2011) to test relations between self-esteem and the physical self-concept domain and subdomains. They found that low actual self-perception led to lower self-esteem when importance was high than when importance was low (Figure 2). However, the Jamesian model also predicts that the positive effect of actual self-perceptions should be stronger (i.e., leading to higher self-esteem) when importance is high than when importance is low, and this part of the model was not supported by Lindwall et al.

Furthermore, although Lindwall et al. (2011) appropriately argued for the importance of a multiple-item latent-variable approach (Marsh, 2008; Scalas & Marsh, 2008), they actually tested their predictions with item-parcel scores, which may camouflage misfits in ways that distort the interpretation of the results (Bandalos, 2002; Marsh et al., 2012). Moreover, they did not consider latent-variable models simultaneously, including all self-concept domains, importance ratings, and interactions. For these models, Lindwall et al. had to rely on a traditional multiple regression approach based on aggregated scale scores and found almost no support for the IIWA model (only one out of four interactions was significant and positive). Therefore, as it is not possible to directly compare the results from latent and manifest models or to determine why they differ, further research with stronger statistical models clearly is needed.

Another possible explanation for the mixed results found in previous studies is the low variability of the importance ratings for the constructs examined in past research. Indeed, as noted by Marsh (1986, 2008), the IIWA model might work only for those domains in which there are big differences in importance scores between people; for this reason, the spiritual domain might be particularly relevant, because there is substantial variation in the importance that different individuals place on spirituality. Nevertheless, no subsequent research has tested the IIWA in relation to spiritual self-concept.

In a similar vein, Lindwall et al. (2011) noted that an apparent ceiling effect in importance ratings of appearance might have prevented the interaction between appearance self-concept and its importance from being significant. Indeed, the appearance domain has been considered a universal self-schema (Markus, Hamill, & Sentis, 1987) constantly accessible in the working self-concept (Markus & Wurf, 1987), and thus important for almost everybody. Therefore, some results of the Lindwall et al. study are consistent with the GIWA model and contrary to the Jamesian model of importance (see also online Appendix 1).

The Present Investigation

The present study focuses on tests of the IIWA model in adolescents from two different countries (the United Kingdom and Italy). Within the framework of a hierarchical and multidimensional model of self-concept (Shavelson et al., 1976) and in accordance with the inherent multidimensionality of the Jamesian importance hypothesis, we examine simultaneously the effects of three self-domains (physical self-concept, academic self-concept, spiritual self-concept) on self-esteem. Appearance and physical self-concept are considered to ensure comparability with previous studies (Lindwall et al., 2011 tests of the IIWA model). The academic self-concepts are considered as this is an important area for self-worth during adolescence and the main focus of self-concept research in educational settings. Spiritual self-concept is also included, as this domain is very important for some people but not important at all for others, and thus, as posited by Marsh (1986, 2008), might provide a critical test of the IIWA model. In all of these models, self-concepts, importance ratings, and interactions are all based on multiple items. In addition, acknowledging some concern for potential multicollinearity problems in models, including more than one self-concept (Hardy & Moriarty, 2006; Hardy & Leone, 2008; Lindwall et al., 2011), we note that the three self-domains chosen in this study are relatively unrelated to one another and thus are well suited to a simultaneous multiple-domain test of the Jamesian model (see Table 2.1 in online Appendix 2).

Even though some interaction effects on self-esteem might be significant and positive (Lindwall et al., 2011), to fully support the IIWA model, it is necessary to contrast it with the alternative models described in the literature (simple unweighted, GIWA-norm, GIWA-free, IIWA) to determine the most parsimonious representation of the data (Marsh, 2008). This comparison requires, once again, that several self-domains be considered jointly. Within the fully latent-variable framework, we propose an updated version of Marsh's (1986) generalized multiple regression approach. Thus, tests of incremental R^2 for the inclusion of critical parameters (e.g., importance factors, interaction terms) will be considered to facilitate comparison between the alternative models. This strategy is particularly relevant in investigating

the unique contribution of the interaction terms for the IIWA model. In addition, we note that exploration of incremental R^2 is common practice in IIWA studies based on multiple regression analysis, as well as more generally. However, this is not generally the case with latent-variable models but should be. Indeed, although the overall fit of a model gives important information, models with good fit indices might be of little psychological interest if the independent variables are not able to predict the dependent variables (i.e., R^2 is small or nonsignificant).

