Evolutionary Psychology

www.epjournal.net – 2010. 8(2): 317-335

Original Article

Exploring the Evolved Concept of NEWCOMER: Experimental Tests of a Cognitive Model

Andrew W. Delton, Center for Evolutionary Psychology, Department of Psychology, University of California, Santa Barbara, USA. Email: delton@psych.ucsb.edu (Corresponding author).

Aldo Cimino, Center for Evolutionary Psychology, Department of Anthropology, University of California, Santa Barbara, USA.

Abstract: Enduring human coalitions face the adaptive problem of integrating new members. Although newcomers can provide benefits (e.g., additional labor), newcomers can also create costs (e.g., by free riding). Due to the unique adaptive problems they pose, we hypothesize that the mind contains an evolved concept of NEWCOMER. We test the design of this concept experimentally and show that the activation of the NEWCOMER concept elicits a variety of anti-free rider responses (e.g., a decrease in trust) with adaptively-targeted exceptions (e.g., a minimal increase in exclusion sentiment). These results support the hypothesis that the mind contains specialized concepts for understanding, creating, and sustaining intergenerational coalitions.

Keywords: newcomers, coalitions, free riding, concepts, evolutionary psychology

Introduction

Many human coalitions have overlapping membership generations: new members enter while older members remain. This is not an artifact of modern life and was likely a recurrent feature of human ancestral environments (Keeley, 1996; Tiger, 1984; Webster, 1932). The existence of coalitional newcomers is an important adaptive problem for veterans, one that may have selected for specialized concepts. For although newcomers can increase the net benefits a coalition[1] provides for its members (e.g., more labor, additional

[1] We use the word "coalition" to refer to a subset of human groups whose members are interdependent, whose association is long-lasting, and whose joint actions at least sometimes produce collective goods. We avoid the more general term "group" as the processes we are studying would not necessarily apply to non-coalitional groups (see also Lickel, Hamilton, and Sherman, 2001).

skills), they may also impose significant costs (Alencar, Siqueira, and Yamamoto, 2008; Chagnon, 1988; Ehrhart and Keser, 1999; Ermer, 2008; Honeycutt, 2005; Iannaccone, 1992; Karau and Williams, 1993; Kerr, 1983; McElreath, Boyd, and Richerson, 2003; Moreland, 1985; Moreland and Levine, 2002; Moreland, Levine, and Wingert, 1996; Sosis, 2003; Tooby and Cosmides, 1988; Tooby, Cosmides, and Price, 2006; Williamson, 1981; Ziller and Behringer, 1965). In this article, we develop and test parts of a cognitive model of a hypothesized NEWCOMER[2] concept, a concept that generates adaptive responses to new coalition members. This model predicts, among other effects, that newcomers will elicit anti-free rider responses, but with adaptively-targeted exceptions.

Our approach to this problem combines elements from two theoretical perspectives. First, we adopt a conceptual semantics approach (e.g., Barrett, 2005; Barrett and Kurzban, 2006; Jackendoff, 2006; Lieberman, 2007; Pinker, 2007; Talmy, 2000; Tooby, Cosmides, and Barrett, 2005). This approach focuses on formally characterizing the nature of the information that cognitive mechanisms process (i.e., the operative representations, primitives, and rules). For example, Jackendoff (2006) shows how various sharing rules identified by anthropologists and social psychologists, such as communal sharing and reciprocity (Fiske, 1992), can be decomposed into their elementary primitives and arguments, and how doing so provides additional insights not gained from a more macro level analysis. We attempt a similar analysis here. Thus, we decompose coalitional psychology into some of its constituent concepts (e.g., NEWCOMERS and FREE RIDERS) and the inferences they license.

Second, we use the sociofunctional approach of Neuberg, Cottrell, and colleagues (Cottrell and Neuberg, 2005; Neuberg and Cottrell, 2002; Neuberg, Smith, and Asher, 2000). This approach, derived from evolutionary and social psychology, assumes that the mind is a collection of mechanisms designed by natural selection to generate adaptive social decisions (see also Kenrick, Maner, and Li, 2005; Kurzban, 2003; Maner et al., 2007, 2009; Cosmides and Tooby, 1989). Specifically, this approach focuses on the costs and benefits created by qualitatively different types of social entities that have existed across evolutionarily-relevant time spans—such as coalitions versus mateships—and how these qualitative differences lead to specialized, domain-specific responses. The goal of the sociofunctional approach, as with other evolutionary psychological research, is not to test specific hypotheses about the human ancestral past, but to use what knowledge we have about the past to constrain and generate plausible theories of extant human psychology and then test these theories empirically. By combining these two perspectives, we map previously unexplored features of the psychology of intergenerational coalitions.

The Adaptive Problem of Integrating Newcomers

In principle, coalition entry could be essentially costless for newcomers and veterans, involving only the introduction of mutual common knowledge that a newcomer is a member of the coalition. In other words, coalition entry logically requires only cognitive re-categorization from non-member to member. In the real world, however, newcomer integration often entails significant costs. Newcomers may be required to undergo lengthy

[2] Adopting a standard convention, we use small caps for concepts in the mind (e.g., "NEWCOMERS") and standard font for entities in the world (e.g., "newcomers").

and costly inductions and veterans must pay the cost of administering these inductions. Even where such inductions do not exist, actual newcomer integration appears to be a consistent source of ambivalence, tension, and stress (Bey, 1972; Cini, Moreland, and Levine 1993; Davis, 1998; Honeycutt, 2005; Keating et al., 2005; Moreland, 1985; Moreland and Levine, 2001, 2002; Van Maanen and Schein, 1979). Why this discrepancy? We hypothesize that one reason newcomer integration deviates from essentially cost-free re-categorization is the possibility of newcomers exploiting veterans.

Ancestrally, veteran coalition members were vulnerable to newcomer exploitation in part due to the presence of *automatic benefits*—coalition benefits available to newcomers upon entry at little or no cost (Cimino and Delton, in press). Automatic benefits are typically communal benefits that were created by past collective actions (i.e., club goods or common pool resources for the coalition in question). "Status" (dominance or prestige) is an especially pure example of an automatic benefit: To the extent that a coalition is considered high-status by outsiders, individuals recognized as newcomers to the coalition can immediately begin accruing the benefits of the coalition's status. Because status is nonmaterial, veterans cannot physically prevent recognized members from consuming status, reinforcing its automatic accrual to newcomers.

Prior to joining a coalition, newcomers have generally contributed much less than veterans (or even nothing at all) to the maintenance of automatic benefits. Ancestrally, this regularity would have increased the viability of short-term exploitation by free-riding newcomers—newcomers playing a strategy of taking automatic benefits without sufficiently contributing. Thus, the possibility of exploitative newcomer behavior—in combination with a consistent informational asymmetry between newcomers and veterans—may have acted as a selection pressure for the development of a dedicated NEWCOMER concept.

