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Auxiliary theories as translation mechanisms for measurement model specification

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ABSTRACT

The translation of concepts into constructs and measurable indicators is rarely a straightforward exercise in any research context. However, while other social sciences, like sociology, consider a range of measurement models, marketing studies tend to focus on a dichotomous choice between reflective and formative measurement models only. Although, measurement scholars offer a diverse and often conflicting set of decision factors, these criteria usually further reinforce the choice between only the two measurement models. This ritualistic behavior calls for a change and thus, by drawing on the concept of auxiliary theory, this study represents measurement model specification as a translation process, in contrast to the previously proposed “decision criteria” approach. The newly developed framework aims to promote a more imaginative approach to measurement model selection combined with the need for a more explicit articulation and documentation of this translation process in academic articles.

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1. Introduction

The question of measurement is at the heart of scientific investigations. However, the translation of concepts into measurable units is rarely a straightforward exercise in any research context. While disciplines like sociology are open to various and often complex measurement model specifications, the marketing discipline tends to limit itself to the examination and contrasting of formative and reflective measurement models and propose new decision criteria with the aim of solidifying the researchers' choice between these two options (Cadogan, Souchon, & Procter, 2008; Diamantopoulos & Sigauw, 2006; Diamantopoulos & Winklhofer, 2001; Edwards & Bagozzi, 2000; Jarvis, MacKenzie, & Podsakoff, 2003). Rigdon et al. (2011) highlight the issue by calling current practices of measurement model specification “dogmatic” and “ritualistic.” This phenomenon results in marketing scholars focusing only on an overly narrow set (formative vs. reflective) of measurement model specifications (Rigdon et al., 2011), and that can lead to suboptimal measurement practices.

Measurement scholars offer numerous criteria, factors, or considerations for measurement model specification. Although these scholars are effective in guiding researchers in their measurement model selection, after reviewing studies on measurement model selection and related criteria, this study concludes that scholars—more often than not—present a) a few selected criteria rather than a holistic set; see

Coltman, Devinney, Midgley, and Venaik (2008) for an exception; criteria in light of the pre-decided choice between formative-reflective measurement models; empirical rather than conceptual criteria; criteria without providing any guidance on how to reconcile them. By building on the works from the measurement scholars mentioned above, this study provides a new perspective compared to the previously proposed “decision criteria” approach. In doing so, this study draws on the notion of auxiliary theories (Blalock, 1968a) and correspondence rules (Bagozzi, 2011) and develops a framework that connects the conceptual and empirical domains. In particular, the proposed framework represents the decision process for measurement model selection as a dual (concept–construct, construct–indicator) translation process and distinguishes between auxiliary processes, heuristics, and conditions. In sum, the proposed framework aims to promote a more imaginative approach to measurement model selection (see Rigdon, 2014) combined with the need for a more explicit articulation and documentation (i.e. reporting) of this translation process in academic articles. Although explicit modeling of item–construct relationships primarily occurs in SEM, the proposed framework should provide assistance to scholars who aim to develop valid measures for their constructs independently of the analytical technique.

This paper first provides a brief overview of the measurement models employed in general and in the marketing discipline. By using the example of socio-economic status, this section concludes that the current practice in measurement model specification is rather restrictive due to criticisms against certain measurement model specifications, disciplinary conventions, and the lack of explicit *a priori* criteria for measurement model specification. Following this latter aspect, the paper reviews studies that have proposed conceptual and empirical decision criteria for the purpose of measurement model specification. This

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review highlights that scholars use a diverse set of criteria and often in a deterministic fashion for deciding on their measurement model. By drawing on the notion of auxiliary theory, this study introduces a framework that provides a new perspective on measurement model specification in contrast to previous approaches.

2. Limited set of measurement model specifications considered

Latent variable modeling has gained traction in various social sciences as it fits well with researchers' goal of constructing and testing the impact of directly unobservable constructs. The once relatively simple measurement domain has evolved over the last few decades, and scholars propose four main types of measurement models: reflective (Churchill, 1979), formative (e.g., Coltman et al., 2008), single item (Hayduk, 1987; Hayduk & Littvay, 2012), and composite (Bollen, 2011; McKenzie, 2005). Although the scope of this article does not allow an in-depth comparison of the similarities and differences between measurement models, this is a brief overview. The differences between these measurement models can be summarized in the following ways: a) presence or absence of conceptual unity of indicators (Bollen & Bauldry, 2011); b) preference for single (Rossiter, 2002; Hayduk, 1987) or multiple items (indicators) per construct; c) whether a sample or a census of indicators is required; d) whether the indicators can co-vary and, hence, can be substituted for each other; e) the "causal" direction between the construct and items; and f) the ability to assess validity and reliability of the respective constructs.

