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1TITLE PAGE**2Manuscript title**

3Measuring decisional certainty among women seeking abortion

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36

37STRUCTURED ABSTRACT

38Objective

39Evaluating decisional certainty is an important component of medical care, including pre-abortion care.
40However, minimal research has examined how to measure certainty with reliability and validity among
41women seeking abortion. We examine whether the Decisional Conflict Scale (DCS), a measure widely
42used in other health specialties, and considered the gold standard for measuring this construct, and the
43Taft-Baker Scale (TBS), a measure developed by abortion counselors, are valid and reliable for use with
44women seeking abortion and predict the decision to continue the pregnancy.

45Methods

46Eligible women at four family planning facilities in Utah completed baseline demographic surveys and
47scales before their abortion information visit and follow-up interviews three weeks later. For each scale,
48we calculated mean scores and explored factors associated with high uncertainty. We evaluated internal
49reliability using Cronbach's alpha and assessed predictive validity by examining whether higher scale
50scores, indicative of decisional uncertainty or conflict, were associated with still being pregnant at follow-
51up.

52Results

53Five hundred women completed baseline surveys; two-thirds (63%) completed follow-up, at which time
5411% were still pregnant. Mean scores on the DCS (15.5/100) and TBS (12.4/100) indicated low
55uncertainty, with acceptable reliability ($\alpha=0.93$ and 0.72 , respectively). Higher scores on each scale were
56significantly and positively associated with still being pregnant at follow-up in both unadjusted and
57adjusted analyses.

58Conclusion

59The DCS and TBS demonstrate acceptable reliability and validity among women seeking abortion care.

60Comparing scores on the DCS in this population to other studies of decision-making suggests that the
61level of uncertainty in abortion decision-making is comparable to or lower than other health decisions.

62Implications

63The high levels of decisional certainty found in this study challenge the narrative that abortion decision
64making is exceptional compared to other healthcare decisions and requires additional protection such as
65laws mandating waiting periods, counseling, and ultrasound viewing.

66

67Keywords

68Decisional conflict, Decisional uncertainty, Decisional certainty, Abortion

69

701. INTRODUCTION

71Decisional conflict is defined as a state of uncertainty about a course of action when the choices involve
72risk, loss, regret, or a challenge to personal values [1]. Assessing and responding to decisional conflict—
73and its corollary, decisional certainty—is routine in health care, particularly in fields such as obstetrics
74and oncology where decisions often require balancing complex benefits and risks which are sensitive to
75patients' preferences and values [2-6].

76Evaluating how certain a woman is about her decision to obtain an abortion is also an important
77component of abortion care [7]. However, unlike other health care decisions, many states enforce laws
78whose stated purpose is to protect women seeking abortion from making an unconsidered decision [8,
799]. Implicit in these laws is that women experience more conflict about abortion than other healthcare
80decisions and require additional time or information beyond that typically offered as part of abortion
81providers' existing informed consent and counseling practices.

82Previous research suggests that the majority of women are certain of their abortion decision when they
83present for care [10-14]. However, minimal research has examined how to effectively measure certainty
84among women seeking abortion, or how women's certainty about abortion compares to other health
85decisions. Here, we measure and explore factors associated with decisional certainty among women
86seeking abortion using both a validated scale used in other health specialties [15] and a scale developed
87using questions authored by abortion counselors [16]. We assess each scale's psychometric performance
88in a sample of women seeking abortion in Utah, some of whom decide to continue the pregnancy.
89Findings may aid providers in their pre-abortion counseling efforts [7] and can be useful in understanding
90the magnitude of decisional uncertainty among women seeking abortion as compared to other health
91decisions.

