THE DEVELOPMENT OF A SCALE
TO MEASURE CHILDBIRTH EXPECTATIONS

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The hypothesized link between women's childbirth expectations and their subsequent psychological response to the experience has not been widely explored. The few studies done in this area have focused on the negative consequences of unmet expectations. Women whose expectations for childbirth are not confirmed by the actual experience evaluate themselves and the experience negatively (Kearney & Cronenwett, 1989; Leifer, 1980; Levy & McGee, 1975; Lumley & Astbury, 1980). In the postpartum period, such women experience feelings of failure, anger, guilt and grief (Grace, 1978; Lipson & Tilden, 1980; Marut, 1978). Mercer (1985) and Gottlieb and Barrett (1986) linked problems with mother-infant interaction to a negative or unanticipated birth experience.

In a recent prospective study of 825 women, the assumption that women with overly high expectations are likely to be disappointed and hence dissatisfied because of unmet expectations, was questioned (Green, Coupland, & Kitzinger, 1990). It was found that high expectations do not necessarily lead to dissatisfaction. Women who had their negative expectations realized were more likely to experience poor outcomes. Without further study, the relationship between what women expect of childbirth and how they evaluate their experiences is unclear. A necessary initial step in the exploration of this relationship is the development of a reliable and valid instrument to measure childbirth expectations.

Literature Review

Few empirical studies have directly investigated maternal childbirth expectations. Roberts (1983) discussed in general terms the need for women

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to develop realistic expectations about pain during labour and Grace (1978) described the resulting grief and personal sense of loss when childbirth expectations are not met. Leifer (1980), in a study of the psychology of the first pregnancy, found that women who romanticized labour had the most difficulty in childbirth and reacted to it as a negative experience.

The impact of unmet childbirth expectations has been investigated in relation to the experience of women who have undergone an unanticipated cesarean section (Cranley, Hedahl & Pegg, 1983; Marut & Mercer, 1979), in studies of factors associated with the experience of severe labour pain (Astbury, 1980; Fridh, Kopare, Gaston-Johansson & Norvell, 1988) and most recently in a study of the correlates of satisfaction with the delivery experience (Seguin, Therrien, Champagne & Larouche, 1989). In general, these studies have found that, when there is a lack of congruence between maternal expectations and the actual childbirth experience, the labour and delivery experience is perceived negatively and often associated with a higher degree of pain.

Clark (1975) conducted one of the first studies to investigate maternal childbirth expectations directly. She explored the relationship between birth expectations and perceptions of the childbirth experience by means of a semi-structured interview administered in the last month of pregnancy and on the first day post delivery. Results indicated that there was a relationship between birth expectations and the amount of distress women experienced in labour. Women who rated their labour as positive had accurately anticipated the amount of discomfort they would experience. Women who reported their labour as negative had underestimated the severity of the discomfort they would feel.

In a study designed to investigate the relationship between expectation and the subjective outcome of childbirth, Levy and McGee (1975) found that women who rated their deliveries as favourable indicated the experience was better than expected, while those women with negative impressions reported childbirth to be worse than expected. They contend that these results are congruent with Janis's theory that exaggerated anticipation of danger leads to a negative outcome following stress impact.

More recently, Scott-Heyes (1982) attempted to clarify the relationship between birth expectations and women's postnatal evaluations of their labour experience. Anticipated and actual evaluations were found to be significantly correlated, suggesting that women's expectations for childbirth do influence their actual experience. The relationship between birth expectations and the actual experience was also examined by Stolte (1987) who found, not surprisingly, that significantly more primiparas than multiparas rated their labour and delivery as "not like" what they had expected.

While these studies have made an important contribution to our understanding of the impact of childbirth expectations on the birth experience, many have been limited in scope and have addressed only the global question of whether expectations were met. Information about expectations for specific aspects of labour usually has not been obtained and, as a result, relatively little is known about which expectations may be important determinants of childbirth satisfaction.

The purpose of this article is to describe the first steps in the development of a tool to assess childbirth expectations. The ultimate goal is to use this instrument in subsequent research studies to explore the relationship between childbirth expectations and associated outcome variables. The following sections describe the initial phases in the development of the *Childbirth Expectations Questionnaire* (CEQ), the refinement and testing of scale items and the psychometric techniques used to establish the reliability and validity of the instrument.

