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# The Importance of Social Cues for Discretionary Health Services Utilization: The Case of Infertility

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## Abstract

Infertility is a discretionary health condition; although it carries with it important life course implications, treatment is rarely necessary for health reasons. Sociological theories of medical help-seeking emphasize demographic factors, perceived need, and enabling conditions in health services utilization, but we find that social cues are also strongly associated with health services utilization for infertility. Adjusted for conventional predictors of medical help-seeking, several social cue indicators have significant associations with utilization, including having friends and family with children, perceiving infertility stigma, and having a partner and/or family member who encourages treatment. Perceived need accounts for the largest portion of the variation in utilization. Enabling conditions explain less of the variance than social cues. Social cues should be especially important for discretionary health services utilization. Studies of service utilization for discretionary health conditions should explicitly incorporate a range of measures of social cues into their models.

Sociologists, psychologists, and others have long been interested in uncovering the factors associated with the utilization of health services. Much sociological research on health services utilization has been inspired by and built upon Andersen's (1968) Socio-Behavioral Model

of Health Services Utilization, which proposed that utilization results from predisposing characteristics, enabling resources, and need. Studies using Andersen's model have found that need-based factors often account for more explained variance in health services utilization than any single other group of factors (Andersen and Newman 1973; Gilbert, Branch, and Longmate 1993; Menec and Chipperfield 2001; Wolinsky and Johnson 1991). Need for services cannot be objectively defined, however, because perceived need for services is socially constructed (Pescosolido and Boyer 2010). Symptoms need to be interpreted as a medical problem, and a medical solution needs to be selected as the best alternative before individuals consider seeking medical help. Social indications from significant others about the value of health services utilization are central to this process of interpreting and selecting treatment (Freidson 1970; Mechanic 1995; Pescosolido et al. 1998; Zola 1973).

Recent work in health services utilization has emphasized the importance of social interaction and social networks in explaining healthcare utilization (Mackian, Bedri, and Lovel 2004; Pescosolido and Boyer 2010). Many studies on the role of social networks in health services utilization have focused on issues of network structure such as the number or types of people in one's social network and the extent to which people report receiving social support (Carpentier 2011; Uehara 2001; Maulik, Eaton, and Bradshaw 2009). But beliefs and attitudes—the *content* of social networks—can be as important as their structure (Carpentier et al. 2008; Deri 2005; Pescosolido 2006). Networks can push people toward or away from treatment, depending on the beliefs and attitudes disseminated into the social network (Bus-sing et al. 2003; Martinez and Lau 2011).

In this article, we investigate the role of social messages regarding the appropriateness of treatment—which we conceptualize as “social cues”—for health service utilization for infertility. Even though little prior research has focused specifically on the role of social cues, we find that social cues explain a substantial portion of the variance in health service utilization for infertility compared with predisposing conditions, enabling conditions, and perceived need. We therefore argue that theories of discretionary health services utilization should explicitly include social cues as a discrete component of their models and that studies of discretionary health services should explicitly analyze the role of social cues.

## Conceptual and Empirical Background

### *Theories of Health Services Utilization*

Andersen's socio-behavioral model divided predisposing characteristics into demographic factors, social structure, and health beliefs. Enabling resources include family resources—such as income, access to health insurance, and access to a regular source of care—and community factors—including cost, availability of health services and community size. Andersen divided need into perceived need on the part of the patient and need as evaluated by healthcare providers.

The relative importance of an individual's perceived need for services depends upon the nature of the symptoms and on the specific condition. Andersen (1968) made a distinction between discretionary utilization behavior—in which utilization is largely a matter of individual choice—and non-discretionary utilization behavior, where utilization is primarily determined by healthcare providers. Perceived need should be more crucial for service utilization for conditions in which contact with the healthcare system involves a strong element of discretion (Hansell, Sherman, and Mechanic 1991) and for non-life-threatening conditions (Alberts et al. 1998; Verbrugge 1985). When individuals can choose whether or not to seek treatment, the relative importance of their own interpretation of whether they need services should have greater weight relative to the evaluation of physicians and others in influencing their behavior.

Pescosolido (1992) has argued that much sociological theory concerning health services utilization, including the socio-behavioral model, makes the isolated individual the focal point, paying insufficient attention to fundamental sociological insights about how individuals, embedded in social relationships, make sense of their symptoms in the context of social interaction. Responding to Pescosolido, Andersen (1995) observed that social relationships fit easily into the socio-behavioral model. Yet, where they fit is not completely clear. At one point, Andersen (1995: p. 2) states that social interaction and social networks “rightly fit into the social structure component,” but also mentions that social relationships “can serve as an enabling resource to facilitate or impede health services' use” (Andersen 1995: p. 3). Education provides another example of a construct that can fit in multiple conceptual categories; it is usually considered an indicator

of social structure in the socio-behavioral model, but it is also an enabling resource. Pescosolido and colleagues offered the Social Organization Strategy framework (Pescosolido 1992), and later the Network-Episode Model (Pescosolido 2006; Pescosolido et al. 1998), to counter these concerns about individualism in earlier models. Pescosolido (2006) recognizes that consideration of social networks is compatible with the sociobehavioral model. But her network-episode model elevates social interaction to a pivotal rather than an accessory role in the health services utilization process (Pescosolido 2006). The network-episode model rejects the image of individuals as making health-related decisions (albeit with social input) and replaces it with an image of illness careers resulting from the dynamic interplay between the individual and significant others. While some of the more dynamic aspects (e.g., illness, career) have proven difficult to operationalize (Choi 2010), the network-episode model has led to an increased focus on social networks in health utilization studies. Pescosolido (2006) specifically includes three aspects of social networks in the network-episode model: network structure, network content, and network functions.

