Parallel and Factor Analysis for Delimiting Items in a Three-Dimensional Construct of Clarity for Nurses

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Abstract

Introduction: *Clarity of Self, Role and System* is a newly developed tool that measures clarity for patient care providers as it relates to self, role and system. The instrument is based on work by Jayne Felgen and Mary Koloroutis. The "Clarity of Self" subscale was derived from another 40-item instrument that was established by Campbell et al. (1996). The other two subscales, "Clarity of Role" and "Clarity of System," were co-created by the authors. **Aims/Objectives:** The purpose of this study is to decrease the number of items that respondents are required to respond to, while maintaining the validity of the construct. **Materials & Methods:** Parallel analysis and factor analysis were performed by Healthcare Environment using SPSS software 22.0 and Brian O-Connor's SPSS syntax. **Results/Discussion:** Four items were removed from the original 29-item survey, resulting in a new 25 item instrument. It was assumed that more items would be identified as candidates for deletion. However, extensive study of the factor structure revealed this not to be possible. Rather, several items for each dimension of clarity were required to have a valid measure of clarity of self, role and system. Although the authors were disappointed that more items could not be eliminated, this study did provide rigorous analysis for discussion of the results. Most helpful was a discussion of the adequacy of this instrument to measure clarity as it was originally articulated by Felgen and Koloroutis. **Conclusion:** This item reduction study did not completely provide its intent, but it did reveal that a re-specification of the measure of clarity is warranted. Items need to be added for both "Clarity of Role" and "Clarity of System." Additionally, a new subscale for measuring clarity of self will need to be developed to more precisely measure the theory of clarity as proposed by Felgen and Koloroutis.

Introduction

Reducing survey items is important not only for minimizing the amount of time it takes healthcare providers to complete a survey, but also for participation rates and quality of response. Longer survey lengths were associated with decreased participation and quality of response in a study with unemployed workers (Galesic & Bosnjak, 2009). Moreover, survey length was a significant factor for the response rate of physicians completing a survey; an 849-word survey exhibited a 60% response rate from physicians, whereas surveys over 1800 words yielded a 16.7% response rate (Jepson, Asch, Hershey, & Ubel, 2005). The purpose of this study is to

decrease the number of items that respondents are required to respond to, while maintaining the validity of the construct: clarity.

Clarity of Self, Role and System is a newly developed instrument that measures the level of clarity for patient care providers as it relates to self, role and system. Jayne Felgen and Mary Koloroutis, experts in the framework of Relationship Based Care (RBC), assert that this three-dimensional concept of clarity is central to effective delivery of patient care within the context of RBC. Clarity of self alone is insufficient. It is also important to understand if employees are clear of their professional role and the role of others within the system. According to Felgen and Koloroutis, if all three dimensions of clarity are not in place, the system remains autocratic, fragmented and chaotic. Conversely, the system might be efficient because of Lean Efforts or other similar strategies to improve efficiency, but if those efforts did not streamline the functional processes, i.e., human resource development and allocation, then it also falls short.

One subscale among the three dimensions of clarity, "Clarity of Self," had a developed and tested instrument in the literature. No instruments were identified for measuring clarity of role or system. The 12-item subscale used to measure clarity of self was derived from another 40-item instrument that was established by Campbell et al. (1996) who used principal component factor analysis to validate the instrument. The 40-item instrument was designed to measure the extent that self-beliefs are clearly and confidently defined and internally stable (Campbell et al., 1996). Cronbach's alpha had a value of 0.86 indicting good reliability (Campbell et al., 1996). This subscale was chosen because of its reliable psychometric testing although it does not relate directly to RBC. Subscales to measure clarity of role and system needed to be developed. The authors co-created the subscales for clarity of role and system, using theories of clarity as proposed by Felgen and Koloroutis. Creation of the subscales began by Felgen delineating the

dimensions of clarity of role and system to Nelson. Scale items for "Clarity of Role and "Clarity of System" were devised by Nelson, based on the delineation provided by Felgen. In order to establish content validity, written items were validated and refined by Felgen so that each item most accurately described each dimension of clarity of role and system as understood by Felgen.

Data

The data collected for this analysis was gathered in eight unique acute care healthcare facilities within the United States (N = 2,174) between the years 2012 and 2016. All respondents worked within patient care in some capacity, including both direct and indirect care. Survey responses were collected by using Healthcare Environment Data and Survey Software. Each respondent was sent an electronic link and asked to respond to 29 items related to clarity: 12 items correspond to "Clarity of Self," 6 items correspond to "Clarity of Role," and 11 items correspond to "Clarity of System." The specific items are listed, in order, in Table 1. The items were scored on a 1-7 Likert scale ranging from strongly disagree (1) to strongly agree (7). Higher scores indicate greater levels of clarity.

