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Innovative Methodology

Personal Construct Theory: A Strategy for the Study of Multidimensional Phenomena in Nursing

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Nursing research is characterized by the study of complex phenomena relative to health behaviours, health-care services, illness, and hospitalization events. The challenge for researchers is to accurately capture and analyze multidimensional phenomena in the context of a dynamic interplay of events and interactions in clinical settings. Traditional methodologies measure a variety of concepts using strategies such as observation and questionnaires that rely on descriptive and inferential statistical analysis. However, the dynamic interplay of experiences, perceptions, and meanings in the social context of the clinical setting is more difficult to examine using these methodologies.

In a recent study, an innovative, multidimensional theory and accompanying methodology were employed to examine parents' experiences in the dynamic social context of the hospital setting. Personal Construct Theory, with its accompanying methodology, Repertory Grid Technique, is a new approach (based on an old theory) to nursing research that is especially well suited to the study of complex, multidimensional research questions. Implications for nursing research, theory development, and practice will be examined relative to the utility of Personal Construct Theory.

Underpinnings of Personal Construct Theory

Personal Construct Theory was first described by George Kelly in a two-volume work in 1955. Kelly's basic thesis was that people construct their own cognitive frameworks for anticipating and interpreting situations, persons, and events (Kelly, 1970). The formal structure of Personal Construct Theory comprises two fundamental tenets and 11 corollaries. It has been described as a metatheory, a theory about theories, that specifies the human process of living, describing the ways in which people anticipate events (Kelly, 1970).

The two tenets of the theory are constructive alternativism and "man-the-scientist" (Blowers & O'Connor, 1996). Constructive alternativism postulates that the universe is a domain open to continual revision, whereby people are constructivists who actively interpret and give meaning to the world around them. Thus, reality is assumed to be subjective, each of us interpreting the world according to our own meaning system with all of its possibilities. The act of construing the world never delivers "reality" to a person; rather, it delivers progressive approximations of reality based on the person's anticipations tested against the outcomes (Blowers & O'Connor). The metaphor of "theory" is used to describe networks of constructs through which people see and handle the universe of situations in which they participate (Fransella & Bannister, 1977).

Man-as-scientist delineates a systematic model of how individuals view, interpret, and know the world around them. It postulates that people act in the manner of scientists, formulating hypotheses, testing them against reality (i.e., against their previous attempts to know the world), and revising them if they turn out to be false or of limited use. Inherent in this tenet is the assumption that people have a need to anticipate and predict the future so they can learn and plan based on possible or expected outcomes (Kelly, 1955). Kelly believed that people strive to make sense of their universe, themselves, and the situations they encounter, and, in order to do so, develop and re-develop an implicit theoretical framework called a "personal construct system" (Fransella & Bannister, 1977). People are scientists who derive hypotheses (have expectations) from their theories (from personal constructs), subject these hypotheses to experiments (respond behaviourally and take active risks in terms of the experiments), observe the results of their experiments (live with the outcome of their behaviour), modify their theory (change their minds, change themselves, and grow), and the cycle continues (Fransella & Bannister). Man-as-scientist is the theoretical model of how people develop construct systems and how information is processed through personal construct systems in a dynamic and cyclical manner.

The corollaries of Personal Construct Theory, which illustrate its principles, are as follows: a person anticipates events by construing their replications (construction corollary); each person characteristically evolves, for the purpose of anticipating events, a construct system embracing ordinal relationships between constructs (organization corollary); a person's construct system consists of a finite number of dichotomous constructs (dichotomy corollary); each person chooses the alternative in a dichotomized construct through which he or she anticipates the greater possibility for the elaboration of his or her system (choice corol-

lary); a construct is convenient for a finite range of events (range corollary); each person's construct system varies as he or she successively construes the replications of events (experience corollary); the variation in a person's construct system is limited by the permeability of the constructs within whose range of convenience the variants lie (modulation corollary); a person may successively employ a variety of construct subsystems that are inferentially incompatible with each other (fragmentation corollary); to the extent that the construction experience of one person is similar to that of another, the two processes are psychologically similar (commonality corollary); to the extent that one person construes the construction processes of another, he or she may play a role in a social process involving the other person (sociality corollary). The corollaries of Personal Construct Theory describe the development and evolution of construct systems and their application to or imposition on the events and interactions experienced by individuals.

