Coordination and communication in groups of varying internationality

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Abstract

Using simultaneous minimum effort (weakest link) experiments in Xiamen, China and London, United Kingdom we examine group coordination between groups of local and international participants. We find that group composition affects the level of coordination between participants; but, the effects in each city are not equal. London participants demonstrate a larger discrepancy between behaviour in local and international groups when compared to Xiamen participants. Interestingly, this discrepancy in behaviour is not matched by differences in their expectations of other group member behaviour. Anonymous one-way cheap talk communication elicits similar changes in behaviour regardless of group composition. Our results reveal that group composition has an effect on coordination when this is the only salient dimension, however when competitiveness and communication are imposed these effects dissipate.

Keywords: coordination, group composition, cheap talk, internationality, communication

1 Introduction

The importance of coordination has been crucial in achieving progress in diverse areas from workplaces to environmental management (Camerer, 2003). Increasingly society is faced

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with situations where coordination between geographically distinct and culturally different groups is necessary. For example, a multinational firm with teams of workers across different countries are required to coordinate to complete a project; a team of researchers organising a conference require coordination amongst themselves, presenters and attendees to ensure a successful event. Such coordination takes place between strangers with their own culturally driven assumptions that are likely to be geographically distinct. In such a situation, singular efforts can promote the integrity of the project, but without coordination, individual efforts will be undermined. With this in mind, we examine the character of coordination in groups that stretch beyond cultural and geographic boundaries and how anonymous, non-binding, one-way communication augments coordination in these groups.

Our geographic location, the place where we reside, can be both a conscious choice or an outcome of situation. In either case, one's geographic location shapes us as individuals and thereby affects our willingness to coordinate and expectations of others (Becker et al., 2016). Our study examines how two aspects of geographic location shape willingness to coordinate. These are identity through nationality and beliefs through expectations. We create groups locally and internationally allowing an interpretation of how these aspects interact with geographic distance between group members.

We conduct a minimum effort coordination experiment (Van Huyck et al., 1990) between 796 students at Xiamen University, China and the London School of Economics, United Kingdom. Our sample of participants from Xiamen, China and London, United Kingdom provide distinct characteristics at opposing spectrums of identity and beliefs. In terms of identity, Xiamen, a city in the South-east coast of China, has a virtually homogenous population. Largely, the population has a single nationality, Chinese, and have lived only in China. This is typical of many cities in China. In contrast, London has a relatively heterogenous population; characterised by people of different nationalities and backgrounds. We compose groups of participants across cities and within cities, altering the geographic and social distance between participants. To the best of our knowledge, our study is the first to compare coordination in the United Kingdom and China in both international and local groups.

Our study makes a contributions to the literature on behavioural differences due to nationalities and expectations, and is one of the first to test the internationality of group composition between China and the United Kingdom. We show that heterogeneity on the dimension of internationality does not necessarily lead to a reduction in coordination. In fact, coordination discrepancies are location dependent. Furthermore, anonymous one-sided cheap talk

communication dramatically changes coordination and overcomes any coordination issues arising from internationality.

We differentiate our study from previous cross-national studies, by considering culture as developing through one's location. In contrast, Chuah et al. (2007) use a sample of British expatriates in Malaysia and Malaysian international students in the UK for their cross-national study of ultimatum games. They find distinct location effects; on foreign soil proposers offer significantly more generous splits than home soil proposers. However, are unable to disentangle these from other aspects of being an expatriate. We instead, select our subject samples by location, acknowledging that a culture other than one's ethnicity develops in cosmopolitan cities such as London.

Previous studies on coordination across nationalities and cultures illustrate a decrease in coordination when participants are disparate (Chen et al., 2014, Hemesath and Pomponio, 1998, Engelmann and Normann, 2010, Jackson and Xing, 2014, Yamagishi et al., 2008). One reason for this decrease is provided by identity theory. Individuals with different identities have a lower willingness to coordinate(Daskalova, 2018). This has been shown when nationalities of participants differ (Engelmann and Normann, 2010) and when the ethnicity of participants differ (Chen et al., 2014).

A second reason for decreases in coordination is homophily; that is, shared characteristics in identity lead to similar choices and greater coordination. Jackson and Xing (2014) show that in a sample of online participants predominantly residing in the United States and India, participants coordinate more frequently and earn higher payoffs when paired with participants in the same location. It has been shown that preexisting social identities can affect behaviour (Bernhard et al., 2006) and in-group coordination is more likely when group identity is salient (Charness et al., 2007). In contrast to the existing literature, we find that there is very little difference between the behaviours of groups formed locally that consist of participants of different nationalities and ethnicities to those of participants of the same nationalities and ethnicities.

Our study builds on these results by manipulating social distance through international and local groups. International groups have a larger social distance between group members since members are geographically distant. In comparison, local groups are closer in social distance since group members are all in the same room. Buchan and Croson (2004) report that Chinese participants have a high general level of trust, however this trust does not change based on social distance. In contrast, trust in United States participants do change based

on social distance. Our results concur with their findings. While playing with the local participants, Xiamen and London participants behave similarly. But when playing with international participants (larger social distance), London participants respond significantly to this change in social distance; whereas, Xiamen participants do not.

We analyse participant expectations of the minimum contribution from the other group members. In keeping with Buchan and Croson (2004), we find very little evidence of differences in the expectations of Xiamen students based on their group (international or local). However, for London students we find a substantially lower minimum contribution expectation in the international group as compared to the local group. This is accordant with the behaviour of London students in the international group. Furthermore, a comparison of behaviour and expectations demonstrates that a large proportion of participants consider non-pecuniary factors when moving between their expectations and behaviour.[1]

Finally, we test the impact of a limited interaction between group members. This is in the form of an anonymous, non-binding, one-way announcement made by one randomly selected member of the group. Advances in technology have made anonymous communication increasingly common through online comments and anonymous forums. This is a particularly common form of communication between geographically distinct strangers and familiar to our sample. Hence we use this type of communication in our study. Unlike the case without communication, we find that there is no difference in behaviour between those in different group compositions.

The announcement is one-sided and restricted to the set of possible contributions by the individual player in a manner similar to Cooper et al. (1992). Our results indicate that the announcement increases the level of coordination in all group compositions. We find that 8.65% of local groups and 9.73% of international groups coordinate on an efficient equilibrium, which is much lower than the results of one-sided communication in coordination games with two possible equilibrium as surveyed in Crawford (1998) and Cooper et al. (1992).[2] This is likely because in our experiment there are nine possible equilibriums, which leads to a larger spread of possible responses by participants. Surprisingly, unlike theoretical predictions, announcements do not necessarily reflect the Pareto dominant equilibrium, with only 55.43% of announcements reflecting a contribution to reach the highest payoff equilibrium.

