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Testing of the Decisional Conflict Scale: Genetic Testing Hereditary Breast, Ovarian Cancer

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Abstract

Background—Hereditary Breast and Ovarian Cancer (HBOC) syndrome is attributed mostly to mutations in the Breast Cancer 1 and Breast Cancer 2 genes (BRCA1/2). HBOC is associated with significantly higher risk for developing breast cancer compared to the general population (55-85% vs. 12%) and ovarian cancer (20-60% vs. 1.5%). The availability of genetic testing enables mutation carriers to make informed decisions about managing their cancer risk (e.g., risk-reducing surgery). However, uptake of testing for HBOC among high-risk individuals is low, indicating the need to better understand how women decide to pursue genetic testing.

Objective—To evaluate the reliability and validity of the modified Decisional Conflict Scale for use in decisions associated with genetic testing for HBOC.

Method—In this cross-sectional, cohort study, women were recruited who pursued genetic testing for HBOC, and also recruited was one of their female relatives who did not pursue testing from two Genetic Risk Assessment clinics affiliated with a large Comprehensive Cancer Center in the Midwest. The final sample consisted of 342 women who completed all 16 items of the Decisional Conflict Scale. The psychometric properties of the scale were assessed using tests of reliability and validity including face, content, construct, contrast, convergent, and divergent validity.

Results—Factor analysis using principal axis factoring with oblimin rotation elicited a three-factor structure (a) Lack of Knowledge about the Decision (a = .97), (b) Lack of Autonomy in Decision Making (a = .94), and (c) Lack of Confidence in Decision Making (a = .87). These factors explained 82% of the variance in decisional conflict about genetic testing. Cronbach's alpha coefficient was .96.

Discussion—The instrument is an important tool for researchers and healthcare providers working with women at risk for HBOC who are deciding whether or not genetic testing is the right choice for them.

Keywords

decisional conflict scale; hereditary breast and ovarian cancer (HBOC); psychometric testing

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Hereditary Breast and Ovarian Cancer (HBOC) syndrome is the collective term used to describe genetic susceptibility to breast and ovarian cancer (American Cancer Society [ACS], 2010). Mutations in the Breast Cancer 1 (BRCA1) and Breast Cancer 2 (BRCA2) genes account for the majority of these cases. Mutation carriers have significantly higher risk for developing breast cancer compared to the general population (55-85% vs. 12%) and ovarian cancer (20-60% vs. 1.5%). Genetic testing for HBOC provides individuals the opportunity to determine their cancer risk and make decisions potentially to reduce the occurrence of the syndrome. Patients already diagnosed with breast or ovarian cancer benefit from knowing their mutation status before making surgical decisions, whereas cancer-free individuals might use this information to make informed life decisions (e.g., reproduction) and take proactive steps towards risk management (i.e., increased surveillance, chemoprevention, and risk-reducing surgery; Eisinger et al., 2001; Finch et al., 2006; Metcalfe et al., 2008).

However, the use of genetic testing for HBOC among high-risk individuals has been lower than expected, varying between 26% and 80% (Lerman, Croyle, Tercyak, & Hamann, 2002; Ropka, Wenzel, Phillips, Siadaty, & Philbrick, 2006), while a significant number of those who get tested do not seek their results (Pasacreta, 2003). Although research examining how women decide whether to have genetic testing for HBOC is underway, there has been little attention to the level of decisional conflict they experience in making this life-altering decision. The purpose of the current study was to bring attention to this significant topic by evaluating the psychometric properties of the Decisional Conflict Scale (O'Connor, 1995), modified to reflect decisional conflict that is specific to genetic testing for HBOC.

Background

Decisional conflict is a condition of hesitation and doubt about a forthcoming decision. It is defined by several contributing characteristics (i.e., verbalization of uncertainty, fluctuation between choices, postponed decision-making, stress, self-absorption, and the questioning of one's own beliefs). Decisional conflict is influenced by insufficient information concerning alternative choices and their consequences; lack of decision making skills; and exceeding demands by significant others (O'Connor, 1993). Individuals with high levels of decisional conflict about the choice at hand will most likely delay making a decision. Ultimately, high decisional conflict compromises one's quality of life (Eastwood, Doering, Roper, & Hays, 2008).