Constructs

According to Kelly (1955), individuals retain dimensions that are relevant for them in order to form impressions of people, objects, and events. This is the heart of the interpretive process, or the act of construing, which leads to the formation of constructs that are "transparent patterns or templates" of the realities that make up the world (Blowers & O'Connor, 1996). The construct is a consistent way for each individual to make sense of some aspect of reality in terms of similarities and differences among objects and events. It is a process of determining, using polarized dimensions called constructs, whether people, places, or things are similar or different (Blowers & O'Connor). Constructs locate an event, help the individual to understand it, and then anticipate it. They are imposed upon events, not abstracted from them (Kelly, 1955). When imposed, a construct is used to distinguish events and group them. Thus, a construct is the distinction that individuals make between the events they experience (Kelly, 1955). Each construct represents a pair of rival hypotheses, either one of which may be applied to a new situation that people seek to interpret according to their attitudes, beliefs, and experiences. By testing hypotheses to see which best fits his or her expectations, the person can retain them temporarily, revise them, or replace them (Blowers & O'Connor). Constructs are points of reference that a person projects upon an event in an effort to more fully understand it.

Construct *Defined in Relation to* Concept

The term *concept* is heavily used in both the social sciences and the health sciences, and it has numerous meanings. Kelly (1955) defines *construct* in

terms of what it is and how it is different from *concept*, in order to clearly illustrate a fundamental aspect of his theory. Specifically, a concept is a static property or characteristic of two or more objects that otherwise are distinct (Kelly, 1955). Kelly would argue that a concept is simply a characteristic property used to classify and define objects in terms of their similarities and differences and that a concept is a finite characterization of an object or event.

A construct can be defined as follows: the interpretation of the use of concepts, or the process of knowing or, more importantly, coming to know (Blowers & O'Connor, 1996); the process by which individuals ascribe meaning to and interpret people, places, and situations or events in the world around them; a basis for discrimination and association within a system that is fluid and evolves and changes as new events are experienced (Kelly, 1970); the contrast that a person perceives — it does not represent an object and is not categorical or concrete (Kelly, 1970).

Personal Construct Theory might at first appear to be similar to symbolic interactionism, since both theories focus on how people construct meaning as they come to know or make sense of the world around them. Both theories generally describe how individuals ascribe meaning and how their behaviour is linked to the meaning they attach to life experiences. Interestingly, symbolic interactionism has been used widely as a theoretical basis in nursing research, yet Personal Construct Theory has remained unnoticed.

There are significant differences in the two theories. In symbolic interactionism, two people agree on the meaning ascribed to things in their environment (Benzies & Allen, 2001); behaviour is an outcome of the meanings derived from interaction (Benzies & Allen); meanings emerge from the individual's interactions and from societal expectations through reciprocal interaction (Benzies & Allen). In Personal Construct Theory, the individual imposes meaning on the event/experience based on the construal process used to understand and distinguish it from previous experiences (Kelly, 1970). According to Kelly (1970), individuals may or may not have agreement between their personal construct systems, but they interact in order to hypothesize and test their construal of a situation or a role they assume.

The main advantage of Personal Construct Theory for nursing research is the well-defined methodology developed to examine individuals' personal construct systems and ways of knowing. Nurse researchers can potentially use Repertory Grid Technique, a methodology developed specifically from Personal Construct Theory, to examine the complexities of meaning systems and the multidimensional nature of health events and health experiences.

Methodology: Repertory Grid Technique

The repertory grid is not only a fertile instrument but a very flexible one that has been widely used in clinical (therapeutic) applications as well as non-clinical applications such as industrial training, quality control, and management development (Shaw, 1981). Behind each act of interpretation or judgement that people make (consciously or unconsciously) lies their personal belief system with regard to the meaning and significance of the event they are experiencing (Fransella & Bannister, 1977). The repertory grid is a way of exploring the structure and content of such implicit belief systems or theories (Fransella & Bannister).

A full repertory grid has three components: elements, which define the people and situations upon which the grid will be based; constructs, or the ways in which the subject groups and differentiates between the elements; and a linking mechanism (i.e., a ranking or rating scale), which indicates how each element is being construed or assessed using each construct (Adams-Webber, 1981). The elements determine the focus of the grid. They must be elicited and defined as specifically as possible (Adams-Webber), and they must be homogeneous, all drawn from the same category of interest to the researcher.