[1] These could be called soft factors as discussed by (Schelling, 1960).

[2] Cooper et al. (1992) find that the Pareto dominant equilibrium is reached 53% of the time with one-way communication.

The remaining sections of this paper consist of a description of our experiment in Section 3. An analysis of the hypotheses and experimental data on behaviour and expectations in Section 4 and a discussion of the implications of the results and possible explanations of the results in Section 5.

2 Hypotheses

We test hypotheses under two different treatments. The first is the group composition treatment and the second is the announcement treatment.

In the group composition treatment we seek to understand how the internationality of groups affects coordination. Interntionality affects group composition both by increasing heterogeneity and by increasing social distance. The composition treatment tests two hypotheses.

1. If heterogeneity in groups decreases coordination, then we expect London local groups to have lower group minimums and individual contributions than Xiamen local groups.

2. If coordination decreases as social distance increases, we expect international groups to have lower group minimums and individual contributions than local groups.

The first hypothesis is expected since London groups are more heterogeneous than Xiamen groups and increases in heterogeneity have been shown to lead to poorer coordination (Chen et al., 2014, Hemesath and Pomponio, 1998, Engelmann and Normann, 2010, Jackson and Xing, 2014). As noted earlier, the sample of London participants is more heterogneous on the dimensions of nationality and language as compared to the Xiamen participants. These dimensions are also associated with other differences between the groups, however we abstract from a detailed deconstruction of cultural heritage and consider heterogeneity as a spectrum (Vogeley and Roepstorff, 2009). On this spectrum, the London sample lies much closer to heterogeneity than the Xiamen sample. For this reason, we expect that both the group minimums and the individual contributions in London groups will be lower than in Xiamen groups.

Our second hypothesis arises from the impact of social distance on coordination. We draw attention to the social distance between participants by emphasising their geographic locations. In the experiment, we increase saliency of the geographic distance in our instructions

that delineate whether participants are in international and local groups and for the participants in an international group we display a video stream of participants in the other city. We anticipate that international groups will have lower group minimums and individual contributions than local groups when the dimension of city is salient.

In the announcement treatment we expect that the announcement will become the predominant factor in contributions. Thereby, we expect the theoretical underpinnings of the game will overcome any effect from group composition, and group composition will have little affect once anonymous communication is permitted. The anonymous communication could work through different channels, including increased salience on a particular coordination level (Corazzini et al., 2015) and a leadership effect. However, our experiment does not allow us to distinguish between channels. We have the following hypotheses:

3. If participants behave rationally, there will be no difference in announcements despite differences in group composition.

4. If participants Bayseian update, announcements in the first composition have persistent effects on the second composition despite changes in group composition.

5. If participants behave rationally, the contribution response to the announcement will not vary across group compositions.

6. If participant behave rationally, the announcement has a stronger effect on behaviour than the revelation of the maximum in the participant pool (round 3).

3 Experiment

Our experiment consists of one-shot minimum-effort coordination games with no prospect of reciprocity. Sessions were conducted simultaneously at the Finance and Economics Experimental Lab (FEEL) at Xiamen University and the Behavioural Research Lab (BRL) at the London School of Economics.[3] The experiment was run over four months and in total there were 408 student participants from Xiamen and 388 student participants from London.

Participants were anonymously placed into near minimal groups of four and asked to indi-

[3]The interaction of group members is virtual rather than face to face. (Staples and Zhao, 2006) show stronger effects in face to face interactions.

vidually contribute to a group investment.[4] Any uncontributed amounts were kept by the participant. The groups were randomly reassigned between the international and local treatments and not within a composition treatment. In each round participants were provided nine tokens of which they could contribute a minimum of one token and a maximum of nine tokens to the group investment. The experiment is largely identical with that of Van Huyck et al. (1990), the main difference being that our contributions range from one to nine rather than one to seven. This change was made to increase the range of increments available to participants. The return on the group investment was double the minimum of the four contributions. In other words the ratio of return was 1:2 between the individually kept tokens and the contribution.[5]

Mathematically, the payoff, π, for player i is:

$$\pi_i(x_1, ..., x_4) = 9 - x_i + 2min_{j=1,...,4}\{x_j\} \tag{1}$$

where x_i is the contribution for player i.

From this payoff structure, we have nine Pareto ranked pure strategy Nash Equilibria, characterised by all players choosing the same level of contribution. The highest payoff for all players is an equilibrium of nine. The most secure but least efficient equilibrium is for all players to contribute one (often termed the security equilibrium). Each round in the session is a one-shot game. Players only learn of other group members' contributions at the end of the session. Very few groups reached a Nash equilibrium, as would be expected in a one-shot game.

Participants take part in six rounds within a local composition (all group members are in the same city) and six rounds within an international composition (group members are from either city). The sample is roughly split in half with 372 participants engaged in the local composition before the international composition (sq1) and 424 participants engaged in the international composition before the local composition (sq2). Each participant is in one local composition and one international composition. We will use the terminology first composition to refer to the first composition that a participant engaged in and second

[4]Near minimal groups (Chen and Chen, 2011) meet three of the four criteria of minimal groups (Tajfel and Turner, 1986): random assignment, subjects do not interact, group membership is anonymous. The fourth(unmet) criteria is that subject's choices do not affect their own payoffs.

[5]In other minimum effort games the ratio ranges from 1:0.75 Chen and Chen (2011), 1:0.4-0.8 Chen et al. (2014).

composition to refer to the second composition the participant engaged in. The experiment clearly states whether participants are taking part in the local or international composition. The distinction is emphasised on screen through instructions and also with a live stream video showing the other city's computer laboratory in the international iteration. This video displays the whole room showing the backs of individuals in the other computer laboratory. This sequencing is designed to permit both a between and within subject analysis.

Participants are shown experimental instructions on screen and on paper. Instructions were back translated from English to simplified Chinese. A practice round is played with computer simulated other players in order to ensure comprehension. The practice round can be repeated until participants are confident that they understand the payout structure (up to a maximum of four times). Participants who are unable to understand the game are excluded.[6]

The six rounds in each composition correspond to six treatments:

1) baseline

2) baseline and elicit expectations

3) weak information and elicit expectations: participants are informed of the maximum contribution in round 1 for their participant pool (international or local treatment).

4) tournament and elicit expectations: competition between groups to determine payoff for individual groups.

5) risk and elicit expectations: a higher minimum contribution in the group leads to higher chance of receiving the full payoff rather than zero.

6) strong information and elicit expectations: announcement is provided by a randomly chosen group member to their group.