Phase 1--Initial Development

Phase 1 involved the construction of scale items for the CEQ. Using a semi-structured interview guide, in-depth interviews were conducted with eleven women in their third trimester of pregnancy recruited from prenatal classes. A sample size of eleven women was deemed sufficient for the purpose of generating expectation statements, when content analysis of the data revealed no new categories of expectations were emerging. Each interview required a minimum of one hour to complete. Questions focused on their general thoughts and concerns regarding childbirth and their expectations for the experience (Beaton & Gupton, 1990). Analysis of these data, together with a review of the childbirth expectation literature, yielded over 100 expectation statements. These statements were analyzed for thematic content and sorted into five major categories which formed the basis for the initial conceptualization of the CEQ subscales. These categories were as follows.

1. *Pain*: the woman's assessment of how painful her labour would be: e.g. "I will experience the worst pain I have ever had."
2. *Self-efficacy*: the woman's assessment of how well she would be able to cope with labour: e.g. "I will be afraid of panicking."
3. *Intervention*: the woman's assessment of technological interventions that might be used during her labour: e.g. "Lots of medical equipment and machinery will be used."
4. *Significant Other*: the woman's assessment of how helpful her husband or partner would be to her during labour: e.g. "My husband/partner will be a source of support to me."
5. *Environment*: the woman's assessment of how supportive the childbirth environment would be: e.g. "I will feel reassured by the nurse's presence."

A panel of four experts in maternal-infant nursing were asked to review the 100 scale items for relevance and clarity of wording and to sort them into one of the five categories. All items judged to be ambiguous in meaning were discarded. Similarly, with respect to categorization, items for which there was less than 75% agreement were deleted. As a result of this process, the CEQ was reduced to 58 items. To avoid response set, wording of these remaining items was reviewed to ensure that approximately half were worded negatively and half were worded positively. All negatively-worded items were reverse scored so that a higher score would represent more positive childbirth expectations. A five-choice Likert scale format was chosen. Lissitz & Green (1975) indicated that this format gives scale reliability equal to if not better than alternative scoring methods. The items were then randomly ordered to form Draft 1 of the Childbirth Expectations Questionnaire.

Phase II--Refinement of Scale Items

Draft 1 of the CEQ was administered to a sample of 202 women in their third trimester of pregnancy attending prenatal classes in a large midwestern Canadian city. Ninety-four percent of the sample were married and 79% were expecting their first child. Approximately half of the sample (n=106) completed the questionnaire on two separate occasions: at the end of one prenatal class and, one week later, at the beginning of the next class. This approach to test-retest reliability was chosen to reduce the possibility that differences in women's responses at the two test times might represent true change rather than lack of instrument stability. The determination of instrument stability is particularly problematic when measuring phenomena such as childbirth expectations which may change over time. The question of instrument stability over time must be balanced against the issue of the instrument's sensitivity to a true change in respondents' attitudes.

As women completed the CEQ, they were asked to comment on the clarity of items, note omissions and add their general observations about the instrument. The most common comment concerned the difficulty women said they experienced making predictions about what would happen to them during childbirth. For example, in response to the item "I will feel intense pain", several women wrote, "Who knows?". To acknowledge these feelings, instructions for completion of the CEQ were rewritten to include the following statement: "While no one can know for sure what will happen to them in labor, we are interested in knowing what you anticipate or expect the childbirth experience will be like for you." A second area of concern related to lack of reference to the labour coach in such items as "My husband/partner will be a source of support to me". As a result of these comments, for each item in which the term "husband/partner" appeared, the term "partner/coach" was substituted.

Standard procedures for item analysis described by Nunnally (1978) were used to identify questionable items. The correlation of each item with the CEQ total score and with the item subscale were compared. Any item that did not correlate well (< 0.30) or that appeared redundant was flagged for further investigation and subsequently either deleted or reworded. On the basis of this analysis 22 items were identified as problematic and were removed.

Internal consistency was tested using Cronbach's alpha. The alpha coefficient for the total scale (58 items) was 0.85 and for the five subscales ranged from 0.79 for self-efficacy to 0.72 for intervention. Scale reliability also was assessed using only the 36 items retained after item analysis. Cronbach's alpha was 0.80 for the total scale. For the five subscales, coefficient alpha was: self-efficacy 0.76, significant other, 0.76, supportive birth environment 0.69, pain 0.68 and intervention 0.68. Coefficient alpha is influenced by the number of scale items; as such, the drop in alpha levels is to be expected. Following Nunnally (1978), this level of reliability was judged sufficient to justify further development of the CEQ.

The Kendall Tau B correlation coefficient was 0.67 for test-retest reliability. Thirty-three of the 106 women who completed the CEQ a second time indicated that their expectations for childbirth had changed since the first administration of the instrument. The reasons most frequently given for changes in expectations were thinking over the content of prenatal classes during the intervening week and developing complications of pregnancy. On the basis of this information, the CEQ was judged to have acceptable stability.

