UNDERSTANDING EMOTIONAL ATTACHMENT TO GROUP: A REPLICATION & EXTENSION OF PAXTON & MOODY

by

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ABSTRACT

Paxton and Moody (2003) examined a naturally occurring group—a sorority from 1994—to see how network structure affects members' emotional attachment to a group. In 2012, we replicate and extend this study on the same sorority. As Paxton and Moody did in their study, we use Bollen and Hoyle's (1990) Perceived Cohesion Scale to measure emotional attachment, and we similarly measure the same explanatory variables: network measures, participation, and competition from other groups. Paxton and Moody found that being more central, having more cross-cutting ties between different subgroups, and participating in more social activities within the overall group increased emotional attachment. In contrast, we find that network measures do not hold significance in affecting emotional attachment when looking at all explanatory variables together. The significance in level of participation, however, still exists with respect to influencing emotional attachment. In our extension of Paxton and Moody's study, we also address other factors that could affect members' emotional attachment to group and include an online element. We find that other factors, i.e., sorority characteristics and other time commitments, affect sense of belonging and feeling of morale in one way or another. For our online element, we use information about members' relations and behavioral interactions on the social network site, Facebook, to find that the network structure of sorority members who regularly interact with one another on Facebook is quite strongly correlated with the network structures created from the real-life relations.

LITERATURE REVIEW

Social networks are social structures that include relationships linking interacting individuals together. In social network analysis, it is not the individual, but the ties between individuals that are of importance. Individuals are seen as interdependent rather than independent units, and the links between these individual actors are viewed as the means for transferring resources. Thus, the results of social network analysis become characteristics of the social entity and properties of the relational system (Wasserman & Faust 1994).

Individuals within a social network are often referred to as "actors" and can be anything from a person within a group to an organization within a holding company. The links between these actors are known as "ties," "edges," "arcs," or "lines." When looking at an individual's personal network, she is seen as the "ego," while all of the others who she is tied to are known as the "alters" (Wasserman & Faust 1994).

Homophily, or homogeneity with respect to sociodemographic, interpersonal, and behavioral characteristics, can be evidenced in social networks among actors. Limited to the number of people in their network, often known as the Dunbar number in the range of 100 to 200, individuals choose to interact with those like themselves for the ease and low cost of forming and maintaining the relationship (Cook et al. 2001). Cook et al. (2001) argue that characteristics, particularly race and ethnicity, shape networks. Geographic distance, families, organizations, and roles within a social system also provide the basis for homophilous networks. Further, Cook et al. show that less homophilous networks dissolve at a quicker rate.

Homophilous networks, thus, include more stable relationships, which foster the development of individuals' social attachment to the group through fulfilling their inherent desire for interpersonal relationships and the need to belong (Lawler & Yoon 1996; Baumeister &

Leary 1995). Baumeister and Leary (1995) suggest that the need to belong and to have these social attachments is universal among humans and stems from frequent, pleasant interactions with the same individuals within a long-term framework. Lawler and Yoon (1996) agree, but further Baumeister and Leary's (1995) thoughts, by adding the element of emotion. Lawler and Yoon's (1996) Theory of Relational Cohesion states how ongoing and frequent exchange within a sustained relationship network promotes positive emotions, which then create commitment and social attachment to the group, or "perceptions of the relation as a cohesive unit."

In Lawler et al.'s (2006) study, two types of relationships are defined: structurally enabled relations, which are based on incentives within the network, and structurally induced relations, which occur when actors within the network have no choice but to exchange with one another even though they prefer to exchange elsewhere. Lawler et al. (2006) then find that enabled relations, because they are not forced, give actors a sense of control, which increases positive emotions to produce a higher perceived relational cohesion and group commitment value. With this control comes the actors' perception of value in the repeated and willing exchange relations (Lawler & Yoon 1998). Wasserman et al. (1993) also find that an actor's power and influence affect the supportiveness within her network. Lawler's (1992) choice-process theory further emphasizes an actor's sense of control as fundamental in strengthening perceived relational cohesion.

Although Lawler and Yoon (1998), in their Theory of Relational Cohesion, use perceived relational cohesion as defined as commitment to an exchange relation and social attachment to a group, Mudrack (1989) acknowledges the difficulty of defining cohesion. Since the 1950s, scholars have recognized the importance of cohesion as a group level variable, but Mudrack finds they are unable to agree on a consistent and accurate definition to use across the board.

Mudrack then concludes that the term is undefinable. In 1990, however, Bollen and Hoyle created a definition for perceived cohesion that they said would work across a broad range of groups. In their study, Bollen and Hoyle produced the Perceived Cohesion Scale (PCS), a six-item scale that determined perceived cohesion based on sense of belonging to the group and feelings of morale related to being a member of the group. Bollen and Hoyle argue that both elements in the PCS are necessary because, although they are highly correlated, the sense of belonging captures cognition, while the feelings of morale are the effects. Further, they found that PCS held up in a small college and a mid-sized city, and Salisbury et al. (1999) found it to be a valid measure of emotional attachment in a small group as well.

The studies testing out Bollen and Hoyle's PCS suggest their six-item scale is effective as an indicator of perceived cohesion defined as sense of belonging and feelings of morale. Many studies describe this group cohesion in two dimensions: cohesion to the group, itself, and cohesion to the members that make up the group (France et al. 2010; Friedkin 2004; Hagstrom & Selvin 1965; Hogg 1992; Lightdale et al. 1994; Utz 2003). Lightdale et al. (1994) define the former as common-identity groups and the latter as common-bond groups. Utz (2003) adds how social identification, where individuals identify themselves with the group and agree with its social norms, goals, and behaviors, promotes their attachment to group. Interpersonal attachment, which comes as a result of frequent physical life contact and then liking other members of the group, fosters individuals' attachment to the people within the group. Some scholars suggest that groups possess both types of group cohesion (Friedkin 2004; Utz 2003). Friedkin (2004) and Hogg (1992) state how attachment to a group creates positive behaviors and attitudes towards the group and socially identifying with it, while the interpersonal attachment to those within the group maintains these positive feelings.

Although many studies have found this interpersonal attachment to be a significant factor in creating and fostering group cohesiveness, there are also subgroup theories that show how a group developed through interpersonal attachments can end up limiting the members' attachment to the group as a whole (Baker et al. 1994; Hall 1988; Lawler 1992; Yoon et al. 1994). Interpersonal attachment to group may form segmentation among the group into subgroups. In some instances, individuals become more attached to the subgroup social system over the overall group social system because of the higher level of cohesiveness they develop in the subgroup (Lawler 1992; Baker et al. 1994). This is also known as the proximal rule (Lawler 1992) or subgroup fragmentation (Baker et al. 1994). With more intense interpersonal attachment within the subgroup, the fragmentation deepens and, consequently, individuals develop attachments to their subgroup, deflecting their commitment to the larger group (Hall 1988). Blau's (1977) notion of cross-cutting ties becomes the notable exception. An individual with cross-cutting ties, even though she may belong in a subgroup within a larger group, has a greater sense of attachment to the group as a whole because she has ties linking her to other people that are in the group, yet are outside of her subgroup.

In their 1994 study, Paxton and Moody (2003) focus on individuals' attachment to a naturally occurring group using Bollen and Hoyle's PCS. A naturally occurring group forms on the premise that members willingly choose to be a part of it. The relations that form within these naturally occurring groups, thus, are the structurally enabled relations that provide actors with a sense of control and, consequently, higher perceived relational cohesion and group commitment value (Lawler et al. 2006). Further, the reasoning behind this self-choice to be in the group is Lawler's (1992) choice-process theory. Knoke (1981) explains the same elements of Lawler's choice-process theory in his own study. Being in a group that permits social control, increases positive emotions, and enables individuals to influence the group's activities and policies, also promotes willingness to commit to the group (Knoke 1981).

Paxton and Moody use a Southern sorority as their naturally occurring group to examine the social network structure of the group and the relationship it has with an individual member's emotional attachment to the group. They look at a number of explanatory variables, including individuals' network position, subgroup membership, participation, competition from other groups, and controls. Paxton and Moody's findings suggest that for an individual to experience a high degree of emotional attachment to a group, she is not only connected with multiple people within her subgroup, but also has cross-cutting ties to the rest of the group as a whole. Her participation in outside social activities with other members increases her sense of both morale and belonging as measured by the PCS.

Paxton and Moody's findings are supported by other studies, which suggest that individuals more involved in the activities of a group are more attached to it (France et al. 2010; Moody & White 2003). Additionally, the finding that participation in outside social activities increases both PCS dimensions of emotional attachment supports Utz's (2003) study, which found that frequent contact with individuals within a group increases attachment to the group on the interpersonal level. Further, Paxton and Moody's results with regards to subgroups support the subgroup theories (Baker et al. 1994; Blau 1977; Hall 1988; Lawler 1992; Yoon et al. 1994). The individuals with ties cross-cutting into multiple subgroups have stronger emotional attachment to the sorority, as a whole, because they do not have that strong affective tie to a particular subgroup detracting away from commitment to the sorority.

THE CURRENT STUDY

This study replicates and expands upon Paxton and Moody's analysis of the 1994 sorority's network structure and its individuals' involvement and relations with the same Southern sorority in the current day. From this study, we compare the results of both studies and see if the relationship between the social network structure and emotional attachment of the same sorority has held up over time, or if it has changed. We also add a social network site element to our study, where we examine the social network structure of relations in real life against the social network structure of relations online.

As stated by Baumeister and Leary (1994), universal among humans is the desire for interpersonal attachments. Having these attachments provides survival and reproductive benefits in a world where individuals must compete for limited resources. Therefore, we believe that this desire for attachments has persisted since 1994. And through the support that comes from the other scholars' theories and studies,

> *Hypothesis 1: We hypothesize that our results will be similar to Paxton and Moody's. That is, network relations and members' participation within the sorority affect their emotional attachment to the overall group. We predict that the more cross-cutting ties she has and the more she participates in the sorority, the more emotionally attached she will be to the sorority.*

Included in this study are a few additional elements addressing other possible explanatory variables that may affect one's emotional attachment to a naturally occurring group, one being specific sorority characteristics.

