Evolution and Human Behavior 36 (2015) 32–37

Contents lists available at ScienceDirect

Evolution and Human Behavior

journal homepage: www.ehbonline.org

Original Article

Does implied community size predict likeability of a similar stranger?☆

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ARTICLE INFO

Article history:
Initial receipt 14 January 2014
Final revision received 15 August 2014

Keywords:
Homophily
Evolution
Social behaviour
Group size
Community
Likeability

ABSTRACT

Homophily, the tendency for people to cluster with similar others, has primarily been studied in terms of proximal, psychological causes, such as a tendency to have positive associations with people who share traits with us. Here we investigate whether homophily could be correlated with perceived group membership, given that sharing traits with other people might signify membership of a specific community. In order to investigate this, we tested whether the amount of homophily that occurs between strangers is dependent on the number of people they believe share the common trait (i.e. the size of group that the trait identifies). In two experiments, we show that more exclusive (smaller) groups evoke more positive ratings of the likeability of a stranger. When groups appear to be too inclusive (i.e. large) homophily no longer occurs, suggesting that it is not only positive associations with a trait that cause homophily, but a sense of the exclusiveness of a group is also important. These results suggest that group membership based on a variety of traits can encourage cohesion between people from diverse backgrounds, and may be a useful tool in overcoming differences between groups.

1. Introduction

Homophily is the well-documented basis for social attraction: people who share traits are more likely to form friendships (Byrne, 1971, 1997; McPherson, Smith-Lovin, & Cook, 2001; Montoya & Horton, 2012). Homophily has been shown for a variety of traits, including shared values and interests (Bergeron & Zanna, 1973; Byrne, 1961; Byrne, Griffitt, & Stefaniak, 1967; Curry & Dunbar, 2013; Izard, 1960; Michinov & Monteil, 2002; Park & Schaller, 2005; Sole, Marton, & Hornstein, 1975; Touhey, 1975; Yabrudi & Diab, 1978) and demographic traits (Burger, Messian, Patel, del Prado, & Anderson, 2004; Byrne, G.C., & Worchel, 1966; Graham, Taylor, & Ho, 2009; O'Reilly, Caldwell, & Barnett, 1989), and has even been investigated in non-human species (Massen & Koski, 2014). Despite extensive research into the effect, there is no consensus on why homophily occurs between strangers (Montoya & Horton, 2012).

Nonetheless, two major alternative psychological explanations continue to be widely discussed (Montoya & Horton, 2012). One suggests that people who are similar to oneself are more positively reinforcing because they affirm one's own viewpoint (Byrne, 1971); the other suggests that we use our own viewpoint as an anchor to determine what might be good behaviour, then use this value judgement to determine whether or not another person is likely to be a trustworthy friend (Kaplan & Anderson, 1973). One important shortcoming with both these explanations is that they do not take into account the possibility that shared traits can indicate membership of a common social group. In the kinds of small scale societies that have characterised most of human history, membership of the same community will typically also identify shared kinship as well as identifying the subset of people on whom one's ability to survive and reproduce ultimately depend. While one may know personally everyone in one's immediate community (in hunter–gatherer societies, the band or the clan), knowing who is and who is not a member of one's wider community (mega-band or tribe[1]) may be equally crucial. Being able to identify members of one's own cultural group quickly and efficiently may be important, in order to know whether one can trust a stranger as well as know whether one can afford to behave altruistically towards them or expect them to behave altruistically towards oneself.

Humans are inherently social, and living in communities confers important benefits such as support with childrearing, knowledge about food sources, social support during stress and improved health, as well as protection from raiders and other predators (Berkman, 1984; Bowles, 2009; Colsen, 1979; Kotler, Iancu, Efroni, & Amir, 2001; Lehmann, Lee, & Dunbar, 2014; Sutcliffe, Dunbar, Binder, & Arrow, 2012; Tilvis et al., 2012; Turner, 1981; Whallon, 2006). Indeed, similar findings have been reported for Old World monkeys, at least in terms of reproductive success (Silk et al., 2009, 2005). While developing knowledge about the individuals that form part of our community, we also develop a strong impression of what characterises and differentiates other groups (e.g. Park & Rothbart, 1982). In-group/out-group classification is generally thought to be a very strong effect (e.g. Castelli, Vanzetto, Sherman, & Arcuri, 2001; Turner, Brown, & Tajfel, 1979); people show bias towards in-group members even when the distinctions between groups are entirely arbitrary (Hartstone & Augoustinos,