To validate the constructs represented by the five subscales, a factor analysis of the remaining 36 items was performed. Following the guidelines set out by Stevens (1986), the principal components method with an orthogonal varimax rotation was employed. Four factors with eigenvalues greater than one emerged from the analysis. This, together with an analysis of how individual scale items loaded on the four factors, resulted in substantial rethinking of the conceptual underpinnings of the CEQ. First, items from both the "pain" and "self-efficacy" subscales loaded heavily on the first factor suggesting that these items were all related to the same concept. The items loading highest on this factor were: " I will be afraid of panicking" (.67) and " I will worry about the severity of labour pain" (.66). Further analysis of the other items loading on Factor 1 revealed that the concept was related to a woman's expectation for her ability to cope with the pain of childbirth. A second source of concern was that items in the "environment" subscale loaded on several factors. In particular, items related to physician support and the physical environment did not load on the same factor (III) as the nurse support items. The scale items loading highest on this factor were:

"The nurses will spend little time with me" (.69) and, "The nurses will be present to offer me encouragement" (.67). We were specifically interested in women's expectations for nursing support and, because all nursing support items were highly correlated with each other, these items were retained, while those items dealing with physician support and the physical environment were flagged for possible deletion. Nine items related to support by significant other loaded heavily on Factor II. The item loading highest on this factor was "I will feel comforted by my husband/partner's presence" (.66). Six items concerning expectations for the use of medical intervention loaded on Factor IV. The scale item "Lots of medical equipment and machinery will be used" loaded highest on this item (.56).

As a final step in the analysis, all items flagged for removal were again re-examined as a group. The purpose of this procedure was to determine whether any additional or unrecognized construct(s) might be present. A possible theme of "personal control" emerged from this re-examination. As a result, all items relating to personal control, including control over the environment, interventions, or other aspects of the birth experience were retained and used to develop a new "control" subscale. Draft Two of the CEQ consisted of 50 items and five subscales: pain/coping, significant other, intervention, nursing support and control.

Phase III -- Further Refinement

Draft 2 of the CEQ was tested on a sample of 104 pregnant women attending a series of prenatal classes identical to those utilized by women who participated in the testing of Draft 1. Ninety percent of the sample were married, 78% were expecting their first child and 93% had completed high school. Exploratory factor analysis failed to confirm the existence of a "control" construct and all items related to this subscale were deleted. Additional items were removed on the basis of low item-total and item-subscale correlations. Subsequent analyses were performed on the remaining 36 items. The alpha coefficient of reliability was 0.81 for the total CEQ; for the four remaining subscales it was: pain/coping 0.82, support by significant other 0.77, nursing support 0.75 and intervention 0.67.

Refactoring of the 36 items verified the existence of the four subscales while examination of scree plots indicated that the differences between factors could be clearly distinguished. Nine items related to coping with pain loaded significantly (0.40 or higher) on Factor I. The highest loading was 0.77 for the item "I will be afraid of panicking". Six items related to support by significant other loaded on Factor II. The item loading highest was "my partner/coach will tell me what is going on" (0.78). Seven items indicating expectations for nursing support loaded on Factor III. The highest loading (0.76) was obtained for the item "The nurses will spend little time with me".

Six items concerned with expectations for medical intervention loaded on Factor IV. The item with the highest loading was "There is little chance I will end up having a cesarean section" (0.61). The clarity of the factor structure was such that all 36 items were retained, after minor changes in wording, to produce Draft III of the CEQ.

Phase IV

Draft 3 of the CEQ was used as a pre-labour measure in a longitudinal study comparing the expectations, perceptions and satisfaction of women experiencing different types of labour (Bramadat, 1990). Subjects (n=100) in their third trimester of pregnancy were recruited from the same population of prenatal class attenders as subjects who participated in Phase III. Comparison of Phase IV sample demographics with those of Phase III using Chi-square tests and Krushal-Wallis/Wilcoxon procedures showed no significant differences between the two samples on any variable. With respect to reliability, analysis of the Phase IV CEQ data set revealed results similar to those obtained in Phase III. Inspection of eigenvalues and rotated factor matrices provided additional confirmation of the high degree of correspondence between the two data sets. On the basis of this evidence, the decision was made to pool the results of Phases III and IV.