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932. MATERIALS AND METHODS

942.1 Sample and study procedures

95This study was conducted with English- and Spanish-speaking women ages 15 and older seeking abortion
96care at four family planning clinics in Utah between October 2013 and April 2014. Adults provided
97informed consent; minors aged 15 to 17 could participate with parental consent and their own assent.
98Detailed methods have been described elsewhere[17]. In brief, eligible women were asked to complete
99a baseline survey on an iPad prior to an abortion information visit and a follow up interview by phone
100with University of California, San Francisco (UCSF) interviewers three weeks later. Utah requires women
101seeking an abortion to complete a face-to-face information visit with their provider at least 72 hours
102before receiving an abortion. During this visit, the provider must read a state-mandated, standardized
103information script. Clinics in this study also provided pre-abortion counseling during this visit. Thus, all
104women recruited into the study were presenting for the first of two clinic visits, and would have to
105return at least 72 hours later for an abortion. Returning for this follow up visit was not a criterion for
106inclusion in the study. At the time that they completed the baseline survey, women had not yet had any
107interaction with a health care provider or counselor at the study clinic. The main goal of the overall study
108was to examine women's reasons for not having an abortion under the 72-hour waiting period and two-
109visit requirement[17]; thus, we aimed to recruit at least 75 women who completed an abortion
110information visit but did not return for an abortion. Previous research in a state without a two visit or
111waiting period requirement found that 7% of women seek but do not obtain an abortion [14]. Prior to
112the current study, clinic sources estimated that this figure was higher in Utah; thus, we conservatively
113assumed that 20% would not return for care and 25% would be lost to follow up, requiring an initial
114sample of 500 women.

115Participants were remunerated with \$10 for the baseline survey and \$20 for the follow up phone
116interview. All research activities were approved by UCSF's Committee on Human Research.

1172.2 Measures

118The baseline survey assessed women's age, race, employment, educational attainment and education in
119progress, religious affiliation, and receipt of public assistance. It also included questions about lifetime
120mental health diagnoses and past year substance use. Women were asked about their relationship status
121with the man involved in the pregnancy and his awareness of and support for the abortion, as well as
122who they had talked to about their abortion decision. To capture levels of misperceptions about
123abortion, women were presented with a series of statements summarizing common abortion myths
124derived from previous research [18-20] and asked which statement was closer to the truth (e.g.,
125"abortion causes breast cancer" *versus* "abortion does NOT cause breast cancer," see Table 1 for all
126myths presented). Women who incorrectly identified the myth as closer to the truth, or responded
127"Don't know," were categorized as endorsing that myth. For most women, gestational age at discovery of
128pregnancy was calculated using the time elapsed between self-reported date of last menstrual period
129and date they discovered pregnancy. For a minority of women who could not recall these dates, women
130were asked about how many weeks or months ago these events occurred.

131The baseline survey included two scales designed to measure decisional certainty. The Decisional
132Conflict Scale (DCS) is a validated scale used to assess individuals' perceptions of uncertainty in the
133context of healthcare decisions and to identify modifiable factors contributing to uncertainty [15]. It
134includes 16 items that can be scored in aggregate or as five subscales (Uncertainty, Informed, Values
135Clarity, Support, and Effective Decision). Women were asked their level of agreement (ranging from
136Strongly Agree to Strongly Disagree) for all items (see Figure 1a). One previous cross-sectional study used

137this scale to assess decisional certainty among women who had an abortion in Portugal, and found low
138conflict post-abortion [21].

139The second, 4-item scale is from a needs assessment form found in a widely disseminated textbook on
140abortion care [16]. The original form contains 16 items developed by abortion counselors and designed
141to be self-administered to aid providers in pre-abortion counseling. Previous studies have used the
142responses to four of these items to classify women's confidence in their decision [14, 22, 23]. Similar to
143the DCS, women are asked their level of agreement with each item (See Figure 1B). Based on input from
144the instrument creators, we refer to this scale as the Taft-Baker Scale (TBS) throughout the present
145analysis.

146The follow up phone interview included the closed-ended question "Have you had an abortion since you
147visited [clinic] on [date]?" We classified women as still pregnant if they responded "No" to this question.
148Women who experienced a miscarriage or discovered that they were not pregnant between baseline
149and follow up were excluded from the follow up sample for this analysis.

1502.3 Statistical Analyses

151We calculated a summary score on the DCS overall and each subscale using guidance from the scale
152authors [24] and consistent with previous literature; this involved summing responses across items
153(where 0=strongly agree, 1= agree, 2= neither agree or disagree, 3=disagree, and 4=strongly disagree),
154and transforming scores to range from 0 to 100. Lower scores reflect lower levels of decisional
155uncertainty. A similar approach was employed to calculate a summary score on the TBS. To ensure that a
156lower score on each item was reflective of lower certainty, we reverse coded two TBS items (#3 and #4,
157see Figure 1B). We examined the distribution of scale scores for normality and missingness, and
158calculated summary statistics on each measure including mean, median, standard deviation, and range.
159We present the median and range given the non-normal distribution of scores. We also present the

mean and standard deviation, in order to allow for direct comparisons between mean DCS score in our study population and how it was presented in other studies.