To remove order effects, rounds 3-5 are randomised at the individual player level. The timing of round 6 is not randomised since this round provides group level information and could contaminate the results of other rounds. To elicit expectations, participants were asked to nominate the minimum contribution of their group excluding themselves. This was incentivised with a bonus payment of one token on a randomly selected round (rounds 2-6)

[6]One student in London was excluded because they were unable to understand the experiment. This participant affected 24 other participants and all these were dropped from our sample for analysis.

if the belief matched the realisation.

In addition to the experimental data, we gather survey data at the end of the session on risk aversion and trustworthiness. For risk aversion we ask ten binary lotteries to determine levels of relative risk aversion. We choose lotteries in a similar methodology to Holt and Laury (2002), where switching points between lotteries provide an interval estimate of the coefficient of relative risk aversion. For trustworthiness we use trust questions from the National Opinion Research Center's General Social Survey and trust questions from Glaeser et al. (2000). For environmental awareness we have seven Likert scale (one to seven) questions. These variables are used as controls in the analysis in Section 4. The experimental instructions and survey can be found in the Appendix.

The monetary payoff at the end of the session was calculated using the exchange rates, one token equivalent to 0.5 GBP or 1 RMB. This exchange rate reflected the relative price of a student lunch in each city (7.50GBP in London and 15 RMB in Xiamen) in February 2017. Our exchange rate is consistent with the ratio of consumer prices based on cost of living measurements that places Xiamen at 47.79% cheaper than London (Numbeo, 2018). The payoff was calculated as the sum of five components. These were the payoff from one randomly selected round in the international composition, the payoff from one randomly selected round in the local composition, the payoff from one randomly selected risk aversion lottery, a bonus 1 token from one randomly selected round (round 2-6) in the international composition if the expectation was correct and a bonus 1 token from one randomly selected round (round 2-6) in the local composition if the expectation was correct. Participants received a summary of their contributions, expectations, realised group minimum, minimum of the other group members and randomly selected rounds for payment at the end of the experiment. Randomisation for payment was made at the inidividual level.

Participants in London received payments between 5 GBP and 22.5 GBP with an average payment of 12.40 GBP. Participants in Xiamen received payments between 10RMB and 44.5RMB with an average payment of 24.38 RMB. The average time of a session was 50 minutes.

4 Results

We report results based on three experimental outcomes. The first is individual contribution. This is the amount that participants select to contribute to the group investment. Individual contributions provide a combined measure of the expectation of group member contributions and individual willingness to contribute. The second outcome variable is the group minimum belief. This is the elicited belief from each individual that reflects their expectation of the group minimum excluding themselves (from round 2 onwards).[7] The third outcome variable is the group minimum; this is the realised minimum contribution in each group and translates into the investment payoff for each group. There is one group minimum for each group. In terms of coordination, this outcome variable is important because it reflects the level of coordination of each group. The previous literature on minimum effort experiments, analyses the group minimum (Bornstein et al., 2002, Weber et al., 2001).

This section is organised into three parts. The first provides summary statistics of relevant variables in our data. The second reports the results against the group composition treatment. Whilst the third, provides an analysis of the announcement effect at the end of each composition.

4.1 Overview

We use a sample of 740 student participants for the analysis from our original sample of 796. 56 participants are removed from analysis because of an internet failure resulting in incompletion (32) and participant failure to complete including those in groups where one member did not complete (24). Our sample for analysis is 376 Xiamen students and 364 London students. The Xiamen sample consists of 115 graduate and 261 undergraduate students from Xiamen University. The London sample consists of 35 graduate and 296 undergraduate students from University of London institutions.[8] The London sample was split into chinese national participants (40) and non-chinese national participants (324). The chinese national participant sample is used as a control. Separate sessions were run with chinese national participants (in London) and Xiamen students.[9] We find no significant

[7] In terms of our incentive structure we elicit the mode of the expectation rather than the mean of the expectation. However, this makes little material difference to our analysis.

[8] 33 London students did not enter a degree.

[9] Chinese national participants include participants from mainland China and Hong Kong.

differences between the chinese-only sample in London and the general London sample. For this reason, we pool these samples together and analyse the London sample as a whole.

Table 1 reports the summary statistics of our participant sample. The two most notable differences in our sample is, significantly more heterogeneity in the London sample and signficiantly lower levels of trust in the London sample. The London student sample consists of 40 distinct nationalities and 32 distinct first languages. In comparison, the Xiamen student sample consists of a single nationality and first language.

Table 1: Summary statistics

	Xiamen	London
Participants	376	364
% female	61%	58%
Distinct nationalities	1	40
Distinct majors	65	45
Median years in London	n/a	over 5 years
Distinct first languages	1	32
% undergraduates	69%	81%
Risk aversion score	4.875	4.824
	[2.017]	[1.883]
GSS score	-0.343	0.356
	[0.861]	[1.010]

Note: The Risk aversion score is calculated by the number times individuals choose the safer lottery over the riskier lottery and the GSS score is the normalised GSS index using the methodology in Gächter et al. (2004). For the London Risk aversion and GSS scores, the observation number is 363 since one participant failed to fill out the survey.

Secondly, the trust variables for the Xiamen and London samples also differ significantly. Xiamen students reflect higher scores on their general level of trust. The distribution of responses is significantly different (p-value=0.0014). The trust level in our sample is also consistent with other participant samples in cooperative games (Anderson et al., 2004, Gächter et al., 2004) and the World Values Survey (see Appendix Table 8). The London and Xiamen sample show similar gender ratios and risk aversion characteristics.

Our samples in London and Xiamen are relatively representative of the populations in the two countries in the dimensions of nationality and trust. Despite this, our sample consists only of students and so cannot be thought of as necessarily representative of the general population in each city. By focusing on differences between our sample groups, characteristics that are shared between students are likely to have a similar impact under all treatments and thus allow us to isolate how coordination differs with nationality and expectation.

The proceeding analysis is divided into two sections. The first discusses the composition

Table 2: Descriptive statistics of contributions per round

Contribution in	Obs	Mean	Std. Dev.	Min	Max
Baseline (1)	1,480	6.143	2.286	1	9
Baseline + beliefs (2)	1,480	6.070	2.309	1	9
Max information (3)	1,480	6.918	2.249	1	9
Risk neutral (4)	1,480	7.474	1.959	1	9
Tournament (5)	1,480	7.386	1.929	1	9
Announcement (6)	1,480	7.187	2.159	1	9

treatment and the second discusses the anonymous announcement treatment.