High decisional conflict has been associated with decreased intention to use genetic testing (Peterson et al., 2006). Decisions to use genetic testing for HBOC likely are influenced by family characteristics (D'Agincourt-Canning, 2006; Marteau & Weinman, 2006). Linkages between family processes, family relationships, and the decision to use genetic testing have been hypothesized (Peterson, 2005; Wilson et al., 2004). Women usually take on the responsibility of making decisions about genetic testing (Metcalfe et al., 2007) and of sharing genetic information with family members (Speice, McDaniel, Rowley, & Loader, 2002). Those who refused genetic testing for HBOC found it a more difficult decision to make and felt pressure from significant others (Claes et al., 2003). Uninformative BRCA1/2 test results led to higher decisional conflict and poorer decisional outcomes among breast cancer survivors (Rini et al., 2009).

Development of the Decisional Conflict Scale

The original Decisional Conflict Scale (DCS) was developed and tested psychometrically by O'Connor (1995) with individuals who were making a decision on influenza immunizations and breast cancer screening. When it was developed, the DCS included three subscales

derived from the decisional conflict construct, which were named Decision Uncertainty (three items), Factors Contributing to Uncertainty (nine items), and Perceived Efficacy in Decision Making (three items; Table 1). Initial psychometric testing of the DCS elicited a test-retest coefficient of .81 and reliability coefficients of .58 to .92 (O'Connor, 1995).

The original DCS has been adapted widely to measure decisional conflict in patients deciding to have hormone replacement therapy, colorectal cancer screening, breast cancer treatment, and treatment of benign prostatic hypertrophy, hypertension, atrial fibrillation, and patients with schizophrenia. It has been used also in a trial evaluating the efficacy of a decision aid for HBOC genetic testing (Green et al., 2004) and to measure decisional conflict about cancer risk management among breast cancer survivors who received an uninformative BRCA1/2 test result (Rini et al., 2009). Table 2 presents information about the development and adaptation of the DCS to different populations. However, validity was not re-evaluated for the adapted DCS; few studies reported reliability data. All studies used the scale relying on the initial psychometric testing and accepting its properties as initially reported. When a nonstandardized measure is changed for subsequent use, it is altered into a different measure and therefore warrants new testing of psychometric properties (Waltz, Strickland, & Lenz, 2010). Thus, the purpose of the present study was to evaluate the reliability and validity of the modified DCS for genetic testing for HBOC.

Method

Data Collection Procedures

The scale was administered as part of a survey that examined individual and familial factors that influence decision-making for HBOC (Katapodi et al., in press). Data for this cross-sectional cohort study were obtained from two genetic clinics affiliated with a comprehensive cancer center and a major research-intensive university. The clinics provide genetic risk assessment, counseling, and genetic testing to individuals at risk for hereditary cancer syndromes, including HBOC. The study recruited two cohorts of women: (a) women from the two clinics who had pursued genetic testing for HBOC (Probands), and (b) one of their female relatives (Relative), who had not pursued testing, although she had a similar risk of carrying a genetic mutation. Participants were older than 18 years of age and completed the survey in English.

Briefly, a genetic counselor identified eligible participants by analyzing pedigrees of women that had genetic testing for HBOC in the clinics within the past 5 years prior to the initiation of the study. Eligible Probands were sent an invitation letter, tailored to identify their high-risk relatives (e.g., sister, maternal or paternal aunt). After Probands agreed to participate in the study, they were mailed a self-administered survey, along with an invitation letter for their high-risk relative. Relatives who agreed to participate were mailed a similar survey. Data collection occurred from January 2008 through April 2009. The Institutional Review Board of the university and the Protocol Review Committee of the cancer center approved the study.