We conceptualize the role of relationships in promoting or discouraging health services utilization as “social cues” (White et al. 2006). Both perceiving a need for and seeking treatment depend in large part on these cues, including the past experiences and support of friends and family, perceived approval of treatment, and perceived pressure for treatment from partners and parents (Pescosolido 1992; Sheppard et al. 2008). We argue here that it is useful for researchers to separate out social cues as a distinct component of utilization models, rather than trying to place them into one of Andersen’s original three constructs, in order to make it possible to assess their relative importance for health services utilization in comparison with other components of health service utilization models.

### ***The Role of Social Cues***

Influenced by the network-episode model, some researchers have begun to investigate the influence of networks and social support on health services utilization (Carpentier 2011; Maulik, Eaton, and Bradshaw 2009). Researchers generally use the concept “social network” to indicate an “objective” feature of social networks—such as their

size, composition, or frequency of contexts—and employ the concept of social support to refer to perceptions that one has people to rely on to help satisfy their affective, affirmational, and instrumental needs (Bussing et al. 2003; Maulik et al. 2009). Evidence for the importance of network structure for health services utilization is inconsistent. Devillanova (2007) reported that undocumented immigrants to Italy with stronger network ties accessed health care more quickly than those without such ties. Several studies have failed to find a relationship between network size and service utilization (Allen et al. 1999; Bussing et al. 2003; Davey et al. 2007). Perceived support from others is associated with utilization for several conditions (Gulliver, Griffiths, and Christensen 2010; Maulik et al. 2009; Sheppard et al. 2008; Wolters et al. 2002), but other studies have found no relationship between social support and health services utilization (Allen et al. 1999; King and Meyer 1997; Mendoza-Sassi, Béria, and Barros 2003).

It is important to consider the influence of network norms, however, in addition to network structure (Carpentier et al. 2008; Deri 2005; Pescosolido 2006). The beliefs of social network members about the appropriateness of medical solutions to illnesses should influence which options are more or less appealing (Bussing et al. 2003). Perceptions of social norms favoring treatment have been shown to be associated with utilization of services (Bradley et al. 2002; de Nooijer, Lechner, and de Vries 2003; Vogel et al. 2007). In a study of breast cancer screening practices among employed women, Allen et al. (1999) found that network size and perceived social support did not influence breast cancer screening but that social norms, in this case, the impression that one's peers approved of screening, did exert an influence on screening choices. In a study of women's decisions about whether to use a birth attendant in a community in Bangladesh, Hruschka, Bernard, and Sibley (2012), reported that perceived messages from network members, but not network structure, was associated with service utilization.

Another social cue related to help-seeking is stigma. There is evidence that perceived stigma delays help-seeking and lessens adherence to treatment regimens (Barney et al. 2006; Golberstein, Eisenberg, and Gollust 2008; Komiti, Judd, and Jackson 2006). We conceptualize perceived stigma as a social cue because the concept of stigma suggests that individuals believe they would be subject to negative evaluations from others if their condition were to become known. There

is evidence that patients are less likely to discuss stigmatized conditions with their healthcare providers than non-stigmatized conditions (Shaw et al. 2008).

Having friends or family members who have received treatment has also been shown to be related to service use (Davey et al. 2007; Vera et al. 1998; Wolters et al. 2002). People who have discussed their medical issues with others are more likely to utilize health services than those who have not (Bish et al. 2005; Edwardson, Dean, and Brauer 1995; Vera et al. 1998). Social pressure and advice from others are also associated with service use (Duijvestjin et al. 2003; Wild, Cunningham, and Ryan 2006; Wolters et al. 2002). Spouses have played a key role in urging help-seeking and have also provided useful information to physicians about symptoms and behavior of which patients were not immediately aware (Salander et al. 1999). Based on a study of lower urinary tract symptoms, Wolters et al. (2002) concludes that social influence was more important than actual symptoms in bringing people to healthcare services.

Thus, the influence of social networks depends on the messages regarding treatment that are delivered by social network members (Bussing et al. 2003). Deri (2005) found, in a study of Canadian immigrants, that network density was positively related to service utilization when the community favored medical service use and negatively associated when the community did not support the use of medical services. Davey et al. (2007) found that addicts are more likely to enter into treatment when they know more network members who are in treatment. Other studies have tended to focus just one or two social cues, but here we examine and compare the effects of eight distinct measures of social cues.

