Building Loyalty to Online Communities Through Bond and Identity-based Attachment to Sub-groups

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ABSTRACT

Researchers and theorists have proposed that feelings of attachment to subgroups within a larger online community or site can increase users' loyalty to the site. They have identified two types of attachment, with distinct causes and consequences. With bond-based attachment, people feel connections to other group members, while with identity-based attachment they feel connections to the group as a whole. In two experiments we show that these feelings of attachment to subgroups increase loyalty to the larger community. Communication with other people in a subgroup but not simple awareness of them increases attachment to the larger community. By varying how the communication is structured, between dyads or with all group members simultaneously, the experiments show that bond- and identity-based attachment have different causes. But the experiments show no evidence that bond and identity attachment have different consequences. We consider both theoretical and methodological reasons why the consequences of bond-based and identity-based attachment are so similar.

Author Keywords

online communities; commitment; social attachment; group identity; computer-mediated communication; Mechanical Turk

ACM Classification Keywords

H.5.3. Information Interfaces and Presentation: Group and Organizational Interfaces.

INTRODUCTION

Many communities form online around common interests or goals, such as sharing pictures, creating an encyclopedia, playing a game, or co-writing music. However, once someone gets involved, even the most compelling interest or project may not be enough to retain participants. Survival of

a site then depends on creating engaging experiences that keep members committed.

A growing body of evidence shows that both mere social awareness that others are participating and direct communication among visitors to a common site can increase retention. For example, when players of a single-person game on Facebook were assigned to nominal groups and given tools to see the activity of other group members or other groups, they remained active members longer than if they weren't aware of others [6]. In a different site, users who were encouraged to communicate with others on the site were also more likely to return [4]. The rationale is that both social awareness and communication help people form social connections and attachment to each other or their groups, which in turn keeps them engaged and committed to the larger site. Theorists have proposed two distinct theoretical pathways mediating the effect of social awareness and communication on loyalty to a larger community or website [15, 19]. Bond-based attachment occurs between individuals, while identity-based attachment is the connection to a group as a whole.

In this paper we experimentally test whether these are two distinct pathways driving attachment. We assess whether we can differentially create bond and identity attachment and whether they have different downstream effects. In addition, we attempt to replicate previous work by experimentally testing whether adding social awareness and communication to a site will increase loyalty to the site. Our results have implications for designers and managers of online communities and suggest that interaction plays an important role in retaining members

RELATED WORK

Early research by Prentice and colleagues first proposed and demonstrated differences in the types of attachment students have to groups on campus; students were either attached to group members or the group as a whole [15]. They argued that this difference arose from two fundamentally different pathways to creating groups. Groups could arise either through interpersonal attraction, which would lead to common-bond groups, or through social identity processes, which would lead to common-identity groups.

These attachment differences were replicated among online groups that formed in IRC channels [19]. Sassenberg found

that people had higher attachment to group members (or bond-based attachment) in IRC channels that focused on interaction among members without a common topic, whereas they had higher attachment to the group as a whole (or identity-based attachment) in channels that focused on a shared interest. In addition Sassenberg found that these differences in bond and identity attachment had different downstream effects in the groups. People in identity-based groups used more homogeneous online idioms, presumably because identity groups have stronger group norms. However, Sassenberg also found a high correlation between bond-based and identity-based attachment, suggesting that the distinct types of attachment may have a common component.

While early research was correlational, focusing on differences among naturally occurring groups, later research used experiments to create bond or identity attachment by introducing tools to increase social awareness and interaction. In general this research shows that manipulations designed to increase either bond-based or identity-based attachment increased people's behavioral loyalty to a site or an encompassing online community [4, 6,17]. Yet demonstrating that they have different pathways for producing behavioral loyalty has been difficult. For example, Farzan and colleagues varied social awareness in a Tetris™ game. Players were assigned to teams and either viewed other team members' scores to induce bond-based attachment or their group's score relative to other groups to induce identity-based attachment [6]. They found that both types of social awareness increased the number of sessions people played compared to players without social awareness. Although both types of attachment had the same behavioral consequences, mediation analyses suggested that the two types of awareness increased game-playing through different routes. However, research did not include self-reports about attachment type to corroborate this interpretation.

A longer-term field experiment in a movie-recommender site varied design features, such as individual, profiles, information about other people, and pairwise communication to induce bond-based attachment or group profile pages, information about groups and group-oriented communication to induced identity-based attachment [17]. Users in both bond and identity conditions increased behavioral loyalty to the site compared to a control condition. However, evidence was ambiguous about whether the manipulations increased participation though different types of attachment. Manipulations designed to induce group identity increased self-reported identity-based attachment, but also increased self-reported bond-based attachment although not as strongly. Manipulations designed to induce bonds increased self-reported identity-based attachment, but not attachment to particular other people. The authors argued that bond-based attachment was more difficult to generate than identity attachment, because users did not use the communication tools provided to them, which should have been most useful for developing interpersonal relationships. Further, when

they conducted a mediation analysis, attachment type only partially mediated the effect of including communication tools on loyalty to the site.

In a study of loyalty to teams in an online game, when confederates initiated communication, particularly socio-emotional communication, players' willingness to continue playing with their team increased [4]. Presumably players remained with their teams longer because they formed a connection to teammates or the team. However this research did not clearly demonstrate this connection because it did not measure self-reported attachment type.

