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RESEARCH ARTICLE

ON THE ROLE OF FAIRNESS AND SOCIAL DISTANCE IN DESIGNING EFFECTIVE SOCIAL REFERRAL SYSTEMS

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Appendix A

Existing Industry Practices in Referral Bonus Incentive Structure[1]

Company	Proposer Receives:	Responder Receives:	How is bonus split informed
Groupon	Free after 3 referrals	0	Separately
OptionsHouse	$150	0	Separately
SPG AMEX	5000 points	0	Separately
Dropbox	250G	250G	Both
Scottrade	3 free trades	3 free trades	Both
Wirefly	$25	$25	Both
Uber	$10	$10	Both
Evernote	Points	Premium Account	Separately
Boston Globe	$15	4 weeks of subscription	Separately
Rock Botom Golf	$10	5% off	Separately
Student Advantage	$25	$10	Separately
Café Press	$10	Free mini poster	Separately
Lending Club	0	$25	Separately

[1]Part of the data comes from Referral*Candy* (http://www.referralcandy.com/).

Appendix B

Social Distance Measurement Items Sources

Table B1. Bogardus Measure's Use and Adaptations

Author(s)	Year	Journal	Measurement Adaptation
Cover	1995	*The Journal of Social Psychology*	Original Bogardus Social Distance Scale
Parrillo and Donoghue	2005	*The Social Science Journal*	Original Bogardus Social Distance Scale
Payne et al.	1974	*Sociometry*	Adapted Bogardus Social Distance Scale The scale contains eight instructional sets which reveal different degrees of intimacy in order.
Lee et al.	1996	*The Journal of Social Psychology*	Adapted Bogardus Social Distance Scale The author revised the original Bogardus social distance scale to explain a minority group's perceptions of the distance established by the majority group between itself and the minority group.
Wilson	1996	*Public Opinion Quarterly*	Adapted Bogardus Social Distance Scale The author chose 2 of 7 items from the original Bogardus social distance scale, and ask the subjects give 5 points scale to descript the two items.
Verkuyten and Kinket	2000	*Social Psychology Quarterly*	Adapted Bogardus Social Distance Scale The Bogardus social distance scale was revised to suit for the study context with Dutch preadolescents, which contained three description of social distance.
Horak Randall and Delbridge	2005	*Sociological Spectrum*	Adapted Bogardus Social Distance Scale The revised Bogardus social distance scale was used to test the social distance among different ethnic people in north Carolina rural county.
Wark and Galliher	2007	*The American Sociologist*	Adapted Bogardus Social Distance Scale The scale would be changed from seven to five items based on the immigration context. The author points out that the Social Distance Scale usually consists of five to seven statements that express progressively more or less intimacy toward the group considered.

Social Distance Manipulation Check

The questions are on a seven-point Likert type scale (X is the name of the subject's relative, neighbor, friend, coworker or acquaintance): (Q1) X and I follow each other on social networking sites; (Q2) X and I value our relationship on social networking sites; (Q3) X and I share private content on social communities; (Q4) X and I talk about private topics in social networking sites; (Q5) X and I belong to the same discussion groups in social networking sites; (Q6) I would recommend my friends and relatives to follow X on social networking sites; (Q7) X and I use the same verbiage in online social networking sites.

Table B2. Sources of Social Distance Measures Used in Manipulation Check

Author Year	Year	Journal	Measure
Warner and Defleur	1969	*American Sociological Review*	Q3, Q5, Q7
Brewer et al.	1987	*Personality and Social Psychology Bulletin*	Q1, Q5, Q6
Boxer	1993	*Journal of Pragmatics*	Q2, Q3, Q4, Q5, Q7
Akerlof	1997	*Econometrica*	Q1, Q5
Krackhardt and Kilduff	1999	*Journal of Personality and Social Psychology*	Q6
Bottero and Prandy	2003	*Journal of Sociology*	Q1, Q2, Q5, Q7
Fossett	2006	*Journal of Mathematical Sociology*	Q1, Q3, Q4, Q7
Buchan et al.	2006	*Journal of Economic Behavior & Organization*	Q1, Q2, Q5, Q7
Ahmed	2007	*Journal of Economic Psychology*	Q1, Q2, Q5, Q7
Kim et al.	2008	*Journal of Consumer Research*	Q1, Q2
Liviatan et al.	2008	*Journal of Experimental Social Psychology*	Q2, Q3, Q5, Q6
Leeson	2008	*Journal of Legal Studies*	Q3, Q4, Q7
Hipp and Perri	2009	*City and Community*	Q1, Q5

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Appendix C

Results of Pairwise Comparisons (TUKEY)

In this appendix, we report the TUKEY HSD test results for all the experiments with a full factorial design. Specifically, the TUKEY HSD statistics were calculated after ANOVA tests.