> *Hypothesis 2:* We *hypothesize that holding certain sorority characteristics, i.e., being a legacy, living with other sorority members, and having a leadership position within the sorority, increases one's emotional attachment to the sorority.*

Towards the conclusion of their study, Paxton and Moody suggest further research on the effects of membership in competing groups. Although this was an explanatory variable in their study, they did not ask sorority members about the extent of involvement in these competing groups. We have decided to follow up on their suggestion and address the extent of involvement in competing groups in this study. We also expand on their suggestion to include the extent of involvement in any activity that would take away time from being involved with the sorority.

> <u>*Hypothesis 3*</u>*: We expect that as members' extent of involvement in other time commitment activities increases, emotional attachment to the sorority will decrease, as it takes away time from getting involved in the sorority and interacting with its members. These other time commitments include, if applicable, amount of time spent working, participating in other groups, studying, and being in a relationship.*

The relations and interaction habits with other sorority members on the social network site (SNS), Facebook, is also addressed in this study, as the Internet has now become an important and popular avenue for individuals, especially college students, to interact. Wellman et al. (2002) has found that computer-supported social networks can provide additional social support, companionship, and a sense of belonging to users. By asking the individuals about their connections and who they regularly interact with on these social network sites, we are able to produce the sorority's network structure online. From the results, we can compare the online network structure to the one in real life and gain a better understanding of relations online in the context of the network structures they create. We can also determine how sorority members' interactions and relations on social network sites may or may not give insight into their emotional attachment to the sorority.

> <u>*Hypothesis 4*</u>*: We hypothesize that the Facebook network structure, which includes relations of sorority members who state they regularly interact with one another online, will exhibit similarities to the actual network structure of the sorority.*

This hypothesis is supported by Schwanen et al.'s (2010) study, which finds that a positive correlation exists between face-to-face communication and electronic communication, that is, regularly interacting friends interact in real life and on social network sites. The results from this replicated study with the addition of explanatory variables and the SNS element expand our understanding of network structures of naturally occurring groups across communication mediums and over time.

SIGNIFICANCE

Since Paxton and Moody conducted their study in 1994, many new ways of communicating and forming relationships with one another have developed and gained immense popularity. The dot-com boom, which occurred in the latter half of the 1990s, brought the Internet to the forefront as a way to share information, form communities, and develop and sustain relationships. In the early 2000s, mobile telephone devices and text messaging became another convenient medium individuals could use to communicate with one another. More recently, social network sites (SNS) such as Facebook, Twitter, Tumblr, and LinkedIn, which act as additional platforms for developing and maintaining relationships and allowing individuals to talk with one another, have exploded in popularity. Online video chatting has also become a familiar alternative way for individuals to communicate with one another without in-person interaction. These technological developments arguably have had an influence on how today's individuals interact and define, form, and sustain relationships with others. Replicating and expanding upon Paxton and Moody's study enables us to determine how digital may have affected or not affected the network structure of a naturally occurring group and the relationships within it. For instance, it can be argued that participating in virtual communities and communicating with others through the digital means reinforces and strengthens relationships. On the contrary, others see these forms of interaction as decreasing the quality of relationships and how people understand relationships, as they cannot provide all of the elements of interaction that face-to-face communication can. This leads to less fulfilling relationships.

Further, this study gives insight into what variables are the most and least significant in affecting a member's emotional attachment to a modern-day naturally occurring group. This enables leaders of the group to better understand what certain factors they may need to focus on to most effectively increase members' sense of belonging and feeling of morale to the overall group. For instance, if it is found that participating in more of the group's activities drastically increases sense of belonging and feeling of morale to the group, leaders will know that increasing the number of group activities is the most effective way to create a group where members have high attachment to it. The results from this study can be applied to that of any naturally occurring group, not necessarily just a sorority. Therefore, the general findings could potentially begin to inform other kinds of groups in other disciplines.

Finally, the additional SNS element of this study addresses the idea of comparing individuals' face-to-face relations to their virtual interactions, and the group's real-life network structure to its virtual network structure on the SNS, Facebook. From this, we will be able to achieve a better understanding of where non-face-to-face interactions come into play with respect to a group's network structure. If the network structure is similar across these communication mediums, perhaps digital could act as an adequate and documentable measure for understanding real-life relations. This could be important when it is difficult to obtain data directly from the source, i.e., the individuals being studied. It also suggests that individuals' relations online and in real-life form are maintained in a similar way or that the two communication mediums reinforce one another with respect to network structure and relations. If the two network structures exhibit no similarities at all, this would give insight into "relationship" as being defined as two completely different things online and in reality. These findings are interesting and important to know, especially as digital and the Internet have become so embedded into our lives.

DATA & MEASUREMENT

Sample

The data for this study were collected from a questionnaire administered to a sorority, which we will refer to as "Alpha Beta Chi" (ABX), between mid-January to late February 2012. ABX is the same sorority Paxton and Moody studied in 1994. During the time of the study, there were 170 listed members in ABX, and 137 members completed the survey. ABX is homogenous with respect to sex, race, and age. All of the members are females, mostly white, and current students at the respective university. 4 of the 137 respondents listed themselves as non-white.

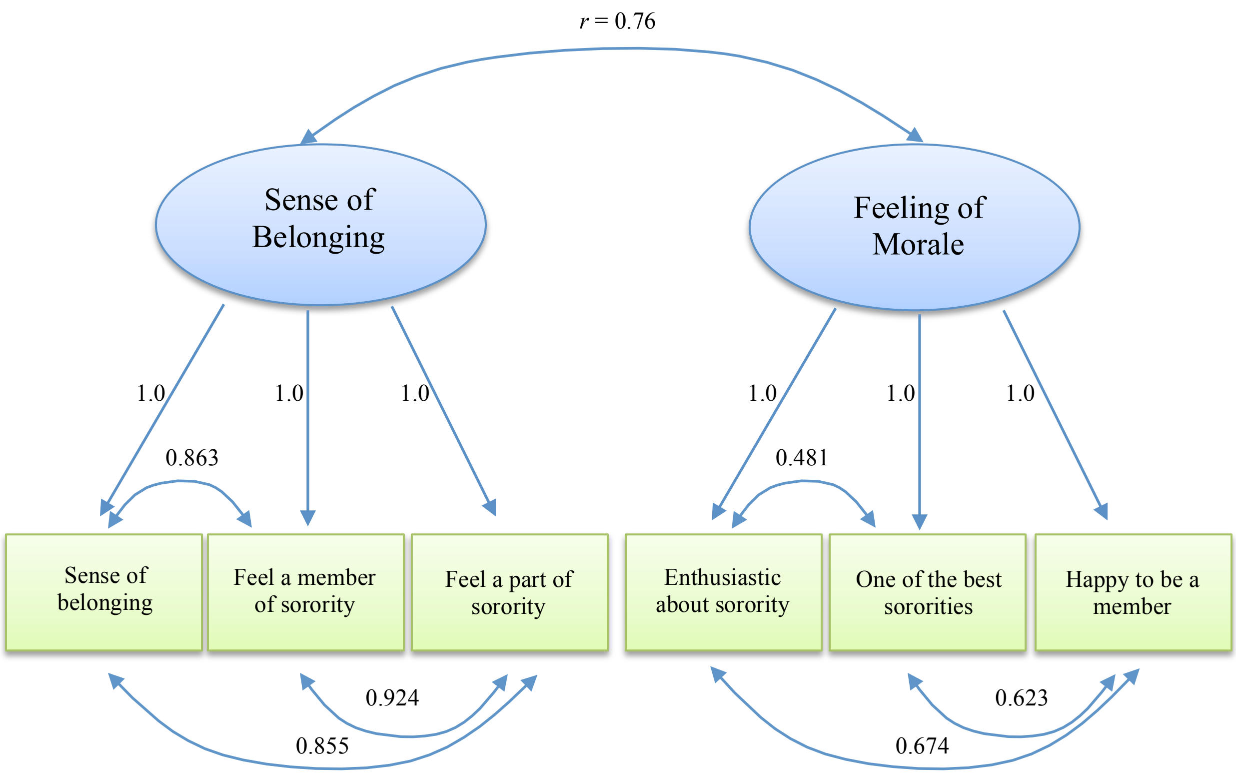
An in-house questionnaire was distributed to all present sorority members during a mid-January 2012 Chapter Meeting, which garnered 107 responses. For the following 3 weeks, the survey link was sent in weekly e-mails to those absent during the Chapter Meeting, which resulted in an additional 30 responses. As in Paxton and Moody's study, we collected our network data by providing a table where subjects independently identified their relationships and interactions with all of the ABX members. Other measures were collected from multiple choice and fill-in-the-blank survey answers. See Appendix A for survey instrument.

Measures

Emotional Attachment

Following Paxton and Moody, we use Bollen and Hoyle's (1990) Perceived Cohesion Scale (PCS) as a measure for emotional attachment to the group. PCS is measured via 6 statements offered to respondents. Specifically, respondents were given a Likert Scale ranging from "1 – Strongly Disagree" to "7 – Strongly Agree." 3 statements address individuals' sense of belonging, and the other 3 address individuals' feeling of morale. To measure a sense of belonging, the subjects ranked statements regarding: (1) sense of belonging, (2) feel that they are a member of the sorority, and (3) feel that they are a part of the sorority. To measure feelings of morale, they ranked how much they agreed on statements regarding: (4) enthusiasm about the sorority, (5) belief that ABX is one of the best sororities, and (6) happiness to be a member. Figure 1 shows the PCS factor model for the two dimensions of perceived cohesion.

Figure 1. Measuring Individual Attachment



The correlation coefficient between sense of belonging and feeling of morale is 0.76, which indicates there is a strong correlation between the two dependent variables measuring emotional attachment. Further, when giving the same weight (i.e., 1.0) to the 3 factors measuring sense of belonging, we observe strong correlation coefficients, with all correlation coefficients at 0.855 or above. Overall, the 3 observed feeling of morale factors have lower correlations, and therefore weaker relations, to one another compared to the sense of belonging factors.