In line with previous literature (Lindwall et al, 2011; Marsh, 1986, 1993), we formulate specific hypotheses for the examined domains.

Hypothesis 1: The physical domain is particularly important for young adolescents due to pubertal development and resulting changes in gender relations (e.g., Petersen, 1988). For this reason, we expect that the importance of physical components might be normatively important for most adolescents, in accordance with the GIWA perspective; that importance is uniformly high with limited variability. Hence, consistent with findings by Lindwall et al., we predict that the IIWA model will not be confirmed for this domain but that the GIWA model will be supported.

Hypothesis 2: For the spiritual self-concept, we pursue tests of Marsh's (1986, 2008) hypothesis that support for the IIWA model is likely to be stronger than in the other domains. The rationale is that because there is more variability in the importance placed on the spiritual domain (high for some, low for others), individual importance is likely to be a stronger moderator of the relation between this self-concept domain and self-esteem. Thus, we predict support for the IIWA model for the spiritual self-domain—a positive, significant interaction between actual spiritual self and its importance such that the effect of spiritual self-concept on self-esteem is greater for individuals who perceive this domain as important.

Hypothesis 3: In relation to the academic self, Marsh (1993) used several indices of IIWA but none predicted school self-esteem or global self-esteem better than a priori constant weighted averages. Thus, we expect to find similar results, not supporting the moderating role of importance in the relation between subdomains (math, verbal), domain (academic self-concept), and global (global self-esteem) levels of self-concept.

Method

Participants, Procedures, and Instruments

In Sample 1, U.K. adolescents (n = 402; 13-15 years old) balanced for gender anonymously completed electronic questionnaires during school time. In Sample 2, Italian adolescents (n = 250; 13-15 years old) balanced for gender anonymously completed a paper-and-pencil version of the questionnaire in class. The correlation matrix at the item level is available on request from the first author.

The electronic instrument used for Sample 1 was developed and administered in collaboration with the Curriculum, Evaluation and Management (CEM) Centre at the University of Durham. The questionnaire was based on items from the Physical Self-Description Questionnaire (Marsh, Richards, Johnson, Roche, & Tremayne, 1994), the Self-Description Questionnaire (Marsh, 1992; Marsh & O'Neill, 1984), and the Rosenberg Self-Esteem Inventory (Rosenberg, 1965). The questionnaire was divided into two sections based on actual self-concept and importance of self-concept. The paper-and-pencil questionnaire used for Sample 2 was an Italian translation/back-translation of the same instrument. A pilot study was conducted on 20 students to examine the adequacy of the translation, detect specific difficulties, and adjust the instrument when necessary.

The section on actual self was presented first to all participants. A total of 6 positive items were used to assess physical self-concept (e.g., *I feel good about who I am physically*), 3 for academic self-concept (e.g., *I learn quickly in most academic subjects*), 5 for appearance self-concept (e.g., *I am attractive for my age*), and 4 each for math (e.g., *I find many mathematical problems interesting and challenging*) and verbal (e.g., *I can write effectively*) self-concepts. Moreover, the 10 items of the Rosenberg Self-Esteem Inventory (e.g., *overall, most things I do turn out well*) were used to assess global self-esteem. All items were rated on a 6-point Likert-type scale (1 = *false for my actual self* to 6 = *true for my actual self*).

For the Importance scale section, as rephrasing the actual scale items would have produced very long items, we used the original wording supplemented by specific instructions to rate the importance of each item:

> In this part of the questionnaire we kindly ask you to think about *what is important for the description of who you are; that is, how important each item listed below is for yourself*. Please read each of the 32 statements below carefully and indicate how important each one is to you. Please use the following choice of six answers to indicate how true (or false) each item is as a description of what is *important* in relation to *how you see your description of yourself*. Be sure that you rate *how important each statement is to you* rather than how you actually see yourself. (italics in original)

A 6-point Likert-type scale was used (with 1 = *not important* and 6 = *important*).

