Forging friendship, soliciting support: A mixed-method examination of message boards for pregnant teens and teen mothers

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ABSTRACT

Among pregnant youth, relationships with parents and romantic partners are correlated with overall wellbeing; however, this relationship does not exist with friends. Friends who have also experienced a pregnancy, however, may offer more effective support than friends who have not. One way that pregnant and mothering adolescents can connect is through online message boards. We hypothesized that adolescents would use these sites primarily to establish friendships and develop a supportive community, rather than simply to solicit pregnancy-related advice. We randomly selected 200 threads from four message boards for pregnant and mothering teens and performed a mixed-methods content analysis of the original posts and responses. Most original posts were categorized as "Community Oriented Posts," rather than "Soliciting Pregnancy or Motherhood Advice." Furthermore, qualitative analysis revealed frequent instances of emotional support, instrumental support, and informational support in both categories. In message board communities where pregnant teens and teen mothers were in the majority, messages were predominantly positive. In sharp contrast, in the one message board in which they were in the minority, as they are in the adolescent community at large, messages were significantly more negative. The dynamics of these message boards indicate the possibility that social support from other pregnant or mothering teens may enhance the wellbeing of pregnant teens and explain why peer "support" from teens who have not had this experience may often have a negative influence on wellbeing.

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1. Introduction

The available literature suggests that the emotional and psychological wellbeing of pregnant adolescents and adolescent mothers is related to a number of factors, including the adolescents' perceived sense of permanence and continuity in her life, and particularly relationships with and level of support received from parents, significant others, and other community members (Boyce, Schaeffer, & Uitti, 1985; Brooks-Gunn & Furstenberg, 1986; Nitz, Ketterlinus, & Brandt, 1995; Stevenson, Maton, & Teti, 1999; Thompson, 1986; Turner, Grindstaff, & Phillips, 1990). What is the role of Internet-mediated communication in providing social support for this population? That is the issue addressed by our study.

1.1. The role of social networks in moderating the experience of teen pregnancy and motherhood

Previous research suggests that social support from others has a significant effect on an adolescent mother's overall wellbeing, including her social adjustment, cognitive readiness for parenting,

health and nutritional status, and ultimately her parenting behaviors (Nath, Borkowski, Whitman, & Schellenbach, 1991). The relationship between the adolescent and her parents (Nitz et al., 1995; Turner et al., 1990), romantic partner (Thompson, 1986), and a non-family mentor (Hurd & Zimmerman, 2010) all play a role in predicting various measures of wellbeing, including levels of stress and symptoms of depression and other mental health outcomes. However, the data on the relationship between peer support and wellbeing are mixed. Some data have demonstrated no significant relationship between peer support and measures associated with wellbeing or quality of life of teen mothers (e.g., Sgarbossa & Ford-Gilboe, 2004), while others (Thompson, 1986; Thompson & Peebles-Wilkins, 1992) have actually found that higher levels of support received from peers is associated with higher levels of psychological distress. Finally, some studies have found that support from peers is positively correlated with measures of wellbeing and quality of life for teen mothers (Kissman & Shapiro, 1990; Richardson, Barbour, & Bubenzer, 1995). Insights from the present study contribute to making sense of these conflicting results.

It may be that certain peers, with limited understanding of an adolescent mother's experience, are ill-equipped to provide valuable support; the effectiveness of peer support could be a reflection of the peers' awareness of a mother's struggles and responsibilities.

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If adolescent mothers rely strongly on peer relationships, only to notice that the nature of these relationships have changed following a pregnancy, increased levels of distress may result. Past qualitative research has demonstrated that young mothers experienced changes in peer relationships from being unable to socialize because of increased responsibilities or because they felt friends did not understand their experiences (Herrman, 2008). In contrast, young mothers who experienced pregnancy together reported feeling closer as a result of the experience. Thus, social support from peers may indeed play an important role in predicting adolescent wellbeing—provided that the peer is also experiencing pregnancy and motherhood. Internet message boards targeted to this population, the subject of the present study, can provide just this mutual understanding of the pregnancy or motherhood experience. Because of differences in user characteristics across different teen pregnancy/motherhood message boards, we were able to assess whether teens who had had the motherhood or pregnancy experience provided more constructive peer support for the teen mother population than adolescents who lacked such experience.

1.2. Connecting to adolescent mothers online

While some young mothers or pregnant adolescents may be one of several in their school or community, others may be the only member of their peer group, class, or neighborhood experiencing pregnancy and motherhood. With Internet-based communities, however, isolated and marginalized teens are increasingly able to find and connect with others going through similar experiences (Csipke & Horne, 2007; Custers & Van den Bulck, 2009; Eichhorn, 2008; Fox, Ward, & O'Rourke, 2005; Johnson, Ravert, & Everton, 2001; Mulveen & Hepworth, 2006; Ravert, Hancock, & Ingersoll, 2004; Whitlock, Powers, & Eckenrode, 2006).

A message board, also known as a bulletin board or forum, is an online tool that facilitates discussion on a particular topic. Participants register with a username of their choosing and then have the ability to post messages about the topic at hand. Other users can read the message and then respond, creating a "thread" that displays the original post and responses in reverse chronological order. The message board may be one of many boards contained on a particular host site. As it appears that most teens use the Internet to communicate with pre-existing friends (Gross, 2004; Subrahmanyam, Reich, Waechter, & Espinoza, 2008; Valkenburg & Peter, 2007) message board use is a departure from typical social behavior online.

1.3. Online communities as a source of social support

In the past several years, a rich literature on online support groups for individuals suffering from distressing circumstances such as terminal illness, addiction, or parenting a child with special needs has developed (Barak, Boniel-Nissim, & Suler, 2008). While online support groups do not replace professional therapy or other treatments, they can serve to empower users and contribute to their overall wellbeing. Online support groups lead to support and empowerment through the development of new interpersonal relationships, the sharing of relevant knowledge and personal experience that can lead to informed decision-making, and the psychological power of writing (Barak et al., 2008; Bartlett & Coulson, 2011; Suler, 2008; Tanis, 2007). Furthermore, because members of online support groups do not usually meet in day-to-day life, members may experience the "online disinhibition effect," (Suler, 2004) wherein individuals feel more comfortable expressing their honest views or personal experience in the anonymous environment of the Internet. This disinhibition effect can lead to negative behaviors and hostile comments (van Uden-Kraan et al., 2008), but can also lead members to identify more closely with

one another and can serve to neutralize status indicators present in daily life (Barak et al., 2008). Finally, while members of online support communities often use these environments to seek knowledge related to their condition, many online communities contain primarily "off-topic" conversations, suggesting that members connect over more than just their shared distressing experience (van Uden-Kraan et al., 2008).

