Hum Nat (2010) 21:186–202
DOI 10.1007/s12110-010-9088-y

On the Perception of Newcomers

Toward an Evolved Psychology of Intergenerational Coalitions

Aldo Cimino · Andrew W. Delton

Published online: 10 June 2010

Abstract Human coalitions frequently persist through multiple, overlapping membership generations, requiring new members to cooperate and coordinate with veteran members. Does the mind contain psychological adaptations for interacting within these intergenerational coalitions? In this paper, we examine whether the mind spontaneously treats newcomers as a motivationally privileged category. Newcomers—though capable of benefiting coalitions—may also impose considerable costs (e.g., they may free ride on other members, they may be poor at completing group tasks). In three experiments we show (1) that the mind categorizes coalition members by tenure, including newcomers; (2) that tenure categorization persists in the presence of orthogonal and salient social dimensions; and (3) that newcomers elicit a pattern of impressions consistent with their probable ancestral costs. These results provide preliminary evidence for a specialized component of human coalitional psychology: an evolved concept of newcomer.

Keywords Evolutionary psychology · Coalitional psychology · Newcomers · Cooperation

From the subincisions of Australian Aborigines to the initiations of college fraternity members, the recruitment and induction of new members is critical to the life cycle of coalitions (Bauer et al. 2007; Cini et al. 1993; Moreland and Levine 1982, 2006; Van Maanen and Schein 1979). Recent work in evolutionary psychology suggests the existence of psychological adaptations for some aspects of coalitional cooperation, such as tracking coalitional alliances (Kurzban et al. 2001), dealing

A. Cimino (✉)
Center for Evolutionary Psychology, Department of Anthropology, University of California, Santa Barbara, CA 93106, USA
e-mail: aldo@aldocimino.com

A. W. Delton
Center for Evolutionary Psychology, Department of Psychology, University of California, Santa Barbara, CA, USA

with intergroup conflict (Ackerman et al. 2006), preferentially sharing with in-group members (Yamagishi et al. 1999), and engaging in leader and follower relations (Tooby et al. 2006; Van Vugt et al. 2008; see also Kurzban and Neuberg 2005; Van Vugt and Van Lange 2006). Does this specialized psychology also include components designed to solve problems inherent to intergenerational coalitions? One such problem is the integration of new members. Here we conduct an initial test of whether the mind contains an evolved concept of NEWCOMER—a series of cognitive subroutines designed to reason about newcomers and their coalitional impact (we use small caps to distinguish entities in the mind, as opposed to entities in the world; e.g., Jackendoff 2006).

Newcomers and Coalitions

Real-world coalitions often have indefinite lifespans. Because members arrive at different times, membership generations overlap—newcomers coexist with veterans (e.g., Lagunoff and Matsui 2004; Sandler 1982). For natural selection to have created adaptations for solving problems related to newcomers, integrating new members must have been a recurrent feature of ancestral human social environments. There are a number of reasons to suspect this was true. First, intergenerational coalitions are widely documented in the ethnographic literature of small-scale societies: the cults of New Guinea (Herdt 1998; Wiessner and Tumu 1998), the men's and women's societies of the Hopi (Bradfield 1973; Stephen 1969), the ritual and hunting cults of the Ndembu (Turner 1967), the secret societies of the Mende (Bradfield 1973), and so on (e.g., Webster 1908). Second, industrialized societies also contain intergenerational coalitions, including countless fraternal and sororal associations, vocational and political organizations, secret societies, and similar groups (Anson and Marchesani 1991; Axelrod 1997; Tiger 1984). Even pre-adolescents tend to form enduring, cooperative peer groups, some of which become coalitions themselves (Adler and Adler 1995; Benenson et al. 1998; Bloch and Niederhoffer 1958). The prevalence and continual recreation of such associations suggests that the capacity and motivation to construct enduring, intergenerational coalitions are components of a universal human psychology.

For veterans, newcomers have at least two fitness-relevant properties. First, newcomers can augment a coalition's ability to create benefits for its members by increasing its formidability (e.g., Chagnon 1988; Tooby and Cosmides 1988; Ermer 2008), increasing labor inputs, bringing in valuable skills and knowledge, and so on (e.g., Moreland et al. 1996). However, adding members to a coalition also entails potential costs. By increasing the size of the coalition, newcomers increase the likelihood that any given member will free ride or that coordination will break down (Alencar et al. 2008; Karau and Williams 1993; Kerr 1983). Newcomers may require instruction in core coalition activities, and their lack of familiarity with in-group norms may impose higher transaction costs on veteran members (McElreath et al. 2003; Moreland 1985; Williamson 1981). A number of idiosyncratic costs may also be associated with newcomer integration. For instance, a newcomer may have a skill that was formerly the unique province of a veteran, lowering the veteran's value to other coalition members (Tooby and Cosmides 1996). Newcomers may compete

with veterans for internal dominance or other forms of social capital (Honeycutt 2005; Ziller and Behringer 1965) and may be a consistent source of discord among veterans (see examples in Moreland and Levine 2002).

By definition, newcomers have no significant history of participation within the coalition. Although veterans might predict newcomers' within-coalition behavior from past behavior external to the coalition, such inferences are noisy and imperfect. In other words, veterans face the information-theoretic problem of estimating newcomers' behavior-regulating variables toward the coalition itself (e.g., degree of trustworthiness). This uncertainty can, in turn, lead to lengthy evaluation periods (Moreland and Levine 2002; Van Maanen and Schein 1979). On this view, newcomers are not necessarily people who have the ordinally shortest tenure; instead, newcomers are members (or quasi-members) who possess specific psychological variables that are poorly estimated by veterans. Depending on the characteristics of the coalition and its members, there may be considerable variability in the length of time needed for veterans to extract sufficiently precise estimates. For some coalitions, even several years may be an insufficient time for appropriate estimation. However, because our experiments represent an initial investigation, we constructed stimuli with very short-tenure newcomers (4–9 days) to maximize the probability that they would activate the hypothesized NEWCOMER concept.