The current project focuses on testing the theoretical mechanisms thought to cause specific social design features to increase behavioral loyalty to a website or community. In particular, we focus on two goals:

1. To show compelling evidence that attachment to subgroups underlies the effect of social design features on site loyalty. Past work has been unable to establish this causal mechanism because either the manipulations of attachment were only partially successful [17] or attachment to subgroups was not measured directly through self-reports [4,6].

2. To evaluate whether there are two distinct types of attachment that can form to subgroups, bond and identity attachment, by attempting to create each in isolation and observing downstream effects. Past work has either not made use of experimental manipulations [15,19], had manipulations of attachment that were only partially successful [17], or failed to measure attachment type directly through self-reports [6].

EXPERIMENT 1

Previous research has demonstrated that inclusion of either social awareness of participation or direct communication among visitors to an online site can increase behavioral loyalty to a site [4, 6,17]. However, this research has not fully tested the underlying mechanisms. In Experiment 1 we attempt to demonstrate that including specific social design features increases site loyalty by creating psychological attachment to subgroups. Attachment to a subgroup is defined as feelings of attraction and identification with the group or its members and as a desire to continue interacting with the group or members. Attachment is defined broadly to encompass both bond and identity attachment, which we discuss in more detail below. Although we use the psychological vocabulary of attachment [9], our usage is equivalent to what organizational scholars refer to as affective commitment [1].

To test the causal mechanisms, Experiment 1 was designed to replicate previous findings in a new environment, Mechanical Turk (MTurk), which is an online labor market where requesters pay Turkers, as the workers are known, to do small tasks. A typical task on Mechanical Turk is structured to be short-term and done independently [10]. The
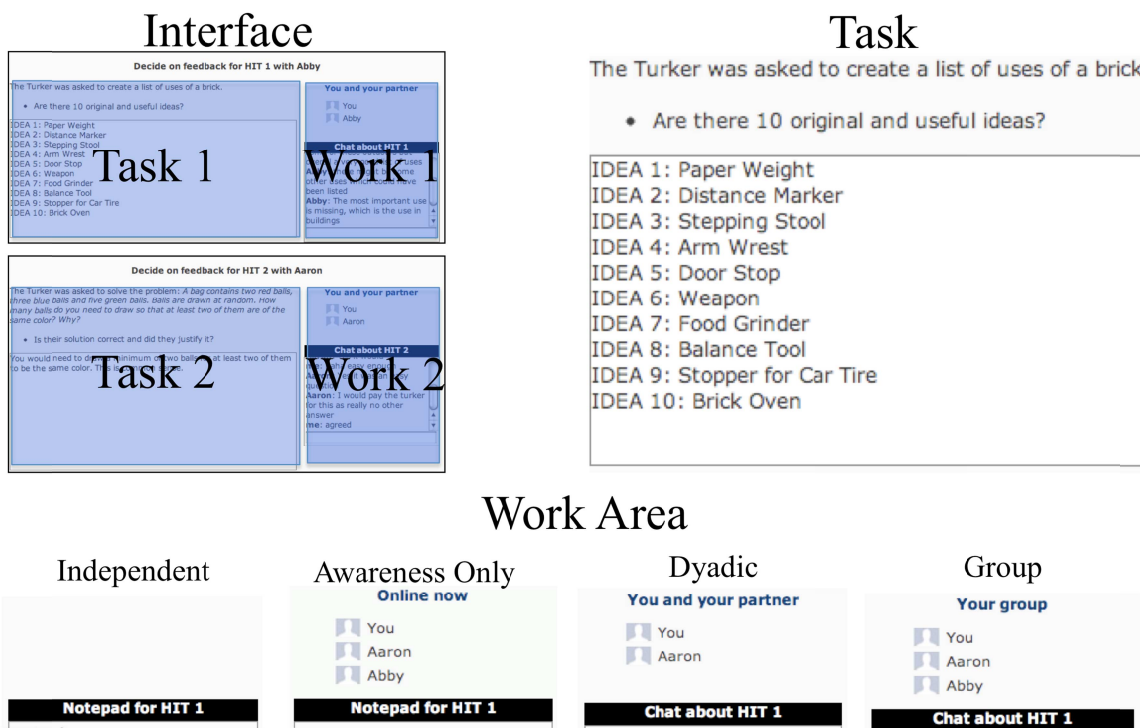
Interface   Task

Work Area

Figure 1: Example of the interface layout, a task used, and work area for the different experimental conditions.

primary motivation of a majority of Turkers is to earn money [7].

In this experiment, three-person work groups were recruited from MTurk to complete a set of tasks. Level of interaction within a work group was manipulated by including or excluding social features. Some workers got no information about other group members (independent). Others were shown group members' names (awareness). And others worked together and had tools to communicate (communication). Those workers who were made aware of their work group were expected to begin becoming attached to their work group, which in turn should translate into greater behavioral loyalty to MTurk and to the experimenters as employers. We predicted that compared to Turkers in the independent and awareness-only conditions, those who worked together in the communication conditions would feel greater attachment to MTurk as a community, as measured by beliefs that MTurk was a community, stronger self-reported identification with other Turkers, and beliefs that maintaining MTurk standards was important. We also predicted that these Turkers would want to complete more tasks for us and be more likely to recommend us to other Turkers, measures of loyalty to us as employers.

Hypothesis 1: Assigning Turkers to communicating groups will increase their loyalty to Mechanical Turk and their

employer by increasing feelings of attachment to work groups.