Repertory Grid Technique was used in a study examining mothers' experiences during their child's unexpected acute hospitalization. The hospitalization of a child has been well documented as a highly stressful experience for parents. However, the meaning(s) and multidimensional nature of this experience has not been examined. The following detailed account of how the repertory grid was used in this study will highlight its flexibility and the potential it offers to nurse researchers.

Development of the Repertory Grid

The focus of the study were the elements (people and situations) associated with the pediatric unit of a community general hospital. Such elements must be representative and cover the full range of elements associated with the area to be investigated (Adams-Weber, 1981). All mothers in the study had to be able to relate directly to the elements (i.e., likely to have experienced all the elements) in the grid (Adams-Weber). There can be as few as six elements in a grid typically used for non-clinical applications and as many as 25 elements in a grid used for research and clinical therapies (Adams-Webber).

The elements were elicited during early pilot testing using open-ended interviews with a group of mothers who were representative of the sample population (i.e., had experienced the hospitalization of a child). During the interview, the mothers described the people with

whom they interacted and the situations or events they experienced. The people they most commonly described were nurses, physicians, and other parents who were present during the child's hospitalization. After eight interviews, elements emerged that were common to the experiences of all the mothers. These were the elements placed in the grid.

A grid has been broadly described as a sorting task that produces primary data in a matrix form to allow for the assessment of relationships (Fransella & Bannister, 1977). Thus, elements are the objects of people's thoughts and constructs are the qualities that people attribute to these objects (Adams-Webber, 1981). Constructs for a research-focused grid are generated using a similar strategy of open-ended interviews. Although there are a variety of strategies for eliciting constructs, the classical approach is to use dyads: two elements are grouped together and the participant is asked to describe their similarities or differences (Adams-Webber). As the participants describe the differences between the two elements, they also describe the meaning they ascribe to each. This approach is used when the elements are complex, such as the relationship between a nurse and a parent in a hospital setting. The goal is to elicit the differentiation in meaning between the two elements. One should avoid focusing on the logical opposites but, rather, focus on the opposite meanings (Adams-Webber). In this study, the researcher selected two elements that were very different for the mothers, such as a nurse who was perceived as helpful and effective and a nurse who was perceived as unsupportive. The mothers were asked to "think of the nurse who you really enjoyed working with and compare him or her to the nurse you found difficult to work with." The dyad establishes a context of discrimination between two elements, so that differentiation between the two elements can be easily described and elicited. Constructs associated with the ineffective nurse included: "[doesn't] spend time with me," "controls my child's care," "not confident," "doesn't communicate with me." These constructs were opposite in meaning (not logically opposite) to those associated with the highly effective nurse: "meets my child's emotional needs," "flexible with rules and policies," "relinquishes control over care," "not intimidating." Verbal labels or adjectives that are logical opposites are more typical of semantic differential scaling. Grids can be used for semantic differential scaling, but in this case the constructs and bipolar adjectives would be developed by the researcher and placed in the grid using standardized verbal labels. In the present study, the verbal labels used by the mothers during the interviews were those used to identify the constructs in the grid. Thus, the uniqueness of the mothers' constructs was captured in their own words. Figure 1 illustrates the structure of the grid used for the mothers in the study.

Figure 1 ***Sample Page of Repertory Grid for Mothers***

Informed 1 Always 2 Moderately 3 A little				**Uninformed** 5 A little 6 Most of the time 7 Always		
1	2	3	Effective nurse	5	6	7
1	2	3	Ineffective nurse	5	6	7
1	2	3	Recovery room nurse	5	6	7
1	2	3	Doctor (Adm.)	5	6	7
1	2	3	Other parents	5	6	7
1	2	3	ER admission	5	6	7
1	2	3	Unit admission	5	6	7
1	2	3	Going to OR	5	6	7
1	2	3	In Recovery room	5	6	7
1	2	3	When child in pain	5	6	7
1	2	3	When mom leaves child	5	6	7
1	2	3	Mom stays at bedside	5	6	7
1	2	3	Decision re child's care	5	6	7
1	2	3	At discharge	5	6	7
1	2	3	IV procedure	5	6	7

For the mothers, the elements of primary importance were elements of the hospital system. These included the people with whom the mothers interacted (i.e., nurses and doctors) and the situations they experienced during the child's hospitalization (e.g., admission to hospital, making decisions about the child's care, procedures, admission to emergency room). An identical process of eliciting constructs and elements was used with nurses in the hospital setting in which the study was to take place. Constructs and elements that were relevant for nurses were elicited through open-ended preliminary interviews designed for repertory grid development.