Most important for the experiments presented here, it is unknown whether newcomers will defect or free ride on the efforts of other members by taking benefits without paying the cost of contributing (Ehrhart and Keser 1999; Gallagher and Sias 2009; Iannaccone 1992; Moreland and Levine 2002; Sosis 2003; Tooby et al. 2006). Ancestrally, these behaviors may have selected for mechanisms in the minds of veterans that not only monitor newcomers for free riding after entry, but also motivate limiting their access to the benefits of past collective actions (e.g., prestige, common property). Given that the costs posed by newcomers are less intuitive than their benefits, in this paper we will focus on the problems of newcomer integration and their implications for the architecture of the NEWCOMER concept.

Design Features of the NEWCOMER Concept

If the mind contains an evolved NEWCOMER concept, then at least two predictions follow. First, the mind should encode tenure length and assign members to categories based on these encodings (e.g., NEWCOMER). Thus, our experiments use a cognitive measure of social categorization (Taylor et al. 1978) to test whether newcomers (and others categories of tenure) are tracked by the mind.

Second, categorizing an individual as a NEWCOMER should elicit specialized motivational responses. Because newcomers are potential free riders, they should be viewed as (1) less trustworthy than veterans, (2) less entitled to coalition benefits, and (3) more worthy of punishment. Moreover, given their lack of experience with in-group norms and activities, newcomers should be (4) judged as less competent than veterans and (5) given lower regard—that is, judged as less likable.

To test these predictions, Experiment 1 contrasts individuals with extremely short tenure length—by hypothesis, individuals categorized as NEWCOMERS—with individuals with medium, long, and very long tenure. Using four tenure

lengths (as opposed to only two) is necessary to rule out an important alternative hypothesis: Instead of NEWCOMER being a specialized portion of the tenure continuum, the mind may simply associate longer tenure with, for example, greater trustworthiness derived from relationship length. This alternative hypothesis predicts linear relationships between objective tenure length and impressions of coalition members, reflecting the progressive establishment of these variables over time. In contrast, our hypothesis predicts nonlinear relationships between tenure and impressions such that short-tenure members elicit especially negative impressions. In other words, newcomers should be motivationally privileged. (Note that our hypothesis does not rule out the possibility that medium- and long-term members are also motivationally distinguished; instead, it simply posits that the motivational response to newcomers is relatively pronounced compared with other tenure lengths.)

Having generated evidence consistent with the privileged status of newcomers, Experiments 2 and 3 investigate the robustness of tenure categorization by testing whether tenure differences are encoded in the presence of important orthogonal social dimensions: prototypical free riders (Experiment 2) and sex (Experiment 3).

Experiment 1: Tenure Categorization

Methods

Subjects Subjects were 54 students (27 female) at the University of California, Santa Barbara. Subjects received partial class credit for participation.

Materials and Procedure The entire experiment was computerized. Subjects learned about members of a fictional group called the Ice Walkers. The Ice Walkers were characterized as arctic specialists engaged in activities requiring intense cooperation (e.g., climbing, hunting). Moreover, membership was described as being high in prestige. Subjects were asked to form impressions of eight target members of the Ice Walkers. Eight facial photographs of white males were used to represent these targets. Tenure length was displayed above each photograph for 5 s. Tenure was divided into four categories with two targets in each category. Each category was separated by approximately 300 days: 4 and 5 days, 297 and 304 days, 598 and 602 days, and 896 and 901 days.

With tenure information still displayed, a statement attributed to the target appeared below the photograph for 10 additional seconds. Over the course of the experiment, subjects viewed each target member paired with three sentences, for 24 photograph/sentence pairs in total. All sentences were designed to be expressible by all targets regardless of tenure (see Appendix). To avoid potential confounds, for each subject the computer randomly determined both photograph/tenure pairings and photograph/sentence pairings.

Although subjects experienced the photograph/sentence presentations as a single series, the series itself was divided into three blocks. Within each block, all eight target members appeared once in a random order. After viewing the three blocks, subjects completed a brief distracter task, followed by a surprise memory test. In the surprise memory test, all eight members were presented in an array on screen. Each

sentence was displayed in succession and subjects were instructed to indicate the original speaker with the mouse. If they were unsure, they were instructed to take their best guess. No information about tenure length was presented during this phase.

Dependent Measures

Categorization Measure Our categorization measure is modeled after Taylor et al.'s (1978) memory confusion paradigm. Under this paradigm, the pattern of errors made by subjects in the surprise memory test is used to infer social categorization. For each subject we calculate a single categorization score, which indexes the degree to which subjects implicitly categorize by the four tenure lengths. Higher categorization scores imply stronger categorization by tenure. To calculate this score, we compare within-category confusions to between-category confusions. For instance, a within-category confusion would occur if a subject misattributes a statement by a target with 4 days of tenure to a target with 5 days. A between-category confusion would occur if a subject misattributes a statement by a target with 4 days of tenure to a target with 602 days. If subjects make more within- than between-category confusions, this indicates that subjects are tracking the dimension of tenure length and are treating targets with large differences in tenure as separate categories.

Correct responses are not analyzed because one cannot know if they are due to accurate memory, within-category confusions, or random guessing. Therefore, although there is only one way to make a within-category confusion, there are six ways to make a between-category confusion. To correct for this, following Taylor et al. (1978), we multiply the total number of between-category confusions by 1/6. Without such a correction, random responding would appear as systematic attribution to other categories. We then subtract the corrected number of between-category confusions from the total number of within-category confusions to create a categorization score. If subjects categorized along the dimension of tenure, categorization scores should be significantly greater than zero.