### ***Infertility, Social Cues, and Utilization***

Infertility is defined by physicians as no conception after 12 months or more of regular unprotected intercourse (Zegers-Hochschild et al. 2009). Infertility is fairly common: about 15% of U.S. women reported “impaired fecundity” in 2002 (Chandra et al. 2005), and about 38% of U.S. women meet criteria for infertility at some point in their life (White et al. 2006). Health services utilization for infertility is less common; only about half of women meeting the medical definition of infertility seek treatment to become pregnant (Boivin et al. 2007;

Chandra and Stephen 2010; Greil and McQuillan 2004). Many studies that seek to explain variability in health services utilization for infertility have concentrated on racial and class disparities—often focusing on the role of enabling conditions, such as income and private health insurance, to explain disparities in treatment (Bitler and Schmidt 2006; Jain 2006; Staniec and Webb 2007). Yet theoretical considerations mentioned previously suggest that social cues should also play a large role in distinguishing those who seek treatment from those who do not.

Health services utilization for infertility is clearly discretionary: health professionals usually learn of it only when patients who suspect they have a problem raise the issue. Self-diagnosis may be particularly problematic because infertility is a “non-event” (Koropatnick, Daniluk, and Pattinson 1993), indicated by the absence of a “symptom” (i.e., the absence of pregnancy) rather than by the presence of a “symptom.” Few of the physiological conditions associated with infertility require medical treatment for daily functioning; rather, they become seen as a “problem” when they inhibit conception. Health services utilization for infertility may be especially open to the influence of social cues because infertility is inherently a social condition. Lack of conception is only seen as a problem if it interferes with the fulfillment of life course goals. Furthermore, a medical solution is only one of several responses including adoption, foster care, a childfree life, and prayer. The experience of being infertile can affect not only an individual who is medically diagnosed but also the social goals of significant others and family members, such as becoming parents or grandparents. We therefore seek to evaluate the general relevance of social cues for seeking discretionary medical treatment and to fill a gap in evidence regarding medical help-seeking specifically for infertility.

Women who have a spouse/partner and/or family members who encourage them to see a doctor should be more likely to seek help. In an Internet study of women trying to conceive, Bunting and Boivin (2007) found that those who had been to a doctor were more likely to perceive that their close family and friends wanted them to seek help compared with their counterparts who had not yet seen a doctor. Infertility is stigmatizing for many people (Remennick 2000; Slade et al. 2007). Some evidence suggests that women who perceive infertility as a stigmatized condition are more likely to delay treatment (Greil 1991). Bunting and Boivin (2007) found that women who delay

treatment for infertility were those who had a greater fear of being labeled infertile. Knowing a friend or family member that has experienced infertility and undergone treatment should pave the way for others to follow.

***The Role of Enabling Conditions.*** Enabling conditions refer to the means or resources through which health services are made available to people (Andersen 1968). Financial resources, including income and health insurance, are the most important (Diamant et al. 2004; Jovanovic, Lin, and Chang 2003), but other resources such as education are also associated with higher propensity to seek medical services (de Nooijer, Lechner, and de Vries 2003). In the United States, where medical services are delivered on a fee-for-service basis and where public insurance does not cover infertility treatments, income and private health insurance can be crucial factors in receipt of medical services for infertility. Bell (2009, 2010), however, reminds us that socioeconomic status matters in more subtle ways as well. For example, the sequencing and scheduling of appointments assumes a level of flexibility and autonomy at work that poorer women are unlikely to have. In addition, the lower- and working-class women that Bell (2009) interviewed reported being steered away from infertility treatment by medical personnel who tried to talk them out of getting pregnant.

Even in countries with socialized medicine, resources can matter. For example, Moreau et al. (2010) found that health services utilization for infertility in France varied by education, which they interpreted as a proxy measure for socioeconomic status. Jain and Hornstein (2005) found that health insurance alone did not dramatically increase health services utilization for infertility; however, not having health insurance arguably presents a major obstacle to seeking treatment. Additionally, those who have a regular doctor are more likely to seek medical help than those who do not (O'Connor et al. 1998). We therefore expect that those who have health insurance and a regular doctor should be more likely to seek medical help. Finally, because fifteen states mandate insurance coverage for IVF or other infertility treatments (Bitler and Schmidt 2006), the presence of state coverage for treatment may act as a contextual enabling condition.

### ***Health Services Utilization for Infertility and Perceived Need.***

Perceived need for infertility treatment should vary with the intensity of the desire for a child. We measure strength of intentions with three variables associated with health services utilization: infertility with intent versus no intent, primary (infertility with no previous pregnancies) versus secondary (infertility following a previous pregnancy and wanting a(nother) child). Greil and McQuillan (2004) and Jacob, McQuillan, and Greil (2007) divided infertile women into the “infertile with intent” (women who say they tried to conceive for at least twelve months without conception) and the “infertile without intent” (women who report having had unprotected intercourse for a year or more without conception but who do not say that they were trying to conceive at the time). The infertile with intent are more likely to seek and to receive treatment than the infertile without intent (Greil et al. 2009, 2011b). White et al. (2006) found that each additional child decreases perceptions of a fertility problem by approximately 50%. Women who have had no prior children should be more likely to move quickly to health services utilization (Greil et al. 2011a; Moreau et al. 2010; Schmidt, Munster, and Helm 1995). Not all women who are infertile by the medical definition actually want a baby. Not surprisingly, those who do are more likely to utilize services (Greil et al. 2011b, 2011c).

### ***Social Location Variables***

We include as predisposing conditions only social location variables associated with health services utilization for infertility in prior research. Although infertility is more common among Black and Hispanic women than among White women (Bitler and Schmidt 2006), Black and Hispanic woman are less likely to receive treatment (Greil et al. 2011c; Stephen and Chandra 2000). Older women are more likely to seek and receive treatment for infertility (Greil et al. 2011c), probably in part because fertility options change with age and in part because older women feel that their “biological clocks” are running out.