1.4. Message board use in adolescence: isolated and marginalized teens

The online support literature may shed some light on the experiences of members of teen pregnancy and mothering communities. However, the majority of existing online support research has focused on adults (Elwell, Grogan, & Coulson, 2011). Examination of teen-focused message board communities is particularly important because online communities for teens often serve individuals who are isolated or marginalized, and the development of successful peer relationships is a key component of the adolescent period (Brown, 2004; Waldrip, Malcolm, & Jensen-Campbell, 2008). Emotional, behavioral, and social adjustment are linked to the level of peer acceptance and the quality of peer relationships, especially for girls (Ma & Huebner, 2008). Teens who maintain close friendships are more well-adjusted than those who do not. Even the existence of a single friend who provides support and protection can predict significantly better adjustment (Waldrip et al., 2008) For some teens, online communities may provide a social support network that is otherwise limited or unavailable.

Indeed, the literature suggests that message boards are frequently used by adolescents who feel isolated as a result of a concern that they cannot discuss with family or friends, and much of the previous research on teen message board use has examined communities that center on topics that users might consider private or difficult (Csipke & Horne, 2007; Custers & Van den Bulck 2009; Eichhorn, 2008; Fox et al., 2005; Johnson et al., 2001; Mulveen & Hepworth, 2006; Ravert et al., 2004; Suzuki & Calzo, 2004; Whitlock et al., 2006). The communities allow teens to make new friends and communicate with others who understand their perspective and to join a peer group where their experience is the norm.

However, not every aspect of these communities is positive. Some communities normalize negative behaviors, like self-injury or "cutting," (Whitlock et al., 2006) or behaviors associated with anorexia (Csipke & Horne, 2007; Custers & Van den Bulck, 2009; Eichhorn, 2008; Fox, Ward, & O'Rourke, 2005; Mulveen & Hepworth, 2006). Illness support groups, while offering peers an opportunity to connect with others who share their diagnosis (Johnson et al., 2001; Ravert et al., 2004) may also increase the likelihood of the emotionally devastating experience of losing a friend to a disease. Message boards, particularly those populated by adolescents, may also lead to the spread of false information. For example, users occasionally offer advice on teen health and sexuality message boards that is in direct contradiction to another user's advice (Suzuki & Calzo, 2004). Given that many individuals can read these publicly accessible message boards, the spread of false information may affect more than just the original poster. As with other examples from the literature, it is likely that message boards for pregnant teens and teen mothers may contain negative content. However, it is also possible that positive outcomes—i.e., the provision of support and the development of new friendships—may outweigh or at least balance these negative possibilities.

1.5. Online communities for adolescent mothers: clinical research

The idea of adolescent mothers obtaining guidance and support on the Internet is not a new one. Dunham and colleagues (1998) developed a clinical version of public motherhood message boards

to test the effectiveness of this medium in combating isolation and providing a new support network. The researchers found that level of participation in the site was associated with participants' isolation from peers, suggesting that the community functioned to "fill a gap" that existed in the teens' social network.

Kauppi and Garg (2009) followed up on this research by implementing a similar support community over a 3-year period by adding features like chats with social service providers and other experts and by organizing periodic workshops in which users met face-to-face. The integration of online and in-person support represents a significant departure from the nature of most online message boards, in which most members will never meet face-to-face. While the in-person supports added to the participants' positive experiences, these services were available only to individuals within close proximity of the program. Public online message boards, which are available to anyone with an Internet connection, have the potential to influence a much larger number of people, including those who are not adolescents or mothers.

1.6. Teen motherhood and pregnancy boards available to the public

As of this publication, public message boards for pregnant teenagers and teenage mothers continue to attract users. These public sites differ from the network developed in Dunham and colleagues', study in a few key ways:

1. By virtue of the fact that these websites are publicly accessible, users are not necessarily adolescent mothers. Users may be pregnant but not yet mothers, for example. Given that these message board communities are often sub-forums on larger websites, readers and participants may have different backgrounds based on the content of the larger site. Adolescent fathers, siblings or friends of adolescent mothers, or curious individuals with no relationship to teen pregnancy are free to read the message boards and even, technically, to participate.
2. Participants in Dunham's study were aware of their involvement in clinical research and likely made the assumption that some, if not all, of their activity would be monitored by researchers. This knowledge likely affected their behavior to some extent. Adolescent behavior in online communities differs drastically when participants believe they are not being monitored by adults, particularly when it comes to content that may be perceived as negative, such as sexually explicit conversation or racist remarks (Subrahmanyam, Šmahel, & Greenfield, 2006; Tynes, Reynolds, & Greenfield, 2004).
3. Furthermore participants in the clinical studies may have felt extrinsically compelled to continue their participation, particularly if an incentive was offered or if they did not wish to upset the researchers by ending their involvement. One would not expect members of public message boards to be extrinsically motivated to participate over time.

Therefore, observation of these public message boards allows us to understand how online communities function when they are not part of a clinical program. While it is likely that many of the positive aspects of the clinical communities will remain a part of these public message boards, other more negative features may emerge as well, especially given the unmonitored nature of these message boards.

1.7. The present study

The present study examined online teen pregnancy and motherhood message boards through a mixed-methods content analysis.