Impression Measures After the surprise memory test, subjects rated each member on 7-point scales, with anchors on 1 and 7. No tenure information was displayed during this phase. These items were (1) trustworthiness ("Compared to other members, how trustworthy is this person?" Anchors: "Less/More than Average"); (2) benefit entitlement ("This person has earned all the benefits that the group provides." Anchors: "Strongly Agree/Strongly Disagree"); (3) punishment worthiness ("Compared to other members, how deserving of punishment is this person?" Anchors: "Less/More than Average"); (4) competence ("Compared to other members, how competent is this person?" Anchors: "Less/More than Average"); and (5) likability ("Compared to other members, how likable is this person?" Anchors: "Less/More than Average").

Results

Directional predictions are tested with one-tailed *p*-values; all others with two-tailed *p*-values. Standard Pearson correlations (*r*) are included as a measure of effect size (Rosenthal et al. 2000). Across all three experiments, we found no consistent sex

differences and no more sex differences than would be expected by chance given the number of post-hoc tests. We therefore collapsed results across subject sex.

Prediction: Coalition Members Will be Categorized by Tenure Length As predicted, subjects implicitly categorized members by tenure length: The average categorization score was significantly greater than zero (M=0.78, SD=1.77, t_{53}=3.24, one-tailed p=0.001, r=0.41).

Prediction: Newcomers Will Elicit Especially Negative Impressions Although subjects categorized members according to tenure, were they simply tracking the dimension of time or were they inferring social consequences from tenure length? To test this, we used a series of orthogonal polynomial contrasts. The four levels of tenure in the Ice Walkers allow for three types of orthogonal contrasts: linear, quadratic, and cubic. We used linear trends to test for monotonically increasing relationships between tenure length and impressions (e.g., is longer tenure length associated with increased trust?). We used quadratic trends to test whether newcomers were viewed especially negatively; this pattern is illustrated by the solid line in Fig. 1. We used cubic trends to test whether newcomers were viewed especially negatively and longest-tenure veterans especially positively; this pattern is illustrated by the dotted line in Fig. 1. Note that tests of linear, quadratic, or cubic trends test for any possible trend of these shapes. Because only some patterns would be consistent with our hypotheses, it is important to examine not just whether a given trend is significant, but also the actual patterns within the data. Further, because linear, quadratic, and cubic contrasts are orthogonal, they model uncorrelated patterns. A significant linear trend, for example, does not affect whether a quadratic trend may have additional explanatory value. (Of course, if our theory required quadratic or cubic trends without simultaneous linear trends, it

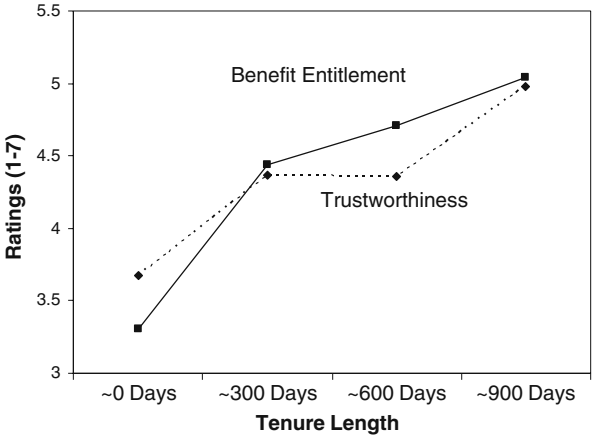

Fig. 1 Impressions of coalition members as non-linear trends. Impression items from Experiment 1 may indicate linear, quadratic, or cubic trends with respect to tenure. If newcomers are viewed especially negatively, a quadratic trend (as obtained in "Benefit Entitlement") or a cubic trend (as obtained in "Trustworthiness") should be evident across tenure categories. A predicted cubic trend also obtained for "Competence" (Table 1)

would be appropriate to test for which trend explained more variance. However, that is not the case.)

As the significant linear trends show, targets with shorter tenure were seen as less trustworthy, less entitled to coalition benefits, less likable, and less competent (Table 1). Although targets with shorter tenure were descriptively seen as more deserving of punishment, this effect was not significant.

If newcomers are a motivationally privileged category, they should elicit especially negative impressions. This should be reflected in specific quadratic or cubic trends in the impression data. One or both of these trends obtained for measures of trust, benefit entitlement, and competence such that newcomers were viewed especially negatively and, sometimes, longest-tenure veterans especially positively (Table 1; see Fig. 1 for example plots). Although not significant, there was a descriptive cubic trend in the predicted direction for liking. For punishment, there was a significant cubic trend, but its shape was not consistent with the cubic hypothesis. Instead, targets with 600 days of tenure, relative to targets with 300 days, were descriptively seen as deserving *more* punishment (but not significantly so, two-tailed $p=0.16$ in a paired-samples t-test).

Discussion

Experiment 1 provides preliminary evidence that humans track tenure length and assign social consequences to tenure differences. Critically, newcomers were perceived especially negatively—more negatively than would be predicted by extrapolating from other tenure lengths. (In some cases, veterans were also perceived especially positively.) Although we argue that tenure categorization is a product of a psychology designed for intergenerational coalitions, many theorists argue that humans have a general capacity for arbitrary group categorization (Hornsey 2007; Tajfel 1982). This capacity may include obligate levels of in-group favoritism and

Table 1 Impressions of coalition members (Mean and SD) across four tenure categories (Experiment 1)

	~0 Day tenure	~300 Day tenure	~600 Day tenure	~900 Day tenure	Linear effect (*r*)	Quadratic effect (*r*)	Cubic effect (*r*)
Trustworthiness	3.67 (1.19)	4.37 (1.00)	4.36 (1.06)	4.98 (1.24)	0.54***	0.04	0.32**
Benefit Entitlement	3.31 (1.18)	4.44 (0.98)	4.71 (1.05)	5.04 (1.27)	0.67***	0.39**	0.25*
Punishment Worthiness	3.74 (1.20)	3.34 (1.04)	3.59 (1.15)	3.22 (1.25)	0.21	0.02	0.34**
Competence	3.64 (1.18)	4.41 (0.94)	4.43 (0.97)	5.04 (1.23)	0.56***	0.11	0.33**
Likability	4.14 (0.96)	4.40 (0.98)	4.39 (1.15)	4.89 (1.21)	0.41**	0.11	0.19