Note that we do not hypothesize that veterans in ancestral coalitions faced an information vacuum with respect to newcomers. Instead, we hypothesize that inferences about future newcomer behavior within the coalition were (on average) subject to a higher degree of error and uncertainty than inferences about future veteran behavior. The hypothesized NEWCOMER concept is designed to license inferences about new members in the face of information uncertainty. As such, the proper domain of the NEWCOMER concept is those individuals whose recent entry (or quasi-entry) creates imprecise estimates of coalition-specific, behavior-regulating variables.[3]

The Nature of the NEWCOMER Concept

The NEWCOMER concept is designed to take cues of short tenure length as input and generate parametric modulations of existing motivational systems as output (e.g., decreases in trust and entitlement). Although it is possible that there are unique motivational systems designed only to respond to newcomers, in this article we focus on how categorization as a newcomer affects responses that are relevant to other types of coalition members as well,

---

[3] On this view, simply having the ordinally shortest tenure is not sufficient for categorization as a NEWCOMER, as established members with lengthy tenure may nonetheless be newest relative to other members. The length of tenure required to stop being categorized as a NEWCOMER, and how this interacts with the characteristics of the coalition, is an open question.

such as monitoring and sanctioning. For ease of exposition, we speak dichotomously in terms of "newcomers" and "veterans." However, we hypothesize that (a) the mind encodes the tenure lengths of individual coalition members as continuous variables, (b) a member's tenure length (among other variables) influences responses to and judgments about that member, and (c) individuals with very short tenure—newcomers—represent a privileged portion of the tenure continuum (on "shortness," see Note 3). By privileged, we mean that the extremity of responses to newcomers is not well predicted by simple extrapolation from responses to longer tenure lengths. This has the effect of turning an underlying continuous dimension (tenure) into an almost categorical set of responses (see Hampton, 2007, for converging research on continuous dimensions and categorical responding in cognitive psychology). Previous work addressed this directly by presenting subjects with individuals who were newcomers, medium-term veterans, long-term veterans, or very long-term veterans (Cimino and Delton, in press, Exp. 1). As hypothesized, subjects' responses distinguished between the various tenure lengths, but newcomers received especially negative responses. Indeed, subjects seemed to treat newcomers as if they were quasi-free riders. However, an experiment in Cimino and Delton (in press, Exp. 2) also suggests that newcomer categorization can proceed independently of free rider categorization. In this study, subjects viewed a social world of newcomers and veterans, half of whom were free riders and half of whom were cooperators. Despite the presence of free riders—who, by hypothesis, should activate many of the same responses as newcomers—subjects continued to track the newcomer/veteran distinction among the cooperative targets. Among newcomer targets, moreover, subjects differentiated by free rider/cooperator status. Together, these two results imply that newcomers are tracked separately from free riders. This result creates an odd conflation: Despite being assigned to separate categories, newcomers and free riders elicit similar responses.

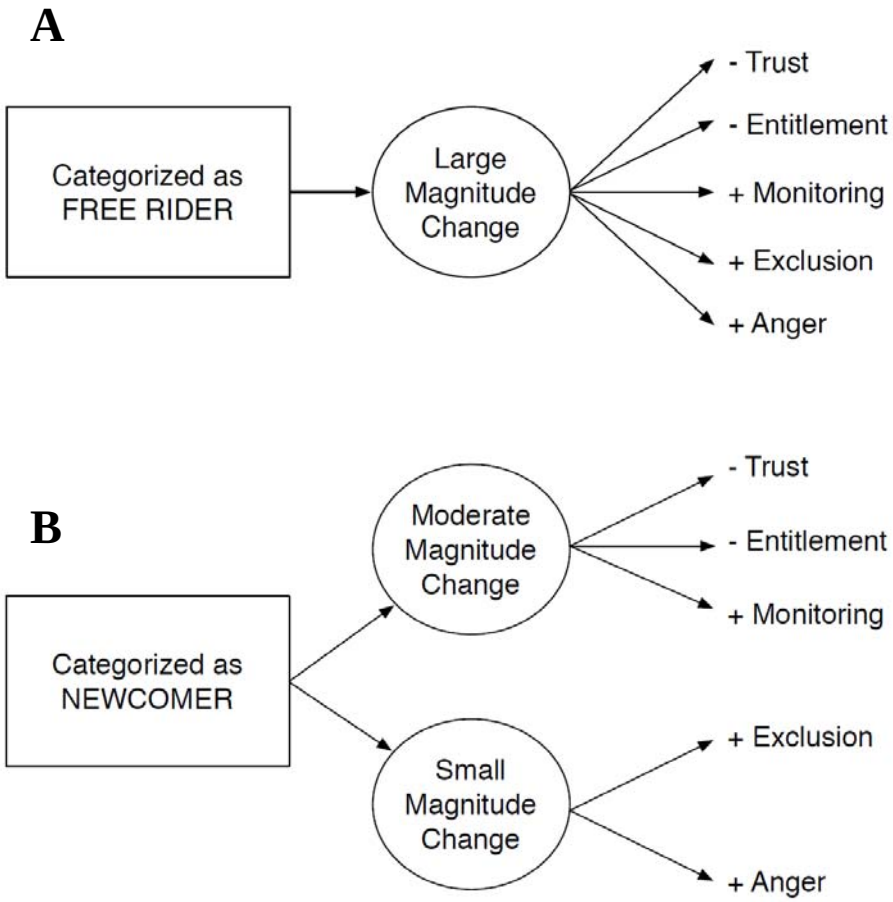
Given that there is already evidence that the mind contains a FREE RIDER concept (which, like tenure, is also a continuum) and that this concept embodies an evolved logic (Delton et al., 2006; Price, 2006; Price, Cosmides, and Tooby, 2002), why not use the FREE RIDER concept for identifying and responding to newcomers? We suggest that the function of having separate concepts of NEWCOMER and FREE RIDER is to allow for distinct responses to different adaptive problems (each of which, however, has partially overlapping functional requirements). In this article, we propose a cognitive model of (some of) the distinctions between NEWCOMER and FREE RIDER, and provide initial empirical support by testing for three predicted design features.

Predicted Design Feature 1: Newcomers Will Elicit Anti-Free Rider Responses with Adaptively-Targeted Exceptions

There are at least five inferences that should be made when an individual is categorized as a FREE RIDER, some of which should also be made when an individual is categorized as a NEWCOMER: decreases in trust and benefit entitlement, and increases in monitoring, exclusion sentiment, and anger (Barclay, 2004; Boyd and Richerson, 1988, 1992; Dawes, 1980; Fehr and Gächter, 2000; Hauert et al., 2002a, 2002b; Kiyonari and Barclay, 2008; Komorita and Parks, 1995; Kurzban et al., 2001; Masclet et al., 2003; Neuberg, Smith, and Asher, 2000; O'Gorman, Henrich, and Van Vugt, 2008; Ostrom, Walker, and Gardner, 1992; Panchanathan and Boyd, 2004; Van Lange et al., 1992; Yamagishi, 1986). Changes in trust imply that the mind is updating its expectation that the

individual will consider the self's or allies' interests when making unmonitored decisions (Cottrell, Neuberg, and Li, 2007; Kelley et al., 2003; Ostrom and Walker, 2003; Simpson, 2007). Changes in benefit entitlement imply that the mind is updating whether the individual's consumption of a resource is considered warranted versus illicit (sensu Cosmides and Tooby, 1989). Changes in monitoring imply that the mind is updating its time allocation to spend more time examining the individual's behavior (Ostrom, 2000; Price, 2006). Changes in exclusion imply the mind is updating the permissibility of the individual being a member of the coalition (Adler and Adler, 1995; Kurzban and Leary, 2001). Changes in anger (sometimes referred to as punitive sentiment) imply the activation of mechanisms that threaten aggression or withdrawal of cooperation (Lazarus, 1991; Sell, Tooby, and Cosmides, 2009; Yamagishi, 1986).