### ***Statement of the Problem***

Although much evidence suggests the importance of social cues for health services utilization, we are not aware of any studies that the

compare the impact of social cues to the traditional components of the socio-behavioral model. Neither are we aware of any studies that assess the role of a wide range of social cues for health services utilization. Because it is a discretionary health condition where treatment depends on perceived need, infertility represents an ideal site for the study of social cues. We know of only one population-based study that includes a measure of social cues on health services utilization for infertility (White et al. 2006). This study, however, included only a measure of general social support, not measures specific to infertility, to assess the importance of social cues from network members. Additionally, the White et al. (2006) study used only a dichotomous measure of health services utilization; therefore, it did not differentiate simply talking to a doctor about ways to get pregnant from having tests or receiving treatment. We provide a more robust evaluation of the importance of social cues for health services utilization for infertility by including several content relevant measures of social cues and using an ordinal measure of health services utilization. Our goal is to disaggregate the possible sources of differences in health services utilization for infertility and to determine the extent to which differences can be accounted for by social cues, enabling conditions, perceived need, and social location variables.

## **Method**

### ***Subjects***

Data come from the National Survey of Fertility Barriers (NSFB), a random-digit-dialing telephone survey designed to assess social and health factors related to reproductive choices and fertility for U.S. women. Funding for the project was received from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, and Institutional Review Board approval was obtained from the Pennsylvania State University and the University of Nebraska-Lincoln. The study over-sampled Census central office codes with a high Black or Hispanic population, so Black and Hispanic women are well-represented in our sample; 19.6% of the women in the overall sample and 24.8% of ever-infertile women identify as Black, and 17.9% of the total sample and 19.7% of ever-infertile women identify as Hispanic.

Women who have experienced infertility and women who desire additional children were also oversampled. Interviewing was conducted by the Survey Research Center at the Pennsylvania State University and the Bureau of Sociological Research at the University of Nebraska-Lincoln. The same interviewer training material and interviewer guides were used at both sites. Methodological information, including the methodology report, introductory letters, interview schedules, interviewer guides, data imputation procedures, and a detailed description of the planned missing design can be accessed at: <http://sodapop.psu.edu/codebooks/nsfb/wave1/>.

Between September 2004 and December 2006, interviews were completed with 4,796 women ages 25 to 45, of whom 4,568 gave their race/ethnicity as Hispanic, White, Black, or Asian. Our sample for this article consists of 1,188 women who reported experiencing an infertility episode within the past 10 years and who self-identified as Hispanic, White, Black, or Asian. An “episode” of infertility is, for the purposes of this analysis, any period of 12 months or greater during which a woman had regular intercourse and was either trying to conceive or “okay either way” about getting pregnant but did not conceive. Women were considered to have had an episode of infertility if they answered yes to either of the following questions: (1) “Was there ever a time when you were *trying* to get pregnant but did not conceive within 12 months?” or (2) “Was there ever a time when you regularly had sex without using birth control for a year or more without getting pregnant?” or if they reported having a pregnancy after a period of at least 12 months during which they were not breastfeeding, were not using birth control, and were either *trying* to become pregnant or said they were “okay either way.”

The survey was long (potentially taking over 45 minutes to complete); therefore, it was shortened to an average of 35 minutes by randomly assigning participants to two-thirds of the items of each scale. This “planned missing” design provided a way to incorporate measures of all of the necessary theoretical concepts while minimizing respondent burden. This type of missing data fulfills the “missing completely at random” assumption and does not bias results (Allison 2002). We use the mean of available scale items in the analyses. The response rate was 53.7%, which is typical for telephone surveys conducted in the last several years (McCarty et al. 2006). To confirm the generalizability of the NSFB, we compared the distribution of the

sample on basic demographic characteristics to female counterparts between the ages of 25 and 45 years in the 2005 Current Population Survey (CPS), which is based on in-person interviews and therefore has higher (90%) response rate. We also compared the NSFB to the most recent (2002) National Survey of Family Growth (NSFG), a large U.S. in-person interview with a high response rate (nearly 90%). These comparisons show that the NSFB sample is similar to well-known nationally representative personal interview surveys, justifying our confidence in the validity of this dataset. Detailed comparisons of the NSFB with the CPS and the NSFG are available at <http://sodapop.pop.psu.edu/datacollections/nsfb/dnd>.

## **Measures**

### ***Outcome***

Unlike many other studies of utilization that treat the decision to seek help as a binary event (help/no help), we treat it as a continuum. *Health services utilization for infertility* is an ordinal variable with 6 values constructed by combining responses from a series of questions about health services utilization. Detailed information on these questions can be obtained from the Web site mentioned previously. Values include: (0) no treatment; (1) considered treatment; (2) talked to a doctor; (3) had tests; (4) had treatment; and (5) had assisted reproductive technology (ART). Anyone at a higher value has satisfied the conditions for all lower values. This approach provides a way to distinguish degree of utilization.

### ***Social Location Variables***

*Race/ethnicity* was measured using the standard Census wording. Dummy variables were constructed for Black, Hispanic, and Asian compared with White women. Those indicating only “other” races were eliminated from the analysis due to small cell counts. *Age* was measured in years.