The Kaiser-Meyer-Olkin *Measure of Sampling Adequacy* (MSA) was used to establish the degree of confidence which could be placed in subsequent factor solutions, considering the modest observation to variable ratio. The value of the Kaiser-Meyer-Olkin MSA lies in the information it provides about the extent to which a scale represents a unified family of ideas or concepts as well as about how well each scale item is related to that family (Kaiser, 1970; Kaiser, 1981). Kaiser suggests deleting a scale item with an MSA of less than 0.6. The MSA for all scale items was greater than 0.6, except for the intervention item "I will be up walking around for most of my labour" which had an MSA of 0.3. Examination of the correlation matrix indicated that this item correlated with only two other scale items and even these correlations were not particularly strong (<0.3). Inspection of item analysis data indicated that omission of this item would not adversely affect the internal consistency of the CEQ. On the basis of this evidence, the item was deleted from the CEQ so that, for the purpose of further analysis, the CEQ consisted of 35 items.

According to Kaiser (1970, 1981), the overall MSA of an instrument should be approximately 0.8 in order for the results of factor analysis to be seriously regarded as evidence of construct validity and generalizability. Because the overall MSA of the CEQ was 0.78, the decision was made to proceed with factor analysis of the 35-item CEQ using the pooled data set n=204. Analysis of scree plot data (Figure 1) and the varimax rotated factor solution again

confirmed the existence of four distinct factors. Loadings were generally clear and well defined for each factor. (Table 1)
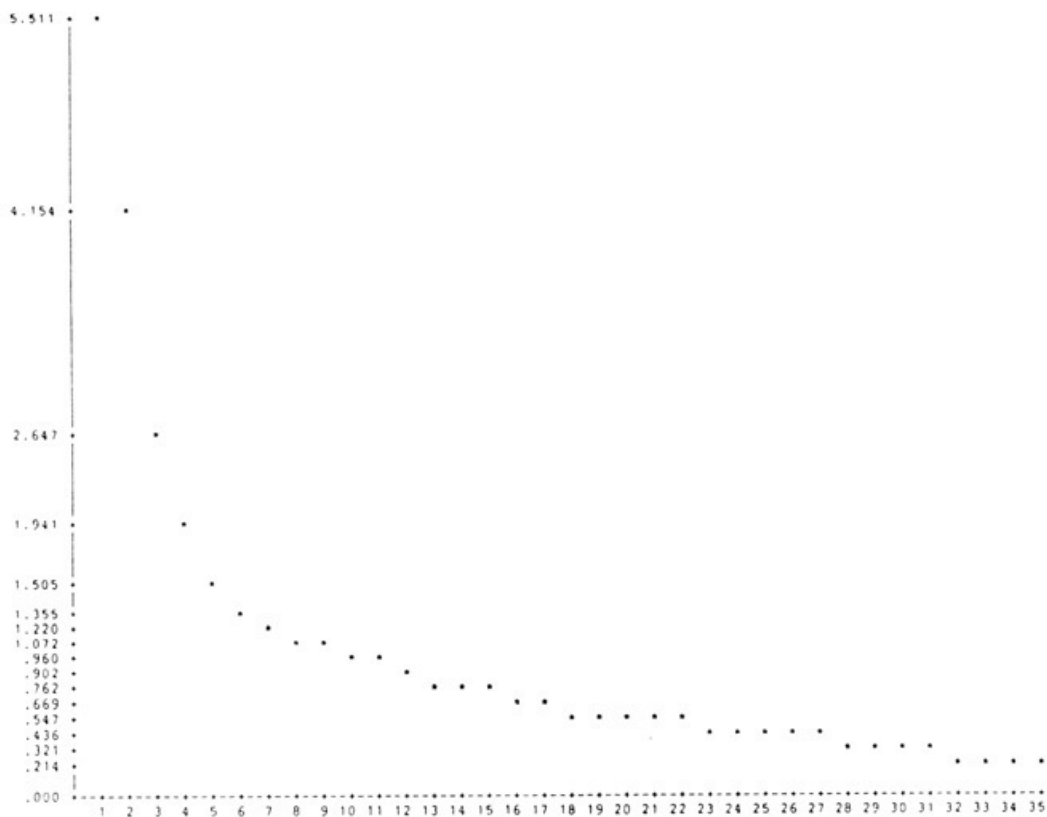

Figure 1
Eigenvalue Plot for the Childbirth Expectations Questionnaire

As the yardstick for identifying significant factor loadings, Stevens (1986) advises using double the critical value for the test of a significant correlation coefficient with a Type I error rate of one percent. For n=204, this means rejecting as spurious any item with a factor loading below 0.45. Using this criterion, 10 of the 11 pain/coping items loaded significantly on Factor I. The entire nursing support subscale loaded on Factor II with eight of the nine items attaining significance. All seven items related to support by partner/coach loaded on Factor III, five with loadings greater than 0.45. Five of the nine intervention items loaded significantly on Factor IV as did one pain item. This item, "I will feel intense pain" also cross-loaded on Factor I. While obviously related to the concept of coping with pain, the item may also be subtly reflective of an expected need to use medical intervention (e.g. analgesics) if pain is severe. Six items failed to load significantly on any factor. However, these items seemed logically oriented to the appropriate subscale and, as a result, were retained for reassessment in future studies.