Based on the prior literature, we expected that one could induce two distinct types of attachment to work groups, bond and identity attachment, through two different pathways. Bond attachment is thought to form from interpersonal attraction to specific individuals, while identity attachment is thought to form from identification with a social group or category. We tried to induce these types of attachment by assigning Turkers to work in the three-person group in pairs, to promote attachment between group members (bond attachment), or to work with everyone in their group simultaneously, to promote attachment to the group as an entity (identity attachment).

In the experiments we focus on the early-stages of attachment formation to have better control over how attachment forms and to tease the two processes apart. Both interpersonal and social identity processes can be studied in short-term interactions (e.g. [16,14,5]).

Hypothesis 2: Structuring group work and communication in pairs or as a group as a whole will differentially create bond or identity-based attachment respectively.

IV: Level of Interaction	IV: Small Group Attachment Type	Condition Interface	DVs
Independent		Independent	
Awareness		Awareness	Bond Attachment
	Bond	Dyad-Dyad	Identity Attachment
Communication	Identity	Group-Group	Community Orientation
	Hybrid	Dyad-Group	Employer Commitment
		Group-Dyad	

Table 1: Experiment 1 conditions and relevant independent and dependent variables.

METHOD

Participants
A total of 606 participants were recruited from Mechanical Turk and randomly assigned to groups of three people. Of those participants 509 (85.0%) completed the Experiment. 52% of participants were female; they ranged in age from 18 to 68 (M = 31.5, SD = 10.5). Most were from the United States (76%), followed by India (19%); the remained were from many other countries. Participants were asked to select their main motivation for Turking from a large range of possible options. The majority, 83%, reported that their main motivation for Turking was for money. Participants were paid 75 cents for participating.

A total of 202 three-person groups were formed and randomly assigned to one of the six conditions. Of these, 123 groups in which no group members dropped out were retained for analysis. The dropout rate did not vary by condition (χ^2(5) = 4.51, p = 0.48).

Procedure
Participants were asked to evaluate work products created by other Turkers in other experiments [2, 21]. They evaluated a variety of work products, including brainstorms, limericks, and product reviews (see Figure 1 for an example). Within each product category, items for evaluation differed in quality. After being recruited participants practiced an evaluation task alone for one minute before agreeing to complete the experiment.

Once participants were placed in the experiment they were randomly assigned to a group of three people, and each group was randomly assigned to one of six interaction conditions. Participants took part in two sessions (Session 1 & Session 2). In each session they evaluated two articles that previous Turkers's had created. Each session lasted 5 minutes, they were prompted to *"Discuss how the Turkers could improve their work, and should it be rejected, accepted, or accepted with a bonus."* Each participants either evaluated the work individually or with others. Participants evaluating the work individually were asked to write down their thoughts as if they were discussing it with others. Participants evaluating the work with others were asked to jointly decide what feedback to give. Participants filled out questionnaires at the mid-point (i.e. between Session 1 and Session 2) and at the end.

Depending on condition, participants worked independently (independent), worked independently but were made aware of their group (awareness), or communicated with others (communication) either in pairs or as a group. When participants worked alone they typed notes into an entry box; when they worked together they were given chat boxes to communicate (see Figure 1).

Design
Three types of conditions were created to manipulate whether participants felt a part of a social group. In the independent condition participants worked alone and were not told they were part of a group. In the awareness condition participants were made aware of their group but could not communicate. Group awareness was created by telling the participants they were part of an evaluation team and displaying their group members' nicknames during the task. In the other four conditions the group members worked together and directly communicated (see Figure 1, Table 1).

There were two communication protocols to differentially promote bond or identity attachment. During each session, participants in the communication conditions either worked in pairs or as an intact group. The communication protocols were counterbalanced across sessions. The Group-Group condition was created to promote identity attachment; Dyad-Dyad condition was created to promote bond attachment; and Group-Dyad, and Dyad-Group conditions were hybrids to examine the process of attachment formation in more detail. However, detailed analysis of attachment formation using the hybrid conditions was not possible because the differences between bond- and identity-attachment were too small (see Results for more detailed discussion).

With the pairs protocol, both the tasks and communication was structured so that groups of three worked on two tasks at a time, one with each partner. This arrangement meant that there were three pairs total (AB, BC, AC), but each individual only saw the two pairs they were a part of (e.g. A only saw pairs AB, AC). To ensure that all conditions were balanced, participants in all conditions were given two evaluation tasks at a time and instructed to work on both simultaneously, which was reinforced by automated reminders if participants focused only on one task at a time (see Figure 1). Conditions were created so that participants
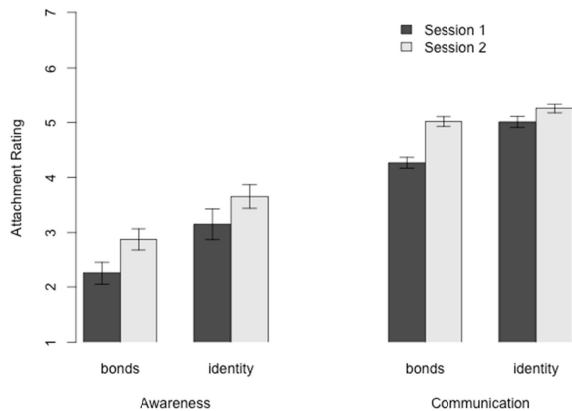
Figure 2: Turkers's mean (S.E.) ratings of bond and identity attachment in the group awareness only and group communication conditions. Bond and identity attachment were rated after Session 1 and 2 on a 7-point Likert scale.

could be assigned to work in one way in Session 1 and work in another way in Session 2 to allow for hybrid conditions.