For our study, we calculate sense of belonging for each individual by summing her responses to (1) sense of belonging, (2) feel a member of sorority, and (3) feel a part of the sorority and dividing by 3. Likewise, we measure feeling of morale by summing (4) enthusiastic about sorority, (5) one of the best sororities, and (6) happy to be a member and dividing by 3. Finally, the measure of attachment includes all 6 measures of the PCS divided by 6.

Table 1 provides descriptive statistics for the 6 variables used to measure sense of belonging and feeling of morale. The means of the 6 variables, which all fall around "6 – Agree," describe a sorority with a high, collective sense of belonging and feeling of morale. These values may be explained by the significant number of respondents who selected "7 – Strongly Agree" for all sense of belonging factors (n = 59) or feeling of morale factors (n = 48).

Table 1. Descriptive Statistics for Variables in the Perceived Cohesion Scale

Variable	Relevant Question in Survey: *Please indicate how strongly you agree with the following statements*	Possible Range	Actual Range	Mean	SD
Sense of Belonging	I feel a sense of belonging to Alpha Beta Chi.	1-7	2-7	6.175	0.992
Feel a Member of the Sorority	I feel that I am a member of the Alpha Beta Chi community.	1-7	3-7	6.190	0.974
Feel a Part of the Sorority	I see myself as part of the Alpha Beta Chi community.	1-7	2-7	6.190	1.073
Enthusiastic About Sorority	I am enthusiastic about Alpha Beta Chi.	1-7	2-7	5.876	1.239
One of the Best Sororities	Alpha Beta Chi is one of the best sororities on campus.	1-7	4-7	6.474	0.728
Happy to be a Member	I am happy to be a member of Alpha Beta Chi.	1-7	2-7	6.504	0.815

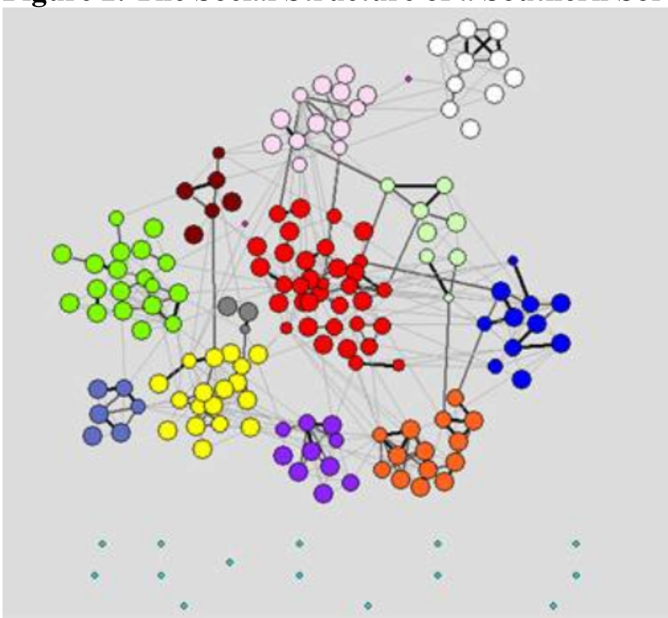
Network

In our survey network component, each respondent was asked to select (1) three best friends, (2) who they would discuss a personal problem with, (3) who they regularly go out with, and (4) who they regularly interact with on the SNS, Facebook. For our study, we use all of the results from (1), the reciprocated results from (2), and the reciprocated results from (3) to create the sorority network structure we use to calculate our network measures, unless otherwise stated. The reasoning behind choosing only the reciprocated ties for (2) and (3) is to account for the fact that many respondents nominated an unlimited number of other members during their selection process. We included all nominations for (1) because respondents were instructed to select only three best friends. For this question only, they were also able to choose non-ABX members as best friends.

Figure 2 displays the sociogram of this network structure, where each circle represents a respondent, a network node. Each line is a tie that connects two individuals if one member nominated another as a best friend, if both members nominated one another for discussing a personal problem with, or if both members nominated one another for regularly go out with. The different colors represent different subgroups we constructed and placed the actors into.[1] The size and thickness of the circle and line, respectively, begin to give insight into embeddedness of the nodes within their subgroups and strength of the ties between the individual nodes. A large circle means that the proportion of total ties within the specific subgroup over total ties is high. A thick line means that both nodes in the tie nominated one another in multiple relations.

[1] Please contact Dr. James Moody for information on how the subgroups were constructed.

Figure 2. The Social Structure of a Southern Sorority



Popularity. We use in-degree, which is the number of nominations an actor receives from other members within the group, and out-degree, which is the number of nominations an actor gives out, to measure popularity. In our questionnaire, respondents were limited to nominating only up to 3 other individuals as (1) their best friends and up to 5 others as (2) those they would discuss personal problems with. There were no limits on the number of individuals respondents could nominate for (3) those they regularly go out with. Therefore, we use all of the results from (1), (2), and (3) to measure in-degree. For out-degree, we use the results from (3) only. In both cases, notice that we use all nominations in the specified relations, not just reciprocated ties. We only use the results from (3) for out-degree because of the unlimited number of nominations an individual could give for this relation, which results in the least inflated portrayal of out-degree out of all the relations and possible combinations of relations. Because there were 137 people who took the survey and a total of 170 members that respondents could nominate, the highest in-degree number is 136, while the highest out-degree number is 169.

Centrality. Centrality is a measure of an actor's prominence and importance within a social network based on that individual's location in relation to others. Those who are the most prominent or important are often located in strategic locations within the network. More specifically, for our study, we use Bonacich's centrality measure because it was the centrality measure used in Paxton and Moody's 1994 study. Bonacich's (1987) centrality measure takes into account and uses how central an actor's ties are within the network structure. That is, an actor's centrality is her summed connections to others, weighted by "others'" centralities. A higher centrality measure results from an actor being connected to individuals who are more central within the network.

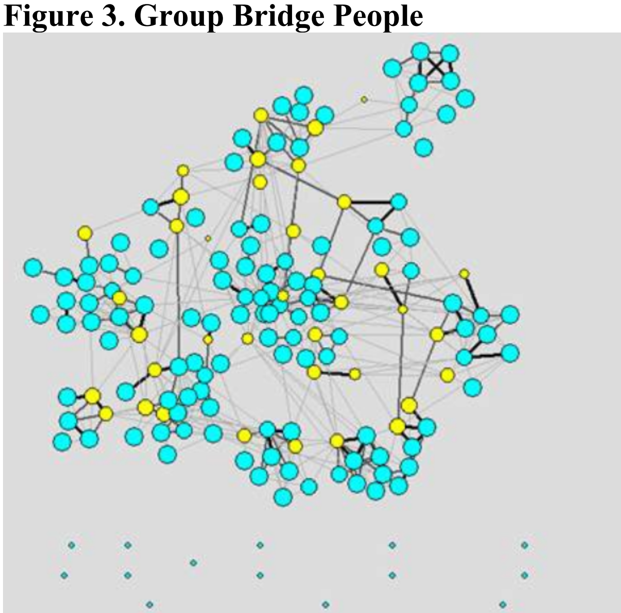
Ego network density. Ego network density measures the extent to which an actor's nominations are also friends with one another. It is defined as the number of ties among those that the actor nominated, which includes the actor's in-degree and out-degree ties, divided by the total possible number of ties in the actor's network.

Subgroup membership. In the 1994 study, Paxton and Moody identified 6 subgroups in ABX's total network, 2 of which were not in a particular cohesive subgroup, but had network position characteristics that were similar to one another (i.e., "Hangers-on," those who were identified as being on the edges of the different subgroups or had no ties at all, and "Liaisons," those who connected the different cohesive subgroups together). For our study, we work with a larger net and identify 13 different subgroups. We also create a "Liaisons" group (Group 12) and an isolates group (Group 0). The 13 subgroups range from 3 to 32 members, with a mean of 10.538 members per group and a median of 8. The different subgroups are denoted by different colors in Figure 2.

From these subgroups, we can determine the proportion of ties an individual has within the subgroup over the total number of ties she has. This calculation gives insight into how strongly connected she is with her designated subgroup. If the number is closer to 1, the ties within her subgroup take up more of her total ties, suggesting that she is more strongly connected to her subgroup. If the number is closer to 0, she has more ties to other individuals outside of her subgroup in relation to the total amount of ties she has.

Another measure we can extract from segmenting the individuals into subgroups is group bridge people. In this study, group bridge people are individuals who have less than two-thirds of their ties within their respective subgroup, i.e., the people who have more cross-cutting ties as coined by Blau (1977). Figure 3 shows the group bridge people in yellow (*n*=36).

Figure 3. Group Bridge People



Sorority Characteristics

As additions to Paxton and Moody's study, we include 3 dichotomous variables that measure sorority-related traits that members either have or do not have. These characteristics are: (1) being a legacy, (2) living with other ABX members, and (3) holding an ABX leadership position currently or in the past. We received data on being a legacy and living with other ABX members from the respondents' answers to the questionnaire. For the ABX leadership position variable, we worked with the leader of the sorority to receive a list of current members who have held or presently hold leadership positions within ABX.

Participation

In our survey, members were provided with a series of questions pertaining to their level of participation in the sorority. Respondents answered questions that asked (1) how many ABX events they attended within the past 6 months, (2) how committed they are to ABX, (3) how often they go out with other ABX members, (4) if applicable, how involved they were with the most recent rush process, (5) how many hours a week they spend on ABX-related activities, and (6) what percentage of their friends are in ABX. For the first 4 variables, respondents ranked their participation on a scale from 1-9, with 1 signifying the lowest level of participation and 9 being the highest. The last 2 variables grouped possible answers into multiple-choice categories, from low numbers (hours per week) and percentages (percentage of friends in ABX) to high.

"ABX events" refer to organized sorority activities that include philanthropy and community service, formals, mixers, and date functions with other fraternities at the university. Many of these events are mandatory or require a minimum number of hours of attendance.