Figure 1. A model of the inferences elicited when an individual is categorized as (A) a free rider or (B) a newcomer. In the figures, boxes represent information coming into this part of the system based on previous perceptual, inferential, or decision processes; circles represent functions that change internal magnitudes by varying degrees.



Importantly, the degree to which these inferences are activated should depend on whether the target is categorized as a NEWCOMER or a FREE RIDER. If the target is categorized as a FREE RIDER, then all of these inferences should be strongly activated; this is depicted in Figure 1A. Many of these inferences should also be activated when a target is

categorized as a NEWCOMER. However, it defeats the purpose of incorporating newcomers into a coalition if they immediately activate strong responses of anger and exclusion sentiment. Arbitrary newcomer-directed anger and exclusion sentiment are likely to generate disaffiliation or coordination problems (but see Cimino, 2010). Thus, on our analysis, veterans must respond to newcomers in ways similar to free riders, but with adaptively-targeted exceptions in their profile of responses; this is depicted in Figure 1B. Thus, Design Feature 1 proposes that the mind contains the mechanisms depicted in Figure 1A and Figure 1B.

An alternative hypothesis might posit that newcomers do not activate a separate NEWCOMER concept but instead weakly activate the FREE RIDER concept. On this hypothesis, the pattern of inferences elicited by newcomers should mirror those elicited by free riders, but with an attenuated effect size. This hypothesis views the mind as containing the mechanism depicted in Figure 1A, but not Figure 1B.

Using vignettes, Experiment 1 tests for the existence of Design Feature 1. First, we examine whether newcomers elicit anti-free rider responses with targeted exceptions. Will newcomers, relative to veterans, strongly activate responses of monitoring, untrustworthiness, and low entitlement—the anti-free rider responses—but only weakly activate responses of anger and exclusion sentiment—the targeted exceptions? Even if we found support for this pattern of results, however, an alternative hypothesis might predict that free riders have the same targeted exceptions. To rule this out, we also examine whether free riders elicit a different set of anti-free rider responses. In other words, we test whether free riders, relative to cooperators, strongly activate all five measured anti-free rider responses. The confirmation of both sets of patterns—showing a qualitative difference between responses to newcomers (relative to veterans) and responses to free riders (relative to cooperators)—would support the hypothesis of a specialized NEWCOMER concept while ruling out a plausible alternative.

Predicted Design Feature 2: Newcomer Consumption of Automatic Benefits Will Elicit Stronger Anti-Free Rider Responses

Automatic benefits are communally shared and are not the property or product of any one member. Given that coalition entry logically requires only the introduction of mutual common knowledge (see above), it is possible that the mind could view newcomers and veterans as equally entitled to automatic benefits.[4] However, if the mind contains evolved inference rules that embody a correlation between newcomer status and free riding, then veterans will treat newcomer consumption of automatic benefits as a cue of a potentially exploitative strategy. This predicts that newcomers who consume automatic benefits will elicit a profile of responses more appropriate for free riders. Because the conceptual structure of coalitional psychology licenses the inference that veterans are entitled to automatic benefits, there should be little to no recalibration if they are observed consuming them. We test this in Experiment 1 by contrasting a Benefit Rejection condition with a Benefit Acceptance condition. Our model predicts that newcomers will be viewed

[4] Of course, if a newcomer's *rate* of contribution (as opposed to their *absolute* level of contribution) falls below some threshold, they may be categorized as free riders. As described in the article, however, the adaptive problem of free riders is somewhat different from the adaptive problem of newcomers.

more negatively in the Benefit Acceptance condition than in the Benefit Rejection condition. Moreover, this effect should be comparatively weaker for veterans.

Predicted Design Feature 3: Anti-Free Rider Responses Will Be Attenuated by Large Labor Inputs

Observing a newcomer consuming automatic benefits is predicted to elicit anti-free rider responses. However, if the newcomer has already paid costs to provision the coalition, it reduces the likelihood that the newcomer is engaged in a purely exploitative strategy (cf. Moreland and Levine, 1982; Stiff and Van Vugt, 2008; Van Vugt and Hart, 2004). (All else equal, this logic also applies to veterans.) If the mind contains inference rules that embody this correlation, then we should be able to attenuate, eliminate, or even reverse the effects of automatic benefit consumption on anti-free rider responses to newcomers. We test this in Experiment 2 by comparing newcomers who have contributed a great deal (given their tenure) to veterans who have contributed the minimal amount for coalition membership (given their tenure).

Experiment 1: Targeted Exceptions and Automatic Benefits

Materials and Methods

Subjects

Subjects were 39 students (30 female) at the University of California, Santa Barbara. Subjects received partial course credit for participation.

Procedure

The entire experiment was computerized and self-paced. Subjects were asked to imagine themselves as a veteran member of a group called the Ice Walkers. To help increase immersion, subjects wore wristbands identifying their membership in the Ice Walkers. As we are interested in newcomers to coalitions specifically (see Note 1), not newcomers to groups more generally, we therefore described the Ice Walkers as an enduring, interdependent, benefit-generating social organization.

Subjects learned that the Ice Walkers were arctic specialists engaged in activities requiring intense cooperation (e.g., climbing, hunting). Importantly, subjects read that the Ice Walkers were prestigious in the eyes of outsiders and that this prestige applied to newcomers as well as veterans. Subjects then read about eight members of the Ice Walkers: four veterans and four newcomers. Half of the newcomers had three weeks of tenure, half had three days of tenure. All newcomers were described as having participated in zero Ice Walker expeditions. Subjects read that it was not logistically possible for newcomers to participate in an expedition until the fourth week of membership. Tenure for veteran members was similarly divided in half between five- and nine-year members. Veterans were described as having participated in either 100 or 200 expeditions, respectively. Subjects were instructed to imagine that they had been a member of the Ice Walkers for six years and had completed 140 expeditions.

Subjects first read four short vignettes: two about newcomers and two about veterans. Each of the four vignettes described a situation wherein a member was given an opportunity to benefit from their status as an Ice Walker. These benefits were all offered by

non-members: free sporting equipment, entrance to an exclusive club, free drinks at a bar, or an invitation to a party. For subjects in the Benefit Rejection condition, these vignettes described the member turning down the benefit. For subjects in the Benefit Acceptance condition, these vignettes described the member accepting the benefit.

Subjects in both conditions then read four additional vignettes about the remaining two newcomers and two veterans. Here, all four members were described as free riding on the efforts of the coalition: not contributing money to pay for a party, not helping to put away equipment after drills, not cleaning up after a charity event, or not helping re-paint the Ice Walker facilities. The free riding vignettes did not vary by condition.