***$p<0.001$, **$p<0.01$, *$p<0.05$; all one-tailed, df=53. Effect sizes represent the absolute, non-signed strength of the different types of trends. Examining the pattern of the means for a measure is necessary to determine whether the observed trend matches predictions. Our hypothesis predicts that at least one, but not necessarily both, of the quadratic and cubic trends will be significant and will take one of the shapes illustrated in Fig. 1. Unlike the rest of our measures, the trends for Punishment Worthiness should have monotonically negative shapes; however, the nonlinear trends for this variable did not match any of the predicted shapes.

out-group derogation. In Experiment 1, the categorization effect may reflect arbitrary categorization along the only dimension that happened to be available, tenure length (cf. Moreland 1985). If subjects spontaneously adopted the perspective of a veteran member—and thus viewed newcomers as a kind of out-group—they might view newcomers especially negatively. This alternative hypothesis predicts that tenure categorization will disappear if an important and attention-capturing dimension is also present. In contrast, if the mind contains an evolved, content-rich social category of NEWCOMER, its use should persist in the presence of orthogonal, attention-capturing dimensions.

To test this, in Experiment 2 we add the orthogonal dimension of cooperator/free rider. Given that newcomers are predicted to activate inferences similar to those activated by free riders, it will be particularly striking if the category of NEWCOMER continues to be encoded even when the social world contains actual free riders.

In Experiment 3 we add the orthogonal dimension of sex. Sex is a particularly salient, reliably encoded social dimension (e.g., Taylor et al. 1978; Kurzban et al. 2001). Moreover, the sex of the targets is visually available throughout the experiment. Tenure length (and cooperator/free rider status) is only available during the learning phase; we do not present this information to subjects while they complete the memory task or the impression measures. Thus, it will be notable if tenure categorization persists in the presence of the salient and visually available dimension of sex.

These two experiments will also give us some insight into the boundary conditions of tenure categorization. When free rider/cooperator is included as an orthogonal dimension, it will be instructive to see if tenure categorization obtains among targets who are free riders. Once targets have been identified as free riders, will it matter what their tenure is? Moreover, given that men appear designed with greater motivation to form and join intergenerational coalitions (Benenson et al. 1998; Geary et al. 2003; Tiger 1984: Webster 1908), it will be instructive to see if subjects' responses to male and female targets show the same patterns. It is possible that tenure length will be viewed as more relevant to male members, leading to stronger categorization and greater differences in impressions of male targets.

Experiments 2 and 3: Robustness of Tenure Categorization

Methods

Except where indicated, our methods are identical to those in Experiment 1.

Subjects Subjects were 65 students (36 female) for Experiment 2 and 55 students (29 female) for Experiment 3.

Modifications for Experiment 2 For Experiment 2, we described the events of a recent Ice Walker expedition. On this expedition, the Ice Walkers needed to build a camp before nightfall. Because the activity was intensely laborious, some members faked injuries to excuse themselves from the hard work, leaving those who actually cooperated exhausted. We used a simplified experimental design with two categories of tenure length: newcomers (4, 5, 6, and 9 days) and veterans (481, 565, 612, and

728 days). In addition to displaying tenure length with each photograph, we also displayed whether the member cooperated or free rode during the described expedition (i.e., "helped make camp" or "shirked duty"). Two of the four newcomers and two of the four veterans were indicated as having cooperated. The placement of tenure and cooperation information (above or below the photograph) was randomized between subjects. Tenure and cooperation information were displayed for 10 s and then accompanied by a statement for 10 s.

Modifications for Experiment 3 Experiment 3 used facial photographs of four white males (not used in Experiments 1 and 2) and four white females. We used only two categories of tenure length, newcomers (4, 5, 6, and 9 days) and veterans (481, 565, 612, and 728 days). Each sex was represented by half of the newcomers and half of the veterans.

Data Analysis

We tested the categorization predictions using an approach similar to Experiment 1. However, to avoid contaminating measures of categorization along one dimension with effects actually attributable to categorization along the other dimension, we used a more conservative analysis strategy (see Stangor et al. 1992 for a similar approach). For each subject, we calculated four separate categorization scores. For Experiment 2, these scores were (*a*) categorization by tenure among cooperators, (*b*) categorization by tenure among free riders, (*c*) categorization by cooperator/free rider status among newcomers, and (*d*) categorization by cooperator/free rider status among veterans. For Experiment 3, these scores were (*a*) categorization by tenure among male targets, (*b*) categorization by tenure among female targets, (*c*) categorization by sex among newcomers, and (*d*) categorization by sex among veterans. For example, to test whether newcomer/veteran categorization occurred among male targets, the analysis used only sentences that (1) were said by veterans and newcomers who were men and (2) were mistakenly attributed to members of these subtypes. Because this analysis creates two possible between-category confusions but only one possible within-category confusion, we multiplied between-category confusions by 1/2 to correct for differing base rates. Finally, we constructed categorization scores by subtracting the corrected number of between-category confusions from the number of within-category confusions. As before, categorization is evident when categorization scores are significantly greater than zero.

Results for Experiment 2

Before testing whether newcomer/veteran categorization occurs in the presence of free riders and cooperators, it is important to determine whether these latter categories were actually perceived. Indeed they were: Considering only targets who were newcomers, categorization scores for the free rider/cooperator distinction were significantly greater than zero (M=0.52, SD=1.57, t_{64}=2.64, one-tailed p=0.005, r=0.31). Considering only targets who were veterans, categorization scores for the free rider/cooperator distinction were also significantly greater than zero (M=0.58, SD=1.50, t_{64}=3.11, one-tailed p=0.001, r=0.36).

Prediction: Tenure Categorization Will Persist in the Presence of an Orthogonal Social Dimension—Cooperator/Free Rider We first examined whether cooperating veterans and cooperating newcomers were distinguished from each other. Consistent with our prediction, categorization scores for cooperating veterans and newcomers were significantly greater than zero (M=0.43, SD=1.18, t_{64}=2.94, one-tailed p=0.002, r=0.34).