The commitment question was broad and up for interpretation by the respondents. Their commitment to the sorority could refer to any combination of the other participation factors or none at all. For instance, one respondent may view commitment as attending all of the sorority's events; another may see commitment as attending all of the sorority's events and going out with other sorority members; still, other members may look at commitment as something completely separate from the other participation factors.

For "how often they go out with other sorority members," respondents gauge the frequency of going out with other members from the sorority. "Going out" refers to voluntary, social, and recreational involvement with sorority members outside of the ABX-organized events.

Rush involvement is applicable to all members who are not freshmen and did not pledge at the start of the 2011-2012 school year. For our study, 94 sorority members out of the total 137 respondents found this question to be relevant and answered. Rush occurs at the beginning of every academic year, where existing sorority members organize numerous activities for the purpose of recruiting new individuals into the sorority. It is often known as being a quite stressful time period for the sorority.

For "how many hours a week they spend on ABX-related activities," "ABX-related activities" include all activities that a member participates in, whether it is mandatory or voluntary, social or solitary. In ABX, members attend formal and informal chapter meetings, which alternate each week. Freshmen, sophomores, and juniors are allowed to have 2 unexcused absences, while seniors can have 3. Excused absences include heavy schoolwork load or other important events scheduled ahead of time.

Competition/ Other Time Commitments & Controls

We include 4 variables to measure competition from possible factors not related to the sorority. These include, if applicable: (1) hours spent working, (2) hours spent participating in other, non-Greek organizations, (3) hours spent studying for school, and (4) time spent with a significant other. Respondents selected the time range category that best describes the amount of time they allot towards the other time commitment variables.

(1) Hours spent working, (2) hours spent participating in other, non-Greek organizations, and (4) time spent with a significant other were asked in a skip logic format, where respondents were initially asked (1) if they worked, (2) if they were a part of other, non-Greek organizations, and (4) if they had been a romantic relationship with someone in the past 12 months. From these skip logic questions, we determined that 62 worked, 106 were in other groups, and 95 had been in a romantic relationship. These respondents were then directed to questions that asked the amount of time they spent on these other time commitment variables.

The controls we use for this study comprise of the respondents' school year, pledge year, college GPA, mother's education, and father's education. We do not control for age because school year and pledge year already cover this. We also do not control for race, sex, and many other socioeconomic factors because of the existing homophily in the already primarily Caucasian, female group. Table 3 includes the descriptive statistics for all of the independent variables, which are grouped in their appropriate variable categories, and controls.

Table 3. Descriptive Statistics for Exogenous Variables

Variable	Relevant Question in Survey:	Possible Range	Actual Range	Mean/ Mode	SD
Network					
Popularity, in degree n=137	Number of people who nominate ego: Constructed from "best friend," "discuss a personal problem," or "regularly go out." No reciprocation.	0-136	0-36	17.299	7.811
Popularity, out degree n=137	Number of people who ego nominated: Constructed from "regularly go out."	0-169	0-79	20.117	13.258
Centrality n=115	Bonacich Centrality Score Constructed from "best friend," "discuss a personal problem," or "regularly go out." Reciprocation from latter 2 relations.	--	0.010-2.590	0.815	0.582
Ego network density n=137	Number of present ties over total possible ties between ego's neighbors [[same as Centrality]]	???	0-1.25	0.449	0.187
Proportion of ties n=137	Number of subgroup ties divided by number of total ties	0-1	0-1	0.781	0.235
Group bridge n=137	Bridges are those who have less than 2/3 of their ties to their own subgroup	Brdg/ Nobrdg	0-1	0.263	0.442

Sorority Characteristic					
Legacy n=136	Are you a legacy with Alpha Beta Chi?	yes/no	0-1	0.154	0.363
Live with ABX n=137	Do you live with other Alpha Beta Chi members?	yes/no	0-1	0.613	0.489
Leader n=137	Member holds/has held leadership position in Alpha Beta Chi.	yes/no	0-1	0.161	0.368
Participation					
Attend sorority events n=137	In the past 6 months, how many Alpha Beta Chi events did you attend?	1-9	2-9	6.883	1.720
Commitment n=137	How committed are you to Alpha Beta Chi?	1-9	2-9	7.036	1.742
Go out with sorority n=137	When you go out, how often is it with other Alpha Beta Chi members?	1-9	2-9	7.547	1.480
Involved in rush n=94	How involved were you in the most recent rush process?	1-9	1-9	6.404	2.380
Hours spent on sorority activities* n=137	About how many hours a week do you spend on Alpha Beta Chi related activities?	1-5	1-5	3.146	1.061
% of friends in sorority* n=137	What percentage of your friends are Alpha Beta Chi's?	1-7	2-7	4.482	1.030
Other Time Commitment*					
Hours working n=136	Do you currently work? If yes, about how many hours do you work per week?	0-5	0-5	1.081	1.388
Other groups n=136	Do you belong to any non-Greek campus groups? If yes, how many hours per week do you spend?	0-3	0-3	1.199	0.965
Hours studying n=137	During a typical week, how many hours a week do you study?	1-5	1-5	3.642	1.034
Relationship n=137	Have you had a romantic relationship with someone in the past 12 months? If yes, how much time did (do) you spend with your last (current) significant other?	0-3	0-3	1.600	1.257
Control Variables					
School year n=137	What is your year in school?	Fresh-Senior	Fresh-Senior	Soph	--
Pledge year n=136	What year did you pledge Alpha Beta Chi?	2008-2011	2008-2011	2010	--
Mom's education* n=136	What best describes your mother's education?	No grad HS-PhD	Grad H-PhD	BA or BS	--
Dad's education* n=137	What best describes your father's education?	No grad HS-PhD	Grad H-PhD	BA or BS	--
College GPA n=134	What is your college GPA?	0-4	2.5-3.98	3.375	0.317

*Responses were grouped in number categories. For information on how these ranges were coded, please contact the author.

Facebook Network Structure

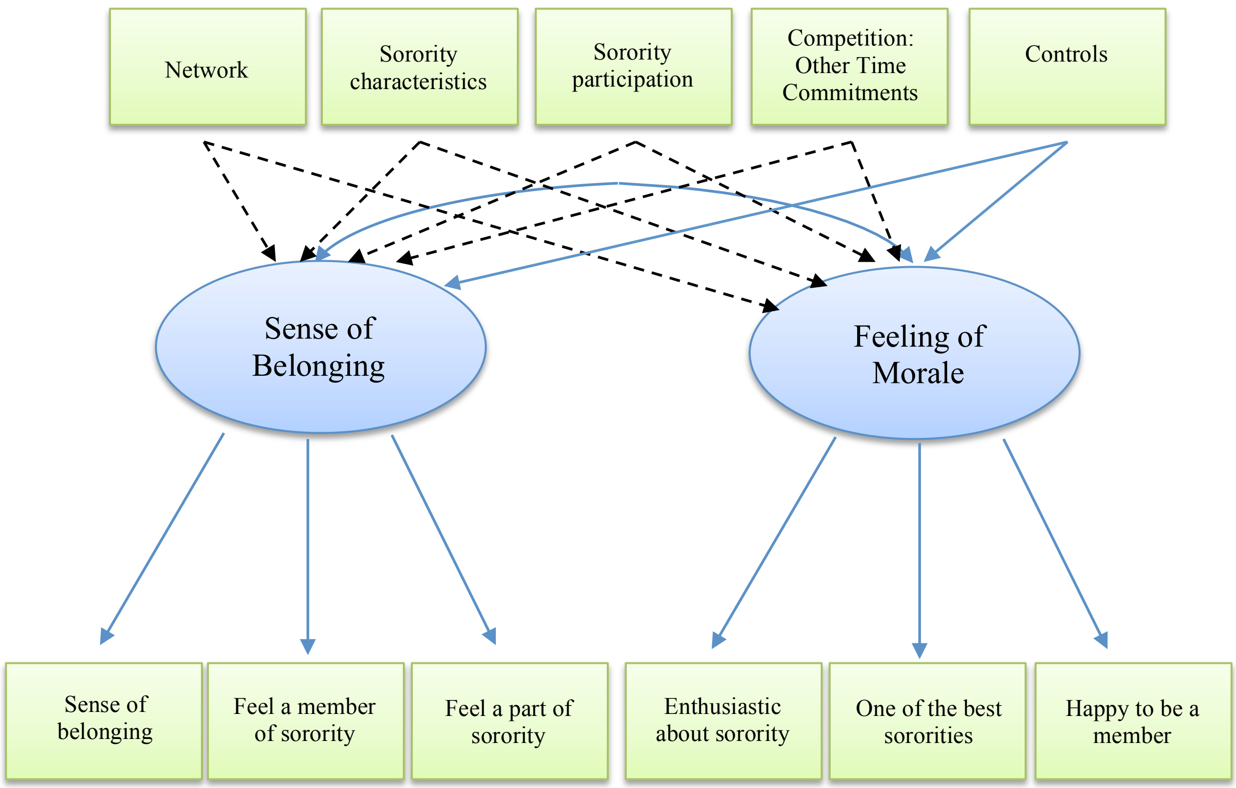
For our online element, we construct the social network structure of the group's SNS relations using the results from when respondents were asked to select those they regularly interact with on Facebook. More specifically, in the survey, "regularly interact" was defined as, "You regularly comment on their statuses, tag photos of them, write on their walls [excluding "Happy birthday" posts]." This was to provide a consistent definition to counter different interpretations that different respondents might have had of the phrase. We then compare our Facebook social network structure with the other real-life relations through performing QAP analysis. QAP analysis is non-parametric calculation method that provides us with the distribution of correlations we would observe if we were to randomly pair two dyads, i.e., two actors, a given number of times. In our QAP analysis, we permute our observed nets 1000 times.

RESULTS

We hypothesized that all of the variables described previously have an effect on a member's emotional attachment to the sorority, as measured by PCS. More specifically, we believed that factors within network position, sorority characteristics, sorority participation, competition from other time commitments, and controls will affect PCS' measure of emotional attachment in its two dimensions of sense of belonging and feeling of morale. Figure 4 displays the full attachment model.