Analyses

In this study, we used a multiple-item latent-variable approach (Scalas & Marsh, 2008). Thus, all the constructs were evaluated

at the item level. As the wordings of the matching actual and importance items were parallel, correlated uniquenesses were posited a priori between each matched pair of items, as recommended by Marsh and Hau (1996). This resulted in an improved goodness of fit but had no substantively important effect on the pattern of parameter estimates, suggesting that it was not a critical issue in regard to the substantive questions pursued in this study. For global self-esteem, orthogonal positive and negative method factors associated with the wording of the items were also included (Marsh, Scalas, & Nagengast, 2010; Quilty, Oakman, & Risko, 2006). Most analyses were conducted separately in the two databases (data standardized within country), unless otherwise specified. All analyses were conducted using Mplus 5.2 (Muthén & Muthén, 1998-2008), using the robust maximum likelihood estimator (MLR), which has been found to be efficient in the estimation of latent-variable models based on items rated on answer scales incorporating five or more response categories (Beauducel & Herzberg, 2006; DiStefano, 2002; Muthén & Kaplan, 1985). To deal with the few missing values at the item level (M = 1.24% missing per item), full information MLR estimation was used (Enders & Bandalos, 2001; Muthén & Muthén, 1998-2008). To evaluate the fit of the models to the data, we considered the Tucker–Lewis index (TLI), the comparative fit index (CFI), and the root mean square error of approximation (RMSEA), as well as the χ^2 test statistic and an evaluation of parameter estimates (Marsh, Balla, & Hau, 1996; Marsh, Hau, & Wen, 2004). Although no golden rule exists (Marsh, Hau, et al., 2004), the TLI and CFI vary along a 0 to 1 continuum in which values greater than 0.90 and 0.95 are typically taken to reflect acceptable and excellent fits to the data, respectively. RMSEA values of less than 0.06 are taken to reflect an excellent fit (Cheung & Rensvold, 2002; Hu & Bentler, 1999; Marsh, Hau, et al., 2004). Preliminary analyses revealed satisfactory reliability estimates for all the measures, with values between 0.83 and 0.95. The measurement models also showed generally good fit indices (e.g., all CFIs > 0.95). Additional information about latent means, variances, and correlations as well as invariance tests across countries is reported in online Appendix 2. We also examined the unique contribution of importance and interaction components by inspecting R^2 changes.

To evaluate the IIWA theoretical (Figure 1) model, we used the product-indicator approach to latent interactions (Marsh, Wen, et al., 2004), which allowed us to include multiple latent interactions in the same model (see online Appendix 3); also the interaction estimates have been standardized according to Lin, Wen, Marsh, & Lin (2010). To support the IIWA model, interactions need to be substantial, in terms of estimates and explained variance, and positive. We also expect these interactions to be statistically significant, although we acknowledge the fact that statistical significance is strongly dependent on sample size, so that statistical significance per se does not mean that the size of the interaction is substantively meaningful in the evaluation of the IIWA model (Fraley & Marks, 2007). In this model, the effects of all self-concepts and importance factors are freely estimated, and all interaction terms are included.

The IIWA was contrasted with the alternative models of importance described earlier (Figure 1): simple unweighted and group weighted (GIWA-free, GIWA-norm). In the simple-unweighted model, importance is not considered; all domains are weighted equally (i.e., constrained to be the same) in the prediction of self-esteem. In the GIWA-free model, self-concepts are freely estimated to obtain empirically optimal weights; the weights given to each domain differ, but for any one domain, the same weight applies to all individuals. In the GIWA-norm, it is assumed that self-concepts are weighted according to group-aggregate importance scores. In operationalizing this approach, the effect of each self-concept on self-esteem was set to be equal to the latent mean of the corresponding importance factor (i.e., an estimate of average importance in the overall group). For the GIWA models, two versions have been specified, one not including importance latent factors and one including them (with paths to self-esteem freely estimated), to evaluate the direct contribution of importance in self-esteem determination and to provide a basis of comparison for the IIWA model. If any of the above models are able to fit the data and predict global components as well as more complex models with latent interactions (IIWA), the results will support the more parsimonious models. In the case of difficulties in disentangling the best model, incremental R^2 for self-esteem prediction can be used to decide on the best model to represent self-esteem determination (Marsh, 1993).

Results

Here, we consider theoretical models of importance: the simple-unweighted model of importance, the GIWA models, and the IIWA model. The R^2 of these models are presented in Table 1, the estimates of the prediction paths are presented in Table 2, and the fit indices are shown in Table 3.

Simple-Unweighted Model

The simple-unweighted model assumes that all self-domains have the same importance and are weighted equally. This model explained much of the variance in self-esteem (U.K. sample: R^2 = .671, Italian sample: R^2 = .530). From this baseline model, the critical question is how much more variance can be explained by models that relax the assumptions that all domains contribute equally to the prediction of self-esteem (GIWA) and that the contribution of any given domain is the same for all individuals (IIWA)?