Table C1. TUKEY Test for Perceived Fairness

Proposer							Responder						
grp	vs.	grp	Group means		diff	HSD-test	grp	vs.	grp	Group means		diff	HSD-test
(10, 0)	vs.	(7, 3)	1.31	2.37	1.05	19.08*	(10, 0)	vs.	(7, 3)	1.35	2.38	1.03	19.25*
(10, 0)	vs.	(5, 5)	1.31	6.19	4.88	88.28*	(10, 0)	vs.	(5, 5)	1.35	6.5	5.14	96.08*
(10, 0)	vs.	(3, 7)	1.31	2.33	1.02	18.52*	(10, 0)	vs.	(3, 7)	1.35	2.59	1.23	23.06*
(10, 0)	vs.	(0, 10)	1.31	1.29	0.02	0.43	(10, 0)	vs.	(0, 10)	1.35	1.49	0.13	2.51
(7, 3)	vs.	(5, 5)	2.36	6.19	3.82	69.20*	(7, 3)	vs.	(5, 5)	2.39	6.50	4.11	76.82*
(7, 3)	vs.	(3, 7)	2.36	2.33	0.03	0.56	(7, 3)	vs.	(3, 7)	2.39	2.59	0.20	3.80*
(7, 3)	vs.	(0, 10)	2.36	1.29	1.08	19.51*	(7, 3)	vs.	(0, 10)	2.39	1.49	0.90	16.75*
(5, 5)	vs.	(3, 7)	6.19	2.33	3.85	69.76*	(5, 5)	vs.	(3, 7)	6.50	2.5895	3.91	73.03*
(5, 5)	vs.	(0, 10)	6.19	1.29	4.90	88.71*	(5, 5)	vs.	(0, 10)	6.50	1.49	5.01	93.57*
(3, 7)	vs.	(0, 10)	2.33	1.29	1.05	18.94*	(3, 7)	vs.	(0, 10)	2.59	1.49	1.10	20.54*

Note: Critical value is 3.489 for 0.1 level significance.

Table C2. TUKEY Test for Experiment 1 (Responder)

grp	vs.	Grp	Group means		Dif	HSD-test
(0, 10) small	vs.	(5, 5) small	0.9333	0.9123	0.0211	0.4277
(0, 10) small	vs.	(10, 0) small	0.9333	0.8947	0.0386	0.7841
(0, 10) small	vs.	(0, 10) large	0.9333	0.7119	0.2215	4.4992*
(0, 10) small	vs.	(5, 5) large	0.9333	0.8246	0.1088	2.2098
(0, 10) small	vs.	(10, 0) large	0.9333	0.4167	0.5167	10.4963*
(5, 5) small	vs.	(10, 0) small	0.9123	0.8947	0.0175	0.3564
(5, 5) small	vs.	(0, 10) large	0.9123	0.7119	0.2004	4.0716*
(5, 5) small	vs.	(5, 5) large	0.9123	0.8246	0.0877	1.7821
(5, 5) small	vs.	(10, 0) large	0.9123	0.4167	0.4956	10.0686*
(10, 0) small	vs.	(0, 10) large	0.8947	0.7119	0.1829	3.7151*
(10, 0) small	vs.	(5, 5) large	0.8947	0.8246	0.0702	1.4256
(10, 0) small	vs.	(10, 0) large	0.8947	0.4167	0.4781	9.7122*
(0, 10) large	vs.	(5, 5) large	0.7119	0.8246	0.1127	2.2895
(0, 10) large	vs.	(10, 0) large	0.7119	0.4167	0.2952	5.9971*
(5, 5) large	vs.	(10, 0) large	0.8246	0.4167	0.4079	8.2866*

Note: Critical value is 3.677 for 0.1 level significance.