Our goal is to test whether coalition newcomers elicit a profile of responses that is in many ways similar to the responses elicited by free riders. It would therefore defeat the purpose of the study to ask subjects to read vignettes about actual free riding prior to reading vignettes about benefit acceptance or rejection. Reading free riding vignettes first might prime anti-free riding responses. To avoid this, the block of free riding vignettes always came last. Within each block, all members had a unique length of tenure, the order of members was randomized, and the pairing of members to specific vignettes was randomized.

After each vignette, subjects expressed their responses to the members on five scales: (1) Exclusion: "Do you want this member kicked out of the group?"; (2) Anger: "Do you feel angry at this person?"; (3) Trust: "Do you think this member is trustworthy?"; (4) Monitoring: "Should you watch this person to make sure he does his fair share of the work?"; (5) Negative entitlement: "Do you think this group member is unfairly benefiting from the work of OTHER group members?" (We call this negative entitlement because higher ratings reflect lower entitlement and lower ratings reflect higher entitlement.) Each question had a scale from 1 to 6 (1 = "not at all" and 6 = "very much"). Questions were asked in a different, random order for every member. For each question type, results are based on the average rating given to the two newcomers or the two veterans within the benefit acceptance/rejection and free riding blocks.

Results

All significance tests use two-tailed *p*-values. Standard Pearson correlations (*r*) are included as a measure of effect size. Unless otherwise noted, we test hypotheses using focused contrasts (Rosenthal, Rosnow, and Rubin, 2000). Some effects sizes are labeled $r_{\text{interaction}}$. These effects (and associated inferential statistics) represent whether the difference between, e.g., newcomers and veterans on one dimension is larger than the difference between newcomers and veterans on a second dimension. Statistically, they are therefore interactions with one *df* in their numerator and can be tested using focused contrasts (Rosenthal et al., 2000).

Testing Design Feature 1: Do Newcomers Elicit Anti-Free Rider Responses with Adaptively-Targeted Exceptions?

As predicted, newcomers were rated more negatively than veterans on all scales (see the "Test of Difference" columns in Table 1). Moreover, so were free riders relative to cooperators. To test whether anti-free rider responses to newcomers had targeted exceptions, we proceed in two steps. First, we test whether differences between newcomers

and veterans on anger and exclusion sentiment are statistically smaller than differences between newcomers and veterans on trust, monitoring, and negative entitlement (as in Figure 1B). Second, we test whether this pattern is different for free riders relative to cooperators (as in Figure 1A). (For all tests, we use the data from the Benefit Rejection condition, as it provides the cleanest test of the hypothesis; the same patterns emerge, however, for the Benefit Acceptance condition.[5])

Are there targeted exceptions for newcomers? Yes: Newcomers depicted rejecting automatic benefits generated more anger (r = .49) and more exclusion sentiment (r = .39) than veterans depicted rejecting automatic benefits, but these differences were much smaller than differences in trust (r = .83), monitoring (r = .77), and negative entitlement (r = .76), all ts(18) > 4 for comparing effect sizes to each other, all ps < .001, all $r_{interaction}$s ranged .69 - .81. Moreover, there were no differences between the effect sizes for anger and exclusion sentiment or between any of the effect sizes for trust, monitoring, and negative entitlement, all ps > .24.

This pattern of anti-free rider responses with targeted exceptions is hypothesized to be unique to newcomers compared with veterans; it should not hold if we instead compare free riders and cooperators.[6] Do responses toward actual free riders lack the targeted exceptions of newcomers? In general, yes: First, consider only newcomer free riders relative to newcomer cooperators. As predicted, the profile of responses was very negative toward newcomer free riders. Newcomer free riders generated more anger than newcomer cooperators (r = .97), more exclusion sentiment (r = .96), less trust (r = .94), more monitoring (r = .91), and more negative entitlement (r = .93). This pattern for newcomer free riders versus newcomer cooperators was qualitatively different than the pattern for newcomers versus veterans, revealing a lack of targeted exceptions. Notably, although not specifically predicted by the theory depicted in Figure 1, the effects for anger and exclusion sentiment were descriptively *larger* than the other effect sizes.

Does the absence of targeted exceptions apply to veteran free riders as well? Veteran free riders, compared to veteran cooperators, generated more anger (r = .96), less trust (r = .92), more monitoring (r = .93), and more negative entitlement (r = .92). Again, although not directly predicted by the theory, there was no targeted exception for anger; it was descriptively larger than the effects for trust, monitoring, and negative entitlement. For exclusion sentiment, however, the difference between veteran free riders and veteran cooperators (r = .88) was smaller than the above differences between veteran free riders and veteran cooperators on trust, monitoring, and negative entitlement (all ps for the differences in effect sizes ≤ .01). While this is strictly inconsistent with our initial hypothesis, it may evidence a functional logic. That is, long tenure may imply a significant history of contribution and thus buffer against exclusion for a single act of free riding.

---

[5] There is evidence of carryover effects from the benefit acceptance/rejection vignettes to the free riding vignettes—compare the absolute levels of responses to free riders in the top and bottom halves of Table 1. Given that the same patterns emerge in both conditions, however, this suggests that these carryover effects do not mitigate the larger conclusions we draw about newcomers and targeted exceptions.

[6] For ease of exposition, we use the term "cooperators" instead of the term "non-free riders." However, it should be remembered that these targets were never explicitly described as free riding or cooperating; instead, they simply accepted or rejected automatic benefits.

Table 1. Responses elicited by newcomers and veterans in Experiment 1

				Test of Difference				Test of Difference	
		Newcomers	Veterans	*r*	*p*	Free Riders (Newcomers)	Free Riders (Veterans)	*r*	*p*
Benefit Rejection Condition	Exclusion	1.21 (0.42)	1.03 (0.11)	.39	.090	4.74 (1.19)	3.13 (1.13)	.81	.0001
	Anger	1.39 (0.57)	1.08 (0.34)	.49	.030	4.95 (1.04)	4.68 (0.99)	.32	.163
	Trust	4.32 (0.75)	5.61 (0.61)	.83	10^{-5}	1.63 (0.78)	2.79 (1.06)	.79	.0001
	Monitoring	2.82 (1.15)	1.47 (0.68)	.77	.0001	5.37 (0.93)	4.53 (1.24)	.57	.008
	Negative Entitlement	2.45 (1.09)	1.11 (0.27)	.76	.0001	5.61 (0.59)	4.55 (1.44)	.60	.005
Benefit Acceptance Condition	Exclusion	2.73 (1.31)	1.73 (0.99)	.51	.019	5.00 (1.22)	3.43 (1.25)	.74	.0001
	Anger	3.20 (1.16)	2.00 (1.19)	.68	.0007	5.70 (0.52)	5.35 (0.73)	.51	.019
	Trust	2.80 (0.75)	4.40 (1.12)	.77	.0001	1.40 (0.55)	2.45 (1.10)	.81	.0001
	Monitoring	4.78 (1.26)	2.25 (1.25)	.86	10^{-6}	5.78 (0.64)	5.15 (0.89)	.65	.002
	Negative Entitlement	4.28 (1.25)	1.98 (1.06)	.85	10^{-5}	5.70 (0.85)	5.30 (0.78)	.42	.061

Note: The "Newcomers" and "Veterans" columns show means, with standard deviations in parentheses. For the Benefit Rejection condition, $df = 18$; for the Benefit Acceptance condition, $df = 19$. In lieu of *t*-values, we present effect sizes (*r*). For interested readers, $t = \text{Sqrt}(r^2 * df * (1 - r^2)^{-1})$.