GIWA Models

The R^2 associated with the GIWA-free model is much higher than that of the unweighted model in the U.K. (.833) and

Table 1. R^2 Incremental Change for Different Latent Models of Importance

Model	Effects on self-esteem	U.K. sample (R^2)	Italian sample (R^2)
Simple unwgted	SCs	.671	.530
GIWA-norm	SCs	.823	.745
	SCs and IMPs	.839	.756
GIWA-free	SCs	.833	.753
	SCs and IMPs	.840	.766
IIWA	SCs, IMPs, and INTs	.859	.773

Note: simple-unwgted= simple–unweighted model, with all self-concept paths to self-esteem constrained to be equal to each other (no importance factors); SCs = self-concepts; GIWA-norm = group importance-weighted approach with regression paths of each self-domain to self-esteem set to be equal to the corresponding group importance latent mean; IMPs = importance factors; GIWA-free = group importance-weighted approach with free estimates for the regression paths of each self-domain to self-esteem; IIWA = individually importance-weighted approach, with free estimates for the regression paths of each self-domain and each importance factor to self-esteem, latent interactions included; INTs = interaction effects.

Italian (.753) samples; differentially weighting the domains thus makes a big difference in the prediction of self-esteem. Implicit in our interpretation of these results is the assumption that the differences in the empirically optimal weights associated with each domain reflect the importance placed on each domain by the individuals. Although this is typically left implicit (i.e., untested), we devised an explicit test of this assumption that involves setting the weight associated with each domain equal to the latent mean of the importance factor for that domain. This GIWA-norm model assumes that self-domains are differentially weighted according to their average importance in each country-specific subsample. Remarkably, the R^2 for the more parsimonious GIWA-norm (U.K. sample: .823, Italian sample: .745) was nearly as high as in the optimally weighted GIWA-free model. This finding is critical and demonstrates that the impressive change in R^2 associated with differentially weighting the various domains is almost completely explained by normative measures of importance placed on each domain by the country-specific sample as a whole. Indeed, two out of the three examined domains significantly predicted self-esteem (academic self-concept, physical self-concept), and their standardized estimates were very similar across models (GIWA-free and GIWA-norm) and samples (U.K. sample GIWA-free: $\beta = .37$ for the academic self and .68 for the physical self, GIWA-norm: $\beta = .37$ and .66; Italian sample GIWA-free: $\beta = .35$ and .73, GIWA-norm: $\beta = .35$ and .69). These results strongly support the idea that group importance weighting processes are involved in self-esteem determination and that these normative processes appear to be highly comparable (i.e., of similar magnitude) in two distinct European countries. The results argue that there are substantial differences in the optimal weights applied to each domain and that these empirically optimal values are largely explained by the normative measures of importance based on importance ratings by the group as a whole, in a way that generalizes across U.K. and Italian samples.

IIWA: The Multiple-Domain Models

As emphasized earlier, the strong support for the GIWA models indicates that the domains are differentially related to self-esteem. However, the GIWA models make the strong assumption that the effect of each domain is the same across all individuals. Tests of the IIWA model require that these effects be allowed to vary from person to person in accordance with the importance placed on that domain by each individual. Support for the IIWA model requires meaningfully large and positive interaction between each self-concept domain and its individual importance. Practical significance is based on the change in R^2 associated with the interactions.

Interaction models should include the main effects of the interacting variables (Aiken & West, 1991). The main effects of self-concept are substantial, as already demonstrated in the GIWA models, explaining 82% of the variance in self-esteem in the U.K. sample and 74% of the variance in the Italian sample. Overall, the added contribution of importance factors on self-esteem was small, with small R^2 increments (U.K. sample = .007, Italian sample = .013; Table 1). Although potentially interesting, this finding is not particularly relevant to tests of the IIWA model. When the critical self-concept × importance interactions were examined in the global model, the results failed to support the IIWA model. Specifically, in the model including all three self-domains, in the U.K. sample, a negative interaction was found for the physical self-domain (−0.14, $SE = 0.059$), rather than the predicted positive interaction. This result shows that self-esteem scores might be slightly more influenced by domains rated as less important and less influenced by domains rated as highly important. In the corresponding model, no significant interaction effect was found in the Italian sample. However, a z test of the difference between the unstandardized effects for each of the two countries was nonsignificant, thus suggesting that the effects are not significantly different from each other. In any case, a negative interaction argues against the IIWA model even more strongly than a nonsignificant interaction. Similarly, in line with our predictions, no support for the IIWA model was found in relation to academic self-concept in either sample while, contrary to our expectations, no substantial interaction was found for spiritual self-concept in either sample. Even if, with much larger samples, the effects could have been significant due to increased power, we note that they were all trivial in magnitude, sometimes in the wrong direction, and that most of their 95% confidence intervals included zero (Table 2).