### ***Perceived Need***

Women were coded as *infertile with intent* if they answered “yes” to the question: “Was there ever a time when you were *trying* to get pregnant but did not conceive within 12 months?” or if they reported having a pregnancy after a period of at least 12 months during which they were *trying* to become pregnant. Women were coded as having infertility *without intent* if they answered “no” to the aforementioned question but reported there had been a time when they had “regularly had sex without using birth control for a year or more without getting pregnant” or said that they were “okay either way” in response to the question about their intentions for pregnancies that took longer than 12 months. As noted previously, women were included in this analysis only if they reported an episode of infertility within the 10 years immediately prior to the interview. *Primary infertility* is a categorical variable constructed from women’s pregnancy histories. A value of 1 indicates that a woman had not experienced any pregnancies at the time of her first episode of infertility. *Would like a(nother) baby* was coded 1 for those responding “yes” to the question: “Would you, yourself, like to have a(nother) baby?”

### ***Enabling Conditions***

Due to people’s sensitivity to questions about income, *family income* was first constructed as an ordinal scale ranging from 1 (less than \$5,000) to 12 (\$100,000 or more). We then substituted the midpoint of each category in dollar amount to convert this into a continuous scale. In order to make its scale similar in range to other measures employed in the study, the income measure was standardized. Responses to three questions were combined to measure *economic hardship*: (1) “During the last 12 months, how often did it happen that you had trouble paying the bills,” (2) “During the last 12 months, how often did it happen that you did not have enough money to buy food, clothes, or other things your household needed,” and (3) “During the last 12 months, how often did it happen that you did not have enough money to pay for medical care?” This is a unidimensional scale with high reliability ( $\alpha = .82$ ). *Employment* was measured by a single binary variable indicating either full-time or part-time employment compared with no employment.

*Education* was measured in years. *Health insurance status* was assessed by the question, "Are you covered by private health insurance, by public health insurance such as Medicaid, or some other kind of healthcare plan or by no health insurance?" A value of "1" indicates that the respondent has private health insurance while all other options are coded as "0." For infertility, Medicaid is appropriately categorized with no insurance because Medicaid does not cover infertility benefits (King and Meyer 1997). Respondents were also asked a simple yes-or-no question about having a *regular doctor*, "Do you have a regular doctor; that is, a specific doctor that you consult for most of your healthcare needs?" A value of 1 indicates that respondents have a regular doctor. Only 15 states mandate insurance coverage for infertility, and they vary in the type and extent of coverage offered. In the absence of a simple way to classify different types of mandates, we employed a binary variable with "1" indicating that the respondent lives in a state with some form of *mandated coverage* for infertility treatment and "0" indicating otherwise.

### **Social Cues**

Perceived *social support*, adapted on Sherbourne and Stewart (1991), was measured by how often the following four kinds of support were available if needed: "someone to give you advice about a crisis," "someone to give you information to help you understand a situation," "someone whose advice you really want," and "someone to share your most private worries and fears with." Responses include: (1) = often, (2) = occasionally, (3) = seldom, and (4) = never. The scale was created by averaging item responses ( $\alpha = .84$ ). *Children important to partner and children important to parents* were assessed via the following questions: "It is important to my partner that we have children," and "It is important to my parents that I have children." For these two items, a response of "Strongly agree" was coded as 1 and all other responses were coded as 0. *Friends and family have kids* was assessed by the question, "Thinking about your family and friends, would you say that all, most, some, few, or none of them have kids?" A response of "all" or "most" was coded as 1 and all other responses were coded as 0. Perceived *infertility stigma* is a 3-item scale combining responses to the following questions: "People who have difficulty getting pregnant find it embarrassing," "People who can't get pregnant

without medical help often feel inadequate,” and “People who experience infertility often feel that their family and friends look down on them.” The response categories ranged from (1) strongly agree to (4) strongly disagree, and the alpha was .74. A dummy variable indicating that the respondent *knows someone who had treatment* was created from the question, “Do you have family or friends who have pursued medical help in order to help them get pregnant?” *Partner encouraged* and *family encouraged* were assessed via the questions “Did your [husband/partner or family or friends] strongly encourage, encourage, discourage, or strongly discourage seeking medical help, or was it mixed?” A response of “strongly encourage” was coded as 1 and all other responses were coded as 0.

### **Analytic Strategy**

Because utilization is an ordinal rather than an interval-level variable, linear regression is not an appropriate analytic tool. There are several more suitable statistical techniques for ordinal dependent variables, including ordinal logistic regression, stereotype logistic regression, multinomial logistic regression, and the continuation ratio model (Long and Frees 2006). Ordinal logistic regression is appropriate only when the model meets the parallel lines (proportional odds) assumption (Winship and Mare 1984). This assumption requires that the slopes predicting values of the dependent variable are parallel for every level of the dependent variable. Using the Brant (1990) technique, we determined that the parallel lines assumption held for this set of variables; therefore, the ordinal logistic regression model is most appropriate for this analysis.

