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ORIGINAL ARTICLE

How can "cheap talk" yield coordination, given a conflict?

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Abstract ChickenHawk is a social-dilemma game that distinguishes uncoordinated from coordinated cooperation. In tests with players belonging to a culturally homogeneous population, natural-language "cheap talk" led to efficient coordination, while nonlinguistic signaling yielded uncoordinated altruism. In a subsequent test with players from a moderately more heterogeneous population nearby, the "cheap talk" condition still produced better coordination than other signaling conditions, but at a lower level and with fewer acts of altruism overall. Implications are: (1) without language, even willing cooperators coordinate poorly; (2) given a sufficiently homogeneous social group, language can coordinate cooperation in the face of opportunities for anonymous defection; (3) coordination therefore depends not on merely a general propensity to cooperate but on the overlap of social identities, which are always costly to acquire and maintain. So far as linguistic variation establishes how much social identities overlap, natural-language "cheap talk" is self-insuring, suggesting that linguistic variation is itself adaptive.

Keywords Language · Game · Cooperation · Coordination · Cheap talk · Linguistic diversity

1 Motivation

Komarova and Nowak (2003) call for applications of game-theoretic studies of nonkin cooperation to research on the evolution of language, claiming that, "we speak because we cooperate, we cooperate because we speak" (p. 336). Responding to this challenge, the experiments reported here adapt the methods of behavioral economics, the better to measure the utility of the modern human language capacity,

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per se, and in hopes of loosening the "chicken-or-egg" knot that entangles the evolution of the human capacity for nonkin cooperation with that of our capacity for speech.

2 Theory

The initial reasoning behind the design of the ChickenHawk game, described below, was that if either one of these twinned capacities, nonkin cooperation and language, could be shown to be ineluctably reliant upon the other, then a crude but necessary evolutionary sequence might be deduced, in which one capacity could only have followed upon the other. This would be a small step toward constraining the many scenarios for language evolution.

It would seem that it must be the capacity for language that could not evolve except on the basis of a capacity for nonkin cooperation. If language is a "discrete-combinatorial system" like DNA or binary code, as Pinker (1994, 1998) has described it, then the content of its signals cannot be considered inherently self-guaranteeing in the sense spelled out by the Zahavian (1997) theory of "handicap" or "costly" signal selection. A self-guaranteeing signal must be analog, so that a direct relationship always obtains between the relative strength of the signal and the import of whatever message, relevant to the fitness of sender and receiver(s), it sends. Discrete-combinatorial systems, on the other hand, are inherently digital, and any arbitrary combination of, say, "ones" and "zeroes" might code for either loudness or softness. As such, language has no inherent falsehood production costs. Drop the word "no," and the previous sentence becomes both false and easier to produce. People are acutely aware of this characteristic of language, to which anxiety we owe not only the cliché, "talk is cheap," but also the conventional game-theoretic definition of "cheap talk" as any form of communication within the game that costs no resources to produce, nor risks any if false (Camerer 2003).

While discrete-combinatorial systems must be evolvable by natural selection (else no DNA!), the "handicap principle" rules out bootstrapping. This, then, was the prior assumption of these experiments, based on both costly-signaling theory and the experimental evidence that indirect recipocity and reputation anxiety alone are strong enough motivators to generate cooperation between nonkin human participants playing economic games (e.g., Brandt et al. 2003; Kings-Casas et al. 2005; Milinski et al. 2002; Nowak and Sigmund 1998). Discrete-combinatorial language could not have bootstrapped the evolution of these uniquely human habits of layered, opportunistic groupishness, often involving nonkin cooperation. These behaviors require costly signaling of quality and intent, and their message is always, "Invest in me; don't mess with me." Language can encode this message, but if there is no *linguistic* price to pay for deception, how can it vouch for it?