In summary, only one interaction effect (physical self-concept) was found to be significant in the U.K. sample, but

Table 2. Regression Paths to Self-Esteem in the Different Latent Importance-Weighted Models With Multiple Self-Domains

	Simple-unwgt	GIWA-free	GIWA-norm	IIWA	
Effect	Estimate (*SE*)	Estimate (*SE*)	Estimate (*SE*)	Estimate (*SE*)	95% CI
U.K. sample					
Academic					
Main SC	0.38 (0.023)	0.37 (0.060)	0.37 (0.055)	0.38 (0.059)	[0.26, 0.50]
Main IMPs		–0.05 (0.058)	–0.04 (0.058)	–0.03 (0.049)	[–0.13, 0.07]
Interaction				0.03 (0.057)	[–0.08, 0.14]
Physical					
Main SC	0.42 (0.023)	0.68 (0.057)	0.66 (0.058)	0.65 (0.060)	[0.53, 0.77]
Main IMPs		0.06 (0.059)	0.07 (0.052)	–0.01 (0.058)	[–0.13, 0.10]
Interaction				–0.14 (0.059)	[–0.26, –0.02]
Spiritual					
Main SC	0.37 (0.016)	0.10 (0.087)	0.12 (0.082)	0.11 (0.084)	[–0.05, 0.27]
Main IMPs		–0.08 (0.090)	–0.10 (0.086)	–0.10 (0.087)	[–0.27, 0.07]
Interaction				0.04 (0.035)	[–0.03, 0.11]
Italian sample					
Academic					
Main SC	0.37 (0.029)	0.35 (0.081)	0.35 (0.076)	0.36 (0.086)	[0.19, 0.53]
Main IMPs		–0.05 (0.094)	–0.05 (0.092)	–0.08 (0.101)	[–0.28, 0.12]
Interaction				–0.04 (0.070)	[–0.18, 0.10]
Physical					
Main SC	0.39 (0.034)	0.73 (0.066)	0.69 (0.072)	0.75 (0.075)	[0.60, 0.90]
Main IMPs		0.11 (0.090)	0.14 (0.094)	–0.09 (0.086)	[–0.26, 0.08]
Interaction				–0.03 (0.077)	[–0.18, 0.12]
Spiritual					
Main SC	0.35 (0.021)	–0.11 (0.160)	0.01 (0.136)	–0.15 (0.170)	[–0.14, –0.15]
Main IMPs		0.13 (0.167)	0.01 (0.142)	0.15 (0.178)	[0.14, 0.15]
Interaction				0.09 (0.052)	[–0.01, 0.19]

Note: simple-unwgted = simple-unweighted model with all self-concept paths to self-esteem constrained to be equal to each other (no importance factors); GIWA-free = group importance-weighted approach with free estimates for the regression paths of each self-domain to self-esteem; GIWA-norm = group importance-weighted approach with regression paths of each self-domain to self-esteem constrained to the corresponding group importance latent mean; IIWA = individually importance-weighted approach, with free estimates for the regression paths of each self-domain and each importance factor to self-esteem, latent interactions included; CI = confidence interval; Main SCs = main effect of self-concepts; Main IMPs = main effect of importance factors; Interaction = effect of interaction terms. All interaction estimates have been standardized according to Lin, Wen, Marsh, and Lin (2010).

it was in the wrong direction. Therefore, our results from the multidomain model in both samples do not support the IIWA model.[1]

Discussion

The present research is a prime example of substantive-methodological synergy (Marsh & Hau, 2007). Our findings have important theoretical and practical implications for self-concept and personality researchers. Moreover, they also demonstrate an evolving latent-variable methodology to test theoretical predictions on latent interactions, which have plagued applied personality and social psychology research as well as research in other areas of psychology and the social sciences more generally.

