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Development of an instrument to measure deliberate practice in professional nurses

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ABSTRACT

Purpose: This paper describes the development of the Deliberate Practice in Nursing Questionnaire (DPNQ) and the reliability and validity characteristics of the instrument.
Methods: A cross-sectional, descriptive study assessed the DPNQ in a sample of critical care registered nurses (RN). It was conducted at one large Midwestern teaching hospital. A medical intensive care unit (ICU), a surgical ICU, and a trauma/burn ICU participated. Instrument construction involved item development based on a literature review, an existing deliberate practice questionnaire and existing parameters of deliberate practice in nursing. Content reliability and validity were established by expert panel review and survey testing. Probit analysis of survey data was used to develop a composite score for the DPNQ.
Results: Expert panel review revealed an inter-rater agreement (80% reliability) of .92–.96 and a content validity index of 0.94. The final DPNQ consists of 24 items with six subcategories and a composite score of 96. Cronbach's alpha coefficient for the DPNQ in this study was .660 (standardized, .703). The instrument was further validated with the Nurse Competence Scale. Deliberate practice was significantly, positively correlated with competence ($rs = .366$, $p = 001$).
Conclusions: Findings from the expert panel provided guidance for development and revision of the DPNQ. Survey testing of the instrument revealed a promising measure of deliberate practice with good reliability and validity characteristics. Identification of a relationship between deliberate practice and competence confirms existing evidence in other domains, providing further validation. Understanding deliberate practice provides a unique way to examine nursing expertise.

Deliberate practice is a concept used in several professions and occupations to describe methods to enhance ongoing development of expert performance (Dunn & Shriner, 1999; Keith & Ericsson, 2007; Sonnentag & Kleine, 2000; van de Wiel, Szegedi, & Weggeman, 2004). Research has been conducted related to performance in music, sports and chess, for example, indicating characteristics of high performing individuals within each discipline. For musicians and chess players, solitary practice and practice hours were most related to high levels of performance whereas in sports both individual and team practice were essential to high performance (Charness, Tuffiash, Krampe, Reingold, & Vasyukova, 2005; Ericsson, Krampe, & Tesch-Römer, 1993; Ward, Hodges, Starkes, & Williams, 2007).

Haag-Heitman (2008) identified deliberate practice as an important influence on expert professional performance thus extending the use of this concept into the health professions domain. Related to nursing as a health profession, Haag-Heitman established the parameters of deliberate practice to include: attaining formal education; attending professional development classes and seminars; attaining specialty certifications; asking questions; de-emphasizing fear of failure; teaching/coaching others; and reading and using professional literature.

Benner's (1984) Novice to Expert Theory is currently most often used in nursing and other professions to identify and describe expertise through five stages (novice, advanced beginner, competent, proficient, and expert). The Novice to Expert Theory was developed through and continues to be assessed only through qualitative narrative analyses and observation (Benner, 2004). While empirically valuable, the narrative, unaccompanied by a quantitative measure of the essential components and process of developing expertise, limits comparison with other measures and outcomes.

The deliberate practice framework posits that in addition to experience, the necessary and distinguishing factor to achieve expert performance levels is extensive hours of deliberate practice (Ericsson, 2008; Ericsson et al., 1993). It focuses on the type, not length of experience one has that can facilitate improvements in particular aspects of performance (Ericsson, 2006). The deliberate practice framework identifies experience as making performance less effortful and less demanding, but improvement is dependent on seeking out activities that allow one to work on improving their performance (Feltovich, Prietula, & Ericsson, 2006). It is this model that served as the theoretical basis of this research.

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Extensive empirical evidence exists supporting the relationship between extended and concentrated practice efforts that define 'deliberate practice' and the attainment of superior performance (Ericsson, 2004; Ericsson et al., 1993; Keith & Ericsson, 2007; Seymour et al., 2002). Deliberate practice can potentially be quantitatively measured thereby providing the opportunity to better understand the relationship of performance with other variables such as motivation, competence and patient/clinical outcomes.

The purpose of this research was to develop a reliable and valid quantitative measure of deliberate practice in professional nurses. This paper describes the development of the Deliberate Practice in Nursing Questionnaire [DPNQ] and the related reliability and validity characteristics of the instrument in a sample of critical care nurses in a large Midwestern metropolitan hospital in the U.S.

1. Methods

1.1. Instrument construction

Initial instrument items were developed based on a literature review, an existing questionnaire developed by Whyte, Ward, and Eccles (2009) used to gain information about nurses' training, experience and information-seeking habits, and paralleled aspects identified by Haag-Heitman (2008) as characteristics of deliberate practice in nursing. From this prior literature, items were generated based on six categories: formal education, continuing education, self-regulated learning/self-development, professional certifications, precepting/teaching others, and professional organization memberships. Demographic information such as age, race, gender, work unit, and experience were also collected. The initial DPNQ questionnaire consisted of 24 items in six categories. It is implied that the deliberate practice items included in the DPNQ are done with the goal of skill improvement, as illustrated in other studies of these activities (Barsuk, McGaghie, Cohen, Balachandran, & Wayne, 2009; DeLeskey, 2003; Kendall-Gallagher & Blegen, 2009; Moore, 2008; Nesbitt et al., 2013; Oermann et al., 2011; van de Wiel et al., 2004; Wayne et al., 2005; Whyte et al., 2009).