The repertory grid matrix was administered using a structured interview when the mothers were asked to interpret each element according to each of the constructs using a rating scale. For example, the mothers were asked the following question: "Think back to when your child was

admitted to the hospital [element]. Did you feel 'informed' or 'not informed' [construct]?" They were then asked to rate the degree to which they felt informed (1 = very well informed, 2 = somewhat informed, 3 = a little informed or not informed, 5 = a little not informed, 6 = somewhat not informed, 7 = not at all informed). A score of 4 was a neutral score entered into the grid data by the researcher whenever a construct was not applicable (not experienced) for a particular mother. In order to ensure accuracy, the researcher administered the grid to each participant and circled the rating score for each element according to each construct. Any element that was not rated was left blank and received a score of 4 when data were entered into the Repgrid software for analysis (Shaw, 1996).

Theoretical Assumptions of Grids

All grids must consider the issue of range of convenience, which states: "A construct operates within a context and there are a finite number of elements to which it can be applied by a given person, at a given time" (Fransella & Bannister, 1977, p. 6). For a given act of construing at a given time, the range of convenience of a person's constructs is always limited (Fransella & Bannister). For example, the construct of "happy" can be applied to a number of people or situations but not to an inanimate object. Thus, the elements to which a construct would consistently be applied is limited. The principle of range of convenience must be carefully considered during both grid development and data analysis. For grid construction, Kelly (1955) derived a primary rule: "For given persons completing a grid, all elements must be within his/her range of convenience." Thus, the constructs in the grid for this study applied only to the elements (people and situations) in the hospital where the study was conducted and only to the mothers or nurses who were functioning there at the time of the study. For the purpose of ensuring that the elements were within the range of convenience, the mothers and nurses were asked to indicate when a construct was not applicable to an element. In addition, pilot testing of the grid was conducted with a small group of mothers and nurses to ensure that all the elements were familiar to the mothers and that the participants readily applied the constructs to the elements in the grid. Further, the elements had to be representative of the pool from which they were drawn (Fransella & Bannister). According to this principle, if the test is to indicate how the participant construes or understands other people or situations, then the other people or situations appearing as elements in the test must be sufficiently representative of all the people and situations with whom the participant interacts in the identified setting (Fransella & Bannister). The elements in the grid for this study included all the people and situations that the mothers most

often interacted with during their child's hospitalization and those that the nurses were most likely to interact with in their clinical practice with families in the hospital setting.

The second theoretical principle is the organization corollary, which postulates that each person characteristically evolves, for his convenience in anticipating events, a construction system embracing ordinal relationships between constructs (Fransella & Bannister, 1977). Specifically, when constructs and elements are elicited during open-ended interviews, the verbal labels the participants use in the grid-development phase are used to identify the constructs. Kelly (1955) asserts that the words that the client uses to describe meaning are the verbal labels employed for the constructs, rather than the dictionary or professional meanings that are typical of other methodologies. According to Personal Construct Theory, constructs are interrelated and, when further analyzed, can be grouped to reflect underlying dimensions or core constructs that are the central framework of an individual's personal construct system (Kelly, 1955). Each person has a small number of core constructs or dimensions in his or her personal construct system. The purpose of the grid analysis in the present study was to examine the hierarchical relationships between the elicited constructs and the core elements, in order to describe the underlying core dimensions of the mothers' and nurses' construct systems.