When the results of the first two sets of tests indicated an unexpectedly strong capacity for materially costless and unsecured verbal commitments (i.e., pre-play, natural-language "cheap talk") to optimize the participants' collective efficiency, at least in that one culturally homogeneous population, the focus shifted to Baker's (2004) suggestion that we have undervalued the adaptive utility of modern languages as *barriers* to communication. By implication, language variation itself is an adaptive signaling system. In planning the follow-up tests, therefore, the reasoning was that any linguistic variation that reliably indicates prolonged membership in a group—slang, dialect, etc.—abets other reliable paralinguistic and nonlinguistic membership signals—gestures, ornamentation, etc.—and thus is costly signaling, distinct from the more arbitrary signals contained in the discrete, combinatorial semantics of the same exchanges the variation both constrains and corroborates. If so, then slightly relaxing the sociolinguistic homogeneity of the participant population should produce a correspondingly moderate decrease in the power of “cheap talk” to coordinate.

3 The ChickenHawk game

3.1 Cooperation, coordination, altruism

Conventionally, the obstacle to solving coordination problems is simply a lack of information, whereas the obstacle to solving a problem in cooperation also involves individual sacrifice and/or risk. (Camerer 2003 reviews this parsing of the distinction between coordination and cooperation, as those terms have been used in behavioral game theory and experimental economics.) Coordination is therefore the lower-order problem of the two, while cooperation presents the knottier social dilemma, involving both coordination and risk. Altruism refers to behaviors that benefit the recipient at cost to the donor, whether any coordination or cooperation between the parties was necessary or not.

The design of the ChickenHawk game derives from a slightly unusual usage of these terms, as follows. Let us suppose an individual with a predisposition toward altruistic behavior. That charitable impulse may or may not be of any benefit to others. An individual who donates blood when it cannot be stored or who sends winter clothing to a tropical climate may be altruistic and may intend cooperation for the greater good, but may fail. Likewise, two individuals may sacrifice for each other’s benefit and both end up the worse for the effort. Such an outcome occurs to the main characters in Arthur Miller’s (1976) play *The Crucible*, in which a husband and wife, caught up in the Salem Witch Trials of Colonial Massachusetts, each attempt to sacrifice for the other but fail to coordinate their confessions, with execution the result. With a bad outcome assured for one partner or the other, even a heroic act of altruistic self-sacrifice needs to be coordinated or both may suffer the consequences of their good intentions. The experimental value of contriving such a situation is that one can then distinguish between the motivation to cooperate and the capacity to coordinate. In short, it permits discrimination between the effects on coordination due to cooperation and to speech, respectively, the two entangled components in the Komarova and Nowak quotation, above.

The first aim of these experiments, therefore, was to try to isolate the coordinating capacities of any social preferences for cooperation from those due to fully syntactic, spoken (or “natural”) language, per se, by engaging participants in a naturalistic social setting with a material conflict of interest and in treatments that controlled for signaling between partners before and/or after play. Whereas the majority of economic game experiments measure individual success at acquiring the available resources, these experiments measured collective efficiencies of resource extraction as the behavioral phenotype of interest. In other words, given that at least one of the partners was doomed to failure, would they (a) attempt to cooperate so that at least one could succeed, and if so would they (b) avoid the danger of them both sacrificing for nothing? These exeriments could not test the efficacy of cooperation by measuring the presence of cooperation only, and therefore had to distinguish between simple willingness to cooperate and actually efficacious cooperation. To this end, the ChickenHawk game was purpose-built. The name is a hybrid of those of two familiar social-dilemma games, “Chicken” and “Hawk-Dove” (Camerer 2003).

3.2 ChickenHawk game design

Pairs played a two-person, one-shot game for an entry in a $100 prize drawing. The choices were to demand or cede the entry. If both players demanded or both ceded, neither won anything. The only way to win an entry, therefore, was to demand one and hope that one’s partner altruistically ceded that sole opportunity. Players made their choices using preprinted, numbered tickets as ballots: a large, red ticket constituted a demand; a small, blue ticket meant the player had opted to cede the opportunity. (See Fig. 1).

4 Participants

The first two sets of ChickenHawk game experiments were played on the campus of Utah Valley State College, in Orem, Utah, USA, in 2005. The participants in these tests formed the “campus population,” below. The first set of campus games were played in classrooms, the second in the student commons and cafeteria. These subgroups of the campus population are distinguished as “classroom” and “cafeteria,” respectively. The follow-up experiment was set up at a popular outdoor shopping mall, near downtown Salt Lake City, early in the summer of 2006. The participants in the follow-up formed the “mall population.”

