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Using Archival Data to Create Synthetic Validity Tables

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Introduction

Synthetic validity is promoted by many but used by few. Early pioneers (Balma, 1959; Guion, 1965; Lawshe, 1952; Primoff, 1959) developed methods for its use and espoused its value. Others have followed with articles aimed at summarizing and refining approaches (Hoffman & McPhail, 1998; Jeanneret & Strong, 2003; Johnson, 2007; McCloy, 1994; McCormick, DeNisi, & Shaw, 1979; Mossholder & Arvey, 1984; Steel, Huffcutt, & Kammeyer-Mueller, 2006) and advocating its wide-scale adoption for our field (Brannick & Levine, 2002; Johnson, et al., 2010; Scherbaum, 2005). Still, it continues to see little real world application and only sparse research attention. There were only two sessions at the SIOP conference in the last four years with “synthetic” in the title, and a search on PsycINFO from the same period reveals no articles with “synthetic validity” in the title.

Perhaps the largest obstacle to synthetic validity is the amount of data it requires. However, with the recent emergence of Big Data as one of the trendiest topics in our field, the application of synthetic validity is timelier than ever. In this session, we will outline the development and multiple applications of synthetic validity tables for the Hogan Personality Inventory (HPI; Hogan & Hogan, 2007). We built these tables using archival data from over 1,000,000 job applicants and incumbents and performance data from over 20,000 employees collected from nearly 400 criterion-related validity studies.

Development

Most synthetic validity approaches involve three steps (e.g., Scherbaum, 2005): (a) identifying important job components, (b) identifying predictors of these components, and (c) aggregating correlations across predictors to estimate the validity of a test battery. The second step in this process requires validity coefficients between predictors and outcomes of interest. For predictors, the HPI synthetic table includes results for each of the 7 primary scales and 41 subscales on the instrument. We based outcomes on the 62 dimensions of the Hogan Competency Taxonomy, which is a comprehensive list of competencies derived using a Q-sort technique to organize competencies from 21 different models into a unified framework. These included 13 competency models and taxonomies found in published literature, 6 from private consulting firms, and 3 from public organizations (Hogan Assessment Systems, 2010). We also included an additional outcome variable for overall job performance ratings.

The HPI synthetic table contains point estimates derived from 3,024 individual meta-analyses (48 predictors x 63 outcomes). Its development included three steps. The first step was to identify relevant predictor and outcome scores from each archival study. Scores for predictor variables were raw scores from the HPI. Scores for outcome variables were performance ratings from individual criterion studies that subject matter experts coded into one of the 63 potential outcomes. When multiple outcome variables aligned with a competency, subject matter experts selected results from the item that most closely aligned with the definition in the model.

Next, we computed correlations between predictor scores and all available outcomes for each study. The average number of outcome variables available from each study was

14.83, of which only 7.82% included only overall performance ratings and 53.04% contained performance rating variables that mapped to 10 or more outcomes.
Finally, we used meta-analytic procedures (Hunter & Schmidt, 2004), to compute estimates of operational validity for each predictor by each outcome, correcting for range restriction (which was minimal), dichotomization in criterion variables when applicable, and unreliability in performance ratings based on an average estimate of .52 (Viswesvaran, Ones, & Schmidt, 1996). We did not correct for unreliability in predictor variables because the purpose was to identify relationships between actual HPI scales and job performance ratings. The average number of studies available for each meta-analysis was 27.52 and the average sample size was 2,804. Table 1 presents results from 10 competencies for the 7 HPI scales.

Uses

Although the initial purpose of the HPI synthetic table was to drive synthetic validation as part of larger validity generalization efforts, we quickly realized that the greater value was in organizing and summarizing vast amounts of criterion-related validity data from hundreds of samples into a product that could be used for multiple purposes. Three of the most common are (a) use in actual synthetic validity processes, (b) the development of competency-based algorithms, and (c) using results to build interpretive guides.
In accordance with steps outlined above (Scherbaum, 2005), our synthetic process includes three steps. First, we use a structured job analysis instrument, the Job Evaluation Tool (Hogan Assessment Systems, 2000) to identify important job components. Next, we use results in the HPI synthetic table to identify specific HPI scales that predict components rated as most critical for a specific job. Finally, we average correlations across scales to create an estimated overall correlation estimate for each job relative to the composite of related job components.

Another common use of synthetic tables is the development of predictive algorithms for specific competencies. Companies often align multiple HR activities around competency models, making it convenient, if not necessary, to translate assessment results into predictive competency scores. Results in the HPI synthetic table allow us to select the most predictive scales or facets for individual competencies and, through formulas such as Nunnally (1978), estimate the validity of these algorithms for predicting specific areas of job performance.

Another common application of the HPI synthetic tables is to serve as content to facilitate the development of interpretive text for HPI scales. Because the primary focus on the HPI is to predict reputation relating to relevant job behaviors (Hogan & Hogan, 2007), synthetic table results provide a direct empirical link between individual scales and one source of reputation ratings – supervisor ratings of various job behaviors. They also highlight the fact that multiple scales can be useful predictors of various competencies such as teamwork, achievement orientation, and communication skills. This information can help trainers tailor development efforts around these areas to individual characteristics and predispositions.
In this session, we will outline both the development and current uses of the HPI synthetic tables, as well as recommendations for future development, refinement, and use of synthetic validity in everyday applications.

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