We next tested whether free-riding newcomers were distinguished from free-riding veterans. They were not: Considering only targets who were free riders, the categorization score for tenure was not significantly greater than zero (M=0.05, SD=1.67, t_{64}=0.26, one-tailed p=0.398, r=0.03).

Prediction: Even in the Presence of an Orthogonal Social Dimension, Newcomers Will Elicit Negative Impressions This prediction was generally supported (Table 2). Relative to cooperating veterans, cooperating newcomers were seen as less

Table 2 Impressions of coalition members (Mean and SD) across two tenure categories with orthogonal social dimensions

Experiment 2	Cooperating Newcomers	Cooperating Veterans	Effect size (r)
Trustworthiness	5.01 (1.06)	5.39 (1.19)	0.26*
Benefit Entitlement	4.97 (1.18)	5.31 (1.29)	0.22*
Punishment Worthiness	2.82 (1.50)	2.40 (1.33)	0.25*
Competence	5.05 (1.05)	5.45 (1.14)	0.27*
Likability	5.05 (1.09)	5.14 (1.14)	0.07
Experiment 2	Free-Riding Newcomers	Free-Riding Veterans	Effect size (r)
Trustworthiness	3.16 (1.24)	3.12 (1.32)	−0.03
Benefit Entitlement	3.22 (1.33)	3.44 (1.55)	0.13
Punishment Worthiness	4.99 (1.43)	4.99 (1.30)	0.00
Competence	3.32 (1.29)	3.74 (1.38)	0.26*
Likability	3.29 (1.33)	3.34 (1.38)	0.04
Experiment 3	Male Newcomers	Male Veterans	Effect size (r)
Trustworthiness	4.15 (0.77)	4.97 (1.01)	0.53***
Benefit Entitlement	4.11 (1.19)	5.49 (1.01)	0.68***
Punishment Worthiness	3.47 (0.93)	3.15 (1.13)	0.24*
Competence	4.15 (0.95)	5.41 (0.97)	0.67***
Likability	4.44 (0.81)	4.69 (1.14)	0.19
Experiment 3	Female Newcomers	Female Veterans	Effect size (r)
Trustworthiness	4.07 (0.90)	4.51 (1.02)	0.30*
Benefit Entitlement	3.98 (1.28)	4.92 (1.18)	0.52***
Punishment Worthiness	3.45 (0.95)	3.48 (0.93)	−0.04
Competence	3.99 (0.92)	4.72 (1.12)	0.48***
Likability	4.20 (1.06)	4.08 (1.14)	−0.08

***p<0.001, *p<0.05; all p-values one-tailed. The effect size represents the difference between means for newcomers and veterans. Negative r values indicate that the effect was opposite the direction predicted. Experiment 2 df=64; Experiment 3 df=54.

trustworthy, less entitled to coalition benefits, less competent, and more deserving of punishment. Free-riding veterans and free-riding newcomers were seen as more similar than their cooperating counterparts, with relatively smaller effect sizes.

Results for Experiment 3

Before testing whether newcomer/veteran categorization occurs in the presence of men and women, it is important to determine whether these categories were actually perceived. They were: Considering only targets who were newcomers, categorization scores for the male/female distinction were significantly greater than zero (M=0.99, SD=1.30, t_{54}=5.64, one-tailed p<0.001, r=0.61). Considering only targets who were veterans, categorization scores for the male/female distinction were also significantly greater than zero (M=0.39, SD=1.40, t_{54}=2.07, one-tailed p=0.022, r=0.27).

Prediction: Tenure Categorization Will Persist in the Presence of an Orthogonal Social Dimension—Sex We first examined whether veterans and newcomers were distinguished from each other within male targets. As predicted, subjects implicitly differentiated between these categories for male targets (M=0.41, SD=1.52, t_{54}= 2.00, one-tailed p=0.025, r=0.26).

We next tested whether newcomers were distinguished from veterans among female targets. They were not: Categorization scores for newcomers and veterans were not significantly greater than zero for female targets (M=−0.08, SD=1.35, t_{54}= −0.45, one-tailed p=0.328, r=−0.06). This differing pattern for male and female targets appears unique to our mixed-sex coalition. In two smaller pilot studies we tested Ice Walker groups containing newcomers and veterans with all male targets (n=38) and all female targets (n=34). The categorization effects were sizeable and essentially identical: for male targets, r=0.48, one-tailed p=0.001; for female targets, r=0.46, one-tailed p=0.003.

Prediction: Even in the Presence of an Orthogonal Social Dimension, Newcomers Will Elicit Negative Impressions This prediction was generally supported (Table 2). Relative to male veterans, male newcomers were seen as less trustworthy, less entitled to coalition benefits, less competent, and more deserving of punishment. Moreover, male newcomers were descriptively seen as less likable, although this effect was not significant. Relative to female veterans, female newcomers were seen as less trustworthy, less entitled to coalition benefits, and less competent. There were essentially no differences between female veterans and female newcomers in punishment worthiness or likability.

Discussion

The results of Experiments 2 and 3 provide further support for our predictions and a number of interesting boundary conditions on tenure categorization. In Experiment 2, cooperating veterans and newcomers were categorized as separate types. Further, these subtypes induced different patterns of impressions. This effect, however, was unique to cooperators. It is possible that the moralistic reactions engendered by free riders overrode any categorization based on tenure. Consistent with this, we note that

the strongest impression difference between free-riding veterans and newcomers was on the item most unrelated to moral considerations—competence.

In Experiment 3, there was strong evidence that male newcomers and male veterans were distinguished from each other—both in the categorization measure and the impression items. In contrast, female newcomers and female veterans were distinguished on the impression items but were not categorized separately. One interpretation of these results is that tenure differences affect representations of either sex (explaining the impression items) but are not used to organize ongoing cognition about females when males are present in the coalition. This could occur if tenure length had greater implications for male coalition members (as it would if females were often peripheral in enduring coalitions). A related phenomenon occurs in studies using the memory confusion protocol to investigate race encoding: Although subjects surely notice who is black and who is white, manipulating the coalitional context can stop subjects from using race to organize their ongoing cognition (Kurzban et al. 2001).