The Elusive Nature of the IIWA Model

The Jamesian model predicts a moderation effect of importance in the relation between specific self-concepts and general self-esteem. However, overall results provide no support for the IIWA model as applied to the level of self-esteem. The contribution of specific areas of self-concept to self-esteem did not vary systematically with the importance placed on the specific components of self-concept by each individual. We hypothesized that the spiritual self, whose importance is characterized by substantial individual variability, would have been a good candidate for the IIWA model. However, this hypothesis was not supported. As expected, no support for the IIWA model was found for the physical domain. We anticipated this would be the case due

Table 3. Fit Indices of Different Theoretical Models of Importance

Model	Chi-square (*df*)	CFI	TLI	RMSEA	RMSEA 90% CI
U.K. sample					
Simple-unwgted	555.713 (263)	0.940	0.932	0.053	[0.047, 0.059]
GIWA-free	1,173.486 (696)	0.950	0.945	0.041	[0.037, 0.045]
GIWA-norm	1,193.433 (699)	0.949	0.943	0.042	[0.038, 0.046]
IIWA	2,177.601 (1,332)	0.930	0.922	0.040	[0.037, 0.043]
Italian sample					
Simple-unwgted	420.224 (263)	0.943	0.935	0.049	[0.040, 0.057]
GIWA-free	1,031.314 (696)	0.940	0.932	0.044	[0.038, 0.049]
GIWA-norm	1,049.557 (699)	0.937	0.930	0.045	[0.039, 0.050]
IIWA	2,109.187 (1,332)	0.895	0.882	0.048	[0.044, 0.052]

Note: CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root mean square error of approximation; CI = confidence interval; Simple-unwgted = simple-unweighted model, with all self-concept paths to self-esteem constrained to be equal to each other (no importance factors); GIWA-free = group importance-weighted approach with free estimates for the regression paths of each self-domain to self-esteem; GIWA-norm = group importance-weighted approach with regression paths of each self-domain to self-esteem constrained to the corresponding group importance latent mean; IIWA = individually importance-weighted approach, with free estimates for the regression paths of each self-domain and each importance factor to self-esteem, latent interactions included.

to low variability in importance scores for this domain; however, the variance of the importance of physical self-concept was not particularly low. Nevertheless, the physical domain is a universal self-schema (Markus et al., 1987), constantly active in the working self-concept (Markus & Wurf, 1987) and thus more in line with the GIWA perspective, particularly during adolescence, due to the biopsychosocial transformations inherent in pubertal development (e.g., Meleddu & Scalas, 2003; Petersen, 1988). This might explain the great impact of physical self-concept on self-esteem in both samples. Moreover, for the U.K. sample, a negative interaction was found for the effect of physical self-concept on self-esteem. This outcome could be the result of a suppression effect, due to the high correlations observed between some of the variables (MacKinnon, Krull, & Lockwood, 2000); however, we note that even the correlation between physical self-concept interaction factor and self-esteem was negative (−.123) and that a negative interaction clearly contradicts the premises of the IIWA model.

We also note that much previously claimed support for the IIWA model confounded effects of normative importance and individual importance (see Marsh, 2008). Both IIWA and GIWA models argue for differential weighting of self-concept domains. However, the IIWA model predicts that the weights for a given domain will vary for each individual (according to the importance placed on each domain by that individual), whereas the GIWA models predict that the weight assigned to each domain is the same for all individuals. In our study, comparison between the different theoretical models of importance showed no support for the IIWA model. Indeed, no interaction positively affected self-esteem in either sample. In contrast, strong support for the GIWA model was found. The GIWA-free and GIWA-norm models better explained self-esteem in comparison with the simple-unweighted model. Of particular relevance is our results for the GIWA models, showing that the GWIA-free estimates based on the freely estimated empirically optimal paths were very close to the estimates of the model where each of these paths was constrained to be equal to the latent mean of the corresponding importance factor (GIWA-norm). Moreover, almost the same estimates were found in the two independent samples (the United Kingdom, Italy), thus supporting the generalizability of the GIWA model across nationalities; however, more studies are needed to evaluate the cross-cultural generalizability of these results, particularly in non-European countries. In addition, the GIWA model needs to be extended to other self-concept domains to ensure that results really do generalize to other age groups, countries, and especially self-concept domains and subdomains (Wells & Windschitl, 1999).