4.2 Composition treatment

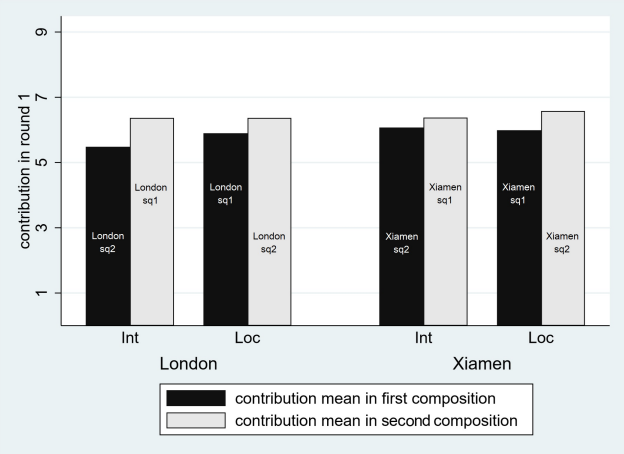
We separate our analysis in this section to a between subject analysis of the first composition,[10] a between subject analysis of the second composition and a within subject analysis. The reason for this is the significant increase in contributions in the second composition regardless of the composition treatment. As can be observed in Figure 1 the second composition had higher contributions than the first composition and the contributions are also roughly similar. An explanation is that the first composition provided adequate information to allow participants to update their beliefs and increase their contributions.[11] The most likely candidate for providing information is the final round in the first composition in which a group member announces a contribution. However, an additional candidate is information from round 3, where the maximum of the participant pool is revealed. An analysis of the effects of these pieces of information is provided in subsection 4.3. Thereby, we present the analysis of the first composition data here and report analogous results for the second composition and the within subject analysis in the Appendix.

Figure 2 provides two cumulative distribution plots that describe our data for individual contributions in round 1 (left) and round 2 (right) in the first session for each composition treatment: London international composition (London_Int), London local composition (London_Loc), Xiamen international composition (Xiamen_Int) and Xiamen local composition (Xiamen_Loc). The city refers to where the participant is based and the composition is international or local.

[10]The first composition is the first composition that a participant engaged in. It can be local or international.

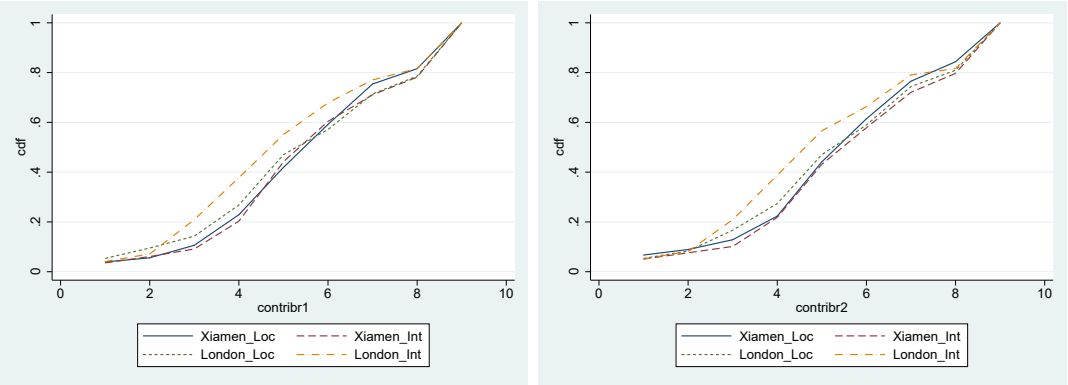
[11]There is an approximately 20% chance that a member from your first composition is in your second composition, if there are both 20 London students and 20 Xiamen students.

Figure 1: First and second compositions



The figures illustrate that across each composition treatment the range of individual contributions largely takes the full range between 1 and 9. In addition the median contribution is consistent across all sub samples except for the London international composition. The spread of contributions is larger in Xiamen international composition than in Xiamen local composition as could be expected since, Xiamen international compositions have more heterogeneity. In the case of the London compositions, the local composition has a larger spread than the international composition. This can also be linked to a decrease in heterogeneity, since the international compositions have less heterogeneity on average than the local compositions.[12]

Figure 2: Cumulative distribution function: contributions (first composition)



Analagous figures for group minimum and expectations are shown in figure 3 and 4. Since expectations were only collected from round 2, there is only one plot. As with contributions, the raw data appears to show significant differences with the London international

[12]Heterogeneity here refers to the definition used in the introduction and refers to the spectrum based on differences in language, nationality and secondary factors associated with these characteristics.

composition as compared to the other composition treatments. The London international composition has a lower median group minimum and a lower median expectation of the group minimum.

Figure 3: Cumulative distribution function: group minimum (first composition)

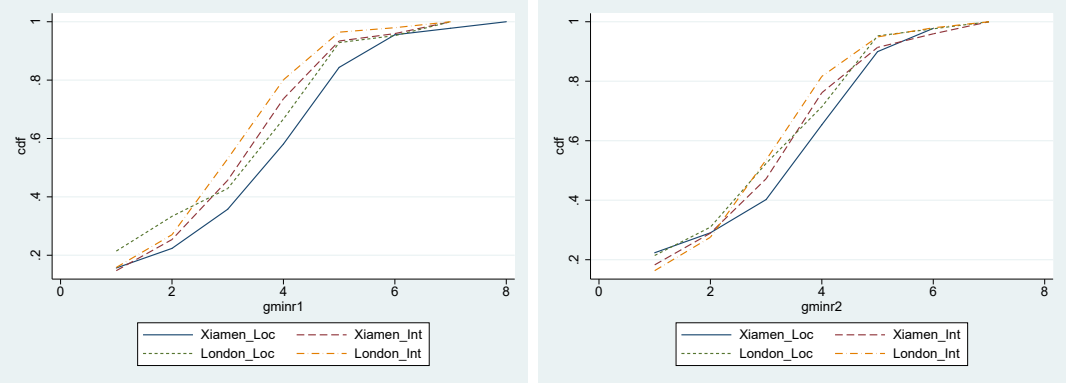
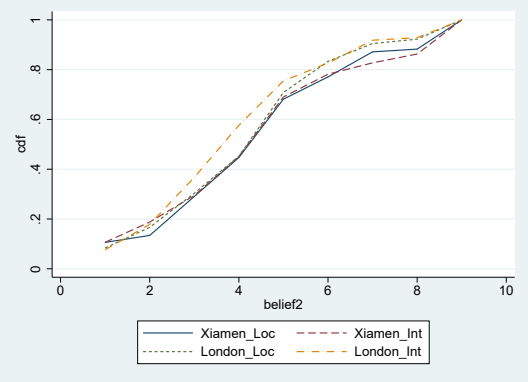


Figure 4: Cumulative distribution function:expectations (first compositon)



These preliminary results indicate that there is a significant difference between the London international composition and the three other compositions. However, this is not necessarily in accordance with the idea that heterogeneity in groups decreases coordination, nor that social distance decreases coordination. The most homogeneous sample is the Xiamen local composition. However, the behaviour of this sample is very similar to that of the London local composition (different location) and the Xiamen international composition (more heterogenous). The results instead suggest that the social distance (international or local group) effect differs depending on whether participants' baseline environment is homogenous or heterogenous. We explore this conjecture below. The tests used for our results (except where noted) are Wilcoxon rank sum tests.