Participants for the classroom experiments were recruited from interdisciplinary course sections during donated class time provided by colleagues who were not in the room for the experiments. Those students in the classes who chose not to participate simply left class early. Students who remained to participate filled out questionnaires. In the case of the cafeteria and mall experiments, participants were

		Column Player	
		Blue	Red
Row Player	Blue	0, 0	0, 1
	Red	1, 0	0, 0

Fig. 1 2 × 2 ChickenHawk matrix

recruited by flyers posted on nearby walls and signboards set up beside the area in which the experiments were conducted.

All participants were paid a “show-up” stipend of $10. All were informed of the intent to study cooperation and communication. All were shown the ChickenHawk payoff matrix, practiced play, and quizzed to be sure they understood that either mutual defection or mutual cooperation yielded nothing and that the only way to win a ticket would be to “defect” while paired with someone who chose to forgo the opportunity.

4.1 The campus population

The first two sets of tests sampled a modern population that, despite living in a postindustrial consumerist society, reasonably approximates the typically close-knit ancestral social context.

None of the participants in these first tests identified themselves as close genetic kin, but all were adult college students. More than 80% preferred to identify themselves as active members of the Church of Jesus Christ of Latter-Day Saints (Mormons). This percentage is roughly equal to that of active Mormons in the college’s student body and in the local county, which is approximately 50 miles to the south of Salt Lake City. A majority of participants had lived most of their lives in Utah and been born within 100 miles of the college. Many of the men had already served their 2-year Mormon missions. All surveyed participants chose the cultural identity “American” and most chose to describe their ethnic identity as “White” or “Caucasian” (See Table 1).

In short, these participants came from a loosely defined cohort within a cohesive cultural group. They had many common experiences of major rituals, group educational hurdles and life-history stages, as well as a strong sense of their shared, distinct sociocultural identity and of a history rooted in their religious geography, which incorporates familiar details of their surrounding landscape. In that sense, they formed a sample of an entirely “natural” human population, however modern, and field-tested in their home environment.

Within this population, the “classroom” participants all knew each other by name. The “cafeteria” participants had a lower level of personal familiarity and had not necessarily known each other prior to volunteering to play the game, but again came from the same college cohort and largely homogeneous cultural background.

4.2 The mall population

Because the goal of the follow-up experiment was to test the hypothesis that slightly relaxing the homogeneity constraint would result in a commensurate drop in collective efficiencies, particularly in the “cheap talk” signaling condition, the games were set up in an urban outdoor mall frequented by a much wider cross-section of the Utah population, including people of varied ethnic and religious backgrounds and non-native speakers of English, as well as a scattering of out-of-state visitors and tourists. The majority of the participants (62%) identified themselves as Mormon; however, about a quarter of these indicated they were not

Table 1 Demographic survey of participants in the classroom treatments

Questions	Responses	Pct. (%)	(Freq.)
What is your *Religious Identity?*	"LDS"	88.2	(30)
	"Christian"	5.9	(2)
	"Agnostic"	2.9	(1)
	"Catholic"	2.9	(1)
What is your *Ethnic Identity?*	"Caucasian"	52.9	(18)
	"White"	35.3	(12)
	"Irish"	2.9	(1)
	"Samoan"	2.9	(1)
	"Serbian"	2.9	(1)
	"Latina"	2.9	(1)
What is your *Cultural Identity?*	"American"	97.1	(33)
	"European- American"	2.9	(1)
What is your *Social Class?*	Lower	0	(0)
	Working	0	(0)
	Middle	100	(34)
	Upper	0	(0)
Are you a *Utah Native?*	Yes	85.3	(29)
	No	14.7	(5)
Were you *Born w/in 100 miles?*	Yes	55.9	(19)
	No	44.1	(15)

Religious, ethnic, and cultural identities were each self-reported by writing choices on blank lines. The four social-class options were in "check one" boxes. The total number of subjects was 34. The mean age was 23.5 years, and the mean amount of time spent as a Utah resident was 19 years

active or not "church going." A large majority, better than 90%, of surveyed participants still chose the cultural identity "American," but a smaller majority (70%) now chose to describe their ethnic identity as "Caucasion" or "White," with "Latino/a" being the most common alternative (22%). Roughly one in six participants surveyed marked "English" their second language (See Table 2).