Dependent measures

Participants separately rated the strength of their attachments to the individuals in their group (bond attachment) and to the group as a whole (identity attachment). After Session 1 we used agreement with a single item to measure bond attachment to each group member (*'I was starting to develop a bond with [partner's name].'*) [19]. Participants' rating of their two group members were averaged to create a composite score for strength of bond attachment ($\alpha = 0.86$). After Session 2 we measured bond attachment by combining this same item with an additional statement about willingness to work with each group member again. These four items, two item of two group members, were combined into a single composite bond attachment score ($\alpha = 0.94$).

Similarly, after Session 1, a single item was used to measure identity attachment (*'I was starting to identify with my evaluation team.'*). After Session 2, the measure of identity attachment was expanded to a modified version of a highly reliable four item measure of social identification [13] ($\alpha = 0.95$). All the attachment measures were rated on 7-point Likert scales from Strongly disagree to Strongly agree.

Community attachment was measured using 5 items, which included perception of MTurker as a community, social identification with the community, and beliefs about the importance of maintaining MTurk standards ($\alpha = 0.92$) [8]. Two aspects of employer commitment were measured, whether the participant would do another task from the same employer and whether the participant would write a review recommending the employer to other Turkers. These two measures of employer commitment, measured on 7-point Likert scales, were combined ($\alpha = 0.67$). To ensure Turkers

were answering accurately, Turkers were asked to provide an email address to be contacted in the future and to write a review of us as employers which might be distributed to other Turkers. Self-reported measures of organizational commitment, similar to these measures of commitment, correlate with behavioral measures commitment [11].

We did not predict that social interaction would affect the quality of work. However because of the practical importance of work quality, we constructed a crude measure of it. Task materials had been selected because they were of low, medium, and high quality, as judged by one of the authors. Correlations between ratings given by each participant and the authors' gold standard ratings were used as a measure of a participant's evaluation accuracy and represent quality of work at the evaluation task.

RESULTS

Hypothesis 1: Small-group Attachment and Site Loyalty

We first evaluated whether social awareness and/or communication could create psychological attachment to work groups. We conducted a multi-level regression analysis in which, level of interaction (awareness only, communication), time (session 1, session 2), attachment type (bond, identity) and interactions were used to predict Turkers's ratings of the strength of attachment to their group. Turkers were nested within their group, to control for dependencies between group members. Because group attachment could only be measured if participants were aware they were part of a group, we include in the analysis only conditions with at least minimal social awareness (i.e. the awareness only and communication conditions).

We were able to promote attachment by allowing communication. However social awareness by itself was not sufficient to create psychological attachment to the groups. There was a main effect of level of social interaction on the strength of attachment ($t(105) = 9.06$, $p < 0.001$, $d = 1.77$; see Figure 2). On average participants in the communication conditions agreed with statements such as *"I was starting to identify with my evaluation team"* (as indicated by a mean score above 4 on the 7-point Likert scale), whereas those in the awareness only condition disagreed with these statements (as indicated by a mean score below 4).

A more detailed examination examining attachment type showed that identity and bond attachment exhibited distinct patterns. There was a main effect of attachment type ($t(918) = 7.81$, $p < 0.001$, $d = 0.52$). Participants formed stronger identity attachment than bond attachment. There was also an interaction between attachment type and communication ($t(918) = -2.70$, $p = 0.007$, $d = 0.18$). Groups that communicated had stronger bond attachment relative to identity attachment compared to groups with only social awareness. Attachment strengthened over time for both types of attachment ($t(918) = 10.33$, $p < 0.001$, $d = 0.68$), but bond
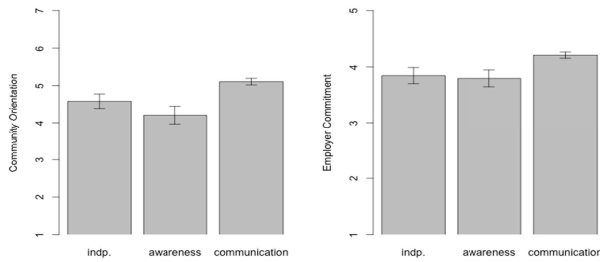
Figure 3: Reported mean (S.E.) community attachment and employer commitment for Turkers in the independent, group awareness only, and group communication conditions. Community orientation and employer commitment were measured on 7- and 5-point scales respectively.

Figure 4: Mean (S.E.) ratings of bond and identity attachment for Turkers in groups that communicated as dyads or as a group at the midpoint (left) and by the end of the experiment (right) in Experiment 1.

attachment strengthened more than identity attachment did ($t(918) = -4.49$, $p < 0.001$, $d = 0.30$).

Next we examined whether social awareness and/or communication could increase community loyalty. Two multi-level models were constructed to test the effect of level of social interaction—independent, group awareness only, or group communication—on two measures of loyalty to Mechanical Turk as a community and to the employer.

Group communication, but not social awareness alone, increased loyalty to the Turker community. There was a main effect of communication on community loyalty ($LR = 18.1$, $p < 0.001$; see Figure 3). Participants in the communication conditions reported more attachment to MTurk as a community than those in either the group awareness only or independent conditions ($t_{comm.VSawareness}$ (120) = 3.95, $p < 0.001$, $d = 0.72$; $t_{comm.VSindp}$ (120) = 2.26, $p = 0.03$, $d = 0.41$). There was also a main effect of communication on employer commitment ($LR = 12.4$, $p = 0.002$; see Figure 3). Participants in the communication conditions were more likely to agree to do another of our HITs than those in either the awareness only or independent conditions ($t_{comm.VSawareness}$ (120) = 2.88, $p = 0.005$, $d = 0.52$; $t_{comm.VSindp}$ (120) = 2.47, $p = 0.01$, $d = 0.45$).