Hypothesis One *If heterogeneity in groups decreases coordination, then we expect London local groups to have lower group minimums and individual contributions than Xiamen local groups.*

Using the data from the first decision in the experiment (baseline first composition), we find there is no significant difference (p=0.7777) in contribution levels between London local and Xiamen local compositions. However, there is a significant difference (p=0.0272) between group minimums. The Xiamen group minimum is significantly higher than London, suggesting a higher level of conformity. Based on the second decision in the experiment (baseline with expectations first composition), we find that there is no significant differences (p=0.8765) in contributions and that there is a marginally significant difference between group minimums (p=0.1281). These statistics show limited evidence of individual behavioural differences. However, the results do show that in the more homogeneous Xiamen local sample, groups have higher group minimums and result in higher average payoffs. The second composition data and within subject data show little evidence of any difference between the cities.

Similarly, the results for the treatment rounds 3-5, show little difference between London local and Xiamen local compositions.

Hypothesis Two *If coordination decreases as social distance increases, we expect international groups to have lower group minimums and individual contributions than local groups.*

Comparing the London international to the London local composition we find a marginally significant difference between the contributions (p=0.0548) with the local composition having higher contributions than the international, and no difference in the group minimums (p=0.1731). Comparing the Xiamen international to the Xiamen local composition we find no difference between the contributions (p=0.7803) but a significant difference in the group minimums (p=0.0103). In line with Hypothesis two, London international has lower contributions than the London local composition and the Xiamen local compositions have a higher group minimum than the Xiamen international compositions. However, there is no consistency insignificance between group minimums and individual contributions.

For this reason, we further analyse our data for hypothesis two using a double difference specification. Here we seek to determine if the behavioural difference between the Xiamen and London local groups differ from the Xiamen and London international groups. A significant difference in this test would support the hypothesis that participants behave differently in in-

ternational groups and local groups, taking into account the resident city of the participants. To do this we run a regression with the specification

$$Y_i = \alpha City_i + \beta Int_i + \gamma CityInt_i + Controls_i + \epsilon_i \quad (2)$$

, where i is each participant. On the right side of the equation, there are three binary variables. $City_i$ is 1 if the participant is located in Xiamen and 0 if located in London. Int_i is 1 if the participant is in an international composition and 0 if the participant is in a local composition and $CityInt_i$ is the interaction term between $City_i$ and Int_i. Control variables include gender, undergraduate, risk aversion, and trust.[13]

Our analysis focuses on the coefficient γ. If γ is positive this demonstrates that the mean difference between Xiamen contributions in the international and local groups is larger than the mean difference between London contributions in the international and local groups. A significant γ indicates that London and Xiamen based participants change their behaviour differently between local and international groups.

Our results reveal that there is a marginally significant difference in behaviour for the first decision in the experiment (baseline first composition) made by participants. Surprisingly, in the second decision of the experiment when participants are asked to nominate their expected group minimum there is a more pronounced significant difference in contribution behaviour (although there is no significant difference in their expectations). As shown in Table 3 columns 1 and 2, the coefficient for the City dummy is not significant, indicating that there is no significant difference between behaviours in London local groups and Xiamen local groups. This is also evidenced by Figure2. However, the coefficient of CityInt is marginally significant, indicating that the way Xiamen students respond to internationalisation is different from the way that London students do. Specifically, London based participants have a larger difference between their contributions in the international and local compositions than their Xiamen counterparts.

Since our outcome variable is truncated data, a potential concern for this results is that it could be due to different basedline contribution level of participants based in different locations. Given that Xiamen and London participants behave similarly, this double difference is most likely to be caused by the participants' different response to the increase of social distance. Speculatively, our results suggests that the additional question of subjective

[13] Coefficients for the control variables can be found in Table 9. We also ran the regression without controls and there was no notable difference in standard errors.

expectations triggered a larger change in behaviour in Xiamen participants than London participants and this intensified the difference between international and local compositions.

Table 3: Double difference regressions

	1	2	3	4	5
	contribution1	contribution2	expectation2	groupmin1	groupmin2
City	-0.229	-0.361	-0.104	0.251	0.126
	[0.250]	[0.253]	[0.250]	[0.185]	[0.185]
Int	-0.480**	-0.488**	-0.293	-0.244	-0.057
	[0.241]	[0.244]	[0.241]	[0.178]	[0.178]
CityInt	0.575*	0.695**	0.283	-0.133	-0.077
	[0.330]	[0.335]	[0.330]	[0.244]	[0.244]
Obs.	707	707	707	707	707

Note: Table regresses equation (2), using the city dummy variable, international group dummy variable, and their interaction term as independent variables, controlling for gender, undergraduate, risk aversion, and trust. Robust standard errors are reported in brackets. We also tried clustering the error by room (that is by date and city) , the significance level are largely the same. * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level.

The results for the treatment rounds 3-5 are shown in Table 10. The coefficients have the same signs, however lower magnitudes and lower significance. In the round of weak information (contribution_r3), we provide participants with information about the maximum contribution in the participant pool. In our experiment this value was 9 in all sessions. The coefficient on *CityInt* is positive demonstrating that the mean difference for Xiamen students between international and local groups is significantly larger than that of London students. That is the information had a different effect on the contributions of Xiamen students as compared to London students. However, we find no persistent composition effects in further treatments. This illustrates that group composition is of secondary impact in decisions when factors such as competitiveness and risk neutrality are induced. As expected, the second composition and within subject results are in line with those of the first composition with lower significance and magnitudes.

4.2.1 Competing explanations

In this section we examine differences in the sample that may lead to the double difference observed between London and Xiamen students. We focus on trust as a factor that differs between London and Xiamen students and the level of student (undergraduate or graduate). Finally, we examine expectations and beliefs that could form evidence of how London and Xiamen students differ.

Trust As mentioned in the choice of sampling, a noteworthy difference between our two cities is the level of trust. As a robustness check, we examine whether the underlying reason for differences between the cities is varying trust levels. We run the regression from Equation 2 controlling for risk aversion, trust and demographic characteristics, as well as an interaction between trust and composition.

We use the trust index established in Gächter et al. (2004) as a measure of trust. The GSS index is the normalised sum of de-meaned and normalised re-signed GSS fair, GSS help, GSStrust. The higher the value of the GSS index the lower their level of trustworthiness. Gächter et al. (2004) establish a positive correlation between the GSS index and public goods contributions. Similarly, we find a significant positive correlation between trust and individual contributions and expectations. Table 9 demonstrates that a lower GSS index (higher trust level) leads to higher contributions and higher expectations of the minimum of the other group members. At the group level, individual trust measures are less significantly correlated. However, there is still a significant correlation between trust and realised group minimums. There is no indication that trust is correlated with the realised correctness of expectations (column (6) in Table 9).[14] The coefficient on Int is negative suggesting lower contributions when participants are in the international group and the coefficient on $CityInt$ is positive demonstrating a that the mean difference for Xiamen students between international and local groups is significantly larger than that of London students.