To determine the effects that all of these independent variables have on sense of belonging and feeling of morale, we initially look at each group of variables separately against the dependent variables of sense of belonging and feeling of morale, which gives us a total series of 8 models. In Figure 4, each dotted, black line signifies a different model. In all models, we include the controls of school year, pledge year, college GPA, mother's education, and father's education. For instance, for one model, we examine all of the factors for sorority characteristics (i.e., being a legacy, living with other ABX members, and holding a leadership position) with sense of belonging. This analysis structure allows us to segment and look at the different subgroups of variables and compare the different effects they have on sense of belonging and feeling of morale. See Appendix B & C for results calculated from the 8 models.

Figure 4. The Full Attachment Model



In the set of variables within Network, we found individuals' in-degree and Bonacich centrality to be significant measures that increase sense of belonging and feeling of morale.[2] For the former, the more nominations an individual received, the higher that individual's sense of belonging and feeling of morale was towards the sorority. For the latter, the higher an individual's centrality score, the higher her sense of belonging and feeling of morale. These results are understandable, as it shows that those individuals who receive more nominations and are more central within the group are more attached to the group.

[2] See Appendix B Models 1 and 1a & Appendix C Models 5 and 5a.

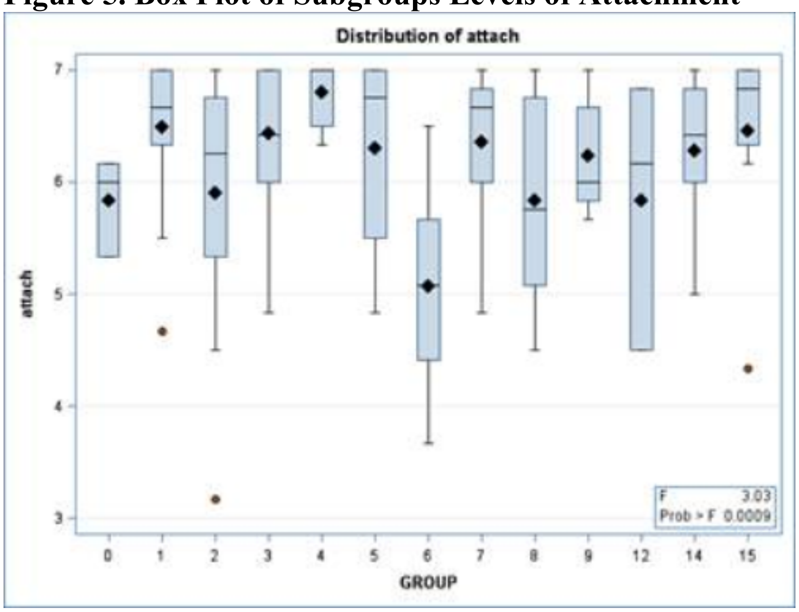
We also calculate the means for sense of belonging, feeling of morale, and attachment for each of the 13 identified subgroups within the network. Table 4 shows the means and standard deviations of each group's sense of belonging, feeling of morale, and attachment.

Table 4. Differences Between Subgroups in Levels of Attachment, by Means

	Sense of Belonging		**Feeling of Morale**		**Attachment (B + M)**	
	Mean	***SD***	***Mean***	***SD***	***Mean***	***SD***
Group 0 [Aqua]*	5.333	.192	6.333	.333	5.833	.255
Group 1 [Yellow]	6.600	.196	6.378	.165	6.489	.167
Group 2 [Neon Green]	5.896	.310	5.896	.258	5.896	.269
Group 3 [Red]	6.417	.113	6.458	.105	6.438	.103
Group 4 [Blue]	**6.733**	**.120**	**6.867**	**.074**	**6.800**	**.092**
Group 5 [Pink]	6.167	.315	6.433	.239	6.300	.272
Group 6 [White]	**4.500**	**.393**	**5.625**	**.359**	**5.063**	**.323**
Group 7 [Orange]	6.359	.237	6.359	.171	6.359	.197
Group 8 [Purple]	6.000	.333	5.667	.351	5.833	.333
Group 9 [Faded Blue]	6.333	.211	6.133	.309	6.233	.256
Group 12 [Gray]	5.889	.484	5.778	.909	5.833	.694
Group 14 [Burgundy]	6.222	.330	6.333	.298	6.278	.300
Group 15 [Light Green]	6.250	.431	6.667	.244	6.458	.321

*[] signifies the color the Group corresponds to in Figure 2.

Figure 5. Box Plot of Subgroups Levels of Attachment



Collectively, the members in Group 4 have the highest attachment at 6.800 (out of the possible highest score of 7), while the individuals in Group 6 have the lowest Attachment at 5.063. The findings for Group 6 support Blau's (1977) idea of cross-cutting ties and its effect on attachment to a group. Group 6 is the most isolated subgroup with only 4 cross-cutting ties to members outside of its subgroup, which explains the collectively lower attachment to the larger group. See Figure 5 for a box plot of the attachment measures.

For the variables within sorority characteristics, we found significance between holding a leadership position in the sorority and both dimensions of emotional attachment. In both cases, holding a leadership position increases sense of belonging and feeling of morale. Although not significant, being a legacy had a negative relationship with attachment and living with other ABX members had a positive relationship.[3]

With the set of participation variables, we found that the commitment variable consistently had a strong significance, not only when looking at commitment with the other participation variables, but also when observing it with all of the independent variables. From this, we conducted further investigation and found that the correlation between the commitment variable and sense of belonging was at 0.7039 and the correlation between commitment and feeling of morale was at 0.6837. We also saw that when we remove the commitment variable from the two participation models (i.e., the participation variables against belonging and the participation variables against morale), participation variables that had not been significant previously, became significant. This suggests that the commitment variable acts as a proximate variable to sense of belonging and feeling of morale, with the other participation variables being the distal variables. It is also possible that the commitment variable is better explained as a dependent variable factor for one or both measures of attachment. Given these findings, we decided to remove the commitment variable from our analysis from that point forward.

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[3] See Appendix B Models 2 and 2a & Appendix C Models 6 and 6a.

After removing the commitment variable, we found many results that showed significance. There was a strong positive relationship between the more sorority events attended and both sense of belonging and feeling of morale. As hours spent on the sorority increases, both sense of belonging and feeling of morale also increase. Frequency of going out with other ABX members did not show significance with sense of belonging, but had a positive effect with feeling of morale. Having a higher percentage of friends that are in ABX increased sense of belonging, but did not have a significance with feeling of morale. Involvement in rush did not show significance with either dimensions of attachment.[4]

When examining all of the other time commitment variables together, we find that the only variable having a strong effect was being in a relationship. As more time is spent with a significant other, belonging decreases. This, however, is not the case with morale, where none of the other time commitment variables, including being in a relationship, show any significance.[5]

After finding the independent variables that were significant in our 8 regression models, we calculated 2 additional regressions that only included the significant variables from each of the 8 models. See Table 5, columns 2 and 4. From these 2 models, we only found significance in the level of participation category for feeling of morale. Being in a relationship was also found to be significant when all significant independent variables were observed against sense of belonging. This contrasts with our hypotheses, which stated network measures, sorority characteristics, and other time commitment variables would all affect emotional attachment to the group. Further, these results differ from Paxton and Moody's, which found network measures to be a large player in affecting emotional attachment to group.

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[4] See Appendix B Models 3 and 3a & Appendix C Models 7 and 7a.
[5] See Appendix B Models 4 and 4a & Appendix C Models 8 and 8a.

More specifically, there was only a strong significance between sorority events attended and both belonging and morale. That is, as an individual's attendance to sorority events increases, the higher her sense of belonging and feeling of morale are towards the sorority. In the belonging regression model (column 2), we saw a significance between sense of belonging and percentage of friends in the sorority out of all friends. Having a higher percentage of friends who are in the sorority had a positive effect on respondents' sense of belonging. In the other time commitments variables, being in a relationship and spending more time with a significant other also showed significance with decreasing sense of belonging. In the morale regression model (column 4), the only other explanatory variable that showed significance besides sorority events attended was going out with other members. Going out with other members increases that individual's feeling of morale.

For the 2 final regression models (columns 1 and 3)—one with belonging as the dependent variable and one with morale as the dependent variable—we included all variables regardless of whether or not they had been identified as significant or not in the previous 8 models. From these final 2 models, we found results that once again differed from Paxton and Moody's with regards to the network measures. In our study, none of the network measures were significant. Like Paxton and Moody, however, we also found level of participation to be significant with respect to emotional attachment to the group, which supports part of our *Hypothesis 1*. There was a positive significance between attendance to sorority events and both belonging and morale. We also found that as hours spent on the sorority increased, belonging and morale increased as well.

For belonging, specifically, we identified negative relationships between having more time commitments in other non-Greek groups, spending more time studying, and being in a relationship and less sense of belonging. For morale, negative significant variables included being a legacy, holding a leadership position within the sorority, spending more time in other non-Greek groups, and being in a relationship. That is, we found that being a legacy, holding an ABX leadership position, participating more in other groups, as well as having a significant other and spending more time with that individual all decrease feeling of morale towards the sorority. These results support our *Hypothesis 2* and *Hypothesis 3*, to the extent that sorority characteristics and other time commitments affect emotional attachment to the sorority. But, our findings that show a negative relationship between being a legacy and holding a leadership position and feeling of morale ran contrary to our belief that the possession of these characteristics would increase emotional attachment to the sorority.

With our controls, we identified school year to be negatively significant with belonging. That is, younger members of the sorority have a higher sense of belonging, while older members have a lower sense of belonging. The other controls in our models did not show any significance with regards to sense of belonging or feeling of morale. Our 4 final models in Table 5 have moderate R^2 values.