In order that the heterogeneity of this population not be too much greater than that of the campus population, volunteers were solicited from clusters of young adults of approximately college age browsing the mall courtyards. Family members played in separate treatments on those few occasions when more than one family member wished to participate. A mixture of degrees of acquaintance held among the participants, although the commonest situation seemed to be for one member of a small group of friends to participate, while her/his companions watched from nearby or wandered off in the duration.

5 Methods

The simplicity of the game and the fact that to defect is each individual's resource-maximizing strategy makes the game easy to teach. The single-shot format removes

Table 2 Demographic survey of participants in the mall treatments

Questions	Responses	Pct. (%)	(Freq.)
What is your *Religious Identity?*	“LDS”	62.3	(70)
	“Christian”	18.8	(21)
	“Catholic”	15.2	(17)
	“Orthodox”	1.7	(2)
	“None”	0.9	(1)
	“Buddhist”	0.9	(1)
What is your *Ethnic Identity?*	“White”	44.6	(50)
	“Caucasian”	25.0	(28)
	“Latino/a”	22.3	(25)
	“Samoan”	6.3	(7)
	“Chinese”	0.9	(1)
	“Korean-American”	0.9	(1)
	“Slavic”	0.9	(1)
	“African-American”	0.9	(1)
	“American”	0.9	(1)
What is your *Cultural Identity?*	“American”	91.1	(102)
	“Mexican-American”	4.5	(5)
	“Chicana”	1.7	(2)
	“Greco-American”	0.9	(1)
	“Russian”	0.9	(1)
	“Colombian”	0.9	(1)
What is your *Social Class?*	Lower	0	(0)
	Working	26.8	(30)
	Middle	73.2	(82)
	Upper	0	(0)
Are you a *Utah Native?*	Yes	59.8	(67)
	No	40.2	(45)
Were you *Born w/in 100 miles?*	No	49.1	(55)
	Yes	48.2	(54)
	Don’t Know/No Answer	2.7	(3)
Is English your *language?*	First	83.0	(93)
	Second	17.0	(19)

As with the classroom questionnaire, religious, ethnic, and cultural identities were each self-reported by writing choices on blank lines, while the four social-class options were in “check one” boxes. The question about English as a first/second language was new. The total number of subjects was 112. Mean age was 19.5 years. Mean time spent as a Utah resident was 15.3 years

the possibility of reciprocally exchanged payoffs. The lottery shields defectors’ anonymity, and, as the maximum possible entries in each drawing is quite small, anyone who gains an entry has a good chance of winning. Spite is also in play, as a defection can deny an entry.

5.1 Basic play

A small group of participants (6–12) gather in the same room or area. All are volunteers and have been paid an honorarium of $10US. No attempt is made to prevent participants from interacting with each other normally before or after the experiment. When they are strangers to each other, they often will make their own introductions. Participants receive instruction in their game, are quizzed, practice the game at least once and discuss the outcome. They open their coded envelopes, remove their red and blue tickets, and play one game. In all of the treatments, the lottery winner later receives a private check in the mail.

5.2 Public balloting

Two of the signaling conditions use a public ballot box, which is a small box carried to each participant. In these treatments, the participants stand in a circle, facing each other, and must stuff their red or blue ticket into the box in view of the group. In these treatments, the valid entries are determined at the time of the experiment, and all are sealed in identical envelopes. The envelopes are shuffled in a bag. A participant who ceded draws. The experimenter marks the envelope. The envelope is set aside, check to be mailed later.