☆ This work was funded by European Research Council Grant No. 295663.
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[1] We follow the terminology of Lehmann et al. (2014) here.

http://dx.doi.org/10.1016/j.evolhumbehav.2014.08.005

1995; Spielman, 2000; Stürmer, Snyder, Kropp, & Siem, 2006; Tajfel, Billig, Bundy, & Flament, 1971). Part of this tendency to show positive bias towards our in-group may come from a belief that someone who is part of the group has already been evaluated and accepted by others whose opinions we trust. In contrast, there is no such trusted source of information about strangers, and cues of community membership, such as cultural badges, may be especially important in allowing us to make rapid decisions about whether to trust a stranger.

A variety of arbitrary signals, such as clothing or bodily modification, are used as indicators of cultural identity and thus become associated with social values (Efferson, Lalive, & Fehr, 2008). Having these outwardly observable markers of our social group makes it possible to evaluate whether a stranger should be treated in a trustworthy manner (McElreath, Boyd, & Richerson, 2003). On the more personal scale, shared traits appear to be the most important criteria for determining the strength of a friendship, with six key dimensions having been identified (language, location, educational history, interests/hobbies, worldview and sense of humour) (Curry & Dunbar, 2013). The more traits we share with someone the more likely it is that we have a shared culture, and hence the more likely it is that they are people from the same community as us, and the more likely it is that they are people with whom we can associate safely.

An important consideration that never features in discussions of homophily is the size of the community. Someone who comes from the same country as us belongs to a much larger community (or set of distributed communities) and, on average, will have much less in common with us than someone who comes from the same town, and we should take this into account when deciding how to behave towards a stranger. Given that there is considerable consistency in the size of communities in traditional contemporary and historical small scale societies (Dunbar, 1992; Grove, 2011; Hamilton, Milne, Walker, Burger, & Brown, 2007), this failure to recognise that community size might be an important variable is surprising.

The current study was undertaken to determine whether homophily associated with smaller and more exclusive social groups is more pronounced than homophily associated with larger, more extended social groups. We conducted two online experiments to determine whether homophily is influenced by the size of group that participants believe they share with an interaction partner. In Experiment 1, we manipulated perceived group size using more or less precise trait options, which correspond to more or less exclusive communities of shared interest. In Experiment 2, we manipulated perception of shared community size by giving participants information about the number of people that belong to the same community as them based on their own traits.

2. Experiment 1

2.1. Methods

One hundred and ninety-five participants representing a broad sample of the UK population were recruited using online survey management software Maximiles (108 Female, Age: Mean ± SD = 45.0 ± 13.6). Participants were reimbursed with 100 Maximiles points (worth approximately £1.50) for their 10 minute participation.

All participants interacted with two partners: one they shared five out of seven traits with (Partner A), and the other they shared two out of seven traits with (Partner B). This allows direct within-subject comparison between a more similar interaction partner and a less similar interaction partner. The order of these two partners was counterbalanced. Group size was a between-subject independent variable, manipulated using different sized option lists, with longer lists giving more precise trait information and therefore identifying more exclusive groups (e.g. in the most inclusive group condition, an option for taste in music was "Pop", whereas in the most exclusive there was an option for "Indie Pop", a more precise category of pop music). Participants either selected information about their own traits from a list of four (inclusive communities), eight (intermediate communities), or twelve (exclusive communities) options. Data were collected from 62 participants for the inclusive version, 64 for the intermediate version, and 69 for the exclusive version.