Measures

Members of participating dyads (Proband Relative) were each mailed a 25-page, self-administered survey that captured demographic information; personal and family history of genetic testing and breast or ovarian cancer; perceived risk of HBOC; perceived utility of genetic testing (benefits minus barriers of genetic testing); knowledge about the genetics of HBOC; and decisional conflict about genetic testing for HBOC. Perceived risk was assessed with 19 items assessing absolute and comparative perceptions of risk of developing breast and ovarian cancer. These items were developed previously and validated with a sample

including 15% of women at high risk for HBOC (Katapodi, Dodd, Lee, & Facione, 2009). Three additional items were developed for this study: "How informed are you about your HBOC risk?" "How much do you know about HBOC?" and "How much control you feel you have over your HBOC risk?" Perceived utility of genetic testing was assessed using seven items for Perceived Benefits of genetic testing and eight items for Perceived Barriers of genetic testing for HBOC (Jacobsen, Valdimarsdottir, Brown, & Offit, 1997). A composite score from the two subscales creates a measure of perceived utility of genetic testing.

Decisional Conflict Scale--Genetic Testing HBOC

The items used in the DCS--Genetic Testing for HBOC were adapted from the original DCS (O'Connor, 1995). All 16 items were scored on a five-point Likert scale, and were changed to a positive wording format so that a higher score would indicate higher decisional conflict. When participants were given the DCS-Genetic Testing HBOC, they were instructed to "Think about the choice to have genetic testing for HBOC" and then to check the box indicating their degree of agreement with each statement. Each box was grounded with the worded Likert response. The Likert scale was coded with 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree.

Procedures for Data Analyses

The suitability of the sample size was examined prior to analyses. Due to the small number of missing responses, it was determined *a priori* that those participants who had omitted questions on the DCS-Genetic Testing HBOC would be excluded from data analyses. This resulted in complete data from 342 participants who were included in the study. As a general rule of thumb, Tabachnick and Fidell (2007) recommend having at least 300 cases for factor analysis. Nunnally and Bernstein (1994) suggested having 10 cases per item in the instrument for factor analysis. Thus, with 16 items in the DCS-Genetic Testing HBOC and 342 participants, an sample size was achieved also for factor analysis. Sampling adequacy for factor analysis was determined using the Kaiser-Meyer-Olkin (KMO) and the Bartlett test. The KMO measure of sampling adequacy was .93, indicating a "marvelous" sample for factor analysis (Kaiser, 1974, p. 35). The Bartlett's Test of Sphericity was significant (c^2 = 6444.17, $p < .001$), indicating that relationships among the items existed (Tabachnick & Fidell, 2007).

All data analyses procedures were undertaken using SPSS, version 17.0. Factor analysis was applied to consolidate items and identify the factors within the DCS-Genetic Testing HBOC. The construct validity of the DCS-Genetic was examined using principal axis factoring (PAF) with oblimin rotation. Additional correlational analyses were completed to ascertain the presence of contrast, convergent, divergent, and predictive validity of the revised measure.

Results

Participants

The sample consisted of 200 Probands and 172 Relatives. Only 354 of the 372 completed the DCS-Genetic Testing HBOC. The mean age of the sample was 49.6 ± 13.6 years, ranging from 18 to 81 years. Most participants (95.7%) reported having health insurance. The demographics of the sample are described in more detail in Table 3. Overall, the sample included women who were primarily Caucasian, well-educated, married or partnered, and were of high socioeconomic status.

Inter-item Correlations

The inter-item correlations were assessed for the existence of conceptual redundancy. First, the correlation matrix was inspected for values that were lower than .30; none were identified. However, one value above .90 was noted. The items "I feel I know the pros of each option" and "I feel I knew the cons of each option" were correlated at .92. Factor analysis was run with both of these items included and then with each deleted. The decision was made to include both of these items because they examine the perceived risks and benefits of genetic testing, they improved factor structure, and they increase the applicability of the model to those who may have more or less favorable opinions about genetic testing for HBOC.

Reliability

The internal consistency of the DCS-Genetic Testing HBOC was evaluated. The reliability coefficient should be .80 or greater for an instrument that has previously been tested (Nunnally & Bernstein, 1994). In this study, items were reworded to capture the content of genetic testing for HBOC and were re-stated in positively worded items. After these changes, the Cronbach's alpha coefficient for the DCS-Genetic Testing HBOC was .96, which is excellent for what is considered by Waltz, Strickland, and Lenz (2010) to be a new scale.

Validity

The types of validity used in assessing the DCS-Genetic Testing HBOC were face, construct, contrast, convergent, divergent, and predictive validity (Table 5).