We evaluate factors associated with utilization through a series of four models. The first model includes only social location variables. In the second model, we add variables related to perceived need to see if these variables result in greater variance explained than social location variables alone. In the third model, we add enabling conditions to see if adding these variables accounts for more of the variance explained. Finally, we add social cues in the fourth model to test whether adding these variables results in even greater variance explained. Because we wanted to discover whether including social cues added explanatory value *over and above* that provided by traditional

elements of the socio-behavioral model, we deemed it most appropriate to enter those variables into the model last. In analyses not presented here, we varied the order of entry and found that the results were robust across various models using different order of entry. We use McKelvey and Zavoina's pseudo *R*-square to assess variance explained because this statistic has been found to most closely approximate the *R*-square obtained using linear regression (Hagle and Mitchell 1992; Windmeijer 1995). It is important to be extremely cautious when interpreting pseudo *R*-square because using different measures can result in widely varying values. It is, however, acceptable to compare different values for pseudo *R*-square in different analysis using the same measures and the same sample (Long and Frees 2006). As is often carried out in presentations of logistic regression results, we report odds ratios (OR) rather than *B*'s or Wald statistics, as these are easiest to interpret in a common-sense way. Ordered log-odds coefficients indicate the change in the dependent variable for a one unit increase in the independent variable, holding all other variables in the model constant. Odds ratios higher than one indicate an increase and odds ratios lower than one indicate a decrease in the odds of the dependent variable.

## Results

Table 1 presents descriptive statistics by each utilization level. Health services utilization for infertility varies by race/ethnicity. Black and Hispanic women are over-represented at the lower stages and under-represented at the higher stages of utilization; the pattern is reversed for White and Asian women. Women who had ART treatment are also significantly older than women who progressed only to the steps of considering treatment, seeing a doctor, or having tests. Turning our attention to perceived need, more women are infertile with intent at higher stages of utilization. We observe the same pattern for primary infertility. Despite the fact that the question about wanting a child refers to the present while the infertility episode occurred in the past, we find an association between wanting a child and utilization: The proportion wanting a child is lowest among those who did not even consider utilization.

**Table 1.** Descriptive Statistics by Utilization Category for Infertile Women (N = 1,188), National Survey of Fertility Barriers

Independent variables	1. No help N = 630		2. Considered N = 131		3. Talked doctor N = 96		4. Tests N = 116		5. Treatment N = 157		6. ART N = 58		Total N = 1,188		p
	% or M	SD	% or M	SD	% or M	SD	% or M	SD	% or M	SD	% or M	SD	% or M	SD	
<b>Social location</b>															
White	44.76		48.85		55.21		57.76		64.33		77.59		51.52		***
Black	29.05		31.30		19.79		22.41		15.92		12.07		25.34		***
Hispanic	23.65		17.56		25.00		13.79		15.29		5.17		20.12		***
Asian	2.54		2.29		.00		6.03		4.46		5.17		3.03		n.s.
Age (25–45)	32.84	5.60 a	32.84	5.54 b	33.84	5.34 c	34.33	4.96 d	34.31	4.78	37.52	4.75 abcd	33.49	5.47	***
<b>Perceived need</b>															
Infertile with intent	28.57		70.23		77.08		89.66		96.18		98.28		55.39		***
Primary infertility	18.89		42.75		41.67		60.34		64.33		79.31		36.36		***
Would like baby	48.14		73.28		70.53		71.30		60.39		71.93		57.83		***
<b>Enabling conditions</b>															
Family income (Ks)	48.99	34.85 a	52.87	34.13 b	59.97	39.25 c	68.79	37.95 abd	77.22	41.39 abcde	97.54	38.21 abcde	58.31	38.89	***
Economic hardship	1.76	.81 a	1.64	.77 b	1.70	.81 c	1.49	.70 ad	1.51	.74 ae	1.22	.52 abc	1.66	.79	***
Employee	65.56		67.94		72.92		64.66		70.06		63.793		66.84		n.s.
Education (years)	14.11	2.63 a	14.50	2.69 b	14.22	2.55 c	15.12	2.79 ad	15.32	2.73 ace	16.68	2.49 abcde	14.54	2.73	***
Private health ins.	58.73		62.60		75.00		76.72		84.08		91.38		67.17		***
No regular doctor	20.63		19.85		12.50		11.21		8.28		8.62		16.75		***
State coverage	50.79		46.56		51.04		51.72		38.22		55.17		48.99		n.s.
<b>Social cues</b>															
Social support	.06	.73	.02	.68	.00	.73	.05	.67	.22	.57	.08	.72	.07	.70	n.s.
Children impt to part.	27.78		34.35		28.13		41.38		49.68		51.72		33.92		***
Children impt to parents	26.51		33.59		22.92		24.14		28.03		37.93		27.53		n.s.
Friends fam have kids	80.32		79.39		83.33		78.45		85.99		84.48		81.23		n.s.
Infertility stigma	2.67	.60	2.63	.59	2.69	.65	2.56	.65	2.71	.62	2.83	.64	2.67	.61	n.s.
Friends pursued treat	44.6		45.04		45.83		58.62		66.88		77.59		50.67		***
Partner encouraged	2.54		23.66		33.33		46.55		63.69		72.41		23.15		***
Family encouraged	2.381		29.77		21.88		40.52		61.78		65.52		21.63		***

Chi-square tests performed for categorical variables. ANOVA with Tukey post-hocs for continuous variables. % provided for categorical variables; M and SD provided for continuous variables.