Table C3. TUKEY Test for Experiment 2

Proposer Acceptance						
grp	**vs.**	**Grp**	**Group means**		**Diff**	**HSD-test**
(3, 7) small	vs.	(5, 5) small	0.1613	0.1449	0.0164	0.6184
(3, 7) small	vs.	(7, 3) small	0.1613	0.1709	0.0096	0.3647
(3, 7) small	vs.	(3, 7) large	0.1613	0.0743	0.0869	3.286
(3, 7) small	vs.	(5, 5) large	0.1613	0.1299	0.0314	1.1875
(3, 7) small	vs.	(7, 3) large	0.1613	0.1087	0.0526	1.9878
(5, 5) small	vs.	(7, 3) small	0.1449	0.1709	0.026	0.9832
(5, 5) small	vs.	(3, 7) large	0.1449	0.0743	0.0706	2.6675
(5, 5) small	vs.	(5, 5) large	0.1449	0.1299	0.0151	0.5691
(5, 5) small	vs.	(7, 3) large	0.1449	0.1087	0.0362	1.3694
(7, 3) small	vs.	(3, 7) large	0.1709	0.0743	0.0966	3.6507
(7, 3) small	vs.	(5, 5) large	0.1709	0.1299	0.0411	1.5523
(7, 3) small	vs.	(7, 3) large	0.1709	0.1087	0.0622	2.3526
(3, 7) large	vs.	(5, 5) large	0.0743	0.1299	0.0555	2.0984
(3, 7) large	vs.	(7, 3) large	0.0743	0.1087	0.0343	1.2981
(5, 5) large	vs.	(7, 3) large	0.1299	0.1087	0.0212	0.8003
Note: Critical value is 3.667 for 0.1 level significance.						
Responder Accept (conditional on Proposer Acceptance)						
grp	**vs.**	**grp**	**Group means**		**Diff**	**HSD-test**
(3, 7) small	vs.	(5, 5) small	0.85	0.65	0.2	2.0668
(3, 7) small	vs.	(7, 3) small	0.85	0.9	0.05	0.5167
(3, 7) small	vs.	(3, 7) large	0.85	0.55	0.3	3.1002
(3, 7) small	vs.	(5, 5) large	0.85	0.75	0.1	1.0334
(3, 7) small	vs.	(7, 3) large	0.85	0.25	0.6	6.2004*
(5, 5) small	vs.	(7, 3) small	0.65	0.9	0.25	2.5835
(5, 5) small	vs.	(3, 7) large	0.65	0.55	0.1	1.0334
(5, 5) small	vs.	(5, 5) large	0.65	0.75	0.1	1.0334
(5, 5) small	vs.	(7, 3) large	0.65	0.25	0.4	4.1336*
(7, 3) small	vs.	(3, 7) large	0.9	0.55	0.35	3.6169
(7, 3) small	vs.	(5, 5) large	0.9	0.75	0.15	1.5501
(7, 3) small	vs.	(7, 3) large	0.9	0.25	0.65	6.7171*
(3, 7) large	vs.	(5, 5) large	0.55	0.75	0.2	2.0668
(3, 7) large	vs.	(7, 3) large	0.55	0.25	0.3	3.1002
(5, 5) large	vs.	(7, 3) large	0.75	0.25	0.5	5.1670*
Note: Critical value is 3.701 for 0.1 level significance.						
Mutual Acceptance						
grp	**vs.**	**grp**	**Group means**		**Diff**	**HSD-test**
(3, 7) small	vs.	(5, 5) small	0.1371	0.0942	0.0429	1.9691
(3, 7) small	vs.	(7, 3) small	0.1371	0.1538	0.0167	0.7689
(3, 7) small	vs.	(3, 7) large	0.1371	0.0409	0.0962	4.4165*
(3, 7) small	vs.	(5, 5) large	0.1371	0.0974	0.0397	1.8222
(3, 7) small	vs.	(7, 3) large	0.1371	0.0272	0.1099	5.0462*
(5, 5) small	vs.	(7, 3) small	0.0942	0.1538	0.0596	2.738
(5, 5) small	vs.	(3, 7) large	0.0942	0.0409	0.0533	2.4473
(5, 5) small	vs.	(5, 5) large	0.0942	0.0974	0.0032	0.1469
(5, 5) small	vs.	(7, 3) large	0.0942	0.0272	0.067	3.0771
(7, 3) small	vs.	(3, 7) large	0.1538	0.0409	0.113	5.1854*
(7, 3) small	vs.	(5, 5) large	0.1538	0.0974	0.0564	2.5912
(7, 3) small	vs.	(7, 3) large	0.1538	0.0272	0.1267	5.8151*
(3, 7) large	vs.	(5, 5) large	0.0409	0.0974	0.0565	2.5942
(3, 7) large	vs.	(7, 3) large	0.0409	0.0272	0.0137	0.6298
(5, 5) large	vs.	(7, 3) large	0.0974	0.0272	0.0702	3.224
Note: Critical value is 3.667 for 0.1 level significance.						

Table C4. TUKEY Test for Experiment 3

Proposer Acceptance

grp	vs.	grp	group	means	Diff	HSD-test
(0, 10) weak tie	vs.	(0, 10) strong	0.6196	0.9072	0.2877	7.3009*
(0, 10) weak tie	vs.	(5, 5) weak	0.6196	0.9565	0.337	8.5523*
(0, 10) weak tie	vs.	(5, 5) strong	0.6196	0.79	0.1704	4.3258*
(0, 10) weak tie	vs.	(10, 0) weak	0.6196	0.6556	0.036	0.9135
(0, 10) weak tie	vs.	(10, 0) strong	0.6196	0.8696	0.25	6.3453*
(0, 10) strong	vs.	(5, 5) weak	0.9072	0.9565	0.0493	1.2514
(0, 10) strong	vs.	(5, 5) strong	0.9072	0.79	0.1172	2.9751
(0, 10) strong	vs.	(10, 0) weak	0.9072	0.6556	0.2517	6.3874*
(0, 10) strong	vs.	(10, 0) strong	0.9072	0.8696	0.0377	0.9556
(5, 5) weak	vs.	(5, 5) strong	0.9565	0.79	0.1665	4.2265*
(5, 5) weak	vs.	(10, 0) weak	0.9565	0.6556	0.301	7.6389*
(5, 5) weak	vs.	(10, 0) strong	0.9565	0.8696	0.087	2.2071
(5, 5) strong	vs.	(10, 0) weak	0.79	0.6556	0.1344	3.4124
(5, 5) strong	vs.	(10, 0) strong	0.79	0.8696	0.0796	2.0195
(10, 0) weak	vs.	(10, 0) strong	0.6556	0.8696	0.214	5.4318*

Note: Critical value is 3.671 for 0.1 level significance.