Face validity—Face validity "is not validity in the true sense and refers only to the appearance of the instrument to the layperson" (Waltz, Strickland, & Lenz, 2010, p. 166). The DCS-Genetic Testing HBOC is an easy to read, well-spaced scale, with minimal wording, and is presented to the participant on one page. The reading level of the DCS was cited by O'Connor (1995) as being at an eighth grade level. The DCS-Genetic Testing HBOC has a Flesch-Kincaid Reading Level of six, indicating that participants with a sixth grade education or higher would be able to read and complete the scale (Flesch, 1948; Kincaid, Fishburne, Robers, & Chissom, 1975).

Construct validity—The 16 items in the DSC-Genetic Testing HBOC were examined with various exploratory factor analysis methods. Principal component analysis (PCA) with varimax and oblimin rotation, PAF with varimax and oblimin rotation, maximum likelihood factor extraction, and unweighted least squares factoring were conducted to determine the best factor solution. Prior to beginning the factor analysis, values were preset for analysis. The criteria that determined the number of factors and the number of items within a factor have been outlined by Nunnally and Bernstein (1994) and include (a) the point of discontinuity of the scree plot, (b) an eigenvalue greater than 1, and (c) item factor loading greater than .40. After multiple iterations, PAF with oblimin rotation was determined to elicit the best factor solution. The three-factor solution that resulted from this exploratory factor analysis was consistent with the number of factors displayed in the scree plot and with factors having an eigenvalue of greater than one.

This analysis elicited three factors, named Lack of Knowledge About the Decision (seven items), Lack of Autonomy in Decision Making (six items), and Lack of Confidence in Decision Making (three items). The total variance of decisional conflict in the context of genetic testing for HBOC explained by the three factors was 81.57%. The reliabilities of the new subscales were assessed and were found to be satisfactory, with a range of .87-.97 (Table 6). The pattern matrix and structure matrix (Pallant, 2007) are demonstrated in Table

7. There were no items that loaded on more than one component at .40 or greater. Although the DCS–Genetic Testing for HBOC includes the 16 items of the original DCS, two items loaded on a different factor. The two items are used to examine perceived pressure and perceived support from significant others in the decision to use genetic testing for HBOC. These two items loaded on the Lack of Autonomy in Decision Making factor, instead of Factors Contributing to Uncertainty of the original DCS (Table 7). These new factor loadings demonstrate that the adapted DCS–Genetic Testing for HBOC includes one of the original subscales and two new subscales. This finding suggests that decisional conflict for genetic testing is markedly distinct from decisional conflict in other healthcare decisions.

Contrast validity—Contrast validity assesses the differences measured by an instrument between two or more diverse groups. Contrast validity was determined using an independent t-test between the cohort of Probands, who used genetic testing, and the cohort of female Relatives, who did not. The hypothesis being tested was that there would be differences between the two groups on the decisional conflict they faced when considering genetic testing. As hypothesized, the t-test revealed significant differences ($p < .001$) between the Probands and their Relatives on all factors (Lack of Knowledge About the Decision, Lack of Autonomy in Decision Making, and Lack of Confidence in Decision Making) and total scores for the DCS-genetic (Table 8).

Convergent validity—Convergent validity is established through a significant correlation with another item or instrument that measures the same construct (Tabachnick & Fidell, 2007). Convergent validity was tested using each factor independently and correlating it with items from the Perceived Risk Questionnaire used in the study. First, the correlation between an item inquiring “How informed are you about your HBOC risk?” and Factor 3, Lack of Confidence in Decision Making, was assessed. A significant negative correlation was found ($r = -.31$, $p < .001$), indicating that the more informed an individual feels, the higher their confidence in making decisions. Second, the correlation between an item inquiring “How much do you know about HBOC?” and Factor 1, Lack of Knowledge in Decision Making, was evaluated. A significant negative correlation was found ($r = -.47$, $p < .001$), indicating that knowledge about HBOC decreases perceived lack of knowledge in decision making. Finally, the correlation between an item inquiring “How much control you feel you have over your HBOC risk?” and Factor 2, Lack of Autonomy in Decision Making, was determined. A small but significant negative correlation was found ($r = -13$, $p < .05$) indicating that the more conflict an individual reported with autonomy, the less control they felt they had in decision making. These correlations are congruent with the theory of decision making and the construct of decisional conflict. Insufficient information about the problem at hand and alternative options; lack of decision making skills; and demands by significant others are factors contributing to increased decisional conflict (O’Connor, 1993).