Analysis of Grid Data

According to Kelly, the conceptual grid is a premathematical representation of an individual's psychological space and is designed to set the stage for mathematical analysis of that space (Fransella & Bannister, 1977). Analysis is based on the assumption that statistical relationships within the grid represent relative stability and permanence in a person's construct system (Fransella & Bannister). Principal components analysis (PCA) was used to examine the numerical ratings that reflected patterns and relationships between the elements and constructs for both the mothers and the nurses. In PCA, the unit of analysis is the correlation coefficient. PCA transforms the raw data into a standardized set of correlations with a mean of zero and a standard deviation of one. A mean of zero means the data set has a common origin, which ensures that the differences between each rating are all standardized from a common mean of zero. The correlations are actually the correlations between entire *columns* of numbers (i.e., the rating of each element according to each construct) and entire *rows* of numbers (i.e., the rating of an element across every construct). The data output is captured in a conceptual map whereby the correlation coefficients are really the angle between two vectors mathematically. High correlations produce very small angles between two vectors, meaning that the subject views these two elements in a very

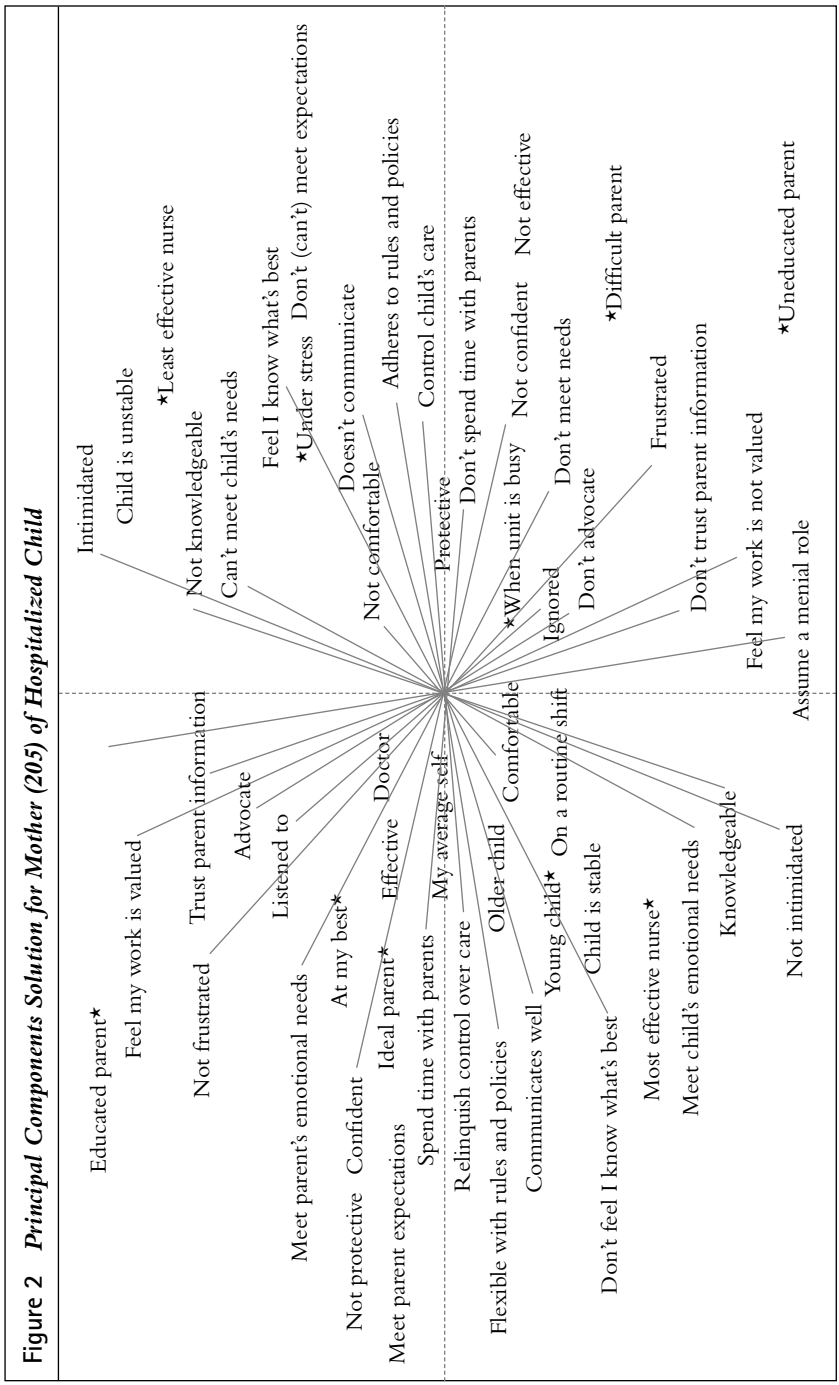


Figure 2 ***Principal Components Solution for Mother (205) of Hospitalized Child***

similar way, as they are highly correlated. When the correlations are low the participant views these two elements very differently, as the angle between the vector approaches 90 degrees. Figure 2 illustrates the vectors of the principal components solution for one of the mothers. Thus, principal components maps are simply vectors representing the correlations between the columns or rows of ratings on the repertory grid, and the angle between two elements represents the size of the correlation.