1.7.1. Hypotheses

1. We predicted that, as with other online message boards (Csipke & Horne, 2007; Custers & Van de Bulck, 2009; Eichhorn, 2008; Fox et al., 2005; Johnson et al., 2001; Mulveen & Hepworth, 2006; Ravert et al., 2004; Suzuki & Calzo, 2004; Whitlock et al., 2006), support groups (Barak et al., 2008; Bartlett & Coulson, 2011; Tanis, 2007) and teen pregnancy communities (Dunham et al., 1998; Kauppi & Garg, 2009) these communities would serve primarily a social support function, with the majority of posts containing conversational topics or updates that presuppose maintained relationships with other forum members. While we expected to see posts containing pregnancy-related-advice solicitation, such as health and medical questions, we expected that these would occur less frequently.
2. We hypothesized that, among communities of pregnant teens and teen mothers, responses to both community-related posts and advice-soliciting posts would prompt significantly more positive responses compared with negative responses.
3. We expected a higher percentage of positive posts in forums in which pregnant teens and teen mothers were the norm (i.e., in the majority) and a higher percentage of negative posts in forums in which pregnant teens and teen mothers were in the minority.

1.7.2. Qualitative analysis

Previous qualitative research examining social support in online communities has assessed the presence of emotional and informational support in original posts and responses (Braithwaite, Waldron, & Finn, 1999; Elwell et al., 2011; Meier, Lyons, Frydman, Forlenza, & Rimer, 2007), and used these types of support as a framework for understanding empowerment in online support groups (Tanis, 2007). Emotional and informational support, originally characterized by House, are two qualitatively distinct means by which individuals may offer assistance to another. Emotional support is the provision of caring, empathy, love, and trust; informational support is defined as providing an individual with information or advice that is helpful in coping with personal or environmental obstacles (House, 1981). Furthermore, while others have suggested that House's instrumental support, or support that involves the provision of an action or behavior that directly helps another individual (House, 1981), is impossible within an online context, preliminary analysis suggested that instances of instrumental support did occur in our sample. Thus, we highlighted instances of emotional, informational, and instrumental support in our analysis. Finally, we selected examples of negative (nonsupportive) responses and analyzed the circumstances in which they appeared.

2. Method

2.1. Message board selection

An Internet search engine (Google.com) was used to identify and select message board communities for pregnant teenagers, as this was a method thought likely to be utilized by young women searching for online communities. Terms searched include *teen pregnancy message board*, *teen pregnancy forum*, and *adolescent pregnancy forum*. Out of the message boards identified using this method, we selected four for in-depth analysis. These four sites were chosen on the basis of several factors: the message boards demonstrated recent activity (posts less than 3 months old), were organized in a manner that allowed for random selection of

individual posts, and were accessible to any interested reader (i.e., one did not need to pose as a member of a particular demographic group in order to read posts). All teen pregnancy message boards were hosted by larger message board communities. Forum 1 was hosted by a more general pregnancy/motherhood web site. The teen forum on this site contained 22,664 threads as of April 10, 2010. Forum 2 was hosted by a teen message board site and contained 82 threads as of April 10, 2010. Forum 3 was hosted by a general pregnancy/motherhood message board site and contained 4926 threads as of April 10, 2010. Forum 4 was hosted by a health message board site and contained 14,270 threads as of April 10, 2010.

2.2. Selection of threads within each forum

We coded each message board using three units of analysis: the original post, the individual response to that post, and the user.

Within each forum, fifty threads were randomly selected using a random number generator. The threads, which included the original post and all subsequent responses, were saved for coding and content analysis.

2.3. Coding user demographics

To obtain a sample of users for demographic purposes, we selected the first two participants in each thread (the original poster and the first respondent). Once a user had been selected, her or his username was added to a list so that we would not select that user a second time accidentally. In cases where the first or second user in a thread had already been selected, the third participant in the thread was selected for coding, etc. This process continued until a sample of 50 users was selected from each forum. While only the first participating users were selected from threads, each thread was coded in its *entirety* for content of original posts and responses, as discussed in Section 2.4.

We decided to sample users based on participation rather than random selection for a number of reasons. First, some forums did not provide a complete list of participants, necessitating an alternate method of selection. Furthermore, through our method, frequent posters were more likely to be represented in the sample. This sampling approach also increased the likelihood of selecting active participants who frequently posted and participated in discussion, thus contributing to the atmosphere of the community within the site.

Demographic data were collected for each selected user. The user's age and gender were collected when available, as well as the participant's pregnancy or motherhood status. Demographic information was determined through a number of sources. Some message board sites allowed users to create a profile, a customizable personal web page also hosted by the site. Some profiles prompted users to enter certain information, including age and gender, while others were more general, allowing users to choose which details to reveal. Signatures, custom messages that appear at the bottom of users' posts and which could include text, graphics, or animations, also revealed demographic information. Finally, the content of the users' previous posts frequently contained declarations of age, gender, and pregnancy status. For each user, the first author explored these various sources and coded all available information based on the user's self-report.

Pregnancy and motherhood status fell into several categories, which were defined after preliminary observation of the message boards. Each user was coded as either pregnant, a mother, the friend/boyfriend/family member of someone who is pregnant, someone who thinks she may be pregnant, or someone who is interested in becoming pregnant. Several users were coded in more than one category, and those that did not appear to fall into any of the above categories were coded as "None of these." Pregnancy

status and age were recorded according to the time of the post recorded for this study. In other words, if a user was 18 and a mother at the time of data collection but was 17 and pregnant at the time of the recorded post, the latter data were recorded. This method was chosen in order to reflect the demographic data of *active* users as closely as possible.

2.4. Coding original posts and responses

All original posts were coded for content using a series of binary (presence–absence) codes developed after preliminary examination of the message boards. Posts were divided broadly into three major categories: Soliciting Pregnancy or Motherhood Advice encompassed all questions or solicitation for advice that explicitly related to pregnancy, women's health, motherhood, or childcare. Questions in this category could be posed by new participants or by existing community members, and generally did not require respondents to have previous knowledge of the poster's situation. The second category of posts was Community-Oriented Posts. Posts in the latter category could be, but were not necessarily, pregnancy- or childcare-related. Community-Oriented Posts included introductory posts, solicitation for friendship, and general updates. Finally, posts that were related to the maintenance of the forum (e.g., posts about forum rules, requests for a custom signature) were categorized as Forum-Related Posts. Posts that addressed multiple topics could be coded in more than one category.