Responder Acceptance

grp	vs.	Grp	group	means	Diff	HSD-test
(0, 10) weak tie	vs.	(0, 10) strong	0.2174	0.5464	0.329	6.6572*
(0, 10) weak tie	vs.	(5, 5) weak	0.2174	0.5543	0.337	6.8182*
(0, 10) weak tie	vs.	(5, 5) strong	0.2174	0.31	0.0926	1.8739
(0, 10) weak tie	vs.	(10, 0) weak	0.2174	0.1111	0.1063	2.1505
(0, 10) weak tie	vs.	(10, 0) strong	0.2174	0.5217	0.3043	6.1584*
(0, 10) strong	vs.	(5, 5) weak	0.5464	0.5543	0.008	0.161
(0, 10) strong	vs.	(5, 5) strong	0.5464	0.31	0.2364	4.7833*
(0, 10) strong	vs.	(10, 0) weak	0.5464	0.1111	0.4353	8.8077*
(0, 10) strong	vs.	(10, 0) strong	0.5464	0.5217	0.0247	0.4988
(5, 5) weak	vs.	(5, 5) strong	0.5543	0.31	0.2443	4.9443*
(5, 5) weak	vs.	(10, 0) weak	0.5543	0.1111	0.4432	8.9687*
(5, 5) weak	vs.	(10, 0) strong	0.5543	0.5217	0.0326	0.6598
(5, 5) strong	vs.	(10, 0) weak	0.31	0.1111	0.1989	4.0244
(5, 5) strong	vs.	(10, 0) strong	0.31	0.5217	0.2117	4.2845*
(10, 0) weak	vs.	(10, 0) strong	0.1111	0.5217	0.4106	8.3089*

Note: Critical value is 3.673 for 0.1 level significance.

Mutual Acceptance

grp	vs.	Grp	group	means	Diff	HSD-test
(0, 10) weak tie	vs.	(0, 10) strong	0.2174	0.5464	0.329	6.9892*
(0, 10) weak tie	vs.	(5, 5) weak	0.2174	0.5543	0.337	7.1582*
(0, 10) weak tie	vs.	(5, 5) strong	0.2174	0.31	0.0926	1.9673
(0, 10) weak tie	vs.	(10, 0) weak	0.2174	0.1111	0.1063	2.2578
(0, 10) weak tie	vs.	(10, 0) strong	0.2174	0.5217	0.3043	6.4654*
(0, 10) strong	vs.	(5, 5) weak	0.5464	0.5543	0.008	0.169
(0, 10) strong	vs.	(5, 5) strong	0.5464	0.31	0.2364	5.0218*
(0, 10) strong	vs.	(10, 0) weak	0.5464	0.1111	0.4353	9.2469*
(0, 10) strong	vs.	(10, 0) strong	0.5464	0.5217	0.0247	0.5237
(5, 5) weak	vs.	(5, 5) strong	0.5543	0.31	0.2443	5.1908*
(5, 5) weak	vs.	(10, 0) weak	0.5543	0.1111	0.4432	9.4160*
(5, 5) weak	vs.	(10, 0) strong	0.5543	0.5217	0.0326	0.6927
(5, 5) strong	vs.	(10, 0) weak	0.31	0.1111	0.1989	4.2251*
(5, 5) strong	vs.	(10, 0) strong	0.31	0.5217	0.2117	4.4981*
(10, 0) weak	vs.	(10, 0) strong	0.1111	0.5217	0.4106	8.7232*

Note: Critical value is 3.671 for 0.1 level significance.

Table C5. TUKEY Test for Experiment 4

Proposer						
grp	**vs.**	**grp**	**group**	**means**	**diff**	**HSD-test**
(fair, small)	vs.	(fair, large)	5.14	4.25	0.89	5.0575*
(fair, small)	vs.	(random, small)	5.14	5.66	0.52	2.955
(fair, small)	vs.	(random, large)	5.14	4.2778	0.8622	4.8997*
(fair, large)	vs.	(random, small)	4.25	5.66	1.41	8.0125*
(fair, large)	vs.	(random, large)	4.25	4.2778	0.0278	0.1579
(random, small)	vs.	(random, large)	5.66	4.2778	1.3822	7.8546*
Note: Critical value is 3.262 for 0.1 level significance.						
Responder						
grp	**vs.**	**grp**	**group**	**means**	**diff**	**HSD-test**
(fair, small)	vs.	(fair, large)	5.1698	4.9792	0.1906	1.1817
(fair, small)	vs.	(random, small)	5.1698	5.8367	0.6669	4.1339*
(fair, small)	vs.	(random, large)	5.1698	4.7885	0.3813	2.3638
(fair, large)	vs.	(random, small)	4.9792	5.8367	0.8576	5.3156*
(fair, large)	vs.	(random, large)	4.9792	4.7885	0.1907	1.1821
(random, small)	vs.	(random, large)	5.8367	4.7885	1.0483	6.4976*
Note: Critical value is 3.262 for 0.1 level significance.						