Several enabling conditions also differ by treatment category. Family and personal resources are higher at more advanced levels of utilization. Women who received ART treatment have higher incomes than women in the other treatment categories; women who have had treatment report higher incomes than those who do not progress to having tests; women who had tests report higher incomes than those who do not progress to talking to a doctor. Similarly, women who received ART treatment have lower economic hardship than women who did not have tests, and women who had tests or treatment report lower economic hardship than women who did not consider talking to a doctor. Women who received ART treatment have more education than women in the other categories; women who had conventional treatment have higher levels of education than women who did not receive any help and women who talked to a doctor only; women who had tests are more highly educated than women who received no help. Private health insurance and having a regular doctor are both more common among women who received treatment than among women who did not. The bivariate analyses show that, in general, women with greater resources proceed further along the treatment continuum.

Social cues also vary by treatment category. For the most part, those who report that having children is important to their partners, who have friends who have pursued treatment, and whose partners and families encouraged them to pursue treatment are more likely to reach higher levels of treatment seeking. Women who report encouragement and/or pressure from friends and family to seek medical care are more likely to move further along the medical care continuum.

Table 2 provides the results of the ordinal logistic regression of health services utilization for infertility. Model 1 displays the associations of the social location variables with health services utilization for infertility. Social location variables alone account for a very small portion of the variability in treatment seeking ( $R^2 = .034$ ). Black (OR = .52) and Hispanic (OR = .51) women are less likely to seek medical care. Each additional year of age increases the odds of going to the next stage by about 5%.

Adding perceived need to the analysis raises the *R*-square to .461 (See Model 2). Women who were trying to become pregnant at the time of the infertility episode (infertile with intent) had much higher odds of utilization (OR = 12.07) than women who were infertile without intent. Women with primary infertility (OR = 2.48) and women

**Table 2.** Ordinal Logistic Regression of Health Services Utilization for Infertile Women, National Survey of Fertility Barriers (N = 1,188)

	Model 1 Controls			Model 2 Perceived need			Model 3 Enabling conditions			Model 4 Social cues		
	B	SE	p	B	SE	p	B	SE	p	B	SE	p
<b>Social location</b>												
Black	-.64	.14	***	-.56	.16	***	-.29	.17	.75	-.23	.18	n.s.
Hispanic	-.67	.15	***	-.75	.17	****	-.44	.19	.65	-.73	.21	**
Asian	.19	.32	n.s.	.14	.35	n.s.	-.20	.39	.82	-.57	.41	n.s.
Age (25–45)	.05	.01	***	.07	.01	***	.05	.01	1.05	.05	.01	***
<b>Perceived need</b>												
Infertile with intent				2.49	.15	***	2.45	.16	11.57	2.01	.17	***
Primary infertility				.91	.13	***	.90	.14	2.46	.71	.15	***
Would like a[another] baby				.67	.13	***	.80	.14	2.23	.66	.15	***
<b>Enabling conditions</b>												
Family income							.49	.09	1.63	.35	.09	***
Economic hardship							-.02	.10	.98	-.02	.11	n.s.
Employee							-.20	.15	.82	-.20	.15	n.s.
Education (years)							.01	.03	1.01	.01	.03	n.s.
Private health insurance							.26	.18	1.29	.19	.19	n.s.
No regular doctor							-.64	.20	.53	-.49	.20	*
State coverage							-.10	.14	.90	.08	.14	n.s.
<b>Social cues</b>												
Social support										-.20	.11	n.s.
Children impt to partner										-.24	.16	n.s.
Children impt to parents										-.39	.16	*
Friends and fam have kids										.27	.18	n.s.
Infertility stigma										.27	.11	*
Friends pursued treatment										.30	.15	***
Partner encouraged										1.78	.17	***
Family encouraged										1.16	.17	***
McKelvey & Zavoina's R square	0.034			.461			.514			.610		

who want a child (OR = 1.94) also have higher odds than women in the comparison groups.

Model 3 shows that adding enabling conditions significantly increases the variance explained from .461 to .514 (BIC dif = -213.87). Each unit increase in income increases (OR = 1.63) the odds of moving to the next step along the utilization continuum. Not having a regular doctor halves (OR = .53) the odds of moving to the next utilization step. The same perceived need variables that were significant in Model 1 (infertile with intent, primary infertility, wanting a(nother) baby) remain significant when enabling conditions are added to the model. Additionally, the indicator for Hispanic women is still associated with seeking treatment but not the indicator for Black women. Age remains significant when enabling conditions are added to the model.

Model 4 shows that adding social cues to the model significantly increases the variance explained from .514 to .610 (BIC dif = -205.11). Surprisingly, net of other factors, reporting that having children is important to one's parents actually lowers the odds (OR = .68) of utilization, but the influence of other variables are in the expected direction. Because family members encouraging treatment seeking is captured by a separate variable, it is possible that parents wanting grandchildren but not encouraging help-seeking lowers the odds of help-seeking. Perceived stigma of infertility (OR = 1.31) and having friends or family who pursued treatment (OR = 1.35) are both associated with moving along the treatment continuum. The odds are substantially higher for women who have their partner's (OR = 5.91) and family's (OR = 3.20) encouragement to seek medical help than for those that do not have such encouragement. All of the variables that were significant in Model 3 remain significant in Model 4.