Our GIWA model also provides a basis for integrating research based on importance ratings with studies focused on social (Lemey & Ashmore, 2006) and cultural (Markus & Kitayama, 1991; Morin, Maïano, Marsh, Janosz, & Nagengast, 2011) factors in self-esteem determination and previous findings by Marsh (2008) supporting a group-based importance model. The literature highlights the role of social and normative factors in self-esteem formation (Leary & Downs, 1995; Solomon, Greenberg, & Pyszczynski, 1991), so that the level of self-esteem depends on how individuals believe they are regarded by others. Based on results from a longitudinal study, Lemay and Ashmore (2006) suggested

that seeking social approval is a sort of universal and implicit motive influencing the level of self-esteem in particular. According to their results, "Trait self-esteem appeared related to, and changed as a function of, perceived regard from others even for people who claimed that their self-esteem was not dependent on others' regard" (Lemay & Ashmore, 2006, p. 133). Additional results also show that cultural factors affect self-esteem (Kitayama, Markus, & Lieberman, 1995; Maïano et al., 2006; Morin et al., 2011). Beyond the scope of the present investigation, an important role of future research will be to determine whether these social and cultural differences can be explained in terms of the importance placed on different self-concept domains and incorporated into the GIWA model demonstrated here. In conclusion, it is not that individuals do not differentially weight the various components of self-concept; rather, the weights they use are largely determined by normative processes.

Subgroup Differences and Potential Biases in Support of the IIWA Model

In the present investigation, there was almost no difference between variance explained in the GIWA and IIWA models. However, wherever there is substantial difference between the IIWA and GIWA models, it is always possible that the apparent support for individual differences in importance weighting can be explained in terms of subgroups. Hence, apparent support for the Jamesian IIWA model would be systematically inflated and biased by such subgroup differences, if they were not made explicit in the model. That is, systematic differences shared by members of the same subgroup, if not incorporated into the prediction model, would show up as individual differences. For example, let us hypothetically assume that physical appearance is given more weight in the prediction of self-esteem for girls than boys, and physical ability is given more weight for boys than girls. If gender was not included appropriately in the model, then the effect would inflate the importance × domain interaction in the IIWA model and be interpreted as support for the IIWA model. Nevertheless, if all the differential weighting of importance could be explained in terms of subgroup differences in gender, then we would argue that the results supported the GIWA rather than the IIWA—that the differential weighting could be explained more parsimoniously by group differences rather than differences among individuals within each of the two groups.

Therefore, for known groups, it would be easy to test a priori predictions by including them as part of the analysis (e.g., multigroup analyses). More generally, for unknown groups, evolving approaches to mixture models that identify subgroups differing systematically in relation to critical parameters (Lubke & Muthén, 2005; Marsh, Lüdtke, Trautwein, & Morin, 2009) should be relevant for future research (see also online Appendix 4).

Methodological Advances in the Study of Importance of Self-Concepts

We used a multiple-item latent approach to provide more appropriate tests of the IIWA model; an approach that addresses most limitations of previous studies (also see supplemental analyses in online Appendix 5). This latent-variable approach provides an explicit test of the a priori factor structure that is typically implicit (and untested) in studies based on manifest variables. Unless there is good support for the a priori factor structure, subsequent analyses are dubious. Within the multiple-item latent approach, we also suggested the importance of testing incremental R^2 associated with critical parameters. Surprisingly, this is not a standard procedure in latent-variable models, but it should be at least in applications, like ours, where hypotheses are related to the added value of specific paths. This procedure has highlighted, for example, the trivial contribution of latent interactions to trait self-esteem.

As the Jamesian model of importance is multidimensional, we have tested comprehensive models, including multiple self-domains. From this perspective we argue that piecemeal approaches testing each domain separately are of limited value and should not be the primary basis for evaluating the IIWA model; moreover, they do not allow comparison between the various theoretical models of weighted importance. We also note that the appropriate multidimensional test of the IIWA model within the more appropriate latent framework was made possible by using the product-indicator approach to latent interactions rather than the approach used by Lindwall et al. (2011).

More generally, we highlight that latent interaction approaches have broader applicability to psychological models involving moderation effects and that the multiple-item latent approach has the advantage of controlling for unreliability (Bollen, 1989). This is particularly useful in light of evidence from the literature (McClelland & Judd, 1993) showing difficulties in detecting interactions in field studies, partly due to measurement errors that can deflate the interaction effects.

Finally, Crocker and colleagues (Crocker, Sommers, & Luhtanen, 2002; Crocker & Wolfe, 2001) found support for a Jamesian model for state self-esteem but did not actually test an IIWA. Thus, although the present study focused on trait self-esteem, a longitudinal extension of our approach could also be used to provide further tests of the IIWA model in relation to state self-esteem.