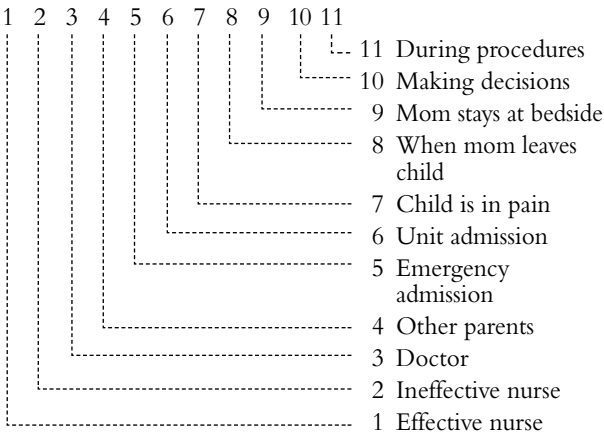
PCA is a data-reduction technique that draws a manufactured vector through as many vectors as possible to illustrate the underlying components in the data. The first line drawn through the vectors accounts for the maximum amount of variance in the data. The second line drawn through the vectors is as different as possible from the first and accounts for as much of the variance as possible once the first component is removed. A third component that is as different as possible from the first two is drawn through the vectors to account for as much of the remaining variance as possible when the first two components are removed. The first principal component is always 90 degrees to component two, which is 90 degrees to either of the first two components, implying that the components are not correlated.

PCA vector maps are mathematically separate for constructs and elements. However, because the data are standardized (have a common zero), a transformation matrix is used to multiply the element matrix by the transformed matrix, which has the effect of moving the elements matrix into the dimensional space of the construct principal components solution. What makes the innovation useful for nurse researchers is its ability to move the elements into the three-dimensional space of the construct matrices. The final solution is rotated using the Varimax rotation to further clarify the underlying construct dimensions in the data (Blowers & O'Connor, 1996). The data output includes a "raw grid" data display (Figure 3), a cluster analysis, and the principal components map (Princom map), which is generated for each participant (Figure 3). Cluster analysis was not used in this study since it does not offer the detailed mapping of the construct and element relationships in the data. The Princom map is a conceptual map illustrating the meaning that a mother or nurse attaches to the people or situations they encounter in the hospital setting. With each Princom map, the loadings for each element and construct are generated. Each loading represents the proximity of the construct or element to the principal component that accounts for the most variance possible. Higher loadings indicate a stronger relationship between the construct or element and the principal component. Analysis of the meaning of each of the underlying principal components in a solution is defined by the constructs that are most strongly loaded onto the principal component.

Figure 3 ***Data Output for Repertory Grid***

Display: Mother 203
Elements: 11; Constucts: 22; Range: 1 to 7; Context: hospital ward

		1	2	3	4	5	6	7	8	9	10	11		
Listened to	1	1	4	1	4	4	1	4	1	1	4	2	1	Not listened to
Adknowledged	2	1	4	1	4	4	1	4	1	1	1	6	2	Ignored
Respected	3	1	4	1	4	4	1	4	1	1	1	5	3	Not respected
Valued	4	1	4	1	4	4	1	4	1	1	1	6	4	Not valued
Caring	5	1	4	1	4	4	1	4	1	1	1	6	5	Not caring
Helpful	6	1	4	1	4	4	1	4	1	1	4	3	6	Not helpful
In control	7	1	4	1	4	4	1	4	1	1	1	7	7	Not in control
Included	8	1	4	1	4	4	1	4	1	1	1	7	8	Excluded
Involved	9	1	4	1	4	4	1	4	1	1	1	6	9	Not involved
Participates	10	1	4	1	4	4	1	4	4	1	1	3	10	No participation
Assume I don't know anything	11	3	4	4	4	4	4	4	4	4	4	4	11	Assume I know everything
No regret	12	1	4	1	4	4	1	4	1	1	1	7	12	Regretful
Not doubtful	13	1	4	1	4	4	1	4	1	1	1	5	13	Doubtful
Not fearful	14	1	4	1	4	4	1	4	1	1	1	6	14	Fearful
No guilt	15	1	4	1	4	4	1	4	5	1	1	5	15	Guilty
Manageable	16	2	4	1	4	4	1	4	1	1	1	5	16	Not manageable
Certainty	17	1	4	1	4	4	2	4	5	1	1	5	17	Uncertainty
Pleased	18	1	4	1	4	4	1	4	1	1	1	5	18	Disappointed
Satisfied	19	1	4	1	4	4	1	4	1	1	1	7	19	Dissatisfied
Reassured	20	1	4	1	4	4	1	4	1	1	1	5	20	Intimidated
Informed	21	1	4	1	4	4	1	4	1	1	1	7	21	Not informed
Understanding	22	1	4	1	4	4	1	4	1	1	1	5	22	Don't understand parents