Each item of the Deliberate Practice Questionnaire has a unique range of scores. Thus the instrument is not designed with a common scale but a range of choices logically related to each item. The scoring of the instrument will be presented later in this paper.

1.2. Content reliability and validation

Content validity of the DPNQ was determined by a five-member panel of nurses composed of three clinical assistant professors, one assistant professor, and one professor; all having extensive teaching and research experience. Experts were chosen based on their knowledge of the deliberate practice framework, with five being an appropriate number of panel members to provide a sufficient level of control for chance agreement (Lynn, 1986). Experts were asked to evaluate the content validity of each item and the possible score range associated with each item based on their knowledge and experience.

Three criteria were used to evaluate each individual item in the questionnaire. First, each individual item was rated on its clarity of wording. The experts were asked the following question regarding this content validity area: (1) How clear was this question? (For example, were you able to understand what the question was asking the first time you read it?) Experts rated each individual item's clarity of wording on a scale from 1 to 5 (*very unclear, unclear, fairly unclear, clear, very clear*).

The second criterion evaluated was the representativeness of the content domain for each item. The experts were asked to rate each item in this content validity area based on the following question: (2) How would you rate this item's relevance/importance to the concept of "deliberate practice" in nursing? Representativeness of the content domain was rated from 1 to 5 (*not at all important, very unimportant, neither important nor unimportant, very important, extremely important*).

The third and final criterion evaluated was the ease of recall/level of difficulty in answering individual items including the range of possible scores. The following question addressed this content validity area: (3) How would you rate this item's level of difficulty? (For example, how difficult was it to recall the information needed to answer this question?) The question's level of difficulty was also rated on a 1 to 5 scale as *very difficult, difficult, neutral, easy, or very easy*. Space for comments related to each individual item was provided. At the end of the questionnaire, an 'additional feedback' section was provided to experts soliciting information about the questionnaire as a whole. All five experts returned the questionnaire, rated items and provided feedback throughout the questionnaire.

In order to determine how reliable the experts were in their rating of the questionnaire items, the inter-rater agreement (IRA) was established (Rubio, Berg-Weger, Tebb, Lee, & Rauch, 2003). The IRA for all three content validity areas, (1) clarity of wording (2) representativeness of the content domain, and (3) ease of recall/level of difficulty in answering was calculated for each item. This was calculated for clarity of wording by dichotomizing the data into categories of (1) *very clear, clear and fairly clear* or (2) *unclear and very unclear*. Representativeness of content domain was dichotomized into (1) *extremely important, very important* and (2) *neither important nor unimportant, very unimportant, and not at all important*. Last, ease of recall/level of difficulty was dichotomized into (1) *very easy, easy* and (2) *neutral, difficult, and very difficult*. Item ratings were counted and the agreement among the experts on each individual item was calculated to determine the IRA (Lynn, 1986; Rubio et al., 2003).

The content validity index (CVI) of the questionnaire was determined based on the representativeness of the measure. The CVI was computed for each individual item and for the entire measure. The CVI for each individual item was calculated by counting the number of experts who rated the item as relevant (*extremely important, very important*), and dividing that number by five (the total number of experts on the panel) (Lynn, 1986).

1.3. Validation of the DPNQ in a sample of practicing nurses

1.3.1. Study design, sample and setting

A cross-sectional, descriptive study design was used to assess the DPNQ in a sample of critical care nurses in the acute care hospital setting. A convenience sample ($N = 225$) of medical and surgical critical care registered nurses (RN) volunteered and were selected for use in this study. The sample was obtained from one large Midwestern teaching hospital in the U.S. that agreed to participate. Three critical care units, a critical care medical unit (CCMU), a surgical intensive care unit (SICU), and a trauma/burn intensive care unit (TBICU) were all included in the study. A total of 92 electronic questionnaires were completed with an overall response rate of 41%. Response rates by unit were as follows: SICU; 47/90 = 52%, TBICU; 30/59 = 51%, and CCMU; 15/76 = 20%. Power analysis for correlation was evaluated with G*Power 3.1 and indicated a minimum sample size of 82 for a power of 0.80, and a medium effect size of 0.30.

Approval for the study was obtained from the institutional review board (IRB) of the medical center. The survey was delivered electronically via Qualtrics© survey software. The survey was anonymous with all identifying information removed from individual responses. All participants completing the survey received a study incentive. The incentive was a $10 gift certificate redeemable at any hospital sponsored café.

1.4. Measures

The DPNQ was the finalized instrument after content validation, a 29 item questionnaire as described above. Additionally, professional