In the final analysis, social location variables, perceived need, enabling conditions, and social cues are all associated with utilization. Among social location variables, Hispanic ethnicity (OR = .48), and age (OR = 1.05) remain associated with health services utilization for infertility. All of the perceived need variables—infertility with intent compared with no intent during the infertility episode (OR = 7.47), primary compared with secondary infertility (OR = 2.03), wanting a(nother) child compared with not wanting a child (OR = 1.93)—are associated with utilization. Of enabling conditions, only income (OR = 1.41) and not having a regular doctor (OR = .61) are associated with health services utilization for infertility.

To assess the relative importance of enabling conditions and social cues, we ran separate models with just the relevant variables for each group. McKelvey and Zavoina's *R*-square for enabling conditions alone is .142, but for social cues alone, it is .397.

## Conclusions

Scholars have critiqued earlier theories of health services utilization behavior for being too narrowly focused on the isolated individual making a rational decision and have called for a greater emphasis on social networks and social interaction. Using a battery of indicators of social cues, we examined whether social cues make an important contribution to health services utilization for infertility and found that social cues do matter. In particular, we found that having family and friends who pursued treatment, perceiving infertility as stigmatizing, and perceiving partner and family encouragement are all associated with increased odds of treatment seeking and utilization. It is important to note that encouragement by members of one's social network to seek treatment is more important for utilization than the mere presence or absence of social support. Thus, the effect of one's social network on health services utilization depends on the content of the messages one's receives from network members. Our findings confirm the importance of conceptualizing individuals as embedded in relevant social contexts when they make healthcare utilization decisions, and lends support to the network-episode model.

As expected, enabling conditions were also associated with health services utilization for infertility. Higher family income is associated with higher odds of utilization, and not having a regular doctor is associated with lower odds. But enabling conditions explain less of the variance in utilization than social cues. Costs are associated with medical care utilization for discretionary treatment in the United States and are important to consider, but they are only part of the story. The largest portion of the variance was explained by factors indicating perceived need, that is, the degree to which infertility interfered with the lives of these women. Although causal order is challenging to disentangle (Greil et al. 2011b, 2011c), women who saw themselves as trying to become pregnant had seven times higher odds of moving in a utilization direction than women who are not trying to become pregnant.

This supports previous research on the socio-behavioral model showing the importance of need for seeking help. It also confirms previous research (Bunting and Boivin 2007; Greil and McQuillan 2004; White et al. 2006) showing that cognitions are crucial to understanding utilization. Intending more children and having primary versus secondary infertility are also associated with higher stages of health services utilization for infertility.

This research has demonstrated that after including social location variables, perceived need, and enabling conditions in the model, social cues are still associated with health services utilization for infertility. Some of the associations are substantial, suggesting that seeking to fully understand health services utilization for infertility requires a complex model but that even a few measures of social cues can be highly informative. Our work suggests the utility of exploring the role of social cues in explaining utilization for other non-life-threatening conditions. Studies of health services utilization would do well to separate out social cues rather than treating all predisposing conditions as an undifferentiated group. The current investigation also highlights the advantages of employing multiple measures of social cues.

Social cues may be especially important in situations where individuals have discretion as to whether or not to see a condition in medical terms. This study has implications for our understanding of utilization for conditions other than infertility in which defining a condition as medical is discretionary. Social cues should be most important for conditions which are not life threatening, have symptoms that are not visibly obvious, and are not the subject of routine screening.

As with all studies, there are limitations to this project. First, cross-sectional data limit strong conclusions about temporal ordering between social cues and utilization behavior. To make such claims, we need longitudinal data. As noted earlier, some key concepts were measured contemporaneously, after the infertility episode. It is possible that some women may have had different attitudes and experiences with their social network at the time of the survey than they did during the infertility episode. It is also possible that in some instances, the presumed causal order may differ from the actual causal order. For example, those who utilized services are more likely to know others who have received treatment, but we have no way of knowing whether networks others utilized services before or after the respondent. In addition, although we interpret social networks as influencing

an individual's behavior, it is also the case that individuals have some choice in creating social networks. Thus, the results that we here interpret as potentially causally related may be, in fact, the result of a selection effect. Furthermore, although we have pointed out that infertility is often experienced as a problem for couples, limitations of our dataset forced us to use women rather than couples as the unit of analysis. Using the same dataset but limiting the sample to only those with partners responding and who have had infertility in the last 10 years would have made for a very small sample (Johnson and Johnson 2009). Future research should address these limitations. In spite of these shortcomings, we believe the research has demonstrated the need to include specific measures of a range of social cues in studies of health services utilization.

As medicalization has increased in scope and as the "engines of medicalization" have shifted in recent years, consumer decision-making power has also grown (Conrad 2005). Many recently medicalized conditions, such as adult Attention Deficit Hyperactivity Disorder and General Anxiety Disorder share two features: (1) they are not life threatening; and (2) they are unlikely to come to the attention of medical personal unless the issue is raised by the person with the condition (Conrad 2005). Where greater discretion and self-diagnosis are involved, the social construction of medical issues through social interaction with significant others should be more influential on seeking medical treatment. Thus, the relevance of the role of social cues for understanding health services utilization may be more important than ever before.

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