Table 5. Coefficient Estimates of Exogenous Variables on Attachment

	Belonging Includes all variables	**Belonging** Includes previously identified significant variables	**Morale** Includes all variables	**Morale** Includes previously identified significant variables
Network				
Popularity, in degree	0.015	0.013	0.018	0.015
Popularity, out degree	0.010	--	-0.007	--
Centrality	-0.071	0.143	-0.202	0.146
Ego network density	-0.186	--	-0.253	--
Proportion of ties	0.944	--	-0.494	--
Group bridge	0.522	--	-0.047	--
Sorority Characteristic				
Legacy	-0.418	--	-0.436**	--
Live with ABX	0.291	--	0.291	--
Leader	-0.185	0.107	-0.550**	0.099
Level of Participation				
Attend sorority functions	0.278***	0.164***	0.331***	0.144***
Often go out with sorority	0.108	--	0.060	0.173***
Involved in rush	0.002	--	-0.034	--
Hours spent on sorority	0.250**	0.016	0.369***	0.020
% of friends in sorority	-0.046	0.225**	-0.069	--
Other Time Commitment				
Hours working	-0.039	--	-0.008	--
Other groups	-0.261*	--	-0.264**	--
Hours studying	-0.192*	--	-0.114	--
Relationship	-0.149*	-0.099*	-0.115*	--
R^2	0.590	0.395	0.663	0.424

Controls (school year, pledge year, college GPA, mom's education, and dad's education) were included in all calculations.
*p ≤ 0.1 (two-tailed); **p ≤ 0.05 (two-tailed); ***p ≤ 0.01 (two-tailed)

For the final extension of our study, we use QAP analysis to compare our Facebook social network structure to the network structures of the 3 relations: (1) best friends with, (2) discuss personal problems with, and (3) regularly go out with. The correlations of the Facebook social network structure and the face-to-face relations ranged from 0.349[6] to 0.647, where the former is the correlation between the best friends network and the Facebook network and the latter is the correlation between the network structure we used to calculate our network measures (i.e., relation (1), relation (2) reciprocated, and relation (3) reciprocated) and the reciprocated

[6] The lower correlation between the Facebook network and best friends network comes from the fact that respondents could nominate as many friends within their sorority for those they regularly interact with on Facebook, but were limited to selecting only 3 best friends either within or outside of their sorority.

Facebook network. In all calculations, the possibility that the correlations we observed came at random was almost never, with the $p = 0.001$.

The correlations found through QAP analysis are quite strong, especially when examining the correlation, 0.647, of the reciprocated Facebook network structure with the network structure we used in our other network measure calculations. See Figures 6a & 6b for similarities visually. This finding supports our *Hypothesis 4*, which stated that the members' relations and behavioral interactions on social network sites would be similar to those in real life.

Figure 6a & 6b. The Social Structures of a Southern Sorority

Figure 6a. The Real-Life Social Structure (same relations as Figure 2, but nodes are not colored by subgroup and are in different locations)

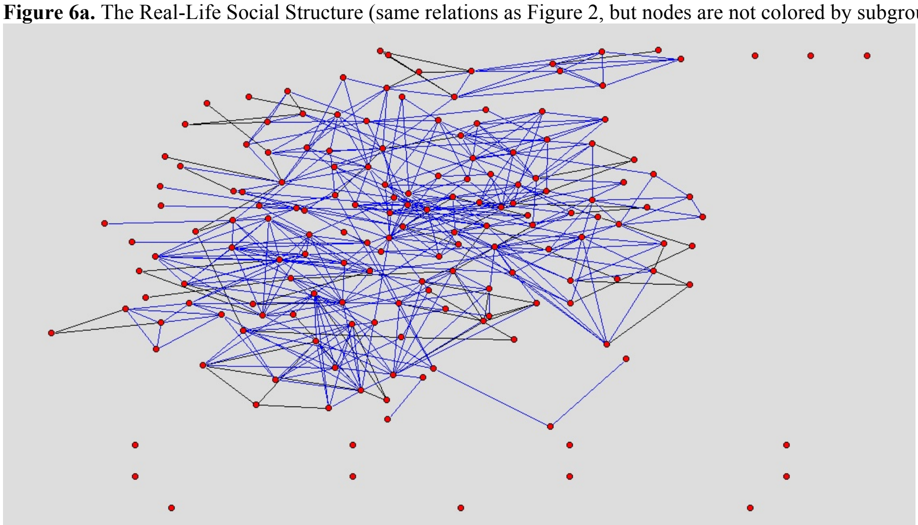
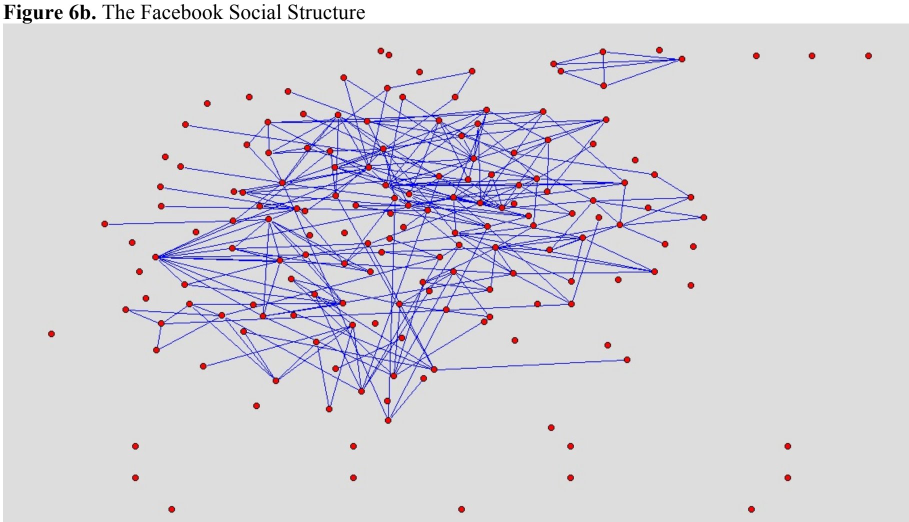


Figure 6b. The Facebook Social Structure



DISCUSSION

In this study, our results differ from Paxton and Moody's. Although we did see some significance in the relationship between the sorority's network structure and emotional attachment when we examined only the network measures against belonging and morale, the significance disappeared after incorporating the other explanatory variables in our final 4 models. See Table 5. For Paxton and Moody, the set of network variables held the most significance in their final models, which also included all other explanatory variables. This suggests that the relationship between social network structure of this naturally occurring group and emotional attachment may have changed over time.

Our results also may have been influenced by our different methods of calculation and different construction of the network structure we used to calculate our network measures.[7] First, Paxton and Moody used simultaneous estimation equations for measuring sense of belonging and feeling of morale. We measured these two dimensions of PCS separately and gave the same weight (i.e., 1.0) to each of the 6 items within sense of belonging and feeling of morale. In our calculations, we also did not transform the attachment measures to account for outliers. Upon completing initial further analysis, we did find that the centrality measure stayed significant across all of our final models after reversing, logging, and then re-reversing the composite

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[7] We did think that our additional explanatory variables (i.e., the sorority characteristics and other time commitment variables) could have been a reason behind the differing results. However, upon replicating and calculating the 2 models in Paxton and Moody's study (which do not include sorority characteristics and other time commitment variables) using our data, the only network measure that came out to be significant in the model against feeling of morale was the proportion of ties an individual had within her subgroup over the total number of ties she had ($p = 0.057$). This finding supports the subgroup theories and Blau's (1977) notion of cross-cutting ties. Those who have a lower number have more ties with other subgroups, which increases attachment to the larger group. No other network measures were found to be significant. The participation variables, events attended and number of hours spent on the sorority, were significant in the models against sense of belonging and feeling of morale.

attachment measure. Unlike Paxton and Moody, we also used different regression models to find our results. We calculated our regression models through a series of 8 initial models, where we looked at the different independent variable categories separately against the dependent variables of sense of belonging and feeling of morale, while Paxton and Moody utilized structural equation modeling (SEM). Finally, it is important to note that we constructed our networks and subsequently calculated our network measures out of different forms of the relations. For our study, our measures come from a network structure that includes all best friend relations, reciprocated ties for discuss personal problems with, and reciprocated ties for regularly go out with. Paxton and Moody used the same relations to create their network structure, but did not look at direction. That is, they included all ties in their network structure, whereas we restricted the latter two relations to only those ties that were reciprocated. We decided to limit our latter two relations to reciprocated ties only because of the higher number of nominations our respondents, overall, gave out during their selection process. We observed that the respondents gave out many more nominations in our study when compared to Paxton and Moody's study.[8]

Although our results do not correspond with Paxton and Moody's when looking at the network measures against the two dimensions of emotional attachment, we did find evidence to support Blau's (1977) idea of cross-cutting ties as Paxton and Moody did in their study. When we examined the collective mean attachment scores of all the subgroups, our results did show

[8] In our study, we asked respondents to select only up to 3 best friends, up to 5 individuals they discussed personal problems with, and as many nominations they wanted to give for those they regularly go out with. In Paxton and Moody's study, they limited respondents to selecting only 1 best friend, up to 5 people with whom they confide in, and up to 5 people they regularly went out with. We restricted the second relation (discuss personal problems with) to reciprocated ties only because many of the respondents did not follow the directions and listed many more relations than 5 in their selection process.

that those subgroups that had fewer cross-cutting ties had lower sense of belonging and feeling of morale scores.

Like Paxton and Moody, we also see that level of participation still affects belonging and morale as it did in the past. For our study specifically, we found there was a strong, positive significance between belonging and morale and the more sorority functions attended. This was the case for all regression models tested, including the models that only looked at level of participation variables against sense of belonging and feeling of morale, the models that included all explanatory variables, and the models that included only significant explanatory variables. These findings support Utz's (2003) notion of interpersonal attachment, which is an attachment to a group that develops from frequent physical life interactions with members within it. In this case, the more sorority events an individual attends, the more frequently she is exposed to physical life contact with the other group members, thus, creating and increasing attachment. More generally, we found that there was significance between many level of participation variables and emotional attachment to group. Across all models, the set of participation variables were collectively the most significant with respect to affecting sense of belonging and feeling of morale. And even though our specific participation results are different from Paxton and Moody's, it is evident that in both studies, how much an individual participates in the group does influence emotional attachment to the group. This continues to support Lawler and Yoon's (1996) Theory of Relational Cohesion, which states that ongoing interaction within a group leads to positive emotions and then attachment to the group. For ABX, the interactions within the group can be expressed through the level of participation variables.