To compare agreement in responses on the two scales, we computed Cohen's kappa statistics (k) with 95% confidence intervals. Scores on each scale were dichotomized to isolate individuals scoring above the 90th percentile. We considered kappa ≥ 0.2 as evidence of fair agreement, ≥ 0.4 as moderate agreement, ≥ 0.6 as substantial agreement, and ≥ 0.8 as almost perfect agreement [25]. In addition, we constructed two multivariate logistic regression models to predict scoring above the 90th percentile on each scale.

We used Wilcoxon-Mann-Whitney tests to examine whether scores differed between women who completed a follow up interview and those who were lost to follow up. A more extensive attrition analysis on this data has been described elsewhere [17].

3.1 Reliability

The internal consistency of each scale was evaluated using Cronbach's α . A threshold of $\alpha=0.70$ was considered evidence of acceptable reliability [26].

3.2 Validity

To examine group validity, we used Wilcoxon-Mann-Whitney and Kruskal-Willis tests to evaluate if scores differed between groups we hypothesized *a priori* would vary based on previous literature. For example, given studies suggesting that women who lack social support for their decision are more likely to anticipate difficulty coping post-abortion [22, 27], we hypothesized that male partner's awareness of and support for the abortion would influence women's uncertainty. We also hypothesized that younger women and those with misinformation about the safety or long term health effects of abortion would express more uncertainty.

182We assessed predictive validity in two ways. First, for both the DCS and TBS, we compared scale
183distributions between women who were still pregnant at follow up and those who received an abortion
184using Wilcoxon-Mann-Whitney tests. Second, we explored the performance of the DCS subscales and the
185TBS in predicting still being pregnant at follow up using multivariate logistic regression models, extending
186our previous work that found that a higher score on the DCS scale (i.e. more uncertainty) was
187significantly and positively associated with still being pregnant at follow up [17]. We conducted all
188analyses using Stata 14.0 (College Station, TX) [28].

189

1903. RESULTS

191Among 683 eligible women approached to participate, 500 completed a baseline survey at the beginning
192of their abortion information visit, for a response rate of 73%. Nearly two-thirds (n=309, 62%) completed
193a follow up phone interview. The mean duration between baseline and follow up survey was 25.7 days. A
194small minority (n=8, 3%) discovered that they were not pregnant or experienced a miscarriage by the
195follow up interview and were excluded from subsequent analyses as they no longer had a decision to
196make about the pregnancy. The majority (n=267, 89%) of those remaining had had an abortion by the
197follow up phone interview.

198Study participants were predominantly white (68%) and Hispanic/Latina (22%). The average age was
19925.6, and one-half (50%) were nulliparous. One-third (32%) reported receiving public assistance in the
200last year. Three-quarters (76%) were employed or in school. Most (67%) were in a relationship with or
201married to the man involved in their pregnancy. Almost half (45%) reported being religiously affiliated
202(Table 1).

2033.1 Decisional Conflict Scale

204At baseline, 492 women completed all 16 items of the DCS. Scores on the DCS were heavily skewed
205toward low conflict scores and were not normally distributed. The median score was 9.4, and ranged
206from 0 to 68.8. The mean score was 15.5 (standard deviation (SD)=15.2). There were no differences in
207mean DCS score according to whether or not women completed a follow up interview ($p=0.558$, Table 2).

208Cronbach's alpha for the DCS overall was 0.93, suggesting high internal consistency. Each subscale of the
209DCS also had acceptable internal reliability, with Cronbach's α ranging from 0.75 for the Uncertainty
210Subscale to 0.92 for the Values Clarity subscale (Table 2).