The protocol, including the trait options, tasks and dependent variables, follows that of Launay & Dunbar (submitted), which tested how homophily can be measured in an online environment. A variety of traits, including demographic, status traits, tastes, and moral views were chosen because they might independently have importance for participants. More precisely, participants were asked to identify their ethnicity, the area they grew up in, religion, current location, musical taste, political ideology, and an ethical statement they agreed with most (e.g. "Assisting in the death of a terminally ill friend who is in terrible pain, and wants to die, is morally permissible"). Participants completed the experiment online, and after giving consent to participate were asked to give information about themselves using dropdown menus. All of the possible options are given in Supplementary Material Table S1, along with proportions of participants that chose each option. After entering this information, the same trait information was displayed for a partner (i.e. participants saw a screen that gave the same seven trait answers for a partner). For Partner A, five of the displayed traits matched the traits that the participant had entered, and two traits were different. For Partner B, two traits matched the participant's answers while five traits were different. An algorithm randomly determined which traits would be shared with each partner for each participant, but no trait was shared with both Partner A and Partner B. To ensure that they attended to the information, participants were asked to remember their partner's trait information as they would be tested on it later in the experiment.

Participants then performed an estimation task: 130 characters were displayed on the screen, each randomly assigned to be either an X or an O. This array was displayed for 5 s, then participants were asked to estimate how many Os had appeared. When entering this estimation, the screen displayed "Your partner guessed:…", followed by the correct number of Os that had appeared. Following this, they were asked to answer some questions about the estimation task and how they felt about their partner (these having been determined in a previous experiment to be indicative of homophily). The question of interest was "How much do you think you would like your partner?" Participants also completed an Inclusion-of-Other-in-Self scale (IOS: Aron, Aron, & Smollan, 1992) with each partner. This measure of social closeness presents participants with a series of two circles that are overlapping to a greater or lesser extent, along with the statement, "Please indicate which of these pictures indicates how close you feel to the partner you interacted with". A control question was also included: "How easy did you find the estimation task?" In addition, participants were asked: "How well do you think your partner performed the estimation task?", "How willing would you be to work with the same partner again on a different task?" and "If you discovered your partner had cheated during the estimation task, how likely would you be to report it to the experimenter", but answers to these questions were not analysed. Participants were then asked to recall three of the seven traits they had been given about their partner, again using drop-down menus.

After completing the task for both partners, participants completed a short personality questionnaire (Gosling, Rentfrow, & Swann, 2003), and gave the name of the town in which they were currently living. Finally, participants were given full details of the aims of experiment, including an explanation that partners were in fact computer controlled, and were given the opportunity to withdraw their data in the light of this information.

2.2. Results

Descriptives for this experiment are given in Table 1, and broadly demonstrate the predicted pattern, with higher ratings on likeability and the IOS scale for Partner A compared to Partner B. Task difficulty

Table 1
Mean scores for likeability, IOS scale, task difficulty and number of traits remembered in Experiment 1.

	Inclusive group		Intermediate group		Exclusive group	
	Partner A	Partner B	Partner A	Partner B	Partner A	Partner B
Likeability mean (SD)	4.8 (1.2)	4.7 (1.4)	4.9 (1.2)	4.4 (1.4)	5.0 (1.4)	4.3 (1.3)
IOS mean (SD)	3.0 (1.9)	2.8 (1.8)	3.3 (1.9)	2.9 (1.8)	3.4 (2.0)	2.7 (1.8)
Task difficulty mean (SD)	3.4 (1.8)	3.5 (1.9)	3.6 (1.8)	3.4 (1.7)	3.5 (1.6)	3.2 (1.6)
Traits remembered mean (SD)	2.4 (0.8)	2.2 (1.0)	2.2 (0.9)	2.2 (0.9)	2.2 (1.0)	1.9 (1.0)

scores and number of traits remembered did not appear to be affected by partner type.