Further, we find that our additional set of variables of sorority characteristics and other time commitments also had significant effects on emotional attachment to group. Within the sorority characteristics category, what was particularly interesting was the negative significance between morale and the sorority characteristics of being a legacy and holding a leadership position in our model that included all explanatory variables. That is, in our study, we found that being a legacy and holding a leadership position in the sorority decreased feeling of morale. Here, we had presumed that having legacy status or being a leader within the sorority would provide a sense of entitlement and control. This, we thought, would positively affect an individual's perceived relational cohesion and support of her network, as theorized by Lawler (1992) and Wasserman et al. (1993). Possible explanations for the observed lower feeling of morale among legacies could be because they may be pressured to join the sorority because of outside forces, such as ABX family members, not because they actually want to be in the sorority. Additionally, after getting past a certain round during the rush process, legacies are guaranteed a bid even if the sorority is not the best fit for them. This could also explain the decrease in feeling of morale. Further, the stress and responsibility of keeping all of the sorority women in line, while also maintaining the integrity of ABX, may explain the lower feeling of morale among those holding leadership positions.

Our results that show other time commitment variables as being negatively significant with respect to affecting emotional attachment to group are also in line with the Theory of Relational Cohesion (Lawler & Yoon 1996). A member who devotes more time to other commitments outside of the sorority has less time available to exchange and interact with the sorority, which does not promote positive emotions or subsequently create social attachment to the group.

The results from the SNS component of our study illustrate that the network structure of real-life relations and the network structure of relations online on Facebook are highly correlated.

This finding aligns with Schwanen et al.'s (2010) study, which saw that face-to-face communications and online communications are correlated. This suggests that relations between individuals in real time crossover into the digital world and also occur on this virtual communication medium.

CONCLUSION

Our results are different from Paxton and Moody's former findings with regards to network measures. However, our findings do align with Paxton and Moody's to the extent that level of participation still influences emotional attachment to group. This further supports Lawler and Yoon's (1996) Theory of Relational Cohesion and Utz's (2003) idea of interpersonal attachment stemming from frequent physical life interactions.

Our findings surrounding the other time commitments variables are also in line with the Theory of Relational Cohesion (Lawler & Yoon 1996). This is not the case for the sorority characteristics variables, which have results that do not support Lawler (1992) or Wasserman et al. (1993), who saw a positive relationship between having entitlement and control within a group and perception of that group.

With our high response rate of 80.588%, we do not think that our network findings differ so substantially from Paxton and Moody's because of missing data or respondent inadequacy. Further, despite our findings, we believe that network positions and subgroup membership are significant to an individual's emotional attachment to the group. Our belief is that the network variables are operating through the participation variables and other non-network variables. That is, perhaps some of our other non-network variables act as proximate variables to sense of belonging and feeling of morale, which, in turn, is absorbing the significance away from the network measures. Our calculations and construction of our network structures are also quite different from Paxton and Moody's. These factors could also explain some of our differing results. Through our initial further calculations, we did find the centrality network measure to hold its significance throughout all models after transforming the overall attachment model.

Although our results are different from Paxton and Moody's, they still give important insights into the significant factors that affect individuals' emotional attachment to group. The fact that level of participation variables, especially the number of events attended and hours spent on the group, are so significant in explaining emotional attachment to group suggests that participation is an important aspect to look at when wanting to increase group members' sense of belonging and feeling of morale towards the group, in general. Further, learning that network measures are not as significant compared to the 1994 study could imply that a change has occurred in the way individuals define relationships. For instance, perhaps the Internet and the ease of achieving "friend" status on SNS have altered individuals' overall perceptions of friendship to being less meaningful and, thus, less directly related to affecting their emotional attachment within a group. These findings are crucial when it comes to finding effective ways to create and maintain healthy dynamics within groups. Knowing the things that are significant in making members feel attached to their group and then providing the environment for those things to exist can lead to better group results and beneficial interactions—whether it be within a sorority, in the workplace, on a sports team, etc.

Finding that the Facebook network structure is highly correlated to the network structure created from real-life relations also has important implications, especially as the Internet and SNS have become quite common avenues for individuals to communicate with others and form and sustain relationships. Seeing that there are similarities between the online and real-life network structures suggests that individuals' online networks may give an understanding into those individuals' relations in real-life. Because individuals' active SNS networks and communications online can be accessible and are documented, knowing that Facebook and real-life network structures are similar has important implications. It suggests that we can better understand individuals' real-life relations and their relationships to other factors, such as emotional attachment to group, through examining those individuals' online network structures. Because we have just examined the correlations between the Facebook and real-life network structure, we suggest that future researchers should consider looking into this comparison even further to get more supporting evidence for individuals' Facebook network structure as a good measure for their real-life network structure.

Further research should also include developing new multi-layer models that take into account proximate and more distal variables. That is, in our current models, we treat all of the explanatory variables as equally describing emotional attachment. With multi-layer models, we would no longer be restricted to this same treatment towards all explanatory variables, resulting in more realistic and meaningful models and results. For instance, our results show that level of participation variables have a strong effect on emotional attachment to group. Perhaps this means that participation variables are actually proximate variables, and the others are distal. In other words, it may be possible that the participation variables are closer to directly affecting sense of belonging and feeling of morale, while network measures are further away. For example, the reality may be that an individual who has a high in-degree (network measure, distal) may affect how often she goes out with other sorority members (participation measure, proximate), which, in turn, affects emotional attachment to group. We also suggest that future researchers should look into using Paxton and Moody's exact methods of calculating the sense of belonging and feeling or morale measures as well as the effects of the explanatory variables on emotional attachment, which would allow for more sufficient comparison. Transforming the overall attachment model to account for outlier effects should also be considered in future research.

REFERENCES

Baker, Mouraine R., Jeongkoo Yoon, and Jong-Wook Ko. "Interpersonal Attachment and Organizational Commitment: Subgroup Hypothesis Revisited." Human Relations 47, no. 3 (1994): 329-51.

Baumeister, R. F., and M. R. Leary. "The Need to Belong: Desire for Interpersonal Attachments as a Fundamental Human Motivation: Desire for Interpersonal Attachments as a Fundamental Human Motivation." Psychological bulletin 117, no. 3 (1995): 497-529.

Blau, Peter Michael. Inequality and Heterogeneity : A Primitive Theory of Social Structure: A Primitive Theory of Social Structure. New York: Free Press, 1977.

Bollen, K. A., and R. H. Hoyle. "Perceived Cohesion - a Conceptual and Empirical-Examination." SOCIAL FORCES 69, no. 2 (1990): 479-504.

Bonacich, Phillip. "Power and Centrality: A Family of Measures." American Journal of Sociology 92, no. 5 (1987): 1170-82.

Cook, James M., Miller McPherson, and Lynn Smith-Lovin. "Birds of a Feather: Homophily in Social Networks." *Annual Review of Sociology* 27, no. 1 (2001): 415-44.

France, M. K., S. J. Finney, and P. Swerdzewski. "Students' Group and Member Attachment to Their University: A Construct Validity Study of the University Attachment Scale." Educational and Psychological Measurement 70, no. 3 (2010): 440-58.

Friedkin, N. E. "Social Cohesion." Annual Review of Sociology 30, no. 1 (2004): 409-25.

Hagstrom, W. O., and H. C. Selvin. "Two Dimensions of Cohesiveness in Small Groups." Sociometry 28, no. 1 (1965): 30-43.

Hall, John R. "Social Organization and Pathways of Commitment: Types of Communal Groups, Rational Choice Theory, and the Kanter Thesis." American Sociological Review 53, no. 5 (1988): 679-92.

Hogg, Michael A. The Social Psychology of Group Cohesiveness : From Attraction to Social Identity. New York: New York University Press, 1992.

Knoke, David. "Commitment and Detachment in Voluntary Associations." American Sociological Review 46, no. 2 (1981): 141-58.

Lawler, E. J. "Affective Attachments to Nested Groups - a Choice-Process Theory." American Sociological Review 57, no. 3 (1992): 327-39.

Lawler, Edward J., Shane R. Thye, and Jeongkoo Yoon. "Commitment in Structurally Enabled and Induced Exchange Relations." Social Psychology Quarterly 69, no. 2 (2006): 183-200.

Lawler, E. J., and J. Yoon. "Network Structure and Emotion in Exchange Relations." American Sociological Review 63, no. 6 (1998): 871-94.

Lawler, E. J., and J. K. Yoon. "Commitment in Exchange Relations: Test of a Theory of Relational Cohesion." American Sociological Review 61, no. 1 (1996): 89-108.

Lightdale, Jenifer R., Dale T. Miller, and Deborah A. Prentice. "Asymmetries in Attachments to Groups and to Their Members: Distinguishing between Common-Identity and Common-Bond Groups." Personality and Social Psychology Bulletin 20, no. 5 (1994): 484-93.

Moody, James, and Douglas R. White. "Structural Cohesion and Embeddedness: A Hierarchical Concept of Social Groups." American Sociological Review 68, no. 1 (2003): 103-27.

Mudrack, Peter E. "Defining Group Cohesiveness: A Legacy of Confusion?" Small Group Behavior 20, no. 1 (1989): 37-49.

Paxton, P., and J. Moody. "Structure and Sentiment: Explaining Emotional Attachment to Group." Social Psychology Quarterly 66, no. 1 (2003): 34-47.

Salisbury, Wm David, Allison W. Pearson, Wynne W. Chin, and Matthew J. Stollak. "Perceived Cohesion in Small Groups: Adapting and Testing the Perceived Cohesion Scale in a Small-Group Setting." Small Group Research 30, no. 6 (1999): 751-66.

Schwanen, Tim, Martin Dijst, and Taede Tillema. "Face-to-Face and Electronic Communications in Maintaining Social Networks: The Influence of Geographical and Relational Distance and of Information Content." New Media & Society 12, no. 6 (2010): 965-83.

Utz, Sonja. "Social Identification and Interpersonal Attraction in Muds." Swiss Journal of Psychology/Schweizerische Zeitschrift f√ºr Psychologie/Revue Suisse de Psychologie 62, no. 2 (2003): 91-101.