All responses following the original post were coded individually for tone into one of three mutually exclusive categories: positive, negative, or neutral. Responses classified as "positive" contained positive or supportive content that was explicitly directed at another user. A response about a positive subject alone did not qualify. Responses containing compliments, words of welcome, wishes of good luck, congratulations, or support ("hang in there!" "I'm sorry for your loss"), or similar offers were all coded as positive. Responses that contained explicitly negative comments directed at another user, such as name-calling or insults, were coded as "negative." Discussion of negative topics (e.g. abortion) or an expression of disagreement with another user were not coded as negative unless the author appeared to be intentionally insulting or disparaging the other user. Comments that did not contain explicitly positive or negative words directed at another user were coded as "neutral."

2.5. Qualitative data analysis

Throughout the coding process, we isolated typical examples of Soliciting Pregnancy or Motherhood Advice, Community-Oriented Posts, and Forum-Related Posts. Furthermore, we selected posts and responses that fit the definition of emotional, informational, and instrumental support, as discussed above, for further qualitative analysis. Finally, we selected examples of nonsupportive comments and unexpected findings for further qualitative analysis.

Considering the sensitivity of the subject matter and the age of the users, however, preserving the anonymity and privacy of the message board participants was of particular importance, as was the preservation of the message boards' integrity. The procedure approved by the Institutional Review Board at the University of California, Los Angeles stipulated that published findings preserve the anonymity of the users and communities. Given that many quotes were traceable to the original source when entered into a search engine, we decided to eliminate direct quotations. The quotations demonstrated here have been minimally modified in such a way as to maintain the feel and content of the original message, an approach used in previous studies of online communities (Braithwaite et al., 1999; Whitlock et al., 2006). For example, in one excerpt we changed the name of the user's child, rendered numbers as words instead of figures, and changed the words

"brother or sister" to "sibling." While these changes made the quotation untraceable by search engine, they did not alter the content of the post related to the users' experiences or emotions. All modified quotations were entered into a search engine (Google.com) to ensure that they were different enough so as not to lead to the original source. We preserved misspelling and agrammatical stylistic features in the quotes utilized in the qualitative discourse analysis.

2.6. Reliability

The first author initially coded all 200 threads, including original posts and all subsequent responses contained within. A randomly chosen 25% of threads from each forum was selected and double coded by a research assistant. For content of original post, the two coders agreed on 92.5% of all posts, Cohen's kappa = .869. For all threads containing positive and neutral responses only, (93.5% of all posts), the two coders agreed on 94.8% of all individual responses, Cohen's kappa = .891. Because negative responses occurred too infrequently to assess reliability, an alternate method of double-coding was devised for threads containing negative responses. Both coders independently examined all 200 threads and flagged any threads that they believed contained negative content. If a thread was flagged by either coder, all responses in that thread were double-coded for positive, negative, and neutral responses. Any disagreements concerning negative responses were discussed and the coders came to a mutual decision about whether it was negative, neutral, or positive. Therefore, all threads containing negative responses were double-coded.

2.7. Differences among the forums

Forum 2 differed from the other three forums on a number of demographic variables. Nineteen users were identified as male (40.4% of users for whom gender could be identified), whereas a male user appeared only a single time in the other three forums combined. Furthermore, while pregnancy/motherhood status varied somewhat by forum, Forum 2 was particularly divergent in that it contained a large number of users that did not identify as pregnant or a mother. As demonstrated in Table 1, only Forum 2 significantly differed from all other forums in the ratio of users that were mothers or expecting vs. users that were neither mothers or expecting. Indeed, Forum 2 was the only forum in which the latter group outnumbered the former.

With its large number of male users and users who were not pregnant or mothers, Forum 2 was not a community of mothers and mothers-to-be, but rather a community populated by teens with more diverse experiences with pregnancy, more typical of the face-to-face peer group in many schools or communities more generally. We begin by exploring the characteristics of the three forums in which most members had experienced motherhood or pregnancy (Hypotheses 1 and 2 and qualitative analysis). We end by exploring the differences in support between these three forums and the forum in which a minority of participants had experienced motherhood or pregnancy (Hypothesis 3 and qualitative analysis).

3. Results and discussion

3.1. User demographics: age, gender, and pregnancy status in Forums 1, 3, and 4

Users ranged in reported age from as young as 14 to as old as 31. The average reported age of users in all forums was 18.59 (SD = 2.72), with the middle 50% falling within the 17–20 year range. Gender data, collected from profiles or surmised from post content, was available for all users in Forums 1, 3, and 4, and all but one user was reported female (99.3%).

Users were categorized into a variety of pregnancy or motherhood categories. Many users were categorized as pregnant (43.3%) at the time of their post, and an even greater number of users were categorized as mothers (46.0%). A few users (6.0%) did not reveal information in their posts or profiles that suggested they fit into any of the status categories; these individuals were categorized as "None of these." Relatively fewer individuals were categorized as the friend, boyfriend, or family member of a pregnant individual (1.3%), formerly pregnant but not raising a child (6.7%), concerned she might be pregnant (7.3%), or interested in becoming pregnant (also known as "TTC" or "Trying to Conceive" on at least one forum; 2.7%). In several cases, individuals were placed into multiple categories. Indeed, 8.7% of the sample consisted of mothers who were once again pregnant (indicating that 80.7% of all users were pregnant and/or a mother). In all, 13.3% of users were categorized at least twice, which accounts for total percentages adding to greater than 100%.

3.2. Content of original posts and responses

3.2.1. Quantitative analysis

Table 2 demonstrates typical examples from the three topic categories. Ninety-six out of 150 posts (64%) were classified as Community-Oriented Posts, while only 57 posts (38%) solicited pregnancy or motherhood advice, and six posts (4%) were classified as Forum-Related Posts. Eight percent of posts contained more than one topic, which accounts for the fact that these percentages add to greater than 100%. To determine whether posts *only* soliciting pregancy or motherhood advice (45 posts) occurred significantly less frequently than posts containing community-oriented content *only* (85 posts), a binomial analysis was conducted. Among posts that only solicited pregnancy or motherhood advice or only contained community-oriented content (n = 130), posts only soliciting pregnancy-related advice occurred significantly less frequently than posts containing community-oriented content without explicitly soliciting advice (p < .0001). In other words, users solicited advice a minority of the time; for the majority of posts, users simply engaged in conversation, building relationships, and general updates on their lives. These results support Hypothesis 1 and suggest that users focused the majority of their message-board participation on socializing, sharing their day-to-day experiences, and building friendships.