5.2.1 The reputation condition

In this condition, none of the partners are identified to each other before they make their choices, but they know that the box will be opened and the partners matched by checking their codes against a list, immediately after play. Participants are not allowed to converse or gesture once they have opened their envelopes, removed their tickets, and circled around to start play. They may, of course, exchange eye contact and facial expressions. After 20 s pause, the experimenter counts down from 10, and then brings the ballot box around.

5.2.2 The honest condition

After opening their envelopes and removing their tickets, players must hold one ticket in each hand. Partners are pointed out to each other. They may not speak or gesture to each other, except by raising, lowering, or waving either or both tickets. Again, they may exchange eye contact and facial expressions. After 20 s and then the countdown from 10, each player is committed to whichever color of ticket she or he holds aloft.

5.3 Secret balloting

The other two treatments employ a two-compartment ballot box with two armholes in the front and a lidded, fastenable top. In these treatments players practice with both the lid up and the lid fastened so that they learn how to place their choice in the upper compartment and discard their other ticket in the bottom one. In these conditions, the drawing is done by a research assistant later. As in all treatments, the winner gets a check in the mail.

5.3.1 The no-signaling condition

This is the control treatment. After instruction and practice, participants face outward in a circle and after 30 s the box is brought around. There is no talking or eye contact, and no player is given any information about partners or the votes cast. As soon as the box has completed the round, the game is done.

5.3.2 The “cheap talk” condition

Partners are identified as in the “honest” condition. They have 30 s to confer. The experimenter counts down the last 10, then they must form an outward-facing circle. The box comes around and when they have all voted, again the game is done.

5.4 Replications

Colleagues donated classroom time for the first set of 2 replications. The participants in those 2 classroom groups (*N* = 22 and *N* = 12, respectively), each played the game under all four conditions, but with a different, randomly assigned partner each time. The groups played the conditions in reverse order.

As it was possible that these repetitive-play circumstances in the classroom replications triggered an expectation of reciprocity even where there was no material opportunity for it, the conditions were then replicated again a few months later, but as a set of true one-shot trials, outside the student-center cafeteria. The participants in these smaller “cafeteria” groups (*N* = 56) played only one game apiece. These trials replicated each of the 4 signaling conditions twice, once with a group of 6 players (3 partnered pairs) and once with a group of 8 (4 partnered pairs).

The set of replications conducted with the more heterogeneous population (*N* = 112) in the outdoor shopping mall were also true one-shot trials. Again, the participants were grouped six or eight at a time and played only one game apiece. As in the cafeteria set, the mall trials replicated each of the four signaling conditions twice, for a total of 14 pairs playing each signaling condition.

6 Expectations

Decades of social-dilemma game experiments, reviewed in Sally (1995) and Camerer (2003), show that we should rarely expect all participants to play the self-interested strategy, and especially not in one-shot games nor in experiments in which participants meet each other, face-to-face. Nonetheless, the no-signaling condition of ChickenHawk should logically produce the most defections, as it affords no chance to exploit language, knowledge of who one’s partner is nor any social preferences for cooperation or enhancing reputation.

Conversely, in the reputation condition it would reasonable to expect the most frequent altruism, as the condition affords an opportunity to display a sacrificial gesture that will be noted publicly following play, but no pre-play opportunity to identify or coordinate with one's partner.

Reasoning from the theoretical distinction between "cheap talk" and "costly signaling" systems outlined above, the prior expectation during the first two sets was that, given the homogeneity of the participant population and their prior acquaintance, they would be able to coordinate their pairwise choices with the greatest collective efficiency in the "honest" condition, in which partners could see each others' faces and signal to each other, at least semaphorically, their options on a simple, binary decision.

On the other hand, the temptations of anonymity, as well as the complex social emotions (including spite and resentment) that can arise in face-to-face conversation, especially when involving material negotiation, justified an expectation of greater defection in the "cheap talk" condition, either out of self-interest or a desire to deny someone else an entry he or she may have forcefully negotiated.