Preference scores for Partner A were determined for each participant by subtracting their ratings of Partner B from their ratings of Partner A for both likeability and IOS. Given that partners differ primarily on the number of shared traits, this preference score represents the homophily effect that occurs in each condition. There was a significant main effect of group size in the preference scores for likeability (Kruskal–Wallis: $H_2 = 10.5$, $P = 0.005$). This result indicates that greater group exclusivity resulted in greater preference for Partner A compared with Partner B, as shown in Fig. 1. In order to test whether this preference for Partner A was significant in each of the exclusivity conditions, one-sample Wilcoxon tests were used on the preference scores. Preference scores were significantly greater than zero in the exclusive (Wilcoxon: $V = 772$, $P < 0.0001$) and intermediate groups ($V = 510$, $P = 0.004$), indicating that homophily occurred in these conditions. However, in the inclusive group preference scores were not greater than zero ($V = 103$, $P > 0.5$), suggesting that these options were too broad to trigger homophily.

Preference as indicated by the IOS ratings did not demonstrate significant differences between the conditions (Kruskal–Wallis: $H_2 = 3.94$, $P = 0.14$). However, as with likeability, IOS preference values were significantly greater than zero in the exclusive (Wilcoxon: $V = 615$, $P < 0.001$) and intermediate groups ($V = 421$, $P = 0.01$), but not in the inclusive group ($V = 306$, $P = 0.43$).

In order to directly compare these homophily results with task difficulty (the control question and the number of traits remembered), the values for Partner B were subtracted from those for Partner A as above. Kruskal–Wallis tests revealed no main effects of condition for these preference scores (Kruskal–Wallis: $H_2 = 1.65$, $P = 0.44$), and values were not significantly greater than zero in any condition (all P-values > 0.1). Similarly, the difference in number of traits remembered for each partner was not different between conditions (Kruskal–Wallis: $H_2 = 3.16$, $P = 0.20$), and values were not significantly greater than zero in any condition (all P-values > 0.05).

In summary the results from Experiment 1 suggest that more exclusive groups are associated with higher levels of homophily. This was found in the likeability ratings but not in the IOS scale or the control question about task difficulty. In order to replicate this result, and test whether there could be any confound caused by the specific manipulation of group size we conducted a second experiment using a different manipulation.

3. Experiment 2

In Experiment 2 we tested whether the effects identified in Experiment 1 could be confounded by features such as the longer lists involved in choosing from the more exclusive option list or a greater affinity for the more selective categories. In Experiment 2, we manipulated the perceived size of group that participants belonged to by giving participants (false) information about how many people shared their traits. The options that could be selected were kept constant, and were the same as those used in the most exclusive list in Experiment 1, to provide the greatest likelihood that homophily would occur.

3.1. Methods

One hundred and ninety-five participants took part in an online experiment as described in Experiment 1. The procedure was the same as in the exclusive group condition, except that after completing the drop-down questionnaires, participants were given information about how many people had similarly answered the trait questionnaire. This number was the between-subject variable: participants were told they had traits in common with 1632 people who had previously taken the survey (large communities), 14 people who had previously taken the survey (medium sized communities), or four people who had previously taken the survey (small communities). These values were chosen to mirror specific group sizes or layers in natural human communities and personal social networks (see Arnaboldi, Conti, Passarella, & Dunbar, 2013; Hamilton et al., 2007; Hill & Dunbar, 2003; Lehmann et al., 2014; Zhou, Sornette, Hill, & Dunbar, 2005). To avoid evoking a specific sense of majority or minority group membership, these numbers were not given as a proportion, and no guide was given about the number of people who had taken the survey overall. Data were collected from 65 participants in the largest size condition, 66 in the medium group size condition and 64 in the smallest group size condition.