Altogether, the pattern of results when comparing free riders to cooperators appears qualitatively different from the pattern of results when comparing newcomers to veterans. But are these qualitative differences statistically meaningful? We tested this using two repeated measures ANOVAs. Both ANOVAs contrasted the pattern of responses elicited by newcomers (relative to veterans) with either (a) the responses elicited by newcomer free riders (relative to newcomer cooperators) or (b) the responses elicited by veteran free riders (relative to veteran cooperators). Both ANOVAs had two factors. The first factor had two levels, with one level representing difference scores between newcomers and veterans and the second level representing difference scores between, e.g., newcomer free riders and newcomer cooperators. The second factor had five levels, with each level representing a type of response (e.g., anger, trust). Does the patterning of the responses depend on whether the comparison involves newcomers and veterans instead of free riders and cooperators? That is, do the ANOVAs reveal significant interactions? In both cases, they did: The patterning of responses to newcomers was qualitatively different from the patterning of responses to either type of free rider. This is shown statistically by the large interaction effect in the ANOVA contrasting newcomer/veteran responses with newcomer free rider/newcomer cooperator responses, $F(4,16) = 7.42$, $p = .0001$, partial $\eta^2 = .76$, and the large interaction effect in the ANOVA contrasting the newcomer/veteran responses with the veteran free rider/veteran cooperator responses, $F(4,16) = 7.42$, $p = .002$, partial $\eta^2 = .66$. (The two main effects were also significant in both ANOVAs, all *p*s < .05.) These qualitative differences cast doubt on the alternative hypothesis that newcomers are simply weakly activating the FREE RIDER concept.

Testing Design Feature 2: Does Newcomer Consumption of Automatic Benefits Elicit Stronger Anti-Free Rider Responses?

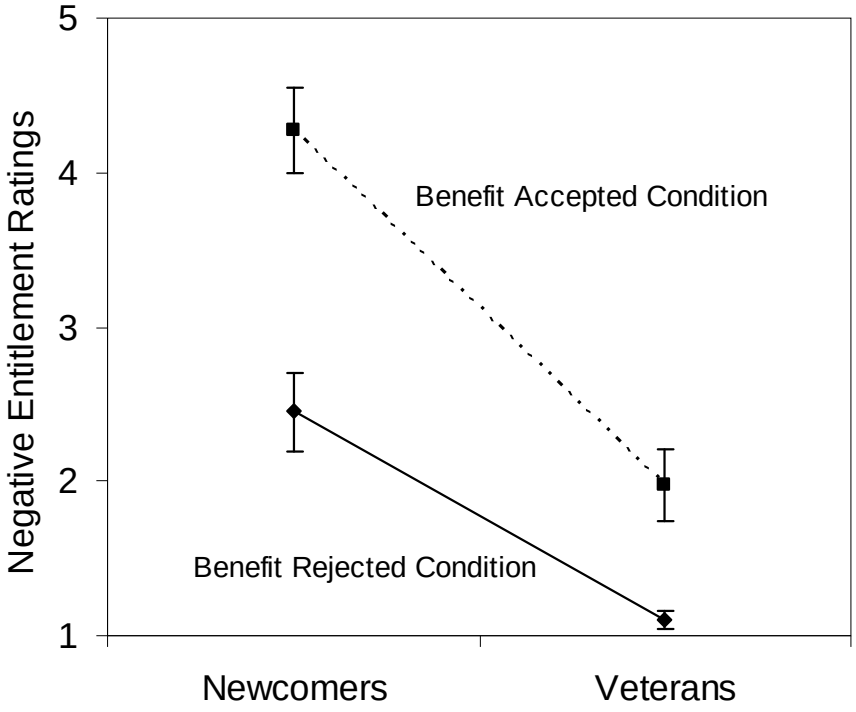
As predicted, newcomers observed accepting automatic benefits, relative to newcomers rejecting automatic benefits, were viewed more negatively (*r*s ranged .62-.72, all *p*s < .0001; see Table 1 for descriptives). Although the effects were generally smaller,

this was also true of veterans observed consuming automatic benefits relative to veterans rejecting such benefits (*r*s ranged .37-.56, all *p*s ≤ .022; see Table 1 for descriptives).

Did newcomers consuming automatic benefits elicit an especially pronounced activation of anti-free rider responses? This was tested by comparing whether newcomers, relative to veterans, elicit especially negative responses in the Benefit Acceptance condition compared to the Benefit Rejection condition, where the difference between newcomers and veterans should be comparatively muted. This was the case for anger ($t(37) = 2.66$, $p = .011$, $r_{interaction} = .40$), exclusion ($t(37) = 1.97$, $p = .056$, $r_{interaction} = .31$), monitoring ($t(37) = 2.68$, $p = .011$, $r_{interaction} = .40$), and negative entitlement ($t(37) = 2.23$, $p = .032$, $r_{interaction} = .34$). Figure 2 depicts this effect for negative entitlement as an example.

Results for trust did not support the prediction of especially pronounced negative responses to newcomers consuming automatic benefits; consumption of automatic benefits produced equal decreases in trust for both newcomers and veterans ($t(37) = 0.84$, $p = .405$, $r_{interaction} = .14$). One possible explanation for this result is that veterans set trust levels so low for newcomers that a large reduction is unnecessary if automatic benefits are consumed. Nonetheless, in four of five tests, the effect of consuming automatic benefits was larger for newcomers than veterans.

Figure 2. Automatic benefits and negative entitlement. Higher ratings reflect *less* entitlement to coalition benefits. The results from the negative entitlement measure are used as an example of the effect of consuming automatic benefits on anti-free rider responses; ratings could range from 1 to 6. Measures of anger, exclusion, and monitoring showed similar effects. Error bars represent ±SEM.



Experiment 2: Overriding Free Rider Status Through Labor Inputs

Experiment 1 provided evidence consistent with Design Feature 1: Newcomers elicited anti-free rider responses with targeted exceptions. It also provided evidence consistent with Design Feature 2: Newcomers received especially negative responses when consuming automatic benefits. In Experiment 2, we test Design Feature 3, whether labor contributions can override free rider status, even in the strong case where newcomers consume automatic benefits.

Materials and Methods

Subjects

Subjects were 38 students (27 female) at the University of California, Santa Barbara. Subjects received partial course credit for participation.

Procedure

This experiment was identical to Experiment 1 with four exceptions. First, we removed the vignettes involving free riding. Second, we added four additional vignettes where an automatic benefit was offered (free car wash, extension on a class paper, free food at a bar, moving to the head of a long line to buy college textbooks). Third, all subjects read vignettes in which the target member accepted an automatic benefit. Fourth, to manipulate labor input, half the members of each tenure length were described as "putting in the minimal effort required to be a part of the group" and half as "putting in much more effort than the group requires of its members." Consistent with their relative labor inputs, the computer also displayed a specific example (e.g., "coming to all required discussion meetings" versus "spending hours repairing the group's equipment"). (Note that it is impossible to equalize *cumulative* labor inputs between newcomers and veterans without causing veterans to appear as extremely low contributors; tenure and cumulative contribution are necessarily confounded.) Importantly, members with low labor inputs were not free riding. Instead, they simply contributed the minimum necessary to remain in good standing.