These data also undermine at least one alternative hypothesis. One could argue that the results of our experiments, such as especially low trust toward newcomers, are not specific to coalitional contexts. For instance, trust in dyadic relationships may start low, increase rapidly, and then level off over time. This could explain some of the nonlinear trends we found in Experiment 1 and might explain why tenure—under this alternative, simply a proxy for experience—has social consequences. While we agree that similar phenomena may be found within dyads, this alternative hypothesis cannot explain the full pattern of our results. For instance, why are only cooperating members categorized by tenure? More tellingly, why does the sex of the target make such a large difference in a mixed-sex coalition? That tenure categorization is so contingent on other factors relevant to coalitional cooperation suggests the operation of mechanisms specific to this domain.

General Discussion

The goal of this paper was to describe preliminary evidence that humans have an evolved concept of NEWCOMER. This is consistent with an evolutionary history of intense participation in intergenerational coalitions, where newcomers were both recurrent and potentially problematic. Our results are at least partially supportive: With few exceptions, subjects implicitly categorized coalition members by tenure. The exceptions—free riders and females in mixed-sex coalitions—may themselves reflect aspects of the underlying psychological design. Also consistent with our predictions, subjects viewed newcomers especially negatively, more negatively than one might expect by extrapolating from other tenure lengths.

There are, however, a number of caveats in interpreting these data. For instance, newcomers were sometimes seen as more deserving of punishment than veterans, even when no events were described that might prompt such a reaction (Tables 1 and 2). We suspect that this reflects an increased willingness to punish newcomer violations, rather than the deployment of arbitrary punitive sentiment (but see Cimino 2010). More generally, our choice of a subtle, third-person manipulation likely attenuated our effects. Subjects were given just a few minutes to observe static pictures of fictional coalition members. Further, no tenure information was visible when they completed

the memory task or indicated their impressions. Given this fact, it is notable that subjects implicitly retained tenure information and used it to make strong social judgments. Future studies may benefit from stronger manipulations of group membership and tenure, including the use of first-person vignettes or laboratory-based coalitions.

For the sake of experimental consistency, subjects read about members of only one coalition, a combination task/intimacy group (Lickel et al. 2001). Importantly, numerous characteristics of coalitions (e.g., group size) may serve as cues that trigger facultative shifts in the valuation of newcomers (Cini et al. 1993; Cottrell et al. 2007). Other ecological cues may be equally important, such as the presence of coalitional warfare or resource scarcity, which might increase the negative sentiments elicited by newcomers (Sosis et al. 2007). Thus, we suggest that our results reflect a set of basic, default sentiments toward newcomers of enduring coalitions, but do not describe the full range of evolved, adaptive responses.

One could argue that our results are anomalous or misinterpreted because newcomers in ancestral environments were almost always close kin with ample reputational histories. Such regularities would seem to reduce the adaptive value of any mechanism that, for example, automatically downregulated perceptions of trustworthiness in newcomers. Why downregulate trustworthiness if trustworthiness is already well estimated? We suggest that there are coalition-specific representations of variables such as trust and competence that may not be accurately computed from past behavior external to the coalition. Further, there are a number of open questions about the demographics of coalition newcomers across human ancestral environments. Were newcomers always individuals born into the local community? There is no question that ethnographic accounts of small-scale societies furnish numerous examples of within-community adolescents integrated into local coalitions (e.g., Precourt 1975). That said, endemic warfare in human ancestral environments may have created many instances of cross-community incorporation, as larger, more successful communities destroyed and assimilated others, who then acted as newcomers to any extant coalitions (Bowles 2009; Richerson and Boyd 2005). If so, newcomers were not necessarily close kin or individuals with whom veteran members had life-long personal experience.

Finally, it may seem obvious that newcomers would be treated differently in our experiments, but it is this intuition that requires explanation. Everywhere that coalitions persist, newcomers seem to be set apart, made to act in distinct ways or given differentiating attire (e.g., Anderson and Noesjirwan 1980; Davis 1998; Honeycutt 2005; Keating et al. 2005; McGlone 2005; Nuwer 2004; Schlegel and Barry 1979; Zurcher 1970). Much of the culture that adheres around newcomers may reflect our evolved ambivalence. Consider the fact that newcomers are commonly assigned peripheral statuses that restrict their access to coalition benefits and limit their degree of participation (e.g., pledge status in fraternities, adolescent initiate status in small-scale societies). Extended periods of observation have the effect of allowing veterans to learn about newcomers prior to the removal of these restrictions. Such "liminal" periods may be a kind of evoked culture to moderate the impact of newcomers. Ultimately, a fuller description of our shared coalitional psychology will enrich our understanding of these and other newcomer-related phenomena.

Appendix

Sentences Used Across Experiments

Our last meeting was very productive.
When you're a member of our group, you have to be able to think on your feet.
We work hard and then we play hard.
Sometimes, being good at what we do is all about timing.
Even if we fail, the important thing is to just keep going.
I have some ideas I'd like to run by everyone.
We should all strive to work faster.
We will probably get together at a bar at some point.
All I care about is that we do our best.
Somewhere there is a list of past members.
I'm looking into learning new ways to do our next activity.
It's important to get a good night's sleep before our activities.
I'm looking into planning our next trip.
Let's focus on working as a team.
There's so much more I'd like to accomplish.
Let's make sure we pack everything we need, as well as some extras.
Good books on what we do are hard to find.
We need to make sure we pack our supplies early.
Let's get this task done by tonight.
I'm really proud of the group's accomplishments.
Doing what we do can be very difficult.
I hope we don't get fatigued next week.
I'm very particular about the kind of gear I use.
"Safety first" is my motto.