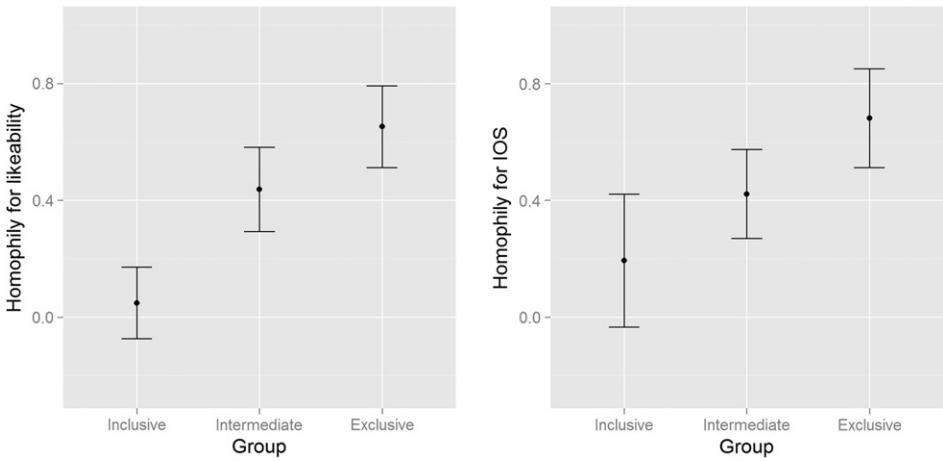

Fig. 1. Experiment 1: mean homophily scores for likeability and IOS in different group exclusivity conditions. Homophily scores are calculated by subtracting ratings of Partner B from Partner A for each participant. Error bars give standard error.

3.2. Results

Descriptives are given in Table 2, and demonstrate similar patterns to Experiment 1. Ratings of likeability and IOS scale are marginally higher for Partner A than Partner B, and in this experiment trends are similar in task difficulty and number of traits remembered.

Preference scores were calculated as in Experiment 1. There was a main effect of group size condition in likeability preference measures (Kruskal–Wallis: $H_2 = 7.7$, $P = 0.021$). As in Experiment 1, belief that groups were more exclusive led to more homophily, as shown in Fig. 2. Preference scores were significantly greater than zero in the smallest group (Wilcoxon: $V = 630$, $P = 0.002$), but not for the medium sized group ($V = 310$, $P = 0.1$) or the largest group ($V = 223$, $P > 0.5$), indicating that participants only liked Partner A more than Partner B when told that their own traits were shared with just four other people who had previously taken part in the experiment.

Preference in IOS ratings did not demonstrate any significant differences between the conditions (Kruskal–Wallis: $H_2 = 0.34$, $P > 0.5$). However, as in Experiment 1, IOS preference values were significantly greater than zero in the smallest group (Wilcoxon: $V = 387$, $P = 0.018$) and medium sized group ($V = 317$, $P = 0.028$), but only marginally different from zero in the largest group ($V = 418$, $P = 0.086$).

As in Experiment 1, there were no main effects of condition for the task difficulty ratings for Partner A versus Partner B (Kruskal–Wallis: $H_2 = 2.41$, $P = 0.30$), and these values were not significantly greater than zero in any condition (all P-values > 0.1). Similarly, there was no main effect of condition on the difference between number of traits remembered for Partner A compared with Partner B (Kruskal–Wallis: $H_2 = 1.41$, $P = 0.49$), but these difference scores were significantly greater than zero in the smallest group (Wilcoxon: $V = 713$, $P = 0.0006$), medium sized group ($V = 644$, $P = 0.004$) and largest group ($V = 690$, $P = 0.0001$). This suggests that in Experiment 2, participants did remember traits of Partner A better than traits of Partner B.

4. Discussion

In these experiments, we show that the number of people with whom traits are shared can influence homophily. Ratings of partner likeability showed more homophily when categories that participants chose from were more exclusive (suggesting small shared communities), and showed no homophily when categories were too broad (implying shared membership of very large communities). Experiment 2 demonstrated that group size is important when participants are given more precise information about how many people they share traits with. However, given that Experiment 2 is directly comparable to the most exclusive condition in Experiment 1, it is important to note that homophily was not recovered until people were told that they shared traits with less than five other people. Given that during online interaction we are likely to share traits with many thousands of other people, this very small threshold for homophily suggests that during Experiment 1 people were dramatically overestimating their own uniqueness when experiencing homophily. Another important finding in the current set of experiments was that homophily in IOS was not significantly different in the different group size conditions, while likeability was. This suggests that when encountering a new person who is similar to ourselves on very broad trait categories we may include them in our sense of self (i.e. see them as similar to ourselves) without believing they are necessarily a more likeable person.

Table 2
Mean scores for likeability, IOS scale, task difficulty and number of traits remembered in Experiment 2.