Guidelines for Future Research

Self-esteem is one of the psychological constructs most widely studied (Leary, 2006). Nevertheless, there is still no consensus about its definition in the literature (Leary, 2006; Mruk, 2006) and, more importantly, some self-esteem researchers do not

provide information about the theoretical model on which they are basing their research (Branden, 2006). This has important consequences for self-esteem research in general and has led some authors to suggest that self-esteem is an overused construct and that many of its relations with other constructs might be spurious (Baumeister, Campbell, Krueger, & Vohs, 2003). From a multidimensional and hierarchical perspective of self-concept, Marsh and Craven (2006) have shown how global self-esteem has often been used in contexts where a content-specific approach would have been more appropriate. Therefore, regardless of what a superficial evaluation of the voluminous self-esteem literature might suggest, more research is needed to empirically test and distinguish between alternative conceptualizations of self-esteem. We believe the present study, and other studies based on a clear theoretical paradigm, affords a deeper and more detailed perspective on the multidimensional nature of self-esteem, in particular the role of normative factors, and on various other aspects of self-esteem. For example, although this was not a direct focus of this investigation, our results are in line with previous studies on the appropriate level of examination of self-concept in applied research and psychological interventions (Marsh, 2007; Marsh & Craven 2006). Indeed, our investigation reinforces the idea that unless the research focus is specifically on self-esteem, it is better to use content-specific domains that are directly relevant to the focus of the study and/or intervention (e.g., math self-concept for math skill intervention, physical appearance self-concept for a study of body image, and so on). Moreover, our results indirectly support the sociocultural nature of self-esteem, at least at the macro level. Self-esteem seems to be influenced by normative and sociocultural factors as well as ethnicity (Maïano et al., 2006; Morin et al., 2011). In particular, sociocultural models conveyed by mass media in Western European countries may directly or indirectly affect self-esteem by setting the stage on what is important, not only through injunctive norms (what others approve) but also through descriptive norms (what others actually do, for example, Cialdini, 2007). The implications of media and social comparison processes have been largely demonstrated in relation to the internalization of the thin ideal, with its critical effect on the development and maintenance of eating disorders (e.g., Ricciardelli & McCabe, 2001), but they can surely affect other areas of self-concept. Nevertheless, more studies are needed to explore these issues further.

An important contribution of the present investigation is the integration of evolving, state-of-the-art methodology and substantively important issues to form paradigmatic models for future IIWA studies; these should begin with latent factors based on multiple items that have strong psychometric properties and latent interaction models to test the critical interactions between importance and actual components of each self-concept domain simultaneously. Researchers also need to bear clearly in mind the distinction between individual and normative importance; although further research is needed, our results suggest that individual factors are less relevant than normative factors due to the sociocultural nature of self-esteem.

Conclusion

This study is a prime example of substantive-methodological synergy as advocated by Marsh and Hau (2007) and Borsboom (2006), and addresses the double disconnection between theory, research, and evolving methodologies. On one hand, James's IIWA model is intuitively very appealing and is still widely cited as an established fact in psychological theory in self-concept circles (Guindon, 2010; Kernis, 2006; Mruk, 2006) and in modern textbooks (e.g., Schacter, Gilbert, & Wegner, 2009). On the other hand, research evidence has generally failed to support the IIWA model of interaction effects between actual self-concept ratings and the importance attributed to these components of the self in the prediction of global self-esteem. However, most of these empirically rigorous studies have apparently failed to capture the attention of theoreticians and textbook authors, who still cite James's IIWA model as an established fact. However, this first disconnection can easily be linked to methodological limitations of the current body of research, which generally fails to use state-of-the-art evolving latent-variable methodologies in testing for interaction effects. Using such methodologies, the present study once again fails to support James's IIWA hypothesis and instead supports the new GIWA hypothesis, based on group-based normative ratings of importance. This finding was produced across two distinct samples, from the United Kingdom and Italy. Although the present results await replication in more diversified samples from other countries and age groups, targeting a wider range of self-concept domains and subdomains, this study also provides a more generalized template not merely for future studies of the IIWA model but for interaction effects more generally.

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Note

1. The detection of interactions between continuous variables is more difficult in comparison with categorical variables, due in part to distributional differences (McClelland & Judd, 1993). This fact might have made the individually importance-weighted average particularly difficult to detect in previous studies. Nevertheless, our multiple-item latent approach has the broader advantage of controlling for unreliability (Bollen, 1989), thus helping in the detection of interaction effects that cease to be deflated by measurement error.

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