Appendix D

Additional Details

Experiment 1

Table D1. Demographics of Lab Study Participants

Social Distance	Gender		Age	Online Shopping Experience	Online Groupbuy Experience
Proposer					
Small	Male 55.1%		21.33(1.491)	2.021(0.6163)	1.810(0.5760)
Large	Male 56.7%		21.70(1.197)	2.100(0.5431)	1.717(0.7386)
Responder					
Small	(10, 0)	Male 57.9%	21.02(1.482)	2.053(0.5484)	1.754(0.5757)
	(5, 5)	Male 54.4%	21.47(1.283)	2.123(0.5025)	1.772(0.7324)
	(0, 10)	Male 53.3%	21.30(1.280)	2.033(0.5197)	1.617(0.6132)
Large	(10, 0)	Male 56.7%	21.33(1.311)	2.000(0.5523)	1.650(0.6593)
	(5, 5)	Male 56.1%	21.07(1.534)	2.105(0.5569)	1.824(0.6303)
	(0, 10)	Male 57.5%	21.34(1.254)	2.068(0.5208)	1.712(0.6708)

Table D2. Descriptive Statistics and Correlation Matrix†

	Mean	STD	1	2	3	4
1. Social Distance	0.62	0.48	1			
2. Fairness	0.30	0.46	-0.12*	1		
3. Proposer Acceptance	0.12	0.33	-0.09*	0.03	1	
4. Final Acceptance	0.08	0.27	-0.14*	0.04	0.79*	1

Note: *p < 0.05

† Responder's acceptance is not in the correlation matrix due to difference in sample size. This is because only responders who receive an invitation from a proposer are observed.

Experiment 2

Table D3. 3 × 2 Factorial Design of Field Experiment 2

(7, 3) Large Social Distance	(5, 5) Large Social Distance	(3, 7) Large Social Distance
(7, 3) Small Social Distance	(5, 5) Small Social Distance	(3, 7) Small Social Distance

Manipulation Check of Social Distance

We used a set of four survey questions to check the social distance manipulation. First, we used the same adapted five-category version of the Bogardus' original social distance scale as in the priming stage. Subjects were asked to choose which category the other party fits in. Out of 240 subjects, none selected "neighbor" as the category. As Table D4 attests, 16 pairs did not choose the same category as the other party (5 proposers believed responders to be relatives, whereas 5 responders stated the proposers to be friends; 3 proposers stated responders to be friends, whereas 3 responders stated to be relatives; 2 proposers stated responders to be coworkers, whereas 2 responders stated to be acquaintances; 6 proposers stated responders to be acquaintances, whereas 6 responders stated to be coworkers). Because Category 1 (relative) and 2 (friends) are considered small social distance, while Category 4 (coworker) and 5 (acquaintance) are considered large social distance by Bogardus, the manipulation check shows that the subjects have a proper understanding of social distance (small versus large). We further used a three seven-point Likert-type scale survey instrument adapted from the literature to check whether Bogardus' measure properly captured the affect-based social distance.[2] The proposer's and the responder's answers had a high correlation of 98%, indicating that social distance was manipulated appropriately, and subjects fell into appropriate treatments.

Table D4. Manipulation Check of Social Distance

Social Distance	Bogardus' Measure	Proposer = Responder	Proposer	Responder
Small	1. Relative	11 pairs	5	3
	2. Friend	41 pairs	3	5
Large	3. Neighbor	0	0	0
	4. Coworker	12 pairs	2	6
	5. Acquaintance	40 pairs	6	2

[2]The three survey items are: (1) We engage in conversations on personal topics on our social networking sites/apps; (2) We have small groups in social networking sites/apps; and (3) We closely follow each other on social networking sites/apps.

Manipulation Check of Fairness

We made three attempts in checking the manipulation of fairness.

First, in checking the fairness measure, if the proposer or the responder did not understand the bonus split correctly, their responses were excluded. We believe such a test could help weed out subjects who did not understand the manipulation of the fairness of the bonus split. Only subjects who were cognizant that they would receive a certain amount (3, 5, or 7) out of the total of 10 were included in the analysis.

Second, although we used objective fairness as a variable, we checked whether the objective fairness (5, 5) was perceived as fair, and whether (7, 3) or (3, 7) were perceived as unfair. We conducted two additional randomized 2 × 5 between-subjects experiments (one for proposers and one for responders) with 994 users of a similar demographic profile under the same experimental scenario, and we report the results below. For both proposers and responders, (3, 7) and (7, 3) were considered unfair (< 2.5 on a scale of 1–7), while (5, 5) were considered fair (> 6 on a scale of 1–7). Furthermore, as shown in Figure D1, a symmetric pattern also emerged that (3, 7), (0, 10) are not significantly different from (7, 3) and (10, 0), respectively. We provide the results of TUKEY HSD tests of group mean differences in Table C1 of Appendix C.