References

Ackerman, J. M., Shapiro, J. R., Neuberg, S. L., Kenrick, D. T., Becker, D. V., Griskevicius, V., et al. (2006). They all look the same to me (unless they're angry): from out-group homogeneity to out-group heterogeneity. *Psychological Science, 17*, 836–840.

Adler, P. A., & Adler, P. (1995). Dynamics of inclusion and exclusion in preadolescent cliques. *Social Psychology Quarterly, 58*, 145–162.

Alencar, A. I., Siqueira, J. D. O., & Yamamoto, M. E. (2008). Does group size matter? Cheating and cooperation in Brazilian school children. *Evolution and Human Behavior, 29*, 42–48.

Anderson, A. M., & Noesjirwan, J. A. (1980). Agricultural college initiations and the affirmation of rural ideology. *Mankind, 12*, 341–347.

Anson, J. L., & Marchesani, R. F. J. (Eds.). (1991). *Baird's manual of American college fraternities*. Menasha: Baird's Manual Foundation.

Axelrod, A. (1997). *The international encyclopedia of secret societies and fraternal orders*. New York: Facts on File.

Bauer, T. N., Bodner, T., Erdogan, B., Truxillo, D. M., & Tucker, J. S. (2007). Newcomer adjustment during organizational socialization: a meta-analytic review of antecedents, outcomes, and methods. *Journal of Applied Psychology, 92*, 707–721.

Benenson, J., Apostoleris, N., & Parnass, J. (1998). The organization of children's same-sex peer relationships. In W. M. Bukowski & A. H. Cillessen (Eds.), *New directions for child development* (Vol. 80, pp. 5–23). San Francisco: Jossey-Bass.

Bloch, H. A., & Niederhoffer, A. (1958). *The gang: A study in adolescent behavior*. New York: Philosophical Library.

Bowles, S. (2009). Did warfare among ancestral hunter-gatherers affect the evolution of human social behaviors? *Science, 324*, 1293–1298.

Bradfield, M. (1973). *A natural history of associations: A study in the meaning of community*. London: Duckworth.

Chagnon, N. A. (1988). Life histories, blood revenge, and warfare in a tribal population. *Science, 239*, 985–992.

Cimino, A. (2010). The evolution of hazing: Motivational mechanisms and the abuse of newcomers. Manuscript submitted for publication.

Cini, M. A., Moreland, R. L., & Levine, J. M. (1993). Group staffing levels and responses to prospective and new group members. *Journal of Personality and Social Psychology, 65*, 723–734.

Cottrell, C. A., Neuberg, S. L., & Li, N. P. (2007). What do people desire in others? A sociofunctional perspective on the importance of different valued characteristics. *Journal of Personality and Social Psychology, 92*, 208–231.

Davis, L. A. (1998). Hazing in the workplace. *Dissertation Abstracts International: Section B. Sciences and Engineering*, *58*, 4499.

Ehrhart, K. M., & Keser, C. (1999). *Mobility and cooperation: On the run*. Retrieved from: http://www.cirano.qc.ca/pdf/publication/99s-24.pdf.

Ermer, E. R. (2008). Coalitional support and the regulation of welfare tradeoff ratios. *Dissertation Abstracts International: Section B. Sciences and Engineering*, *68*, 361.

Gallagher, E. B., & Sias, P. M. (2009). The new employee as a source of uncertainty: veteran employee information seeking about new hires. *Western Journal of Communication, 73*, 23–46.

Geary, D. C., Byrd-Craven, J., Hoard, M. K., Vigil, J., & Numtee, C. (2003). Evolution and development of boys' social behavior. *Developmental Review, 23*, 444–470.

Herdt, G. H. (1998). *Rituals of manhood: Male initiation in Papua New Guinea*. New Brunswick: Transaction.

Honeycutt, C. (2005). Hazing as a process of boundary maintenance in an online community. *Journal of Computer-Mediated Communication*, *10*, Article 3.

Hornsey, M. T. (2007). Social identity theory and self-categorization theory: a historical review. *Social and Personality Psychology Compass, 2*, 204–222.

Iannaccone, L. R. (1992). Sacrifice and stigma: reducing free-riding in cults, communes, and other collectives. *Journal of Political Economy, 100*, 271–291.

Jackendoff, R. (2006). *Language, consciousness, culture: Essays on mental structure*. Cambridge: MIT Press.

Karau, S. J., & Williams, K. D. (1993). Social loafing: a meta-analytic review and theoretical integration. *Journal of Personality and Social Psychology, 65*, 681–706.

Keating, C. F., Pomerantz, J., Pommer, S. D., Ritt, S. J. H., Miller, L. M., & McCormick, J. (2005). Going to college and unpacking hazing: a functional approach to decrypting initiation practices among undergraduates. *Group Dynamics, 9*, 104–126.

Kerr, N. L. (1983). Motivation losses in small groups. *Journal of Personality and Social Psychology, 45*, 819–828.

Kurzban, R., & Neuberg, S. L. (2005). Social exclusion, stigmatization, and discrimination: Managing group relationships. In D. M. Buss (Ed.), *Handbook of evolutionary psychology* (pp. 653–675). Hoboken: Wiley.

Kurzban, R., Tooby, J., & Cosmides, L. (2001). Can race be erased? Coalitional computation and social categorization. *Proceedings of the National Academy of Sciences, 98*, 15387.

Lagunoff, R., & Matsui, A. (2004). Organizations and overlapping generations games: memory, communication, and altruism. *Review of Economic Design, 8*, 383–411.

Lickel, B., Hamilton, D. L., & Sherman, S. J. (2001). Elements of a lay theory of groups: types of groups, relationship styles, and the perception of group entitativity. *Personality and Social Psychology Review, 5*, 129–140.