7 Results

As expected, under no conditions did all participants defect, neither among the more homogeneous campus population, nor among the more heterogeneous mall population. And also as expected, they defected at by far the highest rate in the "no signaling" condition. Individual participants were, equally unsurprisingly, much more likely to cede their opportunity in the "reputation" condition. In the campus population, this was so much the case that the collective efficiency of resource extraction in those treatments was lowered by the surplus of altruists matched to each other. In the mall population, rates of altruism in the "reputation" and "honest" conditions were lower, identical across those two conditions, and could have produced collectively near-optimal resource extraction, as they equalled nearly fifty percent of the votes on each condition. But the altruists were still poorly matched and, in fact, the success of the mall population in the public balloting conditions was exactly equal to the expected pairwise success rate for a large, randomly distributed population of altruists and defectors (See Tables 3, 4, and 5).

In the campus tests, two results ran sharply contrary to initial expectations. The first surprising result was that, even when participants had both the motive of reputation and the possibility of arranging their choices by pre-play signaling through holding up their ballots and exchanging eye-contact and facial expressions with their partners, they were incapable of extracting resources at a rate significantly better than would be expected from a random voting pattern. Nor was this due to excess of self-interested demands for entries. As in the "reputation" condition, too many of these players ceded. They cooperated, but they failed to coordinate (See Table 5).

The second surprising result from the campus tests of ChickenHawk was that any temptations to renege on deals made in a mere thirty seconds of pre-play conversation in the "cheap talk" condition did not derail the effectiveness of talking

Table 3 Results of classroom treatments on campus

Condition	Pairs' success rate	Pair- type skew	Participants' altruism rate
No signal	0.35	DD***	0.18*** (−)
Reputation	0.41	CC**	0.74* (+)
Honest	0.41	CC*	0.71* (+)
Cheap Talk	0.94**	CD***	0.53

N = 17 pairs (34 subj.) each condition: 34 unique participants, 68 unique pairings total. Significance measured by 95%CI & 99.7%CI of random binomial distribution for pairs' success rate and participants' altruism rate. Significance measured by χ^2 with 1df for pair-type skew. (+/−) indicates direction of deviation from expectation, had partners randomly cooperated or defected

* $p < 0.05$, with random play as the null hypothesis, ** $p < 0.01$, *** $p < 0.001$

Table 4 Results of cafeteria treatments on campus

Condition	Pairs' success rate	Pair-type skew	Participants' altruism rate
No signal	0.29	DD*	0.29
Reputation	0.57	None	0.57
Honest	0.43	None	0.67
Cheap Talk	0.85	None	0.57

N = 7 pairs (14 subjects) each condition (56 unique participants, 28 unique pairings total). Significance measured by 95%CI & 99.7%CI of random binomial distribution for pairs' success rate and participants' altruism rate. Significance measured by χ^2 with 1df for pair-type skew. (+/−) indicates direction of deviation from expectation

* $p < 0.05$

Table 5 Summary results, all campus treatments

Condition	Pairs' success rate	Pair-type skew	Participants' altruism rate
No signal	0.33	DD**	0.21** (−)
Reputation	0.46	CC*	0.69* (+)
Honest	0.42	CC*	0.69* (+)
Cheap Talk	0.92**	CD*	0.5

N = 24 pairs (48 subjects) for each condition: 90 unique campus participants, 96 unique pairings, 192 ballots. Significance measured by 95%CI & 99.7%CI of random binomial distribution for pairs' success and participants' altruism rates. Significance measured by χ^2 with 1df for pair-type skew. (+/−) indicates direction of deviation from expectation

* $p < 0.05$, with random play as the null hypothesis; ** $p < 0.01$

itself for coordinating strategies. Deals between partners were honored, judging by their 92% efficiency at extracting the one available entry per pair.

The mall population showed an across-the-board decrease in the participants' altruism rate on all conditions, but they continued to coordinate most efficiently on the "cheap talk" condition. No longer, however, do the pairs given the opportunity for a quick pre-play conversation manage to coordinate their individual altruism and selfishness well enough to extract the resource of lottery drawings significantly more efficiently than would a random distribution of coinflipping would-be cooperators. Thus, in this population, the only significant skew away from randomly efficient cooperation was negative, in the form of significantly non-random rates of defection in the "no signal" control condition (See Table 6).