Divergent validity—An instrument’s divergent validity is assessed by its low correlation with a scale or item that measures a different construct (Tabachnick & Fidell, 2007). Divergent validity was tested using the total score of the DCS-Genetic Testing HBOC and an item from the Perceived Utility of Genetic Testing (PUGT) scale (Jacobsen, Valdimarsdottir, Brown, & Offit, 1997), which assesses an individual’s view on the usefulness of genetic testing. An item from the PUGT scale asks whether “genetic testing will ease my mind regardless of the test result” with a Likert score of 1 = strongly disagree to 5 = strongly agree. A significant negative correlation ($r = -.30$, $p < .01$) was found between the DCS-Genetic Testing HBOC total score and this item from the PUGT scale. Thus, decisional conflict is decreased by the belief that genetic testing will ease an individual’s mind, which is theoretically congruent with the construct of decisional conflict.

Predictive validity—Predictive validity is used to assess an instrument's ability to estimate some form of behavior (Nunnally & Bernstein, 1994). Predictive validity of the DCS-Genetic Testing HBOC was evaluated with the instrument's ability to predict whether an individual would pursue prophylactic measures to reduce their HBOC risk. Significant correlations were found between the total score of the DCS-Genetic Testing HBOC and items inquiring whether women "had a prophylactic mastectomy" ($r = .20$, $p < .001$) and whether they "had a prophylactic oophorectomy" ($r = .24$, $p < .001$). These correlations indicate that women with higher decisional conflict who were considering prophylactic surgery as a means of reducing their HBOC risk were likely more ambivalent about the implications of the test result for their own health.

Discussion

Using psychometric testing of the DCS-Genetic Testing HBOC, it was determined that all 16 items should remain in the scale. The analysis elicited a three-factor solution utilizing PAF with oblimin rotation. The three-factor solution provided evidence that Lack of Knowledge About the Decision, Lack of Autonomy in Decision Making, and Lack of Confidence in Decision Making are factors that contribute to women's decisional conflict about genetic testing for HBOC. The three-factor solution explained 81.57% of the variance in decisional conflict; the reliabilities of the new factors ranged from .87-.97, which demonstrate an instrument with a high amount of variance explained and strong reliability coefficients.

Although the DCS–Genetic Testing for HBOC contains the 16 items included in the original DCS developed by O'Connor, two items loaded on a different factor. These two items examine perceived pressure and perceived support in the decision to pursue genetic testing. The different item loadings demonstrate that decisional conflict about genetic testing is inherently distinct from decisional conflict about influenza vaccination and disease treatment. The new factor loadings support hypotheses about intra-familial decision-making processes that are paramount in the context of HBOC and reflect the hypothesized contextual dynamics that influence autonomy in decision making for genetic testing (Peterson, 2005; Wilson et al., 2004).

Limitations

One limitation of this study was the homogeneous sample. Participants were mostly Caucasian women of high educational and socioeconomic status; therefore, their decisional conflict may be different from women of other ethnicities, educational levels, and socioeconomic status. Thus, future research should evaluate this scale in a more diverse group of women. However, genetic mutations that predispose to HBOC are more common among specific Caucasian subgroups (i.e., Ashkenazi Jewish, Icelandic, French-Canadian, Swedish, Hungarian; ACS, 2010). Thus, although our sample was homogenous, it was representative of women who seek genetic testing in the two high-risk clinics, supporting the relevance of these results to the general population at high risk for HBOC. A second limitation is that history of prophylactic surgery was based on self-report and may not be accurate. Finally, the retrospective and cross-sectional study design limited the ability to capture the dynamics of the decision-making process at the time that the actual decision for genetic testing was being made. Despite its limitations, the study included a large sample ($n = 372$) of women at various levels of risk for HBOC. Moreover, the recruitment method allowed for comparison of two related cohorts of women, namely Probands who pursued genetic testing and their high-risk Relatives who did not.