Third, with a follow-up survey, we were able to obtain additional manipulation-check data for 38.75% of the subjects who participated (45 proposers and 48 responders) in our randomized field experiment, about the perceived fairness of the bonus split treatment they received. We observed a high correlation between our dichotomous fairness measure and subjects' perceived fairness (96.5%). The relationship is graphically shown in Figure D2.

In sum, these three manipulation checks ensured that the bonus split fairness was properly manipulated and perceived by subjects.

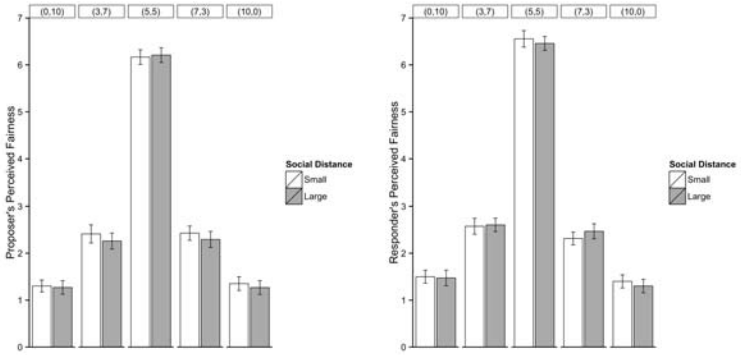

Figure D1. Proposer's and Responder's Perceived Fairness

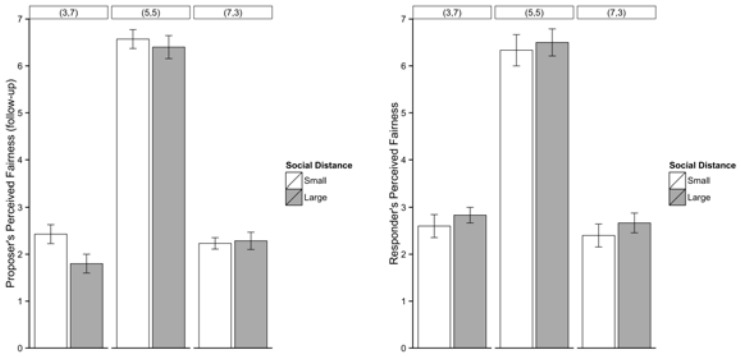

Figure D2. Proposer's and Responder's Perceived Fairness (Field Experiment Participants)

Selection Bias of E-Mail Recall

It is possible that proposers were more likely to remember the e-mails of a friend than of an acquaintance, and they might not want to incur the extra effort to look up the e-mail of an acquaintance, leading to the low referral rate for an acquaintance. Nonetheless, this was not a serious threat to validity for two reasons: First, normally people do not remember an e-mail address, irrespective of the relationship. Second, e-mail addresses are easily located in contact address books within seconds (e.g., Microsoft Outlook or Mac Mail). To assess the role of this potential selection bias, we conducted another one-factor (social distance) between-subjects experiment to check whether subjects perceived that it was more difficult to find the e-mail of a friend versus of an acquaintance. A total of 208 subjects were recruited, and they were randomly selected to either the "Small Social Distance" group (106 subjects) or the "Large Social Distance" group (102 subjects). Subjects were primed about the social distance according to Bogardus and our lab Experiment 1. Subjects were asked to answer two questions on a seven-point Likert-type scale: first, "It is easy to remember the e-mail address of that friend (1: very difficult; 7: very easy)"; second, "I need to utilize an address book in the e-mail system to find the e-mail of that friend (1: strongly disagree; 7: strongly agree)". A manipulation check on social distance including Bogardus's scale and three additional questions were performed. 95% of the subjects passed the manipulation check. Interestingly, we found the following result, as shown in Figure D3.

First, under either conditions (small or large social distances), subjects found it difficult to remember a responder's e-mail; second, subjects strongly believed they needed to use the contact address book of an e-mail system to find the responder's e-mail; third, there were small and statistically insignificant differences under small versus large social distances for ease to remember an e-mail (two sample *t* test: $t = 1.49$, $p = 0.137$) and the need for contact address book (two sample *t* test*:* t=-1.55, p=0.123).

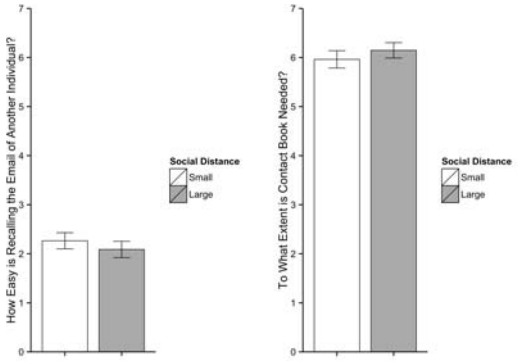

Figure D3. Social Distance and Friend's E-Mail

Social Distance Measure in Online Social Relationship

To further check the validity of the social distance measure, we obtained additional data via a follow-up survey on the online social network relationships between the proposer and the responder via seven questions, respectively, for proposers and responders. We report these measures and their sources in Appendix B above. The average correlation of these measures with our experimentally set of social distances and perceived social distances (manipulation check) are over 90% ($p < .001$) for both proposers and responders.