Results

Testing Design Feature 3: Are Anti-Free Rider Responses Attenuated by Large Labor Inputs?

Both labor input and tenure length had relatively strong, independent effects. There was a large effect of labor input on all variables such that individuals contributing more labor were viewed more positively, all rs $\geq .72$ ("Effect of Labor" column in Table 2). There was also an effect of tenure length on all variables such that veterans were viewed more positively, all rs $\geq .39$ ("Effect of Tenure" column in Table 2). There were, however, no interactions between the effects of labor input and tenure length on any variables (see "Interaction" column in Table 2).

Table 2. Responses elicited by newcomers and veterans in Experiment 2

	High Labor		Low Labor		Effect of Labor		Effect of Tenure		Interaction		High Labor Newcomers vs. Low Labor Veterans	
	Newcomers	Veterans	Newcomers	Veterans	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*
Exclusion	1.58 (0.96)	1.22 (0.41)	2.75 (1.45)	2.39 (1.31)	.78	10^{-8}	.39	.014	.00	1.0	.58	.0001
Anger	1.97 (1.13)	1.62 (0.85)	3.18 (1.41)	2.64 (1.28)	.72	10^{-6}	.59	.0001	.14	.403	.54	.0004
Trust	4.20 (1.11)	4.72 (1.13)	2.80 (0.93)	3.63 (1.21)	.78	10^{-8}	.61	.0001	.16	.319	.41	.01
Monitoring	2.72 (1.38)	1.74 (0.84)	4.72 (1.10)	3.75 (1.45)	.88	10^{-12}	.75	10^{-7}	.01	.964	.56	.0002
Negative Entitlement	2.45 (1.49)	1.62 (0.95)	4.36 (1.51)	3.34 (1.53)	.82	10^{-9}	.70	10^{-6}	.11	.485	.46	.003

Note: The "Newcomers" and "Veterans" columns show means, with standard deviations in parentheses. $df = 37$.

Design Feature 3 predicts that, because high labor inputs can serve as a cue that a person is not using an exploitative strategy, newcomers (and veterans) observed making high labor inputs will elicit reduced anti-free rider responses. Although not logically required by the theory, a strong test of this prediction would be to show that newcomers with high labor inputs are viewed more positively than veterans with low labor inputs. Is this the case? Yes: For all five responses, newcomers with high labor inputs were viewed more positively than veterans with low labor inputs, all rs $\geq .41$ ("High Labor Newcomers vs. Low Labor Veterans" column in Table 2). (Statistically, these tests are equivalent to showing that the effect of labor input is greater than the effect of tenure.) It appears then that the increase in anti-free rider responses elicited by newcomer status can be reduced by high labor inputs, even when the newcomer has consumed automatic benefits.

Discussion

Because many coalitions produce automatic benefits, veterans should be designed to view newcomers with suspicion. Supporting this prediction, newcomers elicited a number of anti-free rider responses. Because the adaptive problem of newcomers is not the same as that of free riders, however, there should be adaptively-targeted exceptions. Supporting this prediction, newcomers did not strongly activate anger and exclusion sentiment. Observing a newcomer consuming automatic benefits should increase the estimation that the newcomer is playing an exploitative strategy. Supporting this prediction, observing a newcomer consuming automatic benefits increased anti-free rider responses. Observing a coalition member's high labor inputs should lower the estimation that the member is a free rider. Supporting this prediction, observing individuals making high labor inputs reduced anti-free rider responses; this effect was so strong that high-contributing newcomers were viewed more positively than low-contributing veterans. Collectively, these results are consistent with the existence of Design Features 1, 2, and 3 and, more generally, with the existence of a specialized NEWCOMER concept.

Nonetheless, we note several caveats. First, it is unlikely that the greater positive responses towards high-contributing newcomers relative to low-contributing veterans would be as easily elicited in real-world coalitions. Instead, we believe this result illustrates the more general proposition that labor inputs can have important mitigating effects on

responses to newcomers (and other coalition members). Second, our vignettes focused on a single coalition with communal benefits, coordination, and cooperative interdependence. These features were likely common to long-lived ancestral coalitions. However, variations in the magnitude of coalitional properties should cause adaptive changes in the responses generated by newcomers (cf. Cini et al., 1993; Tooby et al., 2006). For instance, as the desired size of a coalition becomes smaller than the actual size, the value of newcomers may increase. This, in turn, may lead veterans to make concessions to newcomers, according them greater trust and quicker access to coalition benefits (Cini et al., 1993). Other cues from the local ecology may also be important, such as resource scarcity or endemic warfare. Ecological pressures such as these may increase the negative responses elicited by newcomers (Sosis, Kress, and Boster, 2007). Finally, some newcomers may have idiosyncratic features that change their valuation to veterans, such as the possession of rare skills or ties to high-status individuals (Moreland et al., 1996). Thus, although we suggest that the NEWCOMER concept ties inputs (e.g., tenure length) in principled ways to the activation of downstream responses (e.g., trust, anger), a number of other concepts and computational elements should interact with the NEWCOMER concept, moderating the final responses directed at newcomers.

Because our results were obtained using vignettes, their applicability to real-world settings may be in question. We suspect, however, that our findings are not particular to our laboratory stimuli. First, coalitions often actively seek out new members (Cini et al., 1993) and, in some populations, forcibly induct them (Cimino, 2010; Jankowski, 1991). This is consistent with the hypothesis that exclusion sentiment is selectively muted toward newcomers. Second, real-world newcomers are often subjected to monitoring periods during which they have limited access to coalition benefits. This is consistent with the hypothesis that newcomers are commonly assigned low trustworthiness and entitlement levels (Honeycutt, 2005; Moreland and Levine, 2002; Van Maanen and Schein, 1979; Webster, 1932). Third, the active abuse of newcomers (i.e., hazing) is a recurrent cross-cultural phenomenon, suggesting that newcomers frequently induce negative responses, particularly in benefit-rich coalitions (Cimino, 2010; Ramey, 1982; Schlegel and Barry, 1979; Sosis, Kress, and Boster, 2007; Tiger, 1984; Walker, 1968). We note the congruence between these real-world regularities and our results, which show that newcomers trigger unusually strong negative responses when they attempt to consume certain established coalition benefits. Thus, our experimental findings and the findings of other researchers appear to be triangulating on real features of the mind.[7]

Altogether, our results support the hypothesis that the mind contains a rich set of psychological machinery for understanding, creating, and sustaining intergenerational coalitions (Cimino and Delton, in press; Cini et al., 1993; Moreland and Levine, 2002;

---

[7] Are these features unique to human minds or shared with other primates? In answering this question, the central problem is finding the appropriate analog for our definition of "coalition" in non-human primates. Chimpanzees, for instance, form loose task groups to hunt red colobus monkeys (Mitani and Watts, 2001). However, it is not clear that chimpanzees represent these groups as enduring coalitions that generate and maintain communal benefits over time. As such, it is unclear why they would possess concepts of membership, tenure, coalition entry, etc. A fuller comparative analysis of human coalitions and the social structures of other primates is outside the purview of this article, but see Rodseth et al. (1991).