Clinical Implications

Attending to women's decisional conflict about genetic testing for HBOC should be a priority in clinical practice. Rini et al. (2009) reported that a substantial proportion of breast cancer survivors who received uninformative BRCA1/2 test results had high decisional conflict scores and were at risk for poor decisional outcomes. They also reported that women who were considering risk-reducing mastectomy or oophorectomy experienced higher decisional conflict than women who did not consider these options. This is consistent with the positive correlations between DCS-Genetic Testing HBOC and uptake of prophylactic mastectomy and prophylactic oophorectomy reported in this study. Together, these findings have important clinical implications. Decisions for life-altering surgery, such as prophylactic mastectomy and oophorectomy, are difficult to make especially among asymptomatic women who are at high risk for HBOC. These women are likely to experience lingering dissatisfaction and lack of confidence in their decisions for HBOC genetic testing and risk management. The present study made a contribution in this clinical area by evaluating the psychometric properties of the DCS-Genetic Testing for HBOC. The scale is an important tool for researchers and healthcare providers who are working with women trying to decide whether genetic testing is the right choice for them. The scale can identify women who experience high decisional conflict, so they can receive more clinical attention and decisional support.

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Table 1

Subscales and Items of the original Decisional Conflict Scale

Subscale	Items
Decision Uncertainty Subscale	1. This decision is easy for me to make
	2. I'm unsure what to do in this decision
	3. It's clear what choice is best for me
Factors Contributing to Uncertainty Subscale	4. I'm aware of the choices I have to
	5. I feel I know the benefits of
	6. I feel I know the risks and side effects of
	7. I know how important the benefits are to me in this decision
	8. I know how important the risks and side effects are to me in this decision
	9. It's hard to decide if the benefits are more important to me than the risks, or if the risks are more important than the benefits
	10. I feel pressure from others in making this decision
	11. I have the right amount of support from others in making this choice
	12. I need more advice and information about the choices
Perceived Efficacy in Decision Making Subscale	13. I feel I have made an informed choice
	14. My decision shows what is important to me
	15. I expect to stick with my decision
	16. I am satisfied with my decision

Notes. The original Decisional Conflict Scale was printed in O'Connor, 1995. Item loadings were not provided in the original article.

Table 2

Development of the Decisional Conflict Scale

Study (in chronological order)	Population	Reliability*
O'Connor, 1995	Influenza-immunization: 1. health science students (*n* = 151) 2. health employees (*n* = 15) 3. respiratory or cardiac patients (*n* = 283) Breast-cancer-screening: 1. random sample, women ages 50-69 (*n* = 386)	Test-retest coefficient = .81 Cronbach alpha for total scale ranged .78 - .92
Bunn & O'Connor, 1996	Schizophrenic patients (*n* = 94)	Cronbach alpha = .78
O'Connor et al., 1998	Postmenopausal women ages 50-69 years (*n* = 165)	None reported
O'Connor et al., 1999	Postmenopausal women ages 50-69 years, who had not used hormone replacement therapy (*n* = 201)	None reported
Man-Son-Hing et al., 1999	Patient's with a history of atrial fibrillation and low risk of stroke (*n* = 287)	Cronbach alpha = .92
Dodin, Légaré, Daudelin, Tetroe, & O'Connor, 2001	Menopausal Francophone women, ages 45-69 years (*n* = 101)	In French, Cronbach alpha = .70
Goel, Sawka, Thiel, Gort, & O'Connor, 2001	Patients with newly diagnosed stage I or II breast cancer, had not undergone surgical treatment (*n* = 136)	None reported
Murray et al., 2001	Men with benign prostatic hypertrophy (*n* = 112)	None reported
Murray et al., 2001	Women considering hormone replacement therapy (*n* = 205)	None reported
Dolan & Frisina, 2002	Internal medicine patients at average risk for colorectal cancer (*n* = 93)	Cronbach alpha = .97
Légaré et al., 2003	1) Physicians (*n* = 40) 2) Postmenopausal women (*n* = 184)	Cronbach alpha = .93
Montgomery, Fahey, & Peters, 2003	Patients newly diagnosed with hypertension (*n* = 217)	None reported
Whelan et al., 2004	Women with newly diagnosed clinical stage I or II breast cancer who had not received surgical treatment (*n* = 201)	None reported
Hunter et al., 2005	Women ages ≥35 years undergoing prenatal diagnosis (e.g., amniocentesis; *n* = 352)	None reported
McAlister et al., 2005	Nonvalvular atrial fibrillation patients (*n* = 434)	None reported
Shorten, Shorten, Keogh, West, & Morris, 2005	Pregnant women (*n* = 227)	Cronbach alpha = .63 at 28 weeks & .67 at 36 weeks
Laupacis et al., 2006	Cardiac patients (*n* = 120)	None reported