Table 1
Pregnancy/motherhood status by Forum.

Forum	Users identified as pregnant and/or parent	Users identified as neither pregnant nor parent	χ^2
Forum 1	44 (88%)	6 (12%)	1 ≠ 2[***], 1 ≠ 4[*]
Forum 2	8 (16%)	42 (84%)	2 ≠ 3[***], 2 ≠ 4[***]
Forum 3	42 (84%)	8 (16%)	
Forum 4	35 (70%)	15 (30%)	

Note: Forum 1 vs. 2, χ^2 = 49.08, df = 1; Forum 3 vs. 2, χ^2 = 43.56, df = 1; Forum 4 vs. 2, χ^2 = 27.58; df = 1; Forum 1 vs. 4, χ^2 = 3.86, df = 1.

[*] $p \leqslant$ .05.
[***] $p \leqslant$ .001.

Table 2
Topic categories and examples of original posts.

Soliciting pregnancy or motherhood advice

General or open-ended solicitation of advice:
"I've only recently turned 17 and discovered that i'm pregnant. I Haven't told anyone but my best friend this as im scared of what people will say. Im not with the baby's dad, and not sure when to tell him. Im scared to tell my mother and father, and don't know what to do! Im still living at home and at the end of finishing school. I Have no money. I don't know who to turn to."

Solicitation for relationship advice-pregnancy related:
"Well the thing is, i havent told my parents. Im so scared and i dont know what to do."

Request for health and medical advice:
"anyone else [have back] pain, if so any suggestions?"
"how do you fail the glucose test?"

Request for pregnancy-related school, career, or financial advice:
"I've been on the internet looking up what benefits and grants I will receive for the baby, but I have gotten so confused by it all!"

Request for advice regarding childcare or mothering:
"How important is it for your child to have a backyard to play in – like for bike riding not just playing in?"

Questioning if symptoms or actions indicate pregnancy:
"For the past few days i've been really dizzy and have had a giant headache. I've also been feeling very nauseous... I've also been having a loss of appetite which seems unusual for being pregnant (I would think.) anyways...just thought id get some opinions before I went to buy a pregnancy test."

Age related concerns, interested in becoming pregnant as a teenager or at a young age:
"I'm only 16 and i've been with my boyfriend for 5 years. He's definitely not ready to be a Dad, and i'm not ready to be a Mom. Although, there's just something telling me i really want one!"

Community-oriented posts

Introductory post:
"Hi Everyone,
Just found this site and thought id introduce myself. Im Lizzie, im nineteen and expecting baby number two, i have a daughter already who is 2 years 4 months who i had when i was just 16 years old. The baby was a surprise i.e., not planned either, but me and my boyfriend are happy about it and can't wait for Aimee to have a baby sibling.
Love Liz x"

Solicitation for friendship:
"I'd like to meet some people in my situation so if you could introduce yourself, your age and tell me your story i'd love to hear it :) "

General updates and/or conversational questions on life, pregnancy, etc.:
"hi ladies- since it's Monday, what do you hope to get done by the end of this week?
I'm hoping to at least get an interview in for this week or next week."

Forum-related topics

"Who aboslutely loooovvvvveeeeessss my new signature? :)"
"Guys someone got into my account, so if some of you got really messed up messages from "me" it wasn't me"

Table 3
Total positive and negative comments by Forum.

Forum	Positive comments (percentage of total comments)	Negative comments (percentage of total comments)	Neutral comments (percentage of total comments)
Forum 1	179 (45.4%)	0 (0.0%)	215 (54.6%)
Forum 2	72 (11.7%)	39 (6.4%)	502 (81.9%)
Forum 3	194 (36.5%)	4 (0.8%)	334 (62.8%)
Forum 4	99 (26.1%)	0 (0.0%)	281 (73.9%)

Note: Forum 1 vs. 2, $\chi^2 = 69.68$, $df = 1$, $p < .0001$; Forum 3 vs. 2, $\chi^2 = 62.37$, $df = 1$, $p < .0001$; Forum 4 vs. 2, $\chi^2 = 40.43$, $df = 1$, $p < .0001$.

In support of Hypothesis 2, the majority of responses in these three communities were positive or neutral. In each of the three forums, positive responses overwhelmed negative ones to a statistically significant degree (for binomial tests conducted for each forum, $p < .001$; frequencies are shown in Table 3).

3.2.2. Qualitative analysis: social support

Both posts that solicited pregnancy or motherhood advice and Community-Oriented Post categories often served a social support function, as demonstrated by posts and responses on the topic from members of the community. One user wrote:

"I feel so proud to be surrounded by good vibes from all you girls that know what I am going through. I almost feel like I've formed a kind of bond with you guys because we can relate in so many different ways, to so many things. Well I'm going to rap this up, but I care a lot about you guys and I want nothing but the best for every one of us!!"

Another user said:

"I'm so happy to know that other people are in the same boat as I am, i've said it a million billion times already but i'll say it again, i do not know where i'd be without this site! Its a total life saviour"

And a third remarked:

"At least theres places like this where you can talk to other people who understand though, its not as though were all left on our own in a way."

In these three examples, members expressed their caring for other community members and their feelings of being reciprocally supported by people who understand and "can relate in so many different ways". Furthermore, these users stated that the support they received from their community was unique: without the message boards, these young women would feel as if they were all

alone. From these examples, it appears that message boards offer some members not only valuable support, but a unique form of support that they could not receive from other individuals. Below, we highlight ways that users solicited and provided emotional, instrumental, and informational support.