Despite having four measurement model types, scholars prefer reflective (Bollen, 2002; Howell, Breivik, & Wilcox, 2007; Borsboom, Mellenbergh, & van Heerden, 2004) or if they can't prove its appropriateness (Bollen & Ting, 2000) then formative measurement models over other types of specifications. The reasons for this dichotomist view are threefold. *First*, measurement scholars articulate strong views with regard to the conceptual and statistical deficiencies of formative, composite, and single-item measurement models. In particular, formative measurements may have inherent problems, even when the condition of correct model specification holds; composite indicators are indices that are designed for convenience without having a conceptual underpinning (Bollen, 2011) and single-item measures do not lend themselves to validity and reliability assessment. *Second*, disciplinary conventions and habits of the individual researchers (Bourdieu, 1984) are also at play and that can be blamed for this reductionist view. Disciplinary conventions represent a form of coercive isomorphism¹ (DiMaggio & Powell, 1983) whereby authors are compelled to follow formal and informal rules as to what is acceptable (or not) in a particular discipline. This means that taking the popular "convention of the day" helps authors to get their article published. At the other end of the spectrum—as the call of this special issue points out—failing to conform to accepted standards jeopardizes an author's chance of publishing in particular journals. This problem is further exacerbated by researchers' undocumented views or the unspoken conventions of a field or a journal. Disciplinary conventions can take various forms; for instance, in industrial and organizational psychology, the tradition is that the previously validated scale should not be changed at all.² Traditional psychometric frameworks have heavily influenced scholars by creating the habit of employing a single universal method to translate concepts through constructs to indicators, which has led to the general view that constructs can only be modeled in one particular way. *Third*, most importantly, the authors believe that there has been a lack of explicit *a priori* criteria (c.f. Rigdon et al., 2011) for measurement model specification for authors to draw on to facilitate an informed decision-making process. Hence, this rigidity in the measurement model specification in marketing is likely both to inhibit innovation by potentially discounting certain avenues of inquiry (Rigdon et al., 2011) and also

to jeopardize the validity of conclusions drawn from academic studies (e.g., Bollen, Glanville, & Stecklov, 2007; Coltman et al., 2008).

The rigidity in measurement model specification portrayed above is uncommon in other social sciences, such as sociology. For instance, the concept of socio-economic status (SES) is most likely to be referred to, in marketing, as a construct that needs to be modeled formatively because of the alleged "nature" of the construct. Heise (1972: 153) is often recalled in this context: "SES is a construct induced from observable variations in income, education, and occupational prestige, and so on; yet it has no measurable reality apart from these variables which are conceived to be its determinants." Not surprisingly, this quotation has been a magnet for those inclined to specify SES formatively. In contrast, in sociology, its native discipline, scholars have accepted various measurement model specifications for SES including single items (e.g. Hayduk, 1987), reflective measurement models (e.g., Kluegel, Singleton, & Starnes, 1977), a combination of composite and single-item (Dahly, Adair, & Bollen, 2009) or reflective and composite (Fergusson, Horwood, Boden, & Jenkin, 2007) or formative, reflective, and composite measurement models (Bollen et al., 2007; Hardin, Chang, Fuller, & Torkzadeh, 2011).

3. Decision factors for measurement model selection

The study included reviewing a number of studies from measurement scholars who provided various decision factors and guidelines with regard to measurement model specification (see Table 1). Table 1 shows and empirical decision factors for measurement model specification, some of which served only to effectively differentiate between formative and reflective measurement models.

The *ontological view* (OV) (Borsboom, Mellenbergh, & van Heerden, 2003; Borsboom et al., 2004) represents a philosophical stance regarding a construct's relationship with their indicators. Borsboom et al. (2003, 2004) posit that reflective latent constructs (e.g., attitudes and personality) invoke a realist view, whereas formative constructs (e.g. SES) a constructivist (or operationalist) one. Similar to the realist-constructivist distinction presented above, scholars have also asked the question whether one should or should not model constructs in a particular way (e.g., Podsakoff, MacKenzie, Podsakoff, & Lee, 2003) because of the "nature of the construct." In agreement with previous scholars, Borsboom et al. (2004) state that scholars must not categorize constructs as formative or reflective, and furthermore, they should not view reflective and formative measurement models as alternatives to each other either.

The construct label (CL) (Wilcox, Howell, & Breivik, 2008) and "forward/backward orientation" (FBO) criteria refer to the naming problem (Cliff, 1983) of the latent construct. Studies by Bollen and Ting (2000) and Wilcox et al. (2008) highlight that, depending on whether indicators refer to hypothetical (future) actions or past behaviors, the latent construct can either take up a meaning of a predisposition (or propensity), or an exposure (or extent), respectively. Accordingly, latent constructs tend to be represented with a reflective (formative) measurement model in the former (latter) case (e.g., Cadogan et al., 2008; Wilcox et al., 2008). Considering that construct-level considerations should prevail over item-level ones (c.f. Wilcox et al., 2008), the authors believe that deciding on the construct label (based on the concept and its definition) should precede item-level considerations, such as whether past behavior or attitude towards a hypothetical action is captured.

The *dimensionality* (DIM) criterion captures the generality or specificity of the construct. Bagozzi and Edwards (1998) explain that when researchers consider items for constructs, they have an underlying premise as to whether constructs will be specific or general, which means that the researcher decides on the depth (information richness) of the construct. This decision affects whether (if at all) and how items will be organized into components. In refinement of the ideas already discussed, this study suggests that dimensionality captures the end

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