8 Discussion

The campus results may have been an experimental artifact, possibly arising due to the fact that this is an exceptionally prosocial cultural group (i.e., practicing Mormons) or to the nature of college acquaintances as a cohort, particularly in the classroom settings. Replications with a more heterogeneous group were necessary as a minimal check on the campus results. The choice of conducting those replications with a geographically near population that was only moderately more heterogeneous was meant to test the possibility that the willingness to cooperate altruistically with nonkin and even total strangers would decay roughly in step with any increase in heterogeneity, rather than collapse catastrophically. All participants in the mall treatments spoke English, most as a first language, but their backgrounds, accents, and habits of speech were self-evidently somewhat more varied, as is hardly surprising given the demographic differences reported in Tables 1, and 2 above. Had a dramatic collapse in the efficacy of the "cheap talk" signaling condition occurred, it would be reasonable to assume that the earlier results were artifactual and/or peculiar to the religious community to which almost all of the participants belonged, although it would still seem difficult to imagine that such a community, however atypically homogeneous in a modern society, would be more interdependent than most ancestral human groups, who would have relied upon their immediate neighbors, likely including a mix of close, distant, and metaphorical kin, for their survival.

What is perhaps more interesting about the mall results is that the participant altruism rates on the "cheap talk" condition would have been insufficient to generate optimal collective efficiency even if each altruistic ceding of a lottery opportunity were matched precisely to a defector's demand, the best coordination possible. This indicates that in the mall population, at least, talk really was getting

Table 6 Summary results, all mall treatments

Condition	Pairs' success rate	Pair- type skew	Participants' altruism rate
No signal	0.21*(−)	DD***	0.11** (−)
Reputation	0.5	None	0.46
Honest	0.5	None	0.46
Cheap Talk	0.64	CC	0.32

N = 14 pairs (28 subjects) for each condition: 112 unique mall participants, 56 unique pairings,112 ballots. Significance measured by 95%CI & 99.7%CI of random binomial distribution for pairs' success and participants' altruism rates. Significance measured by χ^2 with 1df for pair-type skew. (+/−) indicates direction of deviation from expectation

* $p < 0.05$, with random play as the null hypothesis; ** $p < 0.01$

cheaper—roughly three times as many people still ceded their opportunity in the “cheap talk” condition as in the “no signal” condition, but in all likelihood some false promises were made.

In these experiments, the more usual effort to subtract all possible signals but “cheap talk” was reversed, and talk itself was subtracted from the rich context of a naturalistic social environment, familiar to all the participants. Identity signals such as dress, manners, and roles all failed to effect coordination when denied speech at the critical moment. One needs commitment to master any in-group’s linguistic quirks. Where all the linguistic markers of identity comport, as for the participants in the campus treatments of this study, the degree of in-group status conveyed by speech may carry a costly signal that bolsters even the cheapest talk.

9 Conclusion

These experiments represent only a first effort to cleave the functional, coordinative value of our social psychology of cooperation from our capacity for syntactic language by presenting participants with a social dilemma that cannot be resolved by altruistic sacrifice of individual opportunity. The desire to keep the social environment as natural as possible led to the eschewing of the more usual computers-in-cubicles approach to experimental economic games. This in turn entailed a somewhat cumbersome methodology.

By leaving uncontrolled the social signals of appearance, dress, and so forth, these experiments cannot tell us how much of the “cheap talk” coordination between partners was due entirely to language itself. Nonetheless, because (a) those same social signals were available under conditions in which no natural language communication was permitted, e.g., the “honest” and “reputation” conditions, and (b) pairwise coordination dropped in those latter conditions across all treatments, the hypothesis that natural language “cheap talk” carries some sort of additional, Zahavian, self-guaranteeing signal, perhaps in the subtleties of accent, slang, and other hard-to-fake aspects of dialect, seems worthy of further testing. Baker’s hypothesis that language serves to divide as well as to unite communicators may eventually be extended to the claim that those divisive aspects of language are precisely that which enabled the emergence of discrete-combinatorial syntax and the efficiencies of “cheap talk” in the first place.

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