Despite trust being positively correlated to overall contributions, we find that the impact of trust does not differ between local and international groups. Table 12 reports three regressions. The first column is a regression without controls, the second column is a regression with controls including the GSS index, and the third column is a regression with controls and an interaction term of GSS index and Int. Between regressions there is little difference in the magnitude of the GSS coefficient, and importantly the interaction term in column 3 is not significant. This suggests that trust is a persistent individual characteristic that has equal impact on both local and international groups. Notably, across regressions the magnitude of coefficients on $CityInt$ remain similar, illustrating the stability of the coefficient on $CityInt$ and that trust is not the reason for the double difference in our results.

Undergraduate and graduate students Our sample of students in Xiamen is around 30% graduate students, whilst our sample of students in London is around 10% graduate students. This is a large difference in the sample composition with potential implications for

[14] We measure this as the expectation minus the realised minimum of other group members.

our results. As a robustness test, we estimate the double difference specification (Equation 2) for a sample of undergraduate students (555 observations). Table 11 shows the results of our regressions. The undergraduate findings are consistent with the findings of the whole sample and several coefficients have increased in significance. The undergraduate sample demonstrates significant behavioural differences between the Xiamen and London students when in local and international groups. The coefficient on $CityInt$ is positive for contributions in round 1 and round 2 indicating that there is a significant difference between Xiamen and London behaviour change in local and international groups. Further, since the coefficient is positive this indicates that the average Xiamen undergraduate student contributes more to the group investment than the average London undergraduate student.

An analysis of the impact of trust on the undergraduate sample is consistent with the whole sample. Table 13 reports that the coefficient on GSS is negative and significant indicating that higher levels of trust lead to higher contributions and the coefficient on the interaction term is not significant. The coefficients on $CityInt$ are significant and similar in magnitude across the regressions with and without controls. As with the full sample, there is no indication that individual trust levels are correlated with the realised correctness of expectations.

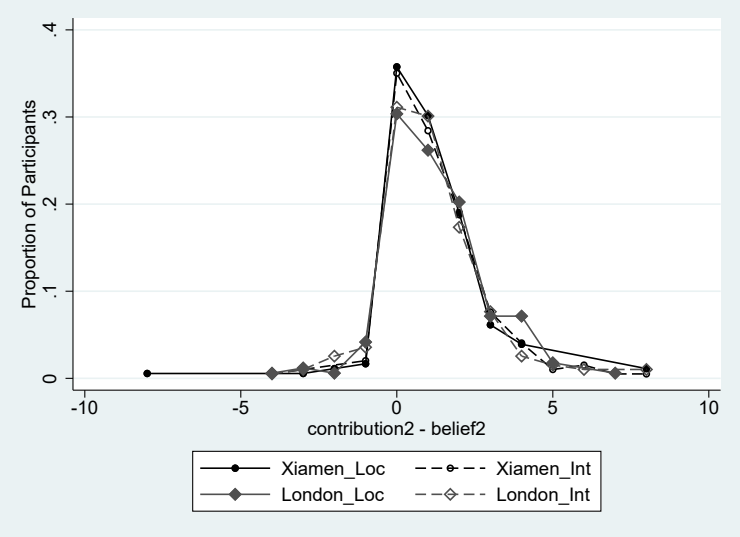
Expectations and beliefs One reason surmised for the fact that disparate groups have lower levels of coordination is that disparate groups have less accurate expectations about other group members. The underlying reason for this can be homophily Jackson and Xing (2014) or that different groups subscribe to different sets of social norms (Bernhard et al., 2006). We explore this possibility by analysing the elicited expectations of the participants. Figure 4 illustrates the distribution of expectations for London international groups, London local groups, Xiamen international groups and Xiamen local groups. The accuracy of these expectations can be determined by comparing an individual's expectation to the realised minimum of the other member's in the group. Our results from a rank sum test indicate that there is no significant difference between the accuracy of expectations between the four types of groups.[15] Thus, we do not find evidence that more similar groups have more accurate expectations of group members.

We also examine the difference between behaviour and expectations. A purely payoff motivated participant would seek to align their contribution with the expected minimum of

[15] A pairwise comparison on each of the four types of groups (city and composition) using the Mann Whitney test shows no difference between the groups based on the raw and absolute difference between expectation and realised group minimum.

the other players in the group. We find a large proportion of participants behave in this manner. However, we also find a significant proportion of participants contribute an amount higher than their expectation. This is likely to reveal non-pecuniary factors or soft factors (Schelling, 1960), however we are unable to find any significant correlates when we run a regression.

Figure 5: Contribution less expectation (round 2 first composition)



4.3 Announcement treatment

The announcement round is the strongest possible interaction in our experimental setup. The announcement is limited to a one-way communication (round 6 treatment) that consists of the integers 1 through to 9. According to Farrell (1988), all announcements in this game are consistent, since the announcements are best responses for each participant assuming the other coalition members follow the announcement. The theory in Farrell (1988) suggests that the predicted equilibrium is the announcement will be 9 because this is the Pareto dominant equilibrium. Indeed, it is in the announcer's best interest to announce 9 since the higher the contributions of the coalition members the higher the payoff for the announcer. If the coalition members follow the announcement and contribute 9, then it is also a best response for the announcer to contribute 9. In our experiment 55% of announcers announced 9[16] and there were announcements ranging from 1 through to 9.[17] Randomly selected announcers

[16]The exact wording was: "A randomly selected individual in each group has been asked to announce a contribution amount. In your group this is ___. You are not bound to this contribution amount and nor are any members of your group (including the announcer). It is only an announcement"

[17]49% in the first composition and 62% in the second composition.

tended to follow their announcement, with 68% percent contributing what they announced.[18] The theoretical underpinnings of the coordination game, lead us to the analyses of hypotheses three to six below.

Hypothesis three *If participants behave rationally, there will be no difference in announcements despite differences in group composition.*

We run a double difference regression of the specification in Equation. 2 with the announcement as the outcome variable. Table 4 reports that there is no significant difference between announcements based on group composition (coefficient *CityInt* is not significant), consistent with the hypothesis.