Methods

Utilizing SPSS software 22.0 and Brian O-Connor's SPSS syntax, Healthcare Environment performed a parallel analysis on *Clarity of Self, Role and System.* A large sample size of 2,174 with no missing data permitted a high level of statistical analysis to understand the factor structure of the 29 items. Nelson performed a parallel analysis selecting 1000 iterations at a confidence level of 0.05. This parallel analysis yielded 10 factor loadings with Eigenvalues greater than one. Subsequent to the parallel analysis, an exploratory factor analysis (EFA) was performed. The authors utilized maximum likelihood estimation to extract factors with an Eigenvalue greater than 1.0. Pattern matrix was used to examine factor loadings less than 0.4 for

possible deletion from the scale. Oblique rotation was used, specifically Direct Oblimin. Scree plots were used to visually examine data.

Results

Parallel analysis and the EFA revealed 10 factors among the 29 items. However, only one item loaded onto the 10th factor in the EFA, and this item had a factor loading value of 0.219 which is less than the acceptable value of 0.4. The item with a factor loading of 0.219 in the 10th factor was removed and the factor analysis was run a second time. Results revealed a seven factor solution with two items that had factor loading values below 0.4. These two items were removed and a third factor analysis was run, revealing a four factor solution. One item had a factor loading value of less than 0.4. This item was removed, and a fourth factor analysis was run. Results revealed a four factor solution with all factor loading values above 0.4. The scree plot, Figure 1, confirmed the four factor model visually, because the Eigenvalues for all four factors were greater than 1.0. Kaiser-Meyer-Olkin of this fourth and final factor analysis was 0.934. Table 1 lists the final factor loading values and the four-factor solution.

Figure 1. A scree plot of factor numbers and their respective Eigenvalues.

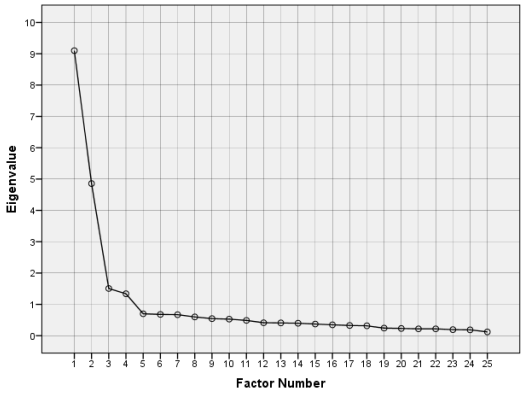

Table 1. Subscale, item number, phraseology, and factor loading values for all 29 original items in the *Clarity of Self, Role and System* survey.

Subscale		Item Number	Phraseology	Factor Loading
Clarity of Self		1	My beliefs about myself often conflict with one another	0.694
		2	On one day I might have one opinion of myself and on another day I might have a different opinion	0.747
		3	I spend a lot of time wondering about what kind of person I really am	0.844
		4	Sometimes I feel that I am not really the person that I appear to be	0.839
		5	When I think about the kind of person I have been in the past, I am not sure what I was really like	0.872
		6	I seldom experience conflict between the different aspects of my personality	*
		7	Sometimes I think I know other people better than I know myself	0.760
		8	My beliefs about myself seem to change very frequently	0.841
		9	If I were asked to describe my personality, my description might end up being different from one day to another day	0.831
		10	Even if I wanted to, I do not think I would tell someone what I am really like	0.699
		11	In general, I have a clear sense of who I am and what I am	*
		12	It is often hard for me to make up my mind about things because I do not really know what I want	0.650
Clarity of Role		1	I feel certain about how much authority I have	*
		2	I have clear planned goals and objectives for my job	0.560
		3	I know that I have divided my time properly	0.497
		4	I know what my responsibilities are	0.847
		5	I know exactly what is expected of me	0.998
		6	Explanation is clear for me of what has to be done	0.882
Clarity of System		1	I understand what I do and do not have control over within this hospital/facility as it relates to my job	*
	Scheduling	2	I understand how patient assignments are made as it relates to continuity of care	0.741
		3	I understand how patient assignments are made as it relates to hospital policy	0.830
		4	I understand how schedules are made, including how part-time and full-time staff are assigned	0.805
		5	I understand how the schedule is made in consideration of vacation, education classes for staff, and other necessary scheduling requirements for staff	0.724
		6	I understand what our organization's key success is and how it makes us stand apart from other hospitals/facilities	0.511
	Governance	7	I understand the difference between responsibility, authority and accountability	0.613
		8	I understand practice change (what I do in my job) is linked to principle (a rationale or reason)	0.629
		9	I believe in shared governance where staff and managers both have input into decisions	0.705
		10	I believe managers should support staff so staff can manage patients	0.699
		11	I believe unit practice councils (small group of unit staff leaders) are helpful in setting unit policy and helping make unit decisions	0.548
	*Items failed to have factor loading values greater than or equal to 0.4 and were removed by the authors			

Discussion

Four items were deleted from the original 29-item survey which resulted in this most current 25-item survey to measure clarity. It was assumed prior to item reduction that more items would be identified as candidates for deletion. The inability to delete more items may be due to the complexity of the dimensions of the construct of clarity (i.e. self, role and system). This is in contrast to simpler constructs such as caring or job satisfaction. For example, after responding to nine items about job satisfaction, the responder may be clear that the nine items relate to how much one likes one's job and thus deduces that the measure relates to job satisfaction. With clarity, it may take more items for respondents to understand what the survey is about, hence the inability to reduce the survey as was desired by the authors of this report. It was hoped one item would be sufficient to represent "Clarity of Self," one to represent "Clarity of Role" and one to represent "Clarity of System." However, extensive study of the factor structure revealed this not to be possible. Rather, several items for each dimension of clarity were required to have a valid measure of this three-dimensional instrument to measure clarity of self, role and system.