Notes. The only study that examined validity of the Decisional Conflict Scale was the original study by O'Connor (1995).

Table 3

Demographic Characteristics (n =372)

Characteristics		*n*	%
Group	Proband	200	53.8
	Female Relative	172	46.2
Ethnicity	Caucasian	343	92.2
	African American	6	1.6
	American Indian	5	1.4
	Other [a]	6	1.6
	Missing	12	3.2
Marital Status	Married/ Partnered	264	71.0
	Single	45	12.1
	Divorced/Separated	36	9.7
	Widowed	18	4.8
	Missing	9	2.4
Education	High School or less	41	11.0
	Some College/Associates Degree	104	28.0
	Bachelor's Degree	112	30.0
	Graduate Degree [b]	115	31.0
Income	Less than $20,000	27	7.3
	$21,000 - $40,000	46	12.4
	$41,000 - $60,000	64	17.2
	$61,000 - $80,000	48	12.9
	$81,000 - $100,000	56	15.0
	More than $100,000	121	32.5
	Missing	10	2.7

Notes.

[a] Includes Hispanic, Asian American, and Arab American

[b] Includes Master's Degree, Professional Degree, or Doctoral Degree

Table 4

Item Analysis Decisional Conflict Scale - Genetic Testing Hereditary Breast and Ovarian Cancer

Item	*M*	*SD*
1. This decision is easy for me	2.19	1.07
2. I'm sure what to do	2.32	1.10
3. It's clear what choice is best	2.14	.96
4. I'm aware of the options I have	1.98	.89
5. I feel I know the pros of	2.08	.91
6. I feel I know the cons of	2.14	.93
7. I am clear about how important the pros are to me	2.03	.87
8. I am clear about how important the cons are to me	2.15	.94
9. For the main option I am considering, I am clear about	2.15	.90
10. I am making this choice without any pressure	1.73	.72
11. I have the right amount of support from others	1.77	.72
12. I have enough advice about	2.10	.94
13. I feel I have made an informed	1.94	.83
14. My decision shows what is important	1.88	.75
15. I expect to stick with	1.86	.75
16. I am satisfied with	1.86	.76
Total	32.31	11.36

Notes.

Cronbach's alpha for the Decisional Conflict Scale–Genetic Testing for Hereditary Breast and Ovarian Cancer = .96

The instrument is available from the corresponding author.

Table 5

Types of Validity used to Validate the Decisional Conflict Scale – Genetic Testing Hereditary Breast and Ovarian Cancer

Validity	Definition	Testing
Face	The appearance of the scale	Presented on one page. Flesch-Kincaid Reading Level of six.
Content	Scale assesses a content domain	DCS has already been assessed for content validity and utilized in different populations. Content validity was not assessed.
Construct	Scale measures what it purports to measure	Three factors elicited: Lack of Knowledge about the Decision (seven items), Lack of Autonomy in Decision Making (six items), and Lack of Confidence in Decision Making (three items). • Three components reflected theoretical congruence • No items loaded on more than one component at .40 or greater • The total explained variance was 81.57%
Contrast	Assess differences in ≥2 groups	Independent t-test between Probands (used genetic testing), and Relatives (did not use genetic testing); differences ($p < .001$) on all factors and total scores for the DCS-genetic.
Convergent	Correlation with another scale that measures same construct	• "How informed do you feel about your HBOC risk" and Factor 3, Lack of Confidence in Decision Making ($r = -.31$, $p < .001$). • "How much do you know about HBOC" and Factor 1, Lack of Knowledge in Decision Making ($r = -.47$, $p < .001$). • "How much control you feel you have over your HBOC risk" and Factor 2, Lack of Autonomy in Decision Making, ($r = -13$, $p < .05$).
Divergent	Negative correlation with scale that measures different construct	Total score of the DCS-Genetic Testing HBOC and "genetic testing will ease my mind regardless of the test result" from the Perceived Utility of Genetic Testing scale, ($r = -.30$, $p < .01$)
Concurrent	Agreement between scale and a validated scale that measures the same construct	No other instrument to measure decisional conflict was used. Concurrent validity was not assessed.
Predictive	Ability to predict some form of behavior	Total score of the DCS-Genetic Testing HBOC and items inquiring whether women had "…a prophylactic mastectomy" ($r = .201$, $p < .001$) and "… a prophylactic oophorectomy" ($r = .244$, $p < .001$).