We did not expect that communication would influence the quality of work, and indeed found no differences ($LR = 0.51$, $p = 0.78$).

Hypothesis 2: Bond vs. Identity Attachment
Finally we examined whether structuring the way group members communicated differentially created bond and identity attachment. Two multi-level models were constructed to test whether communication type, dyads or group communication, had a differential effect on the strength of bond and identity attachment. After Session 1, there was no significant interaction between communication type and attachment type on the strength of attachment ($t(125) = 0.93$, $p = 0.35$), indicating that 5 minutes of
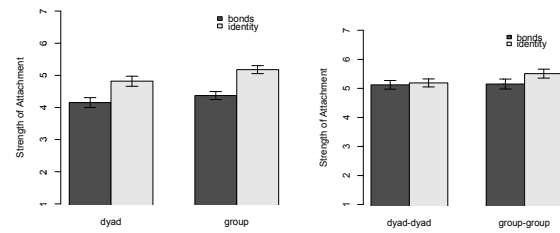
interaction did not differentially influence bond or identity attachment. However, by the end of the experiment, after Session 2, there was a significant interaction between the communication type and the attachment type on the strength of attachment ($t(135) = 2.38$, $p = 0.02$, $d = 0.41$; see Figure 4). Participants who communicated as pairs within a group had roughly equal bond and identity attachment, whereas participants who communicated with the whole group simultaneously had stronger identity attachment than bond attachment.

Together, these results show that communication increased both attachment to participants' work groups and their loyalty to MTurk as a community and their employers. We used Structural Equation Models (SEMs) to evaluate whether the link between communication and loyalty to MTurk as a community and their employers was better explained by differentiating types of attachment to work groups—bond versus identity—or if it was better explained by positing an undifferentiated general attachment to Turkers' work group. We compared two models. Model A differentiated bond and identity attachment while Model B represented undifferentiated general attachment. Model B, with general attachment to a Turkers' work group (CFI = 0.82, RMSEA = 0.21, AIC = 3364), explained the data as well as Model A, with differentiated, bond and identity attachment (CFI = 0.84, RMSEA = 0.21, AIC = 3342) as indicated by equally good fit indices for Model B as Model A. Thus, there was no advantage to making a distinction between bond and identity attachment in explaining increases in loyalty to the larger community and employers.

Having established that undifferentiated general attachment to a Turker's work group was the most parsimonious representation of attachment, we conducted an analysis to show that this attachment was actually mediating the increase in loyalty. This analysis tested whether small group attachment mediated the increase in loyalty among Turkers in the group communication condition compared with those in the group awareness only condition. Individually, both communication ($t_{comm}(105) = 3.90$, $p < 0.001$) and work group attachment ($t_{attachment}(105) = 13.2$, $p < 0.001$) were

significant predictors of attachment to MTurk as a community. When included in a model together, work group attachment completely explained the effect of communication on attachment to MTurk as a community ($t_{attachment}(212) = 12.5$, $p < 0.001$, $t_{comm}(105) = -1.35$, $p = 0.18$). Similarly both communication ($t_{comm}(105) = 2.91$, $p < 0.001$) and work group attachment ($t_{attachment}(105) = 10.2$, $p < 0.001$) were significant predictors of employer commitment. When included in a model together, work group attachment completely explained the effect of communication on employer commitment ($t_{attachment}(212) = 9.78$, $p < 0.001$, $t_{comm}(105) = -1.44$, $p = 0.15$). These results together show that undifferentiated work group attachment mediates the effect of social elements on the increase in loyalty to the Turker community and to the employer.

DISCUSSION

Experiment 1 was designed to test whether specialized social design features, such as social awareness and communication among work groups, would increase overall community loyalty by creating attachments with subgroups within the community.

We hypothesized that inducing Turkers to form attachments to their work groups would increase their loyalty to MTurk and to employers. The results partially confirmed this hypothesis: assigning Turkers to work groups and allowing communication within the groups caused Turkers to demonstrate more loyalty to MTurk and their employer, two measures of community loyalty. However, awareness of their group and its membership by itself did not create subgroup attachment; only work groups given tools to communicate formed subgroup attachment. Moreover, we were able to show that the increase in loyalty to the Turker community and employer was fully mediated by Turkers' increased attachment to their work groups. Our findings are an advance over previous research, which has failed to show that subgroup attachment fully mediates increased community-level loyalty either because this research did not collect self-reported attachment data [6, 4] or did not strongly induce distinct types of attachment to subgroups [17]

We expected that communicating in a subgroup would increase loyalty to Mechanical Turk and to employers through two different pathways, either by creating attachment to group members (bond attachment) or by creating attachment to the group as an entity (identity attachment). The experiment showed that when Turkers worked and communicated as pairs within a work group, bond and identity attachment were equally strongly. But when Turkers worked and communicated as an intact group, identity attachment formed more strongly than bond attachment. This difference demonstrates the presence of two distinct pathways for creating social attachment in groups. However results also showed that working as pairs, which was intended to promote the formation of bond attachment, also promoted identity attachment. Working as a group, which was intended to promote identity attachment, promoted bond

attachment as well, although to a lesser extent. Although the results support distinct causes of bond and identity attachment the effect sizes were small and the results also suggest considerable overlap between the two types of attachment.