3.2.2.1. Emotional support. In the following post and selected responses, we see demonstrations of the four components of emotional support as originally defined by House (1981): caring, empathy, love, and trust:

> *Original post*: "I wish my dad would grow up. He drinks everyday and not only that, sometimes he abuses his sleeping pills and takes them when he gets home from work (tonight was one of those nights). He acts like a complete a-hole to everyone...i shouldn't have to be afraid of my own father...but i always have been! I've never had a father, and it is becoming aparent that i never will. I wish he would just stop."
> *Response 1*: "im sry you are having to go through that, i know what it feels like i was ALWAYS afraid of my dad, and he told me i should be afraid of him....you dont have much longer hun, hang in there! things will be soo different when you move out!"
> *Response 2*: "Yeah I grew up with a super abusive father so I got out quick ... I was suprised he remembered me on my bday to say the least. It is really sad you have to deal with all this!! {{{{HUGS}}}}"

Here we see that the original poster trusted her companions enough to reveal a deeply personal fear about her home life, her safety, and her father's wellbeing. Her **trust** was rewarded with similar confessions from other posters, who offered **empathy** in the proffering of their own similar circumstances. The phrase "I know what it feels like" demonstrates that another participant empathized with the original poster by understanding and reflecting her emotional response. The phrases "im sry you are having to go through that" and "It is really sad you have to deal with all this!!" show **caring**, while {{{{HUGS}}}} shows **love**.

The community members also demonstrated **caring** through their interest in the wellbeing of other users:

> *Original post*: "Here is the pic of the tests. im gonna test with a different brand tomorrow and see what happens im trying not to get my hopes up"
> *Response 1*: "Hun tomorrow get the clearblue digital. It's one of the bests that you can get! But those ones do look mighty positive to me! Best of luck tomorrow morning! And let us know ASAP"
> *Response 2*: "They look positive to me also :) Can't wait to hear your results for tomorrow!!!!"

In this situation, the original poster was hoping to become pregnant and shared an image of her pregnancy tests with the other community members. The other users, understanding the original poster's desire, sent emotional support in the form of a smiling emoticon, " :) ," and in wishes of good luck. Both participants in the thread also demonstrated **caring** by stating their desire to know the outcome of the original poster's situation.

This interest in the continued wellbeing of others was also demonstrated when users posted inquires about the status of other members. In one instance, a member started a thread with the words "Where's Kaylee?" which prompted an update from the member in question. Members were aware that others would be concerned if they disappeared from the site, as evidenced from another situation in which a user updated others on her activities:

> *Subject: Checking in*
> *Original post*: "Having twins and two year old is kind of hard! It is so stressful waking up at night! Then I had to do my taxes! Plus, my older son and the twins doctor appointments! It just has been a lot the last month! I am sorry if I made you guys worry! I am here and I still love all of you!"

In addition to demonstrating this user's understanding of the level of **caring** in the community, this post also contains an explicit offering of **love**, another key aspect of House's emotional support.

3.2.2.2. Informational support. Threads that began by soliciting pregnancy or motherhood advice almost always received some form of informational support.

> *Original post*: "i am just wondering if having diarrhea is a sign of being preggie. Sorry for being so gross but I've had bad diarrhea for about a week now and I have been throwing up and my ribs are really hurting. I am most likely just worrying…"
> *Response*: "I think constipation is more likely a pregnancy sign, which is the opposite of diarrhea! Pregnancy releases tons of new hormones it causes your bowels to move slower...But usually not faster! Hope you are feeling better!"

Here, the response is an example of informational support because the advice itself was helpful to the participant, rather than a means by which the participant could help herself.

> *Original post*: "I'm only 8 weeks, so i'm not supposed to be showing yet right? But I can't suck in my stomach anymore and I feel like someone cut my stomach open, inserted a cantalope, and sewed me back up without my knowledge or consent!"
> *Response*: "Nobody knew I was pregnant till I hit 7 or 8 months thats when I started showing and it happened over nite, but I couldnt suck in my tummy either when I was like 7 weeks"

In this example, the information provided by the commenter assured the original poster that her experience is normal. Here, as with many other threads, the community members were in a particularly good position to provide informational support because they had experienced pregnancy or parenting first-hand.

Informational support frequently appeared in threads requesting health and medical advice, but members also offered informational support on topics outside of pregnancy and parenting:

> *Subject*: *Question to the ladies that live in the states!!*
> *Original post*: "If someone calls YOU long distance, do they pay the bill or you?"
> *Response 1*: "Whoever makes the call is the one who pays"
> *Original poster*: "Thank you Kylie darling"
> *Response 2*: "yup-you can call collect where they pay, but they have to accept the call and the charges."

In this example, a member directed her questions at users who possessed particular knowledge. As with one of the emotional support examples, above, members were willing to provide informational support on a topic outside of pregnancy and parenting.

3.2.2.3. Instrumental support. As there was no evidence to indicate that members ever met face-to-face, the ability to offer instrumental support was somewhat limited. Nonetheless, community members did engage in helpful behaviors in at least two distinct ways. Firstly, members frequently encouraged others to contact them directly through private message, or pm, to receive advice or support:

"Hiya, I'm Lauren. I am 19 and have a 7 month old baby boy. I was on this site when I was pregnant and the help and advice people gave me was really helpful. If anyone wants any help or advice then message me and i'll tell you my experience or advice"

"im 16 going on 17... im 10 weeks tomorrow and had a miscarriage in June this year so if anyone wants my address just pm me."

In response to another member's post: "((((HUGS)))) I know exactly how you feel! My dad is the same, but he's into meth and stuff right now also. If you ever want to talk please feel free to PM me!"

As demonstrated here, members were willing to offer personal advice and support on pregnancy as well as other topics. The leap from the public forum to private messaging is an example of instrumental support because members made a commitment of additional time and energy to speak with another user one-on-one. Posts to the public forum did not typically address one individual, and therefore held no expectation of a response from a specific member. By offering private support, members engaged in an instrumental behavior that could ultimately directly improve the wellbeing of a single individual.

While the offering or sharing of any material goods or offline services on the message boards was impossible, members also provided instrumental support in their making of "signatures" for each other. A signature, or "siggy," is a custom message or image that automatically appears at the bottom of a user's post. Signatures frequently contained images of the member's child or ultrasound, favorite quotes, and animations, and could be created using "signature maker" programs. In the following exchange, two participants decided to make signatures for one another:

Original post: "can one of you make me a siggy?"
Response 1: "I could possibly be persuaded..."
Original poster: " I do for you..you do for me... "
Response 1: "Hahaha. Okay! PM me what pics you want and stuff and Ill start working on it."
Original poster: "You are the greatest! I [heart icon] you!"