Experiment 3

Table D5. 4 × 2 Factorial Design of Field Experiment

(10, 0) Weak Tie	(5, 5) Weak Tie	(0, 10) Weak Tie	(x, 10-x) Weak Tie
(10, 0) Strong Tie	(5, 5) Strong Tie	(0, 10) Strong Tie	(x, 10-x) Strong Tie

Table D6. Demographics of Experiment 3

Proposer			
Tie Strength	**Bonus Split**	**Gender**	**Age**
Strong	(10, 0)	Male 72.8%	22.01(1.719)
	(5, 5)	Male 75.0%	20.48(1.306)
	(0, 10)	Male 74.2%	20.43(1.274)
	(x, 10-x)	Male 75.8%	19.87(0.8854)
Weak	(10, 0)	Male 77.8%	22.20(1.523)
	(5, 5)	Male 73.9%	20.48(1.330)
	(0, 10)	Male 76.1%	20.34(1.244)
	(x, 10-x)	Male 76.4%	20.13(0.9787)
Responder			
Tie Strength	**Bonus Split**	**Gender**	**Age**
Strong	(10, 0)	Male 56.0%	22.08(1.398)
	(5, 5)	Male 58.8%	20.21(1.343)
	(0, 10)	Male 55.4%	19.98(1.087)
	(x, 10-x)	Male 57.5%	20.46(2.344)
Weak	(10, 0)	Male 57.1%	22.43(1.207)
	(5, 5)	Male 57.7%	20.33(1.368)
	(0, 10)	Male 53.8%	20.19(1.443)
	(x, 10-x)	Male 55.5%	20.28(1.501)

Experiment 4

To check the robustness of hypotheses testing and to provide additional insights, we conducted another Experiment 4 (that comprises of two studies) using a between-subjects 2 × 2 lab experimental design, respectively, for proposers and responders. There are two experimental variations: First, in order to strengthen the generalizability of the findings from incentives in the form of cash rewards to incentives in non-cash rewards, we use cloud storage as the reward. Second, in the previous two experiments, for the unfair conditions, we used actual figures ((10, 0) and (0, 10) in pilot lab Experiment 1 and (7, 3), (3, 7) in randomized field Experiment 2), in Experiment 3, we used a random split versus a fair split. Using a random split (the actual realization of the split is *a priori* unknown to either proposers or the responders) allowed us to further identify the interaction effect beyond the four types of splits ((0, 10), (10, 0), (3, 7) and (7, 3)) that were used in the pilot lab Experiment 1 and the randomized field Experiment 2.

Recruitment of Subjects

Two separate lab studies were conducted concurrently during December 2013, one on proposers and the other on responders. Proposers and responders participated in these two studies independently, and they were not allowed to communicate with each other during the studies. During an introduction session, subjects were explained that they will be sending/responding to referrals about a cloud storage service. Cloud storage services offer a different context as the bonuses are not cash rewards but storage spaces. Subjects acting as proposers and responders were randomly assigned seats in a computer lab. We recruited a total of 210 subjects as proposers and 210 subjects as responders. Subjects were undergraduate students from a large public university in China. Each subject received ¥10 as a monetary compensation.

Experimental Design

Subjects were shown the cloud service on the computer screen. Related concepts such as social distance (large, small) were explained to all subjects before the experiment. Before subjects received any treatments, they were told the duty of the responder (register for a cloud storage service account) and the referral bonus (free storage spaces), respectively within each group. Subjects across groups were *not* allowed to communicate about the study. Subjects were also informed that the experiment was anonymous.

Treatment Conditions

The first treatment in the experimental design was *social distance*, designed in the same way as the first lab experiment (referral to a GroupBuy website). The second treatment was the *split of the referral bonus*. We two different referral bonus split conditions: fair split (500MB, 500MB), for which both the responder and proposer would receive 500MB of free cloud service storage; random split of 1000MB of cloud storage space, for which the proposer and the responder would receive a random portion of the total of 1000MB (the actual realization of the split is *a priori* unknown), distributed by the cloud storage service company.

Priming of Treatments

First, all subjects in different groups were primed with different social distances in the same way as the pilot lab Experiment 1 (referral to a GroupBuy website). Second, after priming social distance, researchers explained how the referral bonus split would work. Specifically, in the equal allocation (500MB, 500MB) treatment, proposers and responders were explained that both parties will split the 1000MB space equally; in the random split groups, proposers and responders were explained that the cloud service company will randomly distribute the 1000MB space between proposers and respondents. Consequently, proposers and responders were asked about their likelihood of sending the referral to another individual or to accept the referral from another individual, respectively, measured with a seven-point Likert type interval variable (1 = most unlikely, 7 = most likely).