Tooby et al., 2006). In other words, the mind may contain a folk theory of coalitions that allows humans to coordinate their actions to produce mutually shared benefits (Cosmides, Tooby, and Kurzban, 2003; Hirschfeld, 2001; Tooby et al., 2006). The existence of these specialized concepts, and numerous others, is arguably what has given rise to the unprecedented coalitional abilities of *Homo sapiens*.

Acknowledgements: We thank Leda Cosmides for feedback on a previous draft.

Received 1 April 2010; Revision submitted 12 May 2010; Accepted 18 May 2010

References

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

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

Barclay, P. (2004). Trustworthiness and competitive altruism can also solve the "tragedy of the commons". *Evolution and Human Behavior*, *25*, 209-220.

Barrett, H. C. (2005). Enzymatic computation and cognitive modularity. *Mind and Language, 20*, 259-287.

Barrett, H. C., and Kurzban, R. (2006). Modularity in cognition: Framing the debate. *Psychological Review*, *113*, 628-647.

Bey, D. R. (1972). Group dynamics and the "FNG" in Vietnam: A potential focus of stress. *International Journal of Group Psychotherapy, 22*, 22-30.

Boyd, R., and Richerson, P. J. (1988). The evolution of reciprocity in sizeable groups. *Journal of Theoretical Biology, 132*, 337-356.

Boyd, R., and Richerson, P. J. (1992). Punishment allows the evolution of cooperation (or anything else) in sizable groups. *Ethology and Sociobiology, 13*, 171-195.

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.

Cimino, A., and Delton, A. W. (in press). On the perception of newcomers: Towards an evolved psychology of intergenerational coalitions. *Human Nature*.

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

Cosmides, L., and Tooby, J. (1989) Evolutionary psychology and the generation of culture, Part II. Case study: A computational theory of social exchange. *Ethology and Sociobiology, 10*, 51-97.

Cosmides, L., Tooby, J., and Kurzban, R. (2003). Perceptions of race**.** *Trends in Cognitive Sciences*, *7*, 173-179.

Cottrell, C. A., and Neuberg, S. L. (2005). Different emotional reactions to groups: A sociofunctional threat-based approach to "prejudice." *Journal of Personality and Social Psychology, 88*, 770-789.

Cottrell, C. A., Neuberg, S. L., and 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 B: The Physical Sciences and Engineering*, *58*, 4499.

Dawes, R. M. (1980). Social dilemmas. *Annual Review of Psychology, 31,* 169-193.

Delton, A. W., Robertson, T. E., Cosmides, L., and Tooby, J. (2006). *Are free riders defined by long-term under-contribution or by an adaptive logic?* Poster presented at the 4th Annual Evolutionary Psychology Pre-conference to the 7th Annual Conference of the Society for Personality and Social Psychology, Palm Springs, CA, January 2006.

Ehrhart, K. M., and 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 B: The Physical Sciences and Engineering*, *68*, 361.

Fehr, E., and Gächter, S. (2000). Cooperation and punishment in public goods experiments. *American Economic Review, 90*, 980-994.

Fiske, A. P. (1992). The four elementary forms of sociality: Framework for a unified theory of social relations. *Psychological Review, 99*, 689-723.

Hampton, J. A. (2007). Typicality, graded membership, and vagueness. *Cognitive Science, 31*, 355-384.

Hauert, C., De Monte, S., Hofbauer, J., and Sigmund, K. (2002a). Replicator dynamics for optional public good games. *Journal of Theoretical Biology, 218*, 187-194.

Hauert, C., De Monte, S., Hofbauer, J., and Sigmund, K. (2002b). Volunteering as red queen mechanism for cooperation in public goods games. *Science, 296*, 1129-1132.

Hirschfeld, L. A. (2001). On a folk theory of society: Children, evolution, and mental representations of social groups. *Personality and Social Psychology Review, 5*, 107-117.

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

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, MA: MIT Press.

Jankowski, M. S. (1991). *Islands in the street: Gangs and American urban society*. Berkeley, CA: University of California Press.

Karau, S. J., and 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., and McCormick, J. (2005). Going to college and unpacking hazing: A functional approach to decrypting initiation practices among undergraduates. *Group Dynamics: Theory, Research, and Practice, 9*, 104-126.

Keeley, L. H. (1996). *War before civilization*. New York: Oxford University Press.

Kelley, H. H., Holmes, J. G., Kerr, N. L., Reis, H. T., Rusbult, C. E., and Van Lange, P. A. M. (2003). *An atlas of interpersonal situations*. New York: Cambridge University

Press.
Kenrick, D. T., Maner, J. K., and Li, N. P. (2005). Evolutionary social psychology: From selfish genes to collective selves. In D. M. Buss (Ed.), *Handbook of evolutionary psychology* (pp. 803-827). Hoboken, NJ: Wiley and Sons.
Kerr, N. L. (1983). Motivation losses in small groups. *Journal of Personality and Social Psychology, 45*, 819-828.
Kiyonari, T., and Barclay, P. (2008). Free-riding may be thwarted by second-order rewards rather than punishment. *Journal of Personality and Social Psychology*, *95*, 826-842.
Komorita, S. S., and Parks, C. D. (1995). Interpersonal relations: Mixed-motive interaction. *Annual Review of Psychology, 46*, 183-207.
Kurzban, R. (2003). Biological foundations of reciprocity. In E. Ostrom and J. Walker (Eds.), *Trust and reciprocity: Interdisciplinary lessons from experimental research* (pp. 105-127). New York: Sage.
Kurzban, R., and Leary, M. R. (2001). Evolutionary origins of stigmatization: The functions of social exclusion. *Psychological Bulletin, 127*, 187-208.
Kurzban, R., McCabe, K., Smith, V. L., Wilson, B. J. (2001). Incremental commitment and reciprocity in a real-time public goods game. *Personality and Social Psychology Bulletin, 27*, 1662-1673.
Lazarus, R. (1991). *Emotion and adaptation*. Oxford: Oxford University Press.
Lickel, B., Hamilton, D. L., and 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.
Lieberman, D. (2007). Cognitive programs regulating inbreeding avoidance: Categorization, decision-rules, and emotions. In J. Forgas, M. Haselton, and B. von Hippel (Eds.), *The evolution of the social mind: Evolutionary psychology and social cognition* (pp. 179-194). New York: Psychology Press.
Maner, J. K., DeWall, C. N., Baumeister, R. F., and Schaller, M. (2007). Does social exclusion motivate interpersonal reconnection? Resolving the "porcupine problem." *Journal of Personality and Social Psychology, 92*, 42-55.
Maner, J. K., Gailliot, M. T., and Miller, S. L. (2009). The implicit cognition of relationship maintenance: Inattention to attractive alternatives. *Journal of Experimental Social Psychology*, *45*, 174-179.
Masclet, D., Noussair, C., Tucker, S., and Villeval, M. C. (2003). Monetary and nonmonetary punishment in the voluntary contributions mechanism. *American Economic Review, 93*, 366-380.
McElreath, R., Boyd, R., and Richerson, P. J. (2003). Shared norms and the evolution of ethnic markers. *Current Anthropology*, *44*, 122-129.
Mitani, J. C., and Watts, D. P. (2001). Why do chimpanzees hunt and share meat? *Animal Behaviour*, *61*, 915-924.
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., and 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., and Levine, J. M. (2001). Socialization in organizations and work groups. In M. Turner (Ed.), *Groups at work: Theory and research* (pp. 69-112). Mahwah,

NJ: Lawrence Erlbaum Associates Publishers.