Table 6

Mean, Standard Deviation, and Internal Reliabilities for the Three Newly Derived Subscales

New Subscale	*M*	*SD*	*a*
Factor 1: Lack of Knowledge about the Decision (items 4, 5, 6, 7, 8, 9, 12)	14.61	5.81	.97
Factor 2: Lack of Autonomy in Decision Making (items 10, 11, 13, 14, 15, 16)	11.05	3.97	.94
Factor 3: Lack of Confidence in Decision Making (items 1, 2, 3)	6.65	2.80	.87

Table 7

Pattern and Structure Matrix for PAF with Oblimin Rotation of Three Factor Solution of Decisional Conflict Scale - Genetic Testing Hereditary Breast and Ovarian Cancer

Item	Pattern coefficients			Structure coefficients		
	Factor 1: Lack of Knowledge	Factor 2: Lack of Autonomy	Factor 3: Lack of Confidence	Factor 1: Lack of Knowledge	Factor 2: Lack of Autonomy	Factor 3: Lack of Confidence
1. I'm aware of the options I have	**.74**	.11	.08	.86	.70	.63
2. I feel I know the pros	**.98**	-.01	-.04	.94	.68	.59
3. I feel I know the cons	**1.04**	-.13	.02	.95	.64	.62
4. I am clear about how important the pros are to me	**.77**	.16	.04	.92	.75	.65
5. I am clear about how important the cons are to me	**.87**	-.04	.05	.87	.63	.60
6. For the main option I am considering, I am clear about	**.75**	.13	.08	.90	.73	.66
7. I have enough advice about	**.61**	.31	-.00	.83	.75	.59
8. I feel I have made an informed	.38	**.56**	.03	.82	.86	.64
9. I am making this choice without any pressure	-.06	**.80***	.01	.54	.76	.47
10. I have the right amount of support from others	-.06	**.78***	.01	.52	.75	.46
11. My decision shows what is important	.10	**.75**	.10	.72	.89	.64
12. I expect to stick with	.07	**.84**	.02	.70	.91	.59
13. I am satisfied with	.14	**.78**	.04	.74	.91	.63
14. This decision is easy for me	-.03	-.01	**.89**	.55	.53	.87
15. I'm sure what to do in	-.03	-.00	**.74**	.46	.44	.72
16. It's clear what choice is best	.11	.03	**.86**	.69	.65	.95

Note. Factor loadings > .40 are in boldface.

*Items loaded in a different factor than the original Decisional Conflict Scale

The instrument is available from the corresponding author.

Table 8

Mean Comparison between Probands and Female Relatives of the Decisional Conflict Scale - Genetic Testing Hereditary Breast and Ovarian Cancer

Factor	Proband		Relative				
	M	*SD*	*M*	*SD*	*t*	*df*	*p*
1. Lack of knowledge about the decision	11.81	3.98	17.58	5.97	-10.46	284.90	<.001
2. Lack of autonomy in decision making	9.17	3.08	13.04	3.84	-10.30	340	<.001
3. Lack of confidence in decision making	5.75	2.62	7.60	2.67	-6.47	340	<.001
Total score DCS-Genetic Testing HBOC	26.73	8.53	38.22	10.99	-10.76	311.13	<.001