Using a similar approach to pilot lab Experiment 1, a manipulation check was built into the experiment to ensure that respondents had correctly understood the social distance and bonus splits. If a subject could not correctly recall the primed social distance or bonus split, the observation is not used. There were 4 (1.9%) proposers and 6 (2.9%) responders who did not pass the manipulation check, and they were all dropped.

Experiment 4 Results

We used independent sample *t*-tests, a linear model (OLS) and an ordered logistic model to estimate the effect of social distance, random (versus equal) split and their interaction effect on the likelihood of proposing and accepting a referral. Counterfactually, if Experiment 3 could replicate the results from the pilot lab Experiment 1 and the randomized field Experiment 2, we would observe the random split treatment to have an opposite effect from the fairness split treatment we focused on in the first two experiments. Using independent sample *t*-tests, we found a significant main effect of social distance for both the proposers' intention to send a referral ($t = 6.42$, $p < 0.001$) and the responders' intention to accept the referral ($t = 3.72$, $p < 0.001$). The effect of the treatment "random split" had a no significant main effect ($p > 0.1$) for both the proposers and the responders.

Estimation results are reported in Tables D7 and D8. We also plotted the marginal effects for the linear model to graphically show the interaction effects. We observed several findings that are consistent with the previous experiments. First, both proposers and responders tend to accept referrals from friends with a small social distance. Second, both proposers and responders tend to prefer a random split than the equal split under a small social distance (than under a large social distance), indicating a significant interaction effect.

Experiment 4 Discussion

There are three key differences in the experimental design between Experiment 4 and lab Experiment 1: first, we used a full factorial design for the proposer (in lab Experiment 1 we used a one-factor design that asked the proposer to select the referral bonus split); second, in Experiment 3, we used a slightly tweaked treatment condition that is different from both Experiment 1 and Experiment 2—random split versus a fair split (as opposed to the enforced unfair split conditions (10, 0) and (0, 10)); third, we used a non-cash type incentive (cloud storage) as opposed to monetary incentive in the form of cash in lab Experiment 1 and randomized field Experiment 2. Overall, the results from Experiment 4 show that the results of our lab Experiment 1, randomized field Experiment 2 and Experiment 3 can be replicated, indicating the robustness and generalizability of the main findings.

Table D7. Proposer's Intention of Sending a Referral

	(1) OLS Main Effect	(2) OLS w/ Interaction	(3) Ordered Logit Main Effect	(4) Ordered Logit w/Interaction
Social Distance	**-1.160*** **	**-0.864*** **	**-1.653*** **	**-1.118*** **
	(0.173)	(0.261)	(0.269)	(0.370)
Random Split	0.230	**0.530** **	0.296	**0.866** **
	(0.182)	(0.234)	(0.274)	(0.380)
Social Distance × Random Split		**-0.592***		-1.117**
		(0.355)		(0.541)
Gender	-0.227	-0.246	-0.353	-0.412
	(0.178)	(0.179)	(0.266)	(0.268)
Cloud Usage Experience	-0.0981	-0.117	-0.150	-0.194
	(0.146)	(0.151)	(0.209)	(0.217)
Age	-0.232**	-0.242**	-0.369**	-0.392***
	(0.0968)	(0.0985)	(0.145)	(0.145)
Constant	11.40***	11.53***		
	(2.514)	(2.556)		
Observations	206	206	206	206
R^2	0.21	0.223	0.068	0.074

Notes: Robust standard errors in parentheses, ***p < 0.01, **p < 0.05, *p < 0.1.
Pseudo R^2 are reported for Logit and ordered logit models.

Table D8. Responder's Intention of Accepting a Referral

	(1) OLS Main Effect	(2) OLS w/ Interaction	(3) Ordered Logit Main Effect	(4) Ordered Logit w/Interaction
Social Distance	**-0.578*** **	-0.112	**-0.987*** **	-0.114
	(0.167)	(0.248)	(0.274)	(0.364)
Random Split	**0.294***	**0.755*** **	0.421	**1.352*** **
	(0.166)	(0.221)	(0.258)	(0.374)
Social Distance × Random Split		**-0.923*** **		**-1.832*** **
		(0.327)		(0.548)
Gender	-0.174	-0.186	-0.257	-0.288
	(0.171)	(0.170)	(0.265)	(0.267)
Cloud Usage Experience	-0.243	-0.269	-0.322	-0.401
	(0.174)	(0.174)	(0.273)	(0.275)
Age	0.105*	0.115**	0.167*	0.201**
	(0.0597)	(0.0577)	(0.0992)	(0.0947)
Constant	3.341**	2.920**		
	(1.491)	(1.442)		
Observations	202	202	202	202
R^2	0.099	0.136	0.060	0.040

Notes: Robust standard errors in parentheses, ***p < 0.01, **p < 0.05, *p < 0.1.
Pseudo R^2 are reported for Logit and ordered logit models.