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Table 1

Loading and Factor Structure of the Childbirth Expectations Questionnaire (N=204)

Factor 1 Pain/Coping	Factor 2 Nursing support	Factor 3 Partner/Coach	Factor 4 Intervention
.77			
.77			
.70			
.61			.29
.59			
.58			-.27
.57		.25	
.53			.38
.52			.30
.51			
	.75		
	.74		
	.68		
	.64		
	.62		
	.60		.31
	.51		-.26
	.45	.33	
	.41		.39
		.72	
		.70	
		.69	
		.61	
		.49	
		.42	
		.38	.35
	.28	.37	.31
		.34	.25
			.57
			.53
			.51
			.49
			.48
			.46
			.36

Underline indicates significant loading, p=<.01

Reliability analysis was conducted on the 35-item CEQ using the pooled data set (n=204). The results are shown in Table 2 and indicate that the CEQ has a reliability acceptable for instruments used in basic research (Nunnally, 1978).

Table 2

Internal Consistency of the Childbirth Expectations Questionnaire

Subscale	Coefficient Alpha
Pain/Coping	.84
Nursing support	.80
Partner/Coach support	.72
Intervention	.65
Total scale	.82

Current Form of the CEQ

In its present form, the CEQ consists of 35 items scored on a Likert-like format ranging from strongly disagree (1) to strongly agree (5). A stem statement, "With regard to my labour and delivery experience, I expect that:", is followed by brief statements descriptive of childbirth expectations. Four subscales reflect major areas of childbirth expectations: coping with pain (eleven items), support by partner/coach (seven items), nursing support (eight items) and intervention (nine items). A score can be calculated for each subscale. As well, a total score can be obtained by summing the four subscale scores. The subscales vary in number of items, but may be readily standardized to produce percentile scores for comparison. A high score on the CEQ indicates positive expectations for the childbirth experience and would incorporate expectations for support from a partner/coach and the nurse, the ability to cope with pain that will not be unbearable, and minimal technological intervention in the labour process.

Discussion

Psychometric research on the CEQ over the course of several studies has been fruitful and indicates that continued developmental work with the instrument is justified. Refinement of the intervention scale in particular is required and efforts to increase the conceptual clarity of the instrument will be a major focus of future studies. Results have been consistent across several studies, although testing with larger samples and use of multiple measures is required to demonstrate the instrument's validity adequately.

To date, the CEQ has been used with low-risk homogeneous samples of pregnant women in their third trimester of pregnancy. The task remains to examine the ability of the CEQ to discriminate among different populations of pregnant women (e.g, distinguish differences in expectations between high and low-risk women). The CEQ was developed using middle-class women and, as such, may reflect a middle-class orientation to childbirth. Samples of women more socially disadvantaged than those used thus far might reveal a different set of expectations and, for some groups, questions related to support by partner or coach might not be relevant. Several studies designed to address these issues are on-going.

For the future, use of the CEQ could contribute to increased understanding of the development and importance of women's childbirth expectations. Longitudinal study of childbirth expectations could reveal whether childbirth expectations change over time, and in what direction such changes might occur. Of particular interest would be examination of the impact of childbirth education on the development of childbirth expectations. Knowledge of the development and nature of women's childbirth expectations and of the variables which influence them would assist childbirth educators in developing teaching strategies to prepare women better for the realities of the childbirth experience.

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RÉSUMÉ

Élaboration d'une échelle de mesure
des attentes relatives à l'accouchement

Le but de cette série d'étude était de développer un instrument pour mesurer les attentes des femmes par rapport à l'accouchement. Les phases de développement du questionnaire des attentes à l'accouchement (CEQ) sont décrient ainsi que les téchniques analytiques qui sont utiliseés pour évaluer la sûreté et la validité. Présentement, le CEQ comprend 35 articles de style Likert dans lesquels sont inclus les 4 catégories suivantes: faire face à la douleur de l'accouchement, l'appui du partenaire, l'appui des infirmières, et l'intervention medicale. Dans le futur le CEQ pourrait être utiliser dans des études pour augmenter la connaissance du développement et de la nature des attentes de la femme par rapport à l'accouchement. En comprenant ces attentes des femmes et les facteurs qui les influencent, on pourrait assister aux enseignant des classes d'accouchement à développer des stratégies qui amélioreraient la préparation des femmes aux réalités face à l'accouchement.