211With respect to the individual items comprising the DCS scale, women scored highest (reflecting more
212uncertainty) on the item "This decision is easy for me to make" (mean = 1.55, SD=1.44). This was the
213only item for which less than half of women (34%) strongly agreed with the statement. Women scored
214lowest (reflecting less uncertainty) on the items "I know which options are available to me" (mean =
2150.31, SD=0.54) and "I expect to stick with my decision" (mean=0.40, SD=0.63, data not shown, see Figure
2161a for response distributions to all items).

217Mean DCS scores differed between women who were still pregnant at follow up and those that received
218abortion care (28.5 and 13.8, $p<0.000$) (Table 2). In a multivariate model, a higher score on the
219Uncertainty subscale was significantly and positively associated with being pregnant at follow up
220(adjusted OR = 1.04, 95% CI: 1.00, 1.08 (Table 3).

221Mean scores on the DCS were significantly higher, indicating more conflict, among women ages 19 and
222under as compared to women ages 20 and older (20.5 vs. 14.6, $p=0.005$). Finally, mean DCS scores also
223increased significantly with the number of abortion myths endorsed by women, from a low of 5.8 among
224women endorsing zero myths to 21.1 among women endorsing four myths presented ($p=0.0001$, Table
2252).

2263.2 Taft-Baker Scale

227At the baseline interview, 484 women completed all four items of the TBS. Similar to the DCS, scores
 228were heavily skewed toward low uncertainty scores and were not normally distributed. The median
 229score was 6.3 and ranged from 0 to 56.3. The mean score was 12.4 (standard deviation=14.7). There
 230were no differences in mean TBS score according to whether women completed a follow up interview
 231($p=0.923$, Table 2).

232The reliability of the TBS was acceptable according to Cronbach's alpha ($\alpha= 0.72$) (Table 2).

233Mean TBS scores differed between women who were still pregnant at follow up and those that received
 234an abortion (mean = 24.4 and 10.8, $p<0.000$) (Table 2). In a multivariate model, higher TBS score was
 235significantly and positively associated with still being pregnant at follow up (adjusted OR = 1.07, 95% CI:
 2361.03, 1.09).

237TBS scores also differed according to women's age, with women aged 19 and under scoring higher than
 238women aged 20 and older (16.4 vs. 11.7, $p=0.003$). There were no significant differences in mean scale
 239scores according to partner involvement and support. Similar to the DCS, women who endorsed a larger
 240number of abortion myths also scored higher on the TBS (Table 2).

2413.3 Agreement on scale scores

242Dichotomized scale scores at the 90th percentile demonstrated moderate agreement in responses
 243between scales ($k=0.51$, 95%CI=0.39, 0.63). The majority of women (84%) had scores reflecting low
 244uncertainty on both scales. However, a subset of women (10%) had discordant DCS and TBS scores, and
 2456% had scores reflecting high uncertainty on both scales.

In multivariate analyses, women's age, endorsement of abortion myths, and religious affiliation were associated with scoring above the 90th percentile on the DCS. Age and endorsement of abortion myths were associated with scoring above the 90th percentile on the TBS. Specifically, women ages 35 and older were less likely to have scores reflecting high conflict for the DCS (aOR=0.20, 95% CI:0.04, 0.91) and TBS (aOR=0.11, 95% CI:0.01, 0.88) as compared to women ages 25 to 34. For each additional abortion myth endorsed, women were more likely to score above the 90th percentile on the DCS (aOR=1.92, 95% CI: 1.40, 2.62) and TBS (aOR=1.71, 1.23, 2.38). Finally, compared to women who reported no religious affiliation, women who reported being Mormon were significantly more likely to have scores reflecting high conflict on the DCS (aOR=2.71, 1.32, 5.54).

255

2564. DISCUSSION

Much of the discourse around abortion policy suggests that abortion decision-making is exceptional compared to other healthcare decisions [29], and thus requires additional protection by targeted laws such as mandated waiting periods, information scripts, and ultrasound viewing requirements. Levels of decisional uncertainty in this study as measured by the DCS (mean score (μ) = 15.5) were comparable to or lower than those found in other studies of women making healthcare decisions, such as mastectomy after a breast cancer diagnosis (DCS μ = 17.4)[30], prenatal testing after infertility (DCS μ =22.1)[31], or antidepressant use during pregnancy (DCS μ = 26.2)[32]. They are also lower than levels observed in studies of men and women making decisions about reconstructive knee surgery (DCS μ = 37.4-42.7)[33] or men deciding on prostate cancer treatment options (DCS μ =35.7)[34]. Thus, our findings challenge these laws' implicit characterization of women making abortion decisions—as compared to other healthcare decisions—as particularly conflicted.