Overview of Findings

The purpose of this study was to conduct a multidimensional evaluation of how mothers perceive and ascribe meaning to their interactions in the hospital setting and how nurses perceive and ascribe meaning to their interactions with mothers. Mothers were approached 24 hours following the admission of their child to hospital and completed the repertory grid instrument during a structured interview. Nurses were interviewed using the repertory grid according to the convenience and availability of the nurse on the unit. Twenty mothers and 20 nurses participated. The hospitalization was the first for each family. The participating nurses were primarily Canadian citizens (65%) and had an average of 14 years of nursing experience.

The findings demonstrate that the mothers ascribed three underlying dimensions of meaning to their experience. In the first dimension they evaluated their interactions with nurses in the hospital setting, which were pivotal to their overall hospital experience, whether positive or negative. The second dimension was the mothers' ability to play their parental role in a meaningful way (i.e., to be involved in their child's care, informed, valued). The third dimension was the mothers' active involvement in their child's care, which was based not only on their sense of efficacy or perceived ability to become actively involved, but also on their decision to do so, which was influenced by their interactions with nurses. This was a powerful, emotional dimension: the decision to become involved in care resulted in significant emotional experiences. The mothers indicated that their most critical transactions in the hospital setting were mediated by frontline nursing staff, who played a central role in the meaning of the mothers' experiences.

In contrast, the nurses' meaning systems were very diverse and complex. There were more components to the nurses' PCA, with a more even distribution of variance accounted for by each of the dimensions. The nurses' first dimension was self-evaluation of their effectiveness as a professional, which amounted to a self-portrait of their performance in different circumstances and situations. This dimension concerned how the nurses felt (i.e., valued by parents, frustrated, comfortable, intimidated), what they were able to do for families (i.e., meet expectations and needs), and the strategies they used when interacting with mothers (i.e., communication, relinquishment or exertion of control). Control was a dominant theme in this component across all the nurses in the study. The second dimension was the nurses' ability to work with the mother or the situation, which was largely based on their assessment of the mother as "ideal" or "difficult," "educated" or "uneducated." When a mother was viewed as ideal, the nurse perceived an ability to work with her in an

effective manner. The third dimension was the nurses' ability to form a relationship with the mother or, alternatively, to limit their interactions with and control the behaviour of the mother. This dimension was, again, based on the nurses' evaluation of the mother; nurses formed relationships with mothers they perceived as ideal but limited their contact with those they perceived as difficult or "uneducated."

The findings indicate that there are clear differences in what is important to mothers and what is important to nurses in the hospital setting. The mothers valued their relationship with the nurse first and foremost, whereas nurses most valued their knowledge and competency in their professional role, using control as a strategy whenever they perceived a mother as less than ideal.

Conclusion

Personal Construct Theory and the accompanying Repertory Grid Technique offer a unique approach to the examination of personal construct systems. The outcome of this study was multidimensional mapping of the meanings of the experiences of both mothers and nurses in the hospital setting. Ultimately, Repertory Grid Technique was able to delineate the complex dynamics of mothers' interactions with nurses, something that empirical work has so far been unable to do. The flexibility of this technique allows nurse researchers to focus on any type of clinical phenomenon or health issue. Because of its multidimensionality, the technique presents a range of opportunities for descriptive research as well as intervention research using multidimensional mapping to inform nurse researchers about complex clinical phenomena and to show nurses the extraordinary impact they can have on the meanings of health events and health experiences in their clinical practice.

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