Signatures were unique to each individual and required a commitment of time and effort to create. They were a source of admiration from other users and one of the only signifiers of status within the forums. The creation of a signature for another user was therefore an example of instrumental support as well as an opportunity for two individuals to connect one-on-one, as demonstrated in the quotation above.

3.3. Animosity, negative content, and "fakers"

36.0% of responses contained explicit positively-framed content (compliments, offers of luck, best wishes, prayers, congratulations, or solidarity) and 63.4% of responses did not contain specific positive or negative content (though these "neutral" responses could nonetheless contribute to informational or instrumental support), leaving only 0.6% of responses with explicitly negative content in the three forums. While this percentage was quite small, negative responses did occasionally occur, usually in the form of name-calling or other insults. A particularly striking incident than contributed to feelings of animosity in the community was the appearance of a "faker," or an individual who users determined was faking a pregnancy to participate. This situation occurred only once in our sample, but further examination revealed it to be an occasional occurrence on more than one of the forums. Forum members would "call out" a faker if they decided that the user's

story was too outrageous, she mixed up her story, or if they discovered that an ultrasound picture was taken from another source (e.g., Google Images). While it was impossible for us to determine with confidence whether these users were indeed faking their pregnancy status, members of the communities felt strongly that this was the case. In the incident from our sample, a so-called "faker" tried to contribute to a conversation and was met with a barrage of comments:

"Faker, faker, faker...... omg ur so full of crap...... trailer trash lol ur funny"

"F.A.K.E.R.F.A.K.E.R.F.A.K.E.R.F.A.K.E.R.F .A.K.E.R.F.A.K.E.R.F.A.K.E.R"

"I thought u were in jail. stick to a story, my god"

The "faker" incidents demonstrate a number of important features about the teen pregnancy communities. Firstly, while users considered the environment to be safe and supportive and were free with their expressions of positive sentiment to other members, they would occasionally resort to insulting or attacking other users; in other words, the communities were not free of all negative content. The particular animosity towards "fakers" also demonstrates that members felt strongly about their identity as mothers or mother-to-be, and were angered by others co-opting this identity in an attempt to fit in. Furthermore, the incidents demonstrated that at least a few individuals wanted to participate in the community despite not being pregnant, and went to some lengths to attempt to be involved.

3.4. Medical advice: potential for the dissemination of false or misleading information

One concern about online forums is that users may offer unsound medical advice. Indeed, a small number of threads contained at least one false medical statement or instance of unsound advice. Consider the following example, which claims that sperm contain oxytocin and therefore could induce labor:

"The only guaranteed way ive been told of getting labor to come on is to have sex. Apparently spurm has the same hormone in it as the medicine & drips they induce you with, oxytocin i think it is."

Instances where the offered medical advice was inaccurate due to omission or blanket statements occurred as well. For example, a post that claimed that the pill was the contraception "to be on" may have been appropriate advice from a doctor familiar with the patient's situation, but was inappropriate without any additional background or familiarity with the user. Another response claimed that pre-ejaculate does not contain sperm and cannot cause pregnancy, which may be true in some but not all cases.

3.5. Forum 2: when pregnant teens and teen mothers are in the minority

As described above, Forum 2 differed significantly from the other forums in demographic makeup. Quantitatively, Forum 2 also contained significantly more negative responses and fewer positive responses than the other forums, as demonstrated in Table 3. These results provide support for Hypothesis 3: When teen pregnancy and motherhood are the norms in a discussion board, there is more positive support and fewer negative reactions.

In accord with Hypothesis 3, the community was not united by the pregnancy experience and therefore had diverse opinions about pregnancy. As a consequence, members often made explicitly negative comments when the topic of pregnancy or sex before

marriage arose. In one incident, a young woman was called a "whore" for becoming pregnant at a young age. Another young woman was admonished that her boyfriend should have "put something on it" before they engaged in sexual intercourse. While not all users resorted to name-calling or belittling the pregnant participants, many users individually expressed their beliefs that teen pregnancy was a poor choice:

> "[Teen pregnancy is] stupid, why waste your life? You should think about yourself first then when your older you can have children."

> "Well, I personally don't see it as a very good thing that so many teens are getting pregnant. I think a lot of them are just immature children that are unprepared to take on the responsibility of caring for a baby. A lot them just seem to want the pleasure of sex for a while, but don't understand the long term consequences."

Ultimately, in Forum 2, there was no assumption that teen pregnancy was an acceptable life choice or experience. This contempt for teen pregnancy was not present in the posts sampled from the other message boards; indeed, as demonstrated above, users in other forums expressed positive emotions about pregnancy and were glad to have the opportunity to grow close with other pregnant and mothering teens.

4. Implications and conclusions

4.1. Social support in online communities for pregnant adolescents and adolescent mothers

In support of Hypothesis 1, the majority of posts within Forums 1, 3, and 4 were classified as "Community-Oriented," and contained content demonstrating that the original poster was maintaining or wished to maintain contact with other members of the board. The desire to maintain continuity and permanence in a supportive network is in accord with the findings that a sense of permanence in social networks is an important predictor of adolescent mothers' psychological wellbeing over time (Boyce et al., 1985) and that close friends are linked to wellbeing in adolescence more generally (Waldrip et al., 2008).

In line with Hypothesis 2, both community-oriented threads and threads soliciting pregnancy or motherhood advice contained a significantly high ratio of positive to negative responses, providing ample opportunity for the provision of various forms of support. The low incidence of negative responses is in line with previous examinations of online support groups (van Uden-Kraan et al., 2008). As demonstrated above, emotional, informational, and instrumental support occurred throughout the three forums in which teen motherhood was the norm, despite the fact that participants did not appear to ever meet face to face. Furthermore, users explicitly stated that not only were the message boards a source for friendship-building and understanding, but that they were also a *unique* source of support, unavailable from any other source. In this way, online teen pregnancy communities serve a similar function to other online communities for adolescents who are isolated from peers with similar backgrounds, such as health support communities for teens suffering from chronic disease (Johnson et al., 2001; Ravert et al., 2004; Suzuki & Beale, 2006). Given that some teens had not yet told friends, family, or significant others about their pregnancy, the communities functioned similarly to pro-anorexia (Csipke & Horne, 2007; Custers & Van den Bulck, 2009; Eichhorn, 2008; Fox, Ward, & O'Rourke, 2005; Mulveen & Hepworth, 2006) or self-injury (Whitlock et al., 2006) communities in that they offered space for teens to discuss secrets they did not wish to share with others.