Table 4: Regression: announcement as outcome variable

	1	2	3
	announcement	announcement	announcement
Int	-0.642	-0.793*	-0.746*
	[0.398]	[0.419]	[0.425]
City	0.0987	-0.174	-0.101
	[0.419]	[0.438]	[0.452]
CityInt	0.0988	0.226	0.103
	[0.573]	[0.584]	[0.611]
Constant	7.854***	7.832***	7.820***
	[0.298]	[0.578]	[0.579]
Controls		yes	yes
GSS interaction			yes
Obs.	179	168	168
R-squared	0.026	0.066	0.069

Hypothesis four *If partipants Bayseian update, announcements in the first composition have persistent effects on the second composition despite changes in group composition.*

Hypothesis four tests if there is Bayesian updating of beliefs based upon the information provided in the first composition. In the first composition participants receive information on the maximum contribution in round 1 of their participant sample (international or local) and also receive an announcement from an anonymous group member. The second composition participant pool is the counterpart participant pool to that of the first composition. Explicitly, if a participant first participated in a local group composition they would then

[18] 68% in the first composition and 69% in the second composition.

participate in an international group composition, and if a participant first participated in an international group composition they would then participate in a local group composition. In both cases there is a probability of 20% that a group member in the first composition is also a group member in the second composition.

Let G_1 be the set of members in participant i's first composition (excluding i) and G_2 be the set of members in participant i's second compositon. Without loss of generality, suppose that the participant pool from which G_2 is chosen is selected from n where n is the larger of two participant pools. Then the probability that i has the same group member in the first composition and the second composition is $1 - p(G_1 \cap G_2 \neq \emptyset) = 1 - \frac{(n-4)(n-5)(n-6)}{(n-1)(n-2)(n-3)}$. For the sample in our experiment this gives a range of probabilities between 21.9% and 30.8% that a participant in the first composition is also in the second composition.[19] This is equal regardless of whether the international or local composition is played first.

We run two regressions to test this hypotheses with the dependent variable as the contributions in each round by first and second composition and the independent variable as the announcement in the first composition. We run the regressions on a sample that excludes the participants who made an announcement in the first composition to ensure that our results are not driven by higher contributors making higher announcements. Our results are shown in Table 5, which displays the dependent variables for the contributions in the first and second composition for rounds 1, 2 and 3. Table 5 confirms the hypothesis that the announcement in the first composition affects the contributions in the second composition with higher significance in the second composition than in the first composition. [20]Table 14 reports the results for contributions in the first and second composition for the additional rounds. Columns 5 and 6 compare the impact of the announcement in round 6 first composition on the contributions in round 6 in the first and second composition. Unsurprisingly, the coefficient for contributions to the announcement in the first composition is highly significant, and not significant when considering contributions in the second composition. Column 7 illustrates that announcers are also impacted by announcements in the first composition and reports that announcements in the first composition have a significant influence on announcements in the second composition.

[19]Due to the nature of our experiment, the sample of participants in each location was a multiple of four and we had combinations of (20,20), (16,20), (16,16) and (12,16). This leads to the probabilities 21.9%, 24.2%, 27.1%, 30.8% respectively.

[20]There may be some significance in the first composition despite the announcement not yet being made since the announcer is a randomly selected participant. Thus it is likely there is consistency between the announcer's contributions and their announcement.

Table 5: Contributions and announcements (followers)

	first composition			second composition		
	1	2	3	4	5	6
	contribution1	contribution2	contribution3	contribution1	contribution2	contribution3
ann_c1	0.0863*	0.0842*	0.0208	0.0939*	0.123**	0.112**
	[0.0500]	[0.0511]	[0.0509]	[0.0524]	[0.0520]	[0.0493]
Constant	5.250***	5.176***	6.651***	5.779***	5.490***	6.293***
	[0.391]	[0.399]	[0.398]	[0.410]	[0.406]	[0.385]
Observations	535	535	535	535	535	535
R-squared	0.006	0.005	0.000	0.006	0.010	0.010

Note: c1 refers to the first composition.

Hypothesis five *If participants behave rationally, the contribution response to the announcement will not vary across group compositions.*

Consistent with the hypothesis we find there is no difference between responses to the announcement across group composition. This suggests that the earlier differences in contribution levels can be easily overcome with non-binding anonymous communication. This is consistent with one-sided cheap talk communication leading to greater coordination efficiency (Crawford, 1998). We test this using a double difference specification comparing the realised shift (RS) in contributions between rounds 6 and 2, against the suggested shift (SS) in contributions between the announcement and round 2 contribution. The regression equation is $RS_{62} = \alpha City_i + \beta Int_i + \gamma CityInt_i + \delta SS + Interactions_i + Controls_i + \epsilon_i$. The interaction terms are between the suggested shift and *City*, *Int* and *CityInt*, whilst the controls are gender, undergraduate student, risk aversion, and GSS score. Table 6 demonstrates that the coefficient on *CityInt* is insignificant consistent with no double difference in how London and Xiamen students respond to announcements. That is when London and Xiamen students observe announcements the behavioural difference between being in an international and local composition is the same. However, the significance on the interaction terms SS_Int and SS_City suggests there are still differences in how participants react to announcements by city and composition.

Hypothesis six *If participant behave rationally, the announcement has a stronger effect on behaviour than the revelation of the maximum in the participant pool (round 3).*

The information in the announcement could be considered as "more informative" than the relevation of the the maximum in the participant pool. This is for two reasons. Firstly, the announcement is direct information from another member of the four-person group that

Table 6: Responsiveness to announcements by composition

	first composition		second composition	
	1	2	3	4
	contributionRS	contributionRS	contributionRS	contributionRS
contributionSS	0.484***	0.496***	0.510***	0.504***
	[0.0465]	[0.0501]	[0.0426]	[0.0448]
City	-0.298	-0.344	-0.108	-0.0147
	[0.228]	[0.240]	[0.189]	[0.203]
International	-0.251	-0.311	0.0129	0.0248
	[0.208]	[0.218]	[0.204]	[0.215]
CityInt	0.307	0.403	-0.0647	-0.0855
	[0.296]	[0.303]	[0.282]	[0.292]
SS_City	0.111	0.106	0.158**	0.166***
	[0.0705]	[0.0730]	[0.0613]	[0.0632]
SS_Int	0.194***	0.164**	-0.000287	0.0376
	[0.0626]	[0.0666]	[0.0623]	[0.0655]
SS_CityInt	-0.0938	-0.0693	-0.0847	-0.123
	[0.0914]	[0.0946]	[0.0890]	[0.0918]
Constant	0.422***	0.720**	0.0800	0.0251
	[0.156]	[0.339]	[0.140]	[0.335]
Controls	No	Yes	No	Yes
Obs.	714	678	720	687
R-squared	0.531	0.534	0.483	0.489

could be interpreted to convey some level of intention on behalf of the announcer. Secondly, the announcement refers directly to an announced contribution which is more closely linked to the payoff structure for a participant than the relevation of the maximum in the participant pool, since payoffs are calculated based on the minimum of the four-person group. Thereby, one would expect a Bayesian updater to place more weight on the information in the announcement than the relevation of the maximum and hence respond more strongly to the annoucement.