Wasserman, Stanley, and Katherine Faust. Social Network Analysis : Methods and Applications: Methods and Applications. Vol. 8. New York: Cambridge University Press, 1994.

Wasserman, Stanley, Michael E. Walker, and Barry Wellman. "Statistical Models for Social Support Networks." Sociological Methods & Research 22, no. 1 (1993): 71-98.

Wellman, Barry, and Caroline A. Haythornthwaite. The Internet in Everyday Life. Malden, MA: Blackwell Pub, 2002.

Yoon, Jeongkoo, Mouraine R. Baker, and Jong-Wook Ko. "Interpersonal Attachment and Organizational Commitment: Subgroup Hypothesis Revisited." Human Relations 47, no. 3 (1994): 329-29.

APPENDICES

Appendix A. Survey Instrument

1. What is your year in school?
    a. Freshman
    b. Sophomore
    c. Junior
    d. Senior

2. What is your major? ________________________________

3. What is your race?
    a. White
    b. American Indian or Alaska Native
    c. Black or African American
    d. Asian
    e. Native Hawaiian or Other Pacific Islander
    f. Other

4. What year did you Pledge ABX?
    a. 2008
    b. 2009
    c. 2010
    d. 2011

5. Are you a legacy with ABX?
    a. Yes
    b. No [go to question 6]

5a. If yes, who in your family has been in ABX? Select all that apply.
    a. Mother
    b. Grandmother
    c. Aunt
    d. Sister
    e. Other ____________________

6. What is your college GPA? ____._______ out of 4.00

7. During a typical week, how many hours a week do you study?
    a. 0-2 hours/week
    b. 2-5 hours/week
    c. 5-8 hours/week
    d. 8-15 hours/week
    e. 15+ hours/week

8. Do you currently work?
   a. Yes
   b. No [go to question 9]

8a. If yes, about how many hours do you work per week?
   a. 0-5 hours
   b. 5-10 hours
   c. 10-15 hours
   d. 15-20 hours
   e. 20+ hours

9. Do you live in the House?
   a. Yes [go to question 10]
   b. No

9a. If no, do you live with other ABX members?
   a. Yes
   b. No

10. Have you had a romantic relationship with someone in the past 12 months?
   a. Yes
   b. No [go to question 11]

10a. How much time did (do) you spend with your last (current) significant other?
   a. Everyday
   b. Almost everyday
   c. Multiple times a month
   d. Once or twice a month
   e. During breaks

11. Do you belong to any non-greek campus groups?
   a. Yes
   b. No [go to question 12]

11a. If yes, please list up to 3 groups you are in, how many hours a week you spend on each group, and if you hold a leadership or member role.

	GROUP NAME	HOURS/WEEK	LEADER/MEMBER
1			
2			
3			

12. What best describes your Mother's education?
    a. Did not graduate from High School
    b. High School Graduate or GED
    c. Some College, but No Degree
    d. A Two-Year or Trade Degree
    e. A BS or BA
    f. Some Graduate School, but No Degree
    g. A Masters Degree
    h. A PhD

13. What best describes your Father's education?
    a. Did not graduate from High School
    b. High School Graduate or GED
    c. Some College, but No Degree
    d. A Two-Year or Trade Degree
    e. A BS or BA
    f. Some Graduate School, but No Degree
    g. A Masters Degree
    h. A PhD

14. In the past 6 months, how many ABX events did you attend?

1	2	3	4	5	6	7	8	9
None				Some				All

15. How committed are you to ABX?

1	2	3	4	5	6	7	8	9
Not Committed				Somewhat Committed				Extremely Committed

16. When you go out, how often is it with other ABX members?

1	2	3	4	5	6	7	8	9
Never				Sometimes				Always

17. How involved were you in the most recent rush process?

N/A	1	2	3	4	5	6	7	8	9
	Not At all				Somewhat Involved				Extremely Involved

18. About how many hours a week do you spend on ABX related activities?
    a. 0-1 hours/week
    b. 1-3 hours/week

c. 3-5 hours/week
d. 5-8 hours/week
e. 8+ hours/week

19. What percentage of your friends are ABX's?
    a. None of my friends
    b. Few of my friends (<10%)
    c. Some of my friends (10-40%)
    d. Around half of my friends (40-60%)
    e. Most of my friends (60-80%)
    f. Almost all of my friends (80-99%)
    g. All of my friends

For questions 20-25, please indicate how strongly you agree with the following statements:

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Agree	Strongly Agree
20. I feel a sense of belonging to ABX.	1	2	3	4	5	6	7
21. I feel that I am a member of the ABX community.	1	2	3	4	5	6	7
22. I see myself as a part of the ABX community.	1	2	3	4	5	6	7
23. I am enthusiastic about ABX.	1	2	3	4	5	6	7
24. ABX is one of the best sororities on campus.	1	2	3	4	5	6	7
25. I am happy to be a member of ABX.	1	2	3	4	5	6	7

26. Do you have a Facebook account?
    a. Yes
    b. No [go to question 31]

27. How many Facebook friends do you have?
    a. 1-100 Facebook friends
    b. 101-250 Facebook friends
    c. 251-500 Facebook friends
    d. 501-750 Facebook friends
    e. 751-1000 Facebook friends
    f. 1000+ Facebook friends

28. Out of all of your Facebook friends, how many of them are currently in ABX?

    ___________________________________ number of ABX Facebook friends

29. About how many Facebook friends do you regularly interact with on the site (i.e., you regularly comment on their statuses, tag photos of them, write on their wall [excluding "Happy birthday" posts])?
    a. 0-10 Facebook friends
    b. 11-20 Facebook friends
    c. 20-29 Facebook friends
    d. 30-49 Facebook friends
    e. 50+ Facebook friends

30. How many hours a day do you spend on Facebook?
    a. 0-1 hours/day
    b. 1-2 hours/day
    c. 2-3 hours/day
    d. 3-4 hours/day
    e. 4+ hours/day

31. Do you have a LinkedIn account?
    a. Yes
    b. No [go to question 34]

32. How many LinkedIn connections do you have?
    a. 1-50 LinkedIn connections
    b. 51-100 LinkedIn connections
    c. 101-200 LinkedIn connections
    d. 201-400 LinkedIn connections
    e. 401+ LinkedIn connections

33. How many of your LinkedIn connections are ABX related (past and present; UNC and non-UNC)?

    ___________________________________ number of ABX LinkedIn connections

<u>Questionnaire continues on the following page.</u>

Below, we ask you to evaluate your relationships with other members of ABX. Mark whom the sentence/question best describes.

All answers will be strictly confidential. Nobody in this house will ever know your answers.

	Who are your <u>THREE</u> best friends? Note: Select "Non-ABX" at the end of the list if applicable. **Mark only 3.**	I would discuss a personal problem with this person. **Mark only 5.**	I regularly go out with this person. **Mark those that apply.**	I *regularly interact* with this person on Facebook. *(You regularly comment on their statuses, tag photos of them, write on their walls [excluding "Happy birthday" posts])* **Mark those that apply.**
ABX Girls were Listed in Alphabetical Order in This Column				
Non-ABX #1				
Non-ABX #2				
Non-ABX #3				

Appendix B. Coefficient Estimates of Exogenous Variables on Sense of Belonging

	Model 1	Model 1a	Model 2	Model 2a	Model 3	Model 3a	Model 4	Model 4a	Includes all variables	Includes identified significant variables from columns 1 – 4a
Network										
Popularity, in degree	0.032***	0.032***							0.015	0.013
Popularity, out degree	-0.002	--							0.010	--
Centrality	0.349**	0.349**							-0.071	0.143
Ego Network Density	-0.009	--							-0.186	--
Proportion of Ties	-0.288	--							0.944	--
Group Bridge	0.002	--							0.522	--
Sorority Characteristic										
Legacy			-0.19	--					-0.418	--
Live with ABX			0.154	--					0.291	--
Leadership			0.67***	0.67***					-0.185	0.107
Level of Participation										
Attend sorority functions					0.209***	0.209***			0.278***	0.164***
Often go out with sorority					0.036	--			0.108	--
Involved in Rush					0.057	--			0.002	--
Hours Spent on Sorority					0.168*	0.168*			0.250**	0.016
% of Friends in Sorority					0.249**	0.249**			-0.046	0.225**
Other Time Commitment										
Hours Working							0.05	--	-0.039	--
Other Groups							-0.13	--	-0.261*	--
Hours Studying							-0.032	--	-0.192*	--
Relationship							-0.17**	-0.17**	-0.149*	-0.099*
R-squared	0.169		0.184		0.447		0.228		0.590	0.395

Appendix C. Coefficient Estimates of Exogenous Variables on Feeling of Morale

	Model 5	Model 5a	Model 6	Model 6a	Model 7	Model 7a	Model 8	Model 8a	Includes all variables	Includes identified significant variables from columns 5 – 8a
Network										
Popularity, in degree	0.017*	0.017*							0.018	0.015
Popularity, out degree	-0.009	--							-0.007	--
Centrality	0.309**	0.309**							-0.202	0.146
Ego Network Density	-0.024	--							-0.253	--
Proportion of Ties	-0.783	--							-0.494	--
Group Bridge	-0.265	--							-0.047	--
Sorority Characteristic										
Legacy			-0.256	--					-0.436**	--
Live with ABX			0.111	--					0.291	--
Leadership			0.371**	0.371**					-0.550**	0.099
Level of Participation										
Attend sorority functions					0.214***	0.214***			0.331***	0.144***
Often go out with sorority					0.121**	0.121**			0.060	0.173***
Involved in Rush					-0.034	--			-0.034	--
Hours Spent on Sorority					0.218***	0.218***			0.369***	0.020
% of Friends in Sorority					0.040	--			-0.069	--
Other Time Commitment										
Hours Working							0.012	--	-0.008	--
Other Groups							0.044	--	-0.264**	--
Hours Studying							-0.055	--	-0.114	--
Relationship							-0.076	--	-0.115*	--
R-squared	0.202		0.233		0.508		0.262		0.663	0.381