EXPERIMENT 2

Researchers and theoreticians have proposed two separate pathways through which attachment to groups form. Experiment 2 was designed to investigate whether these pathways are distinct, by testing whether they have distinct causes and consequences. Experiment 1 showed that the way that groups worked together and communicated had some distinct effects on how identity and bond attachment formed. Communicating as a group caused identity attachment to form more strongly than bond attachment. However, working and communicating in pairs, which should have primarily stimulated bond attachment, actually caused both bond and identity attachment to increase equally.

One possible explanation for this paradox is that working and communicating as an intact group versus as pairs were not a strong enough design intervention to isolate the social identity and interpersonal processes that are thought to independently drive identity and bond attachment respectively. Therefore, in Experiment 2 we developed what should be stronger manipulations to encourage greater bond attachment to work groups.

Bond attachment is based on interpersonal attraction [15]. Social psychological research has identified several ways to increase interpersonal attraction including longer exposure to someone [16], mutual self-disclosure [3], and perceived similarity [18, 12]. In order to promote bond-based attachment we manipulated all of these elements in addition to structuring communication among groups to differentially create bond and identity attachment.

Hypothesis 2 extended: Structuring group work and communication in pairs and including other manipulations to increase interpersonal attraction will stimulate bond-based attachment while structuring work and communication as a group as a whole will stimulate identity-based attachment respectively.

One of the main reasons the distinction between bond and identity attachments has received so much attention is because their root causes, interpersonal attraction or group identification respectively, should have large downstream consequences, in areas such as member retention or effort expended on behalf of a group [15, 19, 18].

Hypothesis 3: Bond and identity attachment should have different observable downstream consequences.

For example, bond-based attachment to a group, which is based on interpersonal ties, should lead people to be more interested in individual members of group [15]. In the context of work groups on MTurk, this implies that Turkers with bond-based attachment to their group should be more willing

IV: Small Group Attachment Type	Condition		DVs
	Interface	**Turnover Event**	**DVs**
Bond	Dyad-Dyad		Bond Attachment
Identity	Group-Group		Identity Attachment
	Dyad-Group	None	Continue Relationship
Hybrid	Group-Dyad		Equal Bonus
			Disagreement
Bond	Dyad-Dyad		
Identity	Group-Group	1 person forced to drop at mid-point	Resilience to Turnover
	Dyad-Group		
Hybrid	Group-Dyad		

Table 2: Experiment 2 conditions and relevant independent and dependent variables.

to stay in contact with group members or talk with them after completing their paid task.

Hypothesis 3a: Bond-based attachment to a work group will increase Turkers' desire to stay in contact with work group members.

Identity attachment is based on group identification. Stronger group identification results in seeing individuals in a group as homogeneous and valuing the group and its members because of what the group represents and not because of individual group members' contributions [18]. On MTurk this might lead to individuals ignore differences in individual members contributions to the group. As a result, individuals might distribute a bonus equally among members of their work group despite differences among members in their output.

Hypothesis 3b: Identity-based group attachment will lead Turkers to distribute benefits equally among group members.

Similarly because in an identity-based group, the members are not as important as the group as whole, individuals may treat each other as interchangeable. Thus, we would expect that their loyalty to the group should be robust to members' leaving.

Hypothesis 3c: Identity-based group attachment will lead Turkers to remain in the group when another group member leaves.

Group identification also results in greater normative conformity pressure and greater influence from other group members [14]. One consequence on MTurk is that group members may influence each other's judgments more and disagree with each other less.

Hypothesis 3d: Identity-based group attachment will lead to great conformity and subsequently less disagreement among Turkers in a work group.

METHOD

Participants

A total of 801 participants were recruited from Mechanical Turk and randomly assigned to a group of three people. Of those participants 684 (85%) completed the Experiment. 47% of participants were female; they ranged in age from 18 to 74 ($M = 32.0$, $SD = 12.8$). The largest number of participants were from the United States (74%); followed by India (23%); the remained were from many other countries (2%). Participants were asked to select their main motivation for Turking from a large range of possible options. The majority, 78%, reported that their main motivation for Turking was for money. Participants were paid $1.20 for participating.

A total of 267 three-person groups were formed and randomly assigned to one of the eight conditions. Two samples were retained for analysis. The first sample included 182 groups in which no members dropped out during the first session. The dropout rate did not vary by condition during the first session ($\chi^2(3) = 2.67$, $p = 0.45$). The second sample included 85 groups in which no members dropped out or were forced to dropout during the entire experiment. The dropout rate also did not vary by condition during the entire experiment among groups in which no one was forced to dropout ($\chi^2(3) = 0.41$, $p = 0.94$). The samples had to be separated to distinguish natural turnover from cases where turnover was created artificially to test prediction 3d (see Table 2 and Design section).

Procedure

The procedure was very similar to the one in Experiment 1. However in this experiment participants answered questions in the waiting room, while waiting to be matched with a group. They either answered questions from each other using a chat room in the bond conditions or they answered questions by themselves in the identity conditions (see Design section). As in Experiment 1 participants reviewed other people's work; this time they were told they were reviewing work done by university students, to eliminate any personal bias associated with reviewing other Turkers' work. Finally, following completion of the experiment and

questionnaires, participants were given the option to stay extra time for no additional pay to socialize with their group members. Those opting to stay were placed in a chat room with others who had also elected to stay.