268Our results are also consistent with previous research [10-14] indicating that the majority of women are
269certain of their decision when they present for abortion care. A unique contribution of our study is that,
270unlike previous research, we measured decisional certainty using two scales, one of which has been
271extensively validated and is considered to be the gold standard for measuring this construct across
272diverse health domains [35], and the other of which was developed by abortion providers explicitly for
273counseling purposes. Despite their different origins, both scales performed well in psychometric
274analyses, indicating their appropriateness for use among women seeking abortion care and ability to
275distinguish the minority of women who may benefit from additional support and clinic resources.

276Comparing scores between the DCS and TBS suggests that the two scales are capturing similar but not
277identical constructs. The 16 items in the DCS may permit exploration into more nuanced aspects of the
278decision-making process that are not captured in the 4-item TBS. The item on the DCS that women had
279the most difficult time agreeing with was "*This decision is easy for me to make.*" This is consistent with
280previous research in which over one-half of women who had an abortion retrospectively report that
281their decision was either somewhat or very difficult [36]. Importantly, difficulty deciding does not
282necessarily translate into continuing the pregnancy, as 4 in 5 women in our study who disagreed with
283the statement that the decision was easy had had an abortion at follow up. Further, the majority (85%)
284of those who disagreed that the decision was easy also agreed with the statement that abortion was the
285better choice for them. This suggests that, as has been found in other research, women can
286simultaneously acknowledge that their abortion decision was not easy and that they are confident it was
287the right decision for them [36].

288Our study found that women who endorsed a greater number of myths about abortion were more likely
289to express uncertainty about their decision. Importantly, our study is not able to disentangle the
290temporal relationship between these variables. It is plausible that women who are more conflicted

291about their decision seek out or internalize negative information about abortion in their environment
292[37, 38] more readily than those who are certain of their decision. Alternatively, endorsement of myths
293about abortion, or, more broadly, holding negative attitudes toward abortion, could introduce
294uncertainty into women's decision-making. In our study, myth endorsement and decisional certainty
295were assessed prior to any interaction with a provider at the study clinic. Future research should
296examine how the subsequent patient-provider interaction influences women's myth endorsement and
297certainty, including heterogeneity in effects when providers must cover mandated information scripts
298that contain scientifically inaccurate or misleading information about abortion [39].

299This study had several limitations. Our sample was limited to women seeking abortion care in four Utah
300facilities, and as a result differed from the national profile of women seeking abortion[40] in several
301respects. First, adolescent women were underrepresented here (6%) as compared to nationally (18%).
302Thus, our finding that adolescent women score higher on each scale merits additional exploration with a
303larger and more representative sample of young women. Second, Utah's population, and therefore our
304study population, has an overrepresentation of Mormon women and underrepresentation of African-
305American women seeking abortion as compared to national profiles. Interestingly, the larger sample of
306Mormon women allowed us to identify significant differences in levels of decisional certainty by religious
307affiliation, with Mormon women more likely to have high uncertainty as compared to women reporting
308no religious affiliation. Additional exploration by not only religious denomination, but also religiosity,
309would provide a more complete assessment of the role of religion. Finally, approximately one-third of
310our sample did not complete a follow up interview, and our results might be biased if those with high
311uncertainty were more likely to be lost to follow-up. However, there was no evidence of differential
312attrition by DCS or TBS score, reducing the likelihood of this bias.

313Moving forward, this study should give confidence to providers who want to use validated scales to
314assess their patient's decisional certainty as part of pre-abortion counseling or informed consent. For
315example, the TBS could be used as an initial screening tool to identify the minority of women who are
316uncertain of their decision. The DCS and its subscales could then be administered to this subset of
317women to identify specific factors contributing to that uncertainty, supporting providers in their efforts
318to provide patient-centered counseling and care [41, 42].

319

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326Conflicts of Interest

327David Turok is the director of surgical services for Planned Parenthood Association of Utah.

328

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