	Large community		Medium community		Small community	
	Partner A	Partner B	Partner A	Partner B	Partner A	Partner B
Likeability mean (SD)	4.3 (1.4)	4.3 (1.3)	4.7 (1.1)	4.3 (1.2)	4.9 (1.2)	4.3 (1.3)
IOS mean (SD)	3.0 (1.8)	2.6 (1.5)	3.0 (2.1)	2.7 (1.7)	3.4 (1.8)	3.0 (1.9)
Task difficulty mean (SD)	3.0 (1.8)	3.2 (1.9)	3.4 (1.9)	3.3 (1.6)	3.5 (1.7)	3.4 (1.6)
Traits remembered mean (SD)	2.3 (0.8)	1.6 (1.0)	2.2 (0.9)	1.7 (1.0)	2.3 (0.8)	1.8 (1.0)

Ratings of likeability demonstrated the expected effect, with more exclusive groups demonstrating more homophily than more inclusive groups. This suggests that when we know someone is part of a shared social group, we identify with them more if this group is smaller, in line with findings about minority group behaviour (Carron & Spink, 1995; Schaafsma & Williams, 2012). Previous psychological theories explaining homophily suggest that this effect can be explained by positive associations with traits that we possess. However, the group size effect identified here is hard to explain under that paradigm: the specificity of a trait category should not substantially modify how positively we feel about that trait. This finding is more in line with our proposal that homophily may exist because we relate shared traits to shared communities, and use this as a proxy to gauge people that we do not have detailed information about. The likeability measure used is quite a simple initial index of how people might begin to show a preference for a person of one group over another, but in this paradigm we cannot use this to show how capable they might be in further co-operative activities. Further research could investigate how the identified group size effect of homophily translates more broadly into real friendships and co-operative strategies.

While proximal explanations of homophily suggest that it is a positive association with a particular set of traits that make a similar person more likeable (Byrne, 1971; Kaplan & Anderson, 1973), here we relate homophily to social networks and communities. Given that it is so important to identify who is, and who is not, part of our social network (Brewer, 1979; Turner, 1975), humans may have developed heuristics about how to identify these networks, and shared traits may be one of these (McElreath et al., 2003). While it is likely that the ability to identify group membership cues would have developed with salient markers of specific communities that can aid knowledge about reciprocity (e.g. dialect: Cargile, Giles, Ryan, & Bradac, 1994; Cohen, 2012; Nettle & Dunbar, 1997), this ability would be most useful if it generalised to other cues that might indicate shared social networks. As has previously been shown with the 'other race' effect (Sangrigoli, Pallier, Argenti, Ventureyra, & de Schonen, 2005), the results from our experiment suggest that it is possible to generalise from obvious indicators of community (e.g. language) to more abstract markers such as shared traits. From an evolutionary perspective, being able to flexibly identify group membership using shared characteristics would be an adaptive strategy to deal with cultural norms that exist within groups for limited periods. While similarity might become less important after establishing a relationship with another person, at the point of evaluating their potential as an interaction partner it may be more valuable if it signifies a person from a community with a shared cultural background.

The IOS scale did not exhibit a group size effect. While there was a trend towards less homophily in larger groups, the differences between ratings were not significant in either experiment. The results of Experiment 2, in particular, show that people included others in their sense of self as a consequence of sharing traits with them (homophily occurs in every condition), despite the likeability results demonstrating that, in the larger group conditions, the partner with more shared traits is not perceived as more likeable. While this is not what we would have predicted, it seems to support our argument, suggesting that recognising others as similar to ourselves in the absence of any evidence that they are part of some unique group can make us believe they are close without our necessarily liking them more. This may be analogous to a kin similarity effect, in which identified similarities make us feel closer to kin (Park & Schaller, 2005) without necessarily affecting likeability. Further investigation is clearly needed into the different ways that social