Our results suggest that online teen pregnancy communities serve an important positive role in the lives of the young women that utilize them. While previous research demonstrates that peer relationships are not always linked to positive outcomes (Sgarbossa & Ford-Gilboe, 2004; Thompson, 1986; Thompson & Peebles-Wilkins, 1992), this study indicates that the peer's personal experience with pregnancy and her consequent provision of positive support are important factors in promoting wellbeing. In line with previous clinical interventions (Dunham et al., 1998; Kauppi & Garg, 2009), our results suggest that encouraging young women to become involved in online support communities could potentially improve their wellbeing.

4.2. Negative experiences

While the forums functioned as supportive communities for their members, participation involved negative experiences as well. Insults and name-calling were rare but did occur. Negatively-valenced comments, while less frequent, may have had greater and more far-reaching effects on overall wellbeing and levels of psychological distress than positive ones (Finch, Okun, Pool, & Ruehlman, 1999; Newsom, Nishishiba, Morgan, & Rock, 2003; Schuster, Kessler, & Aseltine, 1990; Taylor, 1991).

Another potential concern related to these communities is the distribution of unsound or misleading medical advice. Much like other health forums, teen pregnancy message boards can serve as an anonymous environment for teens to ask sensitive questions. Online message boards can provide a resource for teens who may be too reluctant to ask their parents or health practitioner about sexuality-related concerns (Suzuki & Calzo, 2004). Unfortunately, users also run the risk of receiving responses that are incomplete or medically unsound. While only a small minority of posts contained unsound medical advice, this advice was continually visible to other members and the misinformation could easily have spread to more than just the intended recipient. The spread of misinformation in online communities, particularly in health-related support groups, has been identified as a negative consequence of community participation in previous research (Barak & Grohol, 2011; Barak et al., 2008). Our results support the notion that misinformation in online health communities is a somewhat uncommon but nonetheless persistent issue.

Finally, while the communities serve as safe and supportive havens for adolescents who are already experiencing pregnancy, their existence may normalize or even glamorize teen pregnancy for other young women. The Internet's ability to bring strangers with common interests together can be a positive force. However, it also raises awareness and even leads to dangerous subcultures, such as pro-anorexia communities (Fox et al., 2005) or suicide pact communities (Naito, 2007). Media or scientific attention on these communities may exacerbate the problem, exposing individuals to a subculture that they otherwise may never have discovered (Naito, 2007). While it is difficult to measure the influence of these communities on non-pregnant readers, some users expressed a desire to become pregnant at a young age, while others may have created a fake identity in order to participate (Section 3.3). If indeed community members faked a pregnant identity, this suggests a direct relationship between knowledge of the communities and desire to appear pregnant. The "faker" incident provides a compelling example of how online communities for marginalized individuals could make the marginalizing experience appear desirable to outsiders.

4.3. Forum 2: a more typical adolescent response?

In accord with Hypothesis 3, negatively-valenced feedback was more prevalent in Forum 2 than in the other three forums. Forum 2

contained many male participants, and the majority of users were neither mothers, mothers-to-be, fathers, nor fathers-to-be. In this way, Forum 2 differed significantly from the other forums and more closely resembled the types of peers a pregnant adolescent or adolescent mother might encounter in school or in her hometown. Forum 2 participants were less sympathetic towards pregnancy, less likely to offer explicitly positive comments, and more likely to engage in insults or name-calling. Multiple participants stated explicitly that they felt teen pregnancy was a poor choice and reflected badly upon the mother; on one occasion a pregnant teen was likened to a prostitute. These responses are typical of adolescent nonparents (Herrman, 2008), suggesting the discourse in Forum 2, like the demographic breakdown, may have more closely resembled a typical peer group for a young mother or pregnant adolescent. Furthermore, perhaps as a result of the *online disinhibition effect* (Suler, 2004), participants in Forum 2 may have made disparaging or insulting comments online that they would not have made in the presence of a pregnant or parenting teen in day-to-day life. Thus, some online environments might be *more* unwelcome for a young mother than other daily environments she might encounter.

The atmosphere of Forum 2 demonstrates that young women must carefully choose an online community. While the topic of Forum 2 was teen pregnancy and motherhood, the conversation therein was less supportive and occasionally downright hostile towards pregnant teens and teen mothers. Our results suggest that peers with little or no direct experience with teen pregnancy may not contribute effective social support to pregnant or mothering peers and may instead decrease the wellbeing of a young mother or mother-to-be, in line with previous research that finds peer relationships are related to increased psychological distress among adolescent mothers (Thompson, 1986; Thompson & Peebles-Wilkins, 1992).

4.4. Future directions

Our results demonstrate that, despite some negative consequences, online communities for pregnant adolescents and adolescent mothers are largely supportive environments, provided that these communities are populated by other young mothers or mothers-to-be. These results suggest that the inconsistent relationship between peer support and the wellbeing of adolescent mothers demonstrated in previous literature may be clarified by the consideration of peers' direct relationship with pregnancy. The opportunity to connect with peers who are also experiencing or have experienced a pregnancy leads to feelings of support and likely increases the overall wellbeing of a young mother or mother-to-be.

Because social support is related not only to increased wellbeing for adolescents (Whitlock et al., 2006) but also to better pregnancy outcomes and improved fetal growth (for a review, see Hoffman & Hatch, 1996), participation in supportive online communities could be a positive force for pregnant mothers and mothers-to-be who feel isolated from peers. To further explore this relationship, a logical next step would involve interviewing participants, perhaps at various points throughout pregnancy and early motherhood in order to further ascertain the role of online communities in mediating social relationships and to better understand their role in contributing to young women's wellbeing. Furthermore, future research in the area of social support and adolescent pregnancy outcomes should assess the specific nature of friendships and peer relationships, considering that friends who have experienced or are experiencing a pregnancy may contribute a unique form of support to these young women.

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