Moreland, R. L., and Levine, J. M. (2002). Socialization and trust in work groups. *Group Processes and Intergroup Relations*, *5*, 185-201.

Moreland, R. L., Levine, J. M., and Wingert, M. L. (1996). Creating the ideal group: Composition effects at work. In E. Witte and H. Davis (Eds.), *Understanding group behavior, Vol 2: Small group processes and interpersonal relations* (pp. 11-35). Hillsdale, NJ: Lawrence Erlbaum Associates.

Neuberg, S. L., and Cottrell, C. A. (2002). Intergroup emotions: A sociofunctional approach. In D. M. Mackie and E. R. Smith (Eds.), *From prejudice to intergroup relations: Differential reactions to social groups* (pp. 265-283). New York: Psychology Press.

Neuberg, S. L., Smith, D. M., and Asher, T. (2000). Why people stigmatize: Toward a sociofunctional framework. In T. F. Heatherton, R. E. Kleck, M. R. Hebl, and J. G. Hull (Eds.), *The social psychology of stigma* (pp. 31-61). New York: Guilford Press.

O'Gorman, R., Henrich, J., and Van Vugt, M. (2008). Constraining free riding in public goods games: Designated solitary punishers can sustain human cooperation. *Proceedings of the Royal Society, B Series, 276*, 323-329.

Ostrom, E. (2000). Collective action and the evolution of social norms. *Journal of Economic Perspectives, 14*, 137-158.

Ostrom, E., and Walker, J. (Eds.) (2003). *Trust and reciprocity: Interdisciplinary lessons from experimental research*. New York: Russell Sage Foundation.

Ostrom, E., Walker, J., and Gardner, R. (1992). Covenants with and without a sword: Self-governance is possible. *American Political Science Review, 86*, 404-417.

Panchanathan, K., and Boyd, R. (2004). Indirect reciprocity can stabilize cooperation without the second-order free rider problem. *Nature, 432*, 499-502.

Pinker, S. (2007). *The stuff of thought: Language as a window into human nature*. New York: Viking.

Price, M. E. (2006). Monitoring, reputation, and "greenbeard" reciprocity in a Shuar work team. *Journal of Organizational Behavior, 27*, 201-219

Price, M. E., Cosmides, L., and Tooby, J. (2002). Punitive sentiment as an anti-free rider psychological device. *Evolution and Human Behavior, 23*, 203-231.

Ramey, D. (1982). Group climate, campus image, and attitudes of fraternity men regarding pledge hazing. *Dissertation Abstracts International B: The Physical Sciences and Engineering, 42*, 3466.

Rodseth, L., Wrangham, R. W., Harrigan, A. M., and Smuts, B. B. (1991). The human community as a primate society. *Current Anthropology, 32*, 221-254.

Rosenthal, R., Rosnow, R. L., and Rubin, D. B. (2000). *Contrasts and effect sizes in behavioral research: A correlational approach*. Cambridge, U.K.; New York: Cambridge University Press.

Schlegel, A., and Barry, H. (1979). Adolescent initiation ceremonies: A cross-cultural code. *Ethnology, 18*, 199-210.

Sell, A., Tooby, J., and Cosmides, L. (2009). Formidability and the logic of human anger. *Proceedings of the National Academy of Sciences, 106*, 15073-15078.

Simpson, J. A. (2007). Interpersonal foundations of trust. *Current Directions in Psychological Sciences, 16*, 264-268.

Sosis, R. (2003). Why aren't we all Hutterites? Costly signaling theory and religious behavior. *Human Nature, 14*, 91-127.

Sosis, R., Kress, H., and Boster, J. (2007). Scars for war: Evaluating alternative signaling explanations for cross-cultural variance in ritual costs. *Evolution and Human Behavior, 28*, 234-247.

Stiff, C., and Van Vugt, M. (2008). The power of reputations: The role of third party information in the admission of new group members. *Group Dynamics: Theory, Research, and Practice, 12*, 155-166.

Talmy, L. (2000). *Toward a cognitive semantics (vol. 1): Concept structuring systems*. Cambridge, MA: MIT Press.

Tiger, L. (1984). *Men in groups* (2nd ed.). New York: M. Moyars.

Tooby, J., and Cosmides, L. (1988). *The evolution of war and its cognitive foundations.* Institute for Evolutionary Studies Technical Report #88-1. Retrieved from: http://www.psych.ucsb.edu/research/cep/papers/EvolutionofWar.pdf.

Tooby, J., Cosmides, L., and Barrett, H. C. (2005). Resolving the debate on innate ideas: Learnability constraints and the evolved interpenetration of motivational and conceptual functions. In Carruthers, P., Laurence, S. and Stich, S. (Eds.), *The innate mind: Structure and content* (pp. 305-337). New York: Oxford University Press.

Tooby, J., Cosmides, L., and Price, M. E. (2006). Cognitive adaptations for n-person exchange: The evolutionary roots of organizational behavior. *Managerial and Decision Economics, 27*, 103-129.

Van Maanen, J., and Schein, E. H. (1979). Toward a theory of organizational socialization. In B. M. Staw (Ed.), *Research in Organizational Behavior* (pp. 209-264). Greenwich, CT: JAI Press.

Van Lange, P. A. M., Liebrand, W. B. G., Messick, D. M., and Wilke, H. A. M. (1992). Introduction and literature review. In W. B. G. Liebrand, D. M. Messick, and H. A. M. Wilke (Eds.), *Social Dilemmas* (pp. 3-28). Oxford: Pergamon Press.

Van Vugt, M., and Hart, C. M. (2004). Social identity as social glue: The origins of group loyalty. *Journal of Personality and Social Psychology, 86*, 585-598.

Walker, G. (1968). Organizational type, rites of incorporation, and group solidarity: A study of fraternity hell week. *Dissertation Abstracts International B: The Physical Sciences and Engineering, 29*, 689-690.

Webster, H. (1932). *Primitive secret societies: A study in early politics and religion*. New York: Macmillan.

Williamson, O. E. (1981). The modern corporation: Origins, evolution, attributes. *Journal of Economic Literature, 49*, 1537-1568.

Yamagishi, T. (1986). The provision of a sanctioning system as a public good. *Journal of Personality and Social Psychology, 51*, 110-116.

Ziller, R. C., and Behringer, R. D. (1965). Motivational and perceptual effects in orientation toward a newcomer. *Journal of Social Psychology, 66*, 79-90.