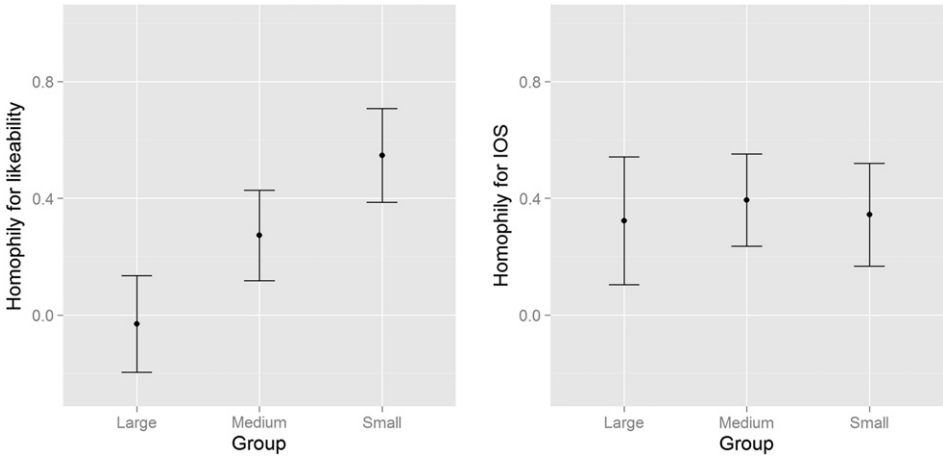

Fig. 2. Experiment 2: mean homophily scores for likeability and IOS in different group size conditions. Homophily scores are calculated by subtracting ratings of Partner B from Partner A for each participant. Error bars give standard error.

closeness can be measured between people interacting for the first time, as well as into the reasons that different indices give different results.

Another important result emerging from the current set of experiments is that homophily in Experiment 2 appeared to be reliant on the belief that traits were shared with only a very small number of people. In Experiment 1, we made an assumption that participants would use more precise trait categories to infer more exclusive groups, but this did not provide information on how large participants might expect these groups to be. In Experiment 2 we are able to gauge more precisely how small a group participants believe they belong to when homophily develops, and this value was surprisingly small (less than five). Given that the numbers of participants in Experiment 1 and Experiment 2 are comparable, it is notable that homophily was never as pronounced in Experiment 2, even in the smallest groups. This suggests that people tend to estimate their own uniqueness as being relatively high, which helps to encourage homophily and interest in others (c.f. Oates & Wilson, 2002). However, the precise numbers of people in each trait group in Experiment 2 should be interpreted with some caution. Although homophily did not occur when participants believed they shared traits with more than five people, this could be specific to this online experimental situation, in which participants may have some implicit expectations about the numbers of people who are likely to have previously done the experiment.

Similarly, in Experiment 2, when participants were given some indication of their own uniqueness, we found that they tended to remember more about a similar partner than a dissimilar partner. This is not a confound for the current results because no group size effect emerged in this memory preference. However, it does suggest that drawing attention to one's own significance in a task like this also changes the relative importance of the two partners, and may make people more likely to see them as distinct.

Taken together, the findings that group exclusivity is important in homophily and that we tend to overestimate our own uniqueness suggest that membership of any social group can, in and of itself, become an important bonding tool. Discovering that someone shares *any* kind of label with us (such as national identity) may be sufficient to encourage a sense of social closeness with that person (c.f. minimal group membership e.g. Billig & Tajfel, 1973). The more labels that we attach to ourselves (e.g. sports interests, musical taste, languages), the easier it becomes to identify similar others, and feel a sense of social belonging in diverse contexts.

Overall, these experiments support our claim that homophily effects may indicate a desire to associate with specific communities or social groups with whom we already have some familiarity. Given that categories associated with very large social groups do not demonstrate homophily as measured by likeability and inclusion of other in self, it is likely that there is some degree of group categorisation involved in deciding whether a person who is similar to ourselves should be judged as a potential ally. The current result opens the possibility of understanding homophily from an evolutionary perspective, as a phenomenon that relates to our inherent tendencies towards social behaviour and group categorisation, and moves away from the proximal explanations that have been used to explain homophily in the past.

Supplementary Materials

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.evolhumbehav.2014.08.005. All data reported in this paper can be found at http://dx.doi.org/10.5287/bodleiandri.6.

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