Experimental design

As in Experiment 1 there were four communication conditions to manipulate bond and identity attachments (see Table 2). During the task participants in the communication conditions either worked in pairs or as an intact group. The Group-Group condition was created to promote identity attachment; Dyad-Dyad condition was created to promote bond attachment; and Group-Dyad, and Dyad-Group conditions were created as hybrids to examine the formation of attachment in more detail (the hybrid conditions turned out not to be necessary).

We changed some procedures from Experiment 1 to strengthen the induction of bond attachment in this experiment: groups assigned to the bond condition in session 1 communicated for longer, disclosed more personal information, and were told that they were matched with their group because they were similar to other group members. While supposedly waiting for group members to arrive, participants were put in a waiting room with their future group members and asked to chat. This meant that at least two group members communicated for between 1.5 and 5 minutes and all group members communicated for at least 1.5 minutes before the main task began. During the waiting room period, participants were asked to disclose personal information to each other by telling each other answers to personal questions such as "What's the most unique skill you have?" (modified from [20]).

Those participants assigned to group communication in Session 1 spent equal time in the waiting room and answered the same questions, but they were told that they were answering the questions so that we could find a group that would be a good fit for them. They were not given tools to communicate with group members during this time, nor were they aware that their future group was also waiting. These participants were told that they were matched with their group because they were a good fit.

In addition, to test the effect of turnover on group retention and attachment, in half the groups one member was randomly chosen and removed from their group between Sessions 1 and 2. The remaining group members were told this member had dropped out.

Dependent measures

The same measures of attachment from Experiment 1 were used in Experiment 2. Participants rated bond and identity attachment after Session 1 and Session 2. Additional measures were included to evaluate other outcomes of interest. As in Experiment 1 after jointly discussing what they believed to be students' work products, participants independently rated the quality of the work they were
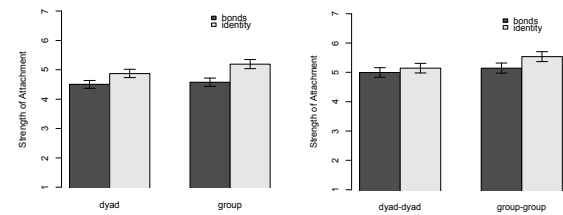
Figure 5: Mean (S.E.) ratings of bond and identity attachment for Turkers in groups that communicated as dyads or as a group at the midpoint (left) and by the end of the experiment (right) in Experiment 2.

reviewing. They gave each product a letter grade from A to F. Instructions explained the grading scale. Letter grades were converted to standard grade point values and the average pairwise absolute difference among group members for each task was calculated as a measure of disagreement. Following the main tasks, participants were invited to exchange email addresses with each group member and to stay extra time for no addition pay to socialize with individual group members; agreeing to do either with at least one group member was considered a measure of relationship continuation. Finally, participants were told they had receive a 60-cent bonus for good group work and were asked to divide it among their group members (including themselves); whether they divided it evenly was considered a measure of equality.

RESULTS

Hypothesis 2: Bond vs. Identity Attachment Formation

In Experiment 2 we tried to get Turkers to form bond and identity attachment independently by increasing interpersonal attraction in the bond condition in addition to differences in the communication structure. We evaluated whether these changes increased relative differences in bond and identity attachment. Two multi-level models were constructed to test whether communication type (dyadic or group communication) had a differential effect on the strength of bond and identity attachment. Results in Experiment 2 were similar to those from Experiment 1. At the midpoint of the experiment there was a marginally significant interaction between communication type and attachment type on the strength of attachment ($t(244) = 1.76$, $p = 0.08$, $d = 0.23$; see Figure 5). The difference increased through the end of the experiment; there was a significant interaction between the communication type and the attachment type on the strength of attachment ($t(124) = 1.96$, $p = 0.05$, $d = 0.35$; see Figure 5). Turkers in groups that communicated as pairs with manipulations to enhance interpersonal attraction formed bond and identity attachment equally. Turkers in groups that communicated as a group formed stronger identity attachment than bond attachment.

Hypothesis 3: Impact of Bond vs. Identity Attachment

We examined whether the differences in relative bond and identity attachment had a downstream impact on aspects of group dynamics. Multi-level models tested whether type of communication influenced each outcome of interest. Participants were nested in groups to control for dependencies among group members (242 participants in 85 groups in the sub-sample with no turnover and 461 participants in 182 groups in the larger sample with and without turnover).

Turkers in groups that communicated dyadically with manipulations to increase interpersonal attraction were expected to have greater bond attachment and thus express more interest in contacting members after the task had ended. This prediction was not supported. They were no more likely to exchange emails or to stay and socialize with specific group members than were Turkers in the group communication condition ($\chi^2(3) = 3.43$, $p = 0.33$; see Table 3).

Turkers in groups that communicated as a group were expected to have greater group identification and identity attachment and, as a result, see all group members as homogeneous. Thus, these participants were expected to distribute the bonus more equally among their group members. This prediction was not supported. They were no more likely to distribute the bonus evenly ($\chi^2(3) = 4.93$, $p = 0.18$; see Table 3). Participants that communicated as a group were also expected to drop out at a lower rate following a turnover event. Again, this prediction was not supported; there was no significant interaction between communication condition and turnover on dropout rates ($\chi^2(3) = 2.75$, $p = 0.43$; see Table 3).