McElreath, R., Boyd, R., & Richerson, P. J. (2003). Shared norms and the evolution of ethnic markers. *Current Anthropology, 44*, 122–129.
McGlone, C. A. (2005). Hazing in NCAA division I women's athletics: An exploratory analysis. *Dissertation Abstracts International: Section A. Humanities and Social Sciences*, *66*, 1690.
Moreland, R. L. (1985). Social categorization and the assimilation of "new" group members. *Journal of Personality and Social Psychology, 48*, 1173–1190.
Moreland, R. L., & Levine, J. M. (1982). Socialization in small groups: temporal changes in individual-group relations. *Advances in Experimental Social Psychology, 15*, 137–192.
Moreland, R. L., & Levine, J. M. (2002). Socialization and trust in work groups. *Group Processes and Intergroup Relations, 5*, 185–201.
Moreland, R. L., & Levine, J. M. (2006). Socialization in organizations and work groups. In J. M. Levine & R. L. Moreland (Eds.), *Small groups: Key readings* (pp. 469–498). New York: Psychology Press.
Moreland, R. L., Levine, J. M., & Wingert, M. L. (1996). Creating the ideal group: Composition effects at work. In E. H. Witte & J. H. Davis (Eds.), *Understanding group behavior* (Vol. 2, pp. 11–35). Hillsdale, NJ: Lawrence Erlbaum Associates.
Nuwer, H. (2004). *The hazing reader*. Bloomington: Indiana University Press.
Precourt, W. E. (1975). Initiation ceremonies and secret societies as educational institutions. In R. W. Brislin, S. Bochner, & W. J. Lonner (Eds.), *Cross-cultural perspectives on learning* (pp. 231–250). New York: Sage.
Richerson, P. J., & Boyd, R. (2005). *Not by genes alone: How culture transformed human evolution*. Chicago: University of Chicago Press.
Rosenthal, R., Rosnow, R. L., & Rubin, D. B. (2000). *Contrasts and effect sizes in behavioral research: A correlational approach*. Cambridge: Cambridge University Press.
Sandler, T. (1982). A theory of intergenerational clubs. *Economic Inquiry, 20*, 191–208.
Schlegel, A., & Barry, H. (1979). Adolescent initiation ceremonies: a cross-cultural code. *Ethnology, 18*, 199–210.
Sosis, R. (2003). Why aren't we all Hutterites? Costly signaling theory and religious behavior. *Human Nature, 14*, 91–127.
Sosis, R., Kress, H. C., & Boster, J. S. (2007). Scars for war: evaluating alternative signaling explanations for cross-cultural variance in ritual costs. *Evolution and Human Behavior, 28*, 234–247.
Stangor, C., Lynch, L., Duan, C., & Glass, B. (1992). Categorization of individuals on the basis of multiple social features. *Journal of Personality and Social Psychology, 62*, 207–218.
Stephen, A. M. (1969). *Hopi journal of Alexander M. Stephen*. New York: AMS Press.
Tajfel, H. (1982). Social psychology and intergroup relations. *Annual Review of Psychology, 33*, 1–39.
Taylor, S. E., Fiske, S. T., Etcoff, N. L., & Ruderman, A. J. (1978). Categorical and contextual bases of person memory and stereotyping. *Journal of Personality and Social Psychology, 36*, 778–793.
Tiger, L. (1984). *Men in groups* (2nd ed.). New York: Marion Boyars.
Tooby, J., & Cosmides, L. (1988). *The evolution of war and its cognitive foundations*. Retrieved from http://www.psych.ucsb.edu/research/cep/papers/EvolutionofWar.pdf.
Tooby, J., & Cosmides, L. (1996). Friendship and the banker's paradox: Other pathways to the evolution of adaptations for altruism. In W. G. Runciman, J. M. Smith & R. I. M. Dunbar (Eds.), *Evolution of social behaviour patterns in primates and man* (Vol. 88, pp. 119–143). New York: Oxford University Press.
Tooby, J., Cosmides, L., & Price, M. E. (2006). Cognitive adaptations for n-person exchange: the evolutionary roots of organizational behavior. *Managerial and Decision Economics, 27*, 103–129.
Turner, V. W. (1967). *Schism and continuity in an African society*. Ithaca: Cornell University Press.
Van Maanen, J., & Schein, E. H. (1979). Toward a theory of organizational socialization. In B. M. Staw (Ed.), *Research in Organizational Behavior* (Vol. 1, pp. 209–264). Greenwich: JAI Press.
Van Vugt, M., & Van Lange, P. A. M. (2006). Psychological adaptations for prosocial behavior: The altruism puzzle. In M. Schaller, D. T. Kenrick, & J. A. Simpson (Eds.), *Evolution and social psychology* (pp. 237–261). New York: Psychology Press.
Van Vugt, M., Hogan, R., & Kaiser, R. B. (2008). Leadership, followership, and evolution: some lessons from the past. *American Psychologist, 63*, 182–196.
Webster, H. (1908). *Primitive secret societies: A study in early politics and religion*. New York: Macmillian. (Whitefish, MT: Kessinger, 2006 reprint ed.).
Wiessner, P. W., & Tumu, A. (1998). *Historical vines: Enga networks of exchange, ritual, and warfare in Papua New Guinea*. Washington: Smithsonian Institution Press.
Williamson, O. E. (1981). The modern corporation: origins, evolution, attributes. *Journal of Economic Literature, 49*, 1537–1568.

Yamagishi, T., Jin, N., & Kiyonari, T. (1999). Bounded generalized reciprocity: ingroup favoritism and ingroup boasting. *Advances in Group Processes, 16*, 161–197.
Ziller, R. C., & Behringer, R. D. (1965). Motivational and perceptual effects in orientation toward a newcomer. *Journal of Social Psychology, 66*, 79–90.
Zurcher, L. A. (1970). The "friendly" poker game: a study of an emphemeral role. *Social Forces, 49*, 173–185.

Aldo Cimino is a PhD student working on the psychology of enduring coalitions, newcomers, and hazing. He is presently conducting field work with a United States social fraternity and performing experimental investigations of hazing motivation.

Andrew W. Delton is a PhD student who uses experimental and modeling approaches to understand the psychology and evolution of cooperation.