Although the authors were disappointed that more items could not be eliminated, this study did provide rigorous analysis for discussion of the results. Most helpful was a discussion of the adequacy of this instrument to measure clarity as it was originally articulated by Felgen and Koloroutis. The tool chosen to measure clarity of self, according to Felgen's reflections of this psychometric testing, does not resonate as well as it should with the theories of Felgen and Koloroutis. The measure for the subscale of clarity of self was originally selected for testing because no scientific justification could be identified for not using it in the initial measurement

of clarity. However, research conducted in another study using the subscale for clarity of self showed no relationship with nurse job satisfaction (Felgen & Nelson, 2015). Theoretically, each of the three dimensions of clarity should be related to how employees navigate their work socially and technically as measured by the instrument of job satisfaction referred to as the *Healthcare Environment Survey* (HES; Felgen & Nelson, 2015). The current subscale for clarity of self measures stability of self-concept, but it fails to include some of the dimensions of clarity of self that are important within the context of an environment of RBC. Felgen asserts that clarity of self, within the context of RBC, includes a sense of self-awareness, emotional maturity and purposefulness; three facets of clarity of self that are not measured by the current subscale. The lack of these three facets may explain why the clarity of self tool failed to have a relationship with nurse job satisfaction as measured by the HES.

The current measure of clarity of role more adequately captures Felgen's and Koloroutis' theories. Unlike the clarity of self tool, this measure had a statistically significant relationship with nurse job satisfaction as measured by the HES (Anderson-Johnson & Nelson, 2012). "Clarity of Role" was found to predict 7% of the HES in Jamaica (Anderson-Johnson & Nelson) and 2% of the HES in a study from the United States (Felgen & Nelson, 2015). Felgen contends that the tool to measure clarity of role adequately expresses the importance of understanding what tasks are appropriate within one's role, but the tool should also measure an awareness of how one's role fits into a larger mission and team. More specifically, the measure needs to include items that relate to the technical, relational, and innovative aspects of one's role functions. It must also incorporate the notion of nurturing and "growing" others within one's role. Adding these items to "Clarity of Role" may more adequately measure clarity of role and subsequently explain a greater variance of nurse job satisfaction.

"Clarity of System" most accurately depicts Felgen's and Koloroutis' theories, predicting 31% of nurse job satisfaction (Felgen & Nelson, 2015). Moreover, the tool is unique because "Clarity of System" appears to have two facets: "Clarity of Governance" and "Clarity of Scheduling." Both are important facets of the system according to Felgen. This study and its subsequent results has implications for a deeper discussion to more precisely understand the construct of clarity in the context of RBC. Similar to "Clarity of Self" and "Clarity of Role," there is theoretically more to "Clarity of System," as reflected by Felgen. A revised "Clarity of System" subscale should include items relating to the employees' intention to align strategic, operational and functional aspects of strategic plans, policies, procedures and standards with values that support the expectations of patient, self and collegial care.

Felgen holds that the notion of clarity, as a cohesive, aligned unit in an organization, assumes that self, role and system conform with both values and practice. In other words, nurses must feel purposeful, intentional and rewarded to provide care in an organization because they have created roles that are clear. These roles must be based on the philosophy that the development of all staff and mangers to be instruments of caring is essential; the practice structures of care delivery and management must be redesigned so that they overtly support the empowerment of individuals in day-to-day practices like staffing, scheduling, assignments and shared leadership. Thus, the relationship between individuals, their role and the system is more effective when the system recognizes both philosophical and professional practices.

Conclusion

This item reduction study did not completely provide its intent, but it did reveal that a re-specification of the measure of clarity is warranted. Utilizing an existing subscale of clarity of self was scientifically justifiable and made the process of investigation easier. However, the

decision to use “an off-the-shelf” subscale to measure clarity resulted in a subscale that failed to relate to its context. This failure highlighted the importance of proper evaluation of results. Researchers must examine their results to determine if the theory or the instrument failed. In this case, the authors assert that the subscale failed and not the theory.

Researchers must not only consider the accuracy of the subscale in its entirety but also consider re-specification for more exact measurement of the construct. This was illustrated in the history of “Clarity of Role.” This subscale predicted a small amount of variance in theoretically associated outcomes. Similarly, the discussion of “Clarity of System,” a subscale which explained greater variance in associated outcomes, revealed missing items.

The next step for this line of research will be to test a re-specified model of clarity and to add items for both “Clarity of Role” and “Clarity of System.” Additionally, a new subscale for measuring clarity of self will need to be developed to more precisely measure the theory of clarity as proposed by Felgen and Koloroutis. Ongoing psychometric testing will be required to ensure validity of this instrument: *Clarity of Self, Role and System*.

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