Outcome	Dyad-Dyad	Group-Group	Dyad-Group	Group-Dyad
Continue Relationship	21%	35%	25%	22%
Equal Bonus	71%	83%	74%	64%
Disagreement	0.57 (0.43)	0.50 (0.31)	0.64 (0.56)	0.59 (0.36)
Dropout	6.5%	5.6%	2.3%	2.3%

Table 3: Measures of group outcomes of interest across the communication conditions. Gives means (S.D.) or percent of participants as appropriate.

Finally, because of conformity effects associated with greater group identification, participants in groups that communicated as a group were expected to disagree less. This prediction was not supported; there was no significant difference in disagreement between communication conditions ($LR = 1.40$, $p = 0.71$).

DISCUSSION

Experiment 2 was designed to investigate whether there are distinct pathways through which attachment forms in a group

by testing whether bond and identity attachment have distinct causes and consequences. This experiment found evidence of distinct causes of bond and identity attachment, but not distinct consequences. Experiment 2 replicated findings from Experiment 1 that bond and identity attachment could be formed to different degrees depending on how social interaction was structured. When social interaction was structured to promote interpersonal attraction bond and identity attraction formed equally and when interaction was structured to promote social identity processes identity attachment formed more strongly than did bond attachment. These results provide some evidence that bond and identity attachment have different causes and are created by distinct processes. However, there was considerable overlap between bond and identity attraction, that is when interaction was structured to promote identity attachment it led to the formation of both identity and bond attachment to some extent and the other way around. Either the way we structured social interaction did not cleanly promote interpersonal attraction and social identity processes independently or there is a more complicated relationship between these underlying processes and the two types of attraction.

The distinction between bond and identity attachment is thought to be important in part because their distinct causes are thought to lead to different downstream consequences. Although we found evidence of bond and identity attachment having distinct causes we found was no evidence that this resulted in different downstream consequences. Again one explanation is that our manipulations were not strong enough. Alternatively, there is a more complicated relationship between these underlying processes and the two types of attraction than suggested by prior theory.

GENERAL DISCUSSION

Previous work has shown that both mere social awareness and direct communication among visitors to a common site can increase retention [4, 6, 17]. In Experiment 1 we were able to partially replicate this finding on Mechanical Turk, a work environment in which Turkers do short-term tasks mainly by themselves. Turkers who were assigned to work in a group and given tools to communicate reported being more attached to MTurk and more likely to work for their employer again, two measures of loyalty on MTurk. We were able to extend previous work by showing that the effect of group communication on community loyalty was completely mediated by attachment to the assigned work group. This experiment provides compelling evidence that loyalty is mediated by attachment to the social entities present. However, unlike previous work only direct communication and not mere social awareness increased site loyalty on MTurk. This finding suggests that including social awareness and communication features only increase loyalty to the site to the extent that they crease attachment among subgroups.

Experiment 1 and 2 were designed to create attachment to Turkers' work groups in two distinct ways—through

interpersonal attraction to promote bond attachment and through social identity processes to promote identity attachment. The results of the two experiments provide some evidence that these two different processes cause different degrees of bond and identity attachment. However, bond and identity attachment remain highly correlated in spite of the manipulations to promote one processes over the other. Interpersonal processes and social identity processes, the theorized underlying causes of bond and identity attachment, are expected to have very different downstream effects, Experiment 2 was designed to test differences in these downstream effects. However, we found no differences in downstream effects.

There are two compelling explanations for why bond and identity attachment remain so highly correlated and we observed no downstream effects. First, our manipulations to promote interpersonal processes and social identity independently may not have cleanly separated the two. Interpersonal attraction builds over time [16]; 25 minutes may not be long enough to feel close to specific group members. While we thought we were promoting interpersonal attraction in the bond condition, in a short-term task with complete strangers we may have actually been predominantly promoting weaker group identification. With longer periods of communication, there might behave been downstream differences in conformity between bond and identity groups as other research as shown in IRC channels [19].

Second, there may be a more complicated relationship between bond and identity attachment, and their root causes interpersonal and social identity processes. In particular, both bond and identity attachment may share a common factor – overall attachment to a social group. This may arise because bond attachment induces identity attachment and identity attachment induces bond attachment. For example, feeling attached to a group as an entity may spread and induce positive feelings toward individuals in the group. It could also be that bond and identity attachment both induce a general attachment to the group that cannot be differentiated. For example, feeling attached to a group as an entity may induce general positive feelings toward anything having to do with the group. These two mechanisms are conceptually equivalent. This explanation is supported by the strong correlation between bond and identity attachment, even when they are differentiated in these two studies as well as others [15, 17].

Design Implications
There is now growing evidence that social interaction can promote community loyalty and therefore should be integrated into online communities to enhance their survival. How to integrate and build social awareness and interaction into an online community is less clear. In other online communities, social awareness alone has been enough to increase loyalty. On MTurk, however, only direct interaction increased loyalty. Future work should explore the level of social interaction needed in a variety of online communities to increase loyalty. Although there was no decrease in the quality of the work in these experiments, there may be tradeoffs associated with introducing more social interaction than necessary.

The results of these studies do not provide a conclusive recommendation as to whether differences in bond and identity attachment should be considered when building social interaction. If bond and identity attachment share a strong common factor it may not matter which type of attachment social tools support. In the latter case designers should create tools to support identity attachment which seems to be easier to promote [17]. On the one hand, if the failure to observe downstream consequences from bond and identity attachment, occurred because interpersonal attraction and bond attachment are difficult to promote in short-term settings with strangers, designers should design tools to promote identity attachment when people first join a site and be concerned about bond attachment only later. Alternatively, they can build bond attachment by importing existing friendships.

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