Since we seek to test the difference between the responses to information in round 3 and round 6, we run an analysis on a subset of the sample. The maximum of all participant pools in the baseline for each composition was 9. This means that all participants were provided the same information in round 3, regardless of composition and participant pool. Matching this to the announcements provided in round 6, we limit our data to participants who received an announcement of 9. This seeks to control for the effects of observing different announcements, since in both cases participants observe 9. We run two regressions (Equations 3 and 4) and compare the coefficients a and b.

$$RS_{32} = constant + aSS_{92} + \epsilon \tag{3}$$

$$RS_{62} = constant + bSS_{92} + \epsilon \tag{4}$$

where RS_{32} is the realised shift in contributions between round 3 (relevation of maximum in participant pool) and round 2 (baseline with expectations), RS_{62} is the realised shift in contributions between round 6 (announcement by random group member) and round 2 (baseline with expectations), SS_{92} is the suggested shift between a contribution of 9 and the contribution in round 2.

Both coefficients a and b are significant, illustrating that participants responded to both forms of information. This is consistent with the concept of focal points, since the observation of any particular contribution could create a focal point for participants. Nonetheless, the coefficient for the relevation of the maximum in the pool is half that of the announcement, as shown in Table 7. This suggests that participants responded more strongly to the "more informative" information, since the coefficient is double the magnitude. This is also consistent in the second composition as shown in the Appendix

Table 7: Informativeness and Contributions

	First composition			
	1	2	3	4
	Realised shift 32	Realised shift 32	Realised shift 62	Realised shift 62
Suggested shift	0.302***	0.311***	0.574***	0.581***
	[0.0374]	[0.0395]	[0.0374]	[0.0394]
Constant	0.0274	-0.0913	0.145	0.149
	[0.139]	[0.430]	[0.139]	[0.429]
Controls		yes		yes
Observations	350	332	350	332
R-squared	0.157	0.171	0.404	0.414

5 Conclusion

Our study has examined the impact of geography on coordination. Geography is one component of our natural social identities that could deliver challenges to coordination. Where

we live is also closely linked to our nationalities and expectations of others. For this reason we conduct our experiment in both a cosmopolitan city (London, United Kingdom) and a less cosmopolitan city (Xiamen, China). We find that coordination across cities results in a distinct behaviour change in London, but not in Xiamen. This result is somewhat surprising to those that live in a cosmopolitan city, since residence may be a revealed preference for heterogeneity and diversity. However, such a preference does not translate to more generous behaviour nor more accurate expectations of others, when faced with an international partnership. Our findings show that in an international partnership, expectations and behaviours change only in participants from London. In contrast, Xiamen participants tend to display almost identical behaviour and expectations. Although, our findings are restricted in their generalisability because our sample is restricted to two cities, we demonstrate the importance of city based considerations in coordination. Our findings warrant further examination of the interaction of geography and social distance on group coordination in different cultural and social contexts.

Despite initial differences in behaviour between groups, anonymous non-binding communication supplants composition effects of local and international groups. All compositions respond similarly to anonymous, one-sided, non binding communication. This indicates the power of even the most limited form of communication and suggests that behaviour is easily swayed by any communication. In addition, the announcements have a persistent effect on behaviour in the future, with prior communication painting the background of future decisions. Our findings imply that the proliferation of non binding, one way communication channels aided by technology can create bubbles of group think from seemingly unreliable communication.

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Appendix

The results from the most recent World Values Survey are in columns China (2007) and United Kingdom (2005). The corresponding responses to the same question in our survey are shown in columns Xiamen (2017) and London (2017). Our responses for 'most people can be trusted' are similar to the wider survey results.

Table 8: Comparison of trust responses

	China	Xiamen	United Kingdom	London
Most people can be trusted	45.43%	48.67%	29.88%	20.66%

Table 9: Regressions with controls

	1	2	3	4	5
VARIABLES	contribution1	contribution2	expectation2	groupmin1	groupmin2
City	-0.218	-0.362	-0.120	0.241	0.102
	[0.251]	[0.255]	[0.251]	[0.186]	[0.186]
Int	-0.480**	-0.488**	-0.293	-0.244	-0.0565
	[0.241]	[0.245]	[0.241]	[0.178]	[0.178]
CityInt	0.569*	0.698**	0.303	-0.120	-0.0508
	[0.331]	[0.336]	[0.331]	[0.245]	[0.245]
male	0.218	0.120	0.312*	-0.0685	-0.0440
	[0.175]	[0.177]	[0.175]	[0.129]	[0.129]
undergrad	0.0652	-0.0725	0.0761	0.0865	0.202
	[0.210]	[0.213]	[0.210]	[0.155]	[0.155]
lottery_numA	-0.0673	-0.0862**	-0.0969**	-0.00537	0.00448
	[0.0422]	[0.0428]	[0.0422]	[0.0312]	[0.0312]
GSS	-0.407***	-0.415***	-0.406***	-0.147**	-0.117*
	[0.0892]	[0.0905]	[0.0891]	[0.0660]	[0.0660]
Constant	6.275***	6.468***	5.086***	3.580***	3.248***
	[0.342]	[0.347]	[0.342]	[0.254]	[0.253]
Observations	703	703	703	703	703
R-squared	0.045	0.045	0.045	0.024	0.009

Standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table 10: Regression table for rounds

	1	2	3	4	5	6	7	8	9
	contribution3	contribution3	contribution3	contribution4	contribution4	contribution4	contribution5	contribution5	contribution5
City	-0.405*	-0.733***	-0.769***	-0.287	-0.387*	-0.427*	-0.0209	-0.199	-0.203
	[0.242]	[0.254]	[0.264]	[0.212]	[0.222]	[0.230]	[0.209]	[0.221]	[0.229]
Int	-0.108	-0.303	-0.335	-0.250	-0.234	-0.269	-0.122	-0.149	-0.153
	[0.237]	[0.246]	[0.253]	[0.207]	[0.214]	[0.221]	[0.205]	[0.213]	[0.220]
City_Int	0.619*	0.815**	0.880**	0.407	0.415	0.486	0.350	0.386	0.393
	[0.333]	[0.337]	[0.359]	[0.290]	[0.294]	[0.313]	[0.287]	[0.292]	[0.312]
Constant	6.863***	7.698***	7.715***	7.571***	7.546***	7.564***	7.250***	7.499***	7.500***
	[0.174]	[0.349]	[0.350]	[0.152]	[0.304]	[0.305]	[0.150]	[0.303]	[0.304]
Controls		yes	yes		yes	yes		yes	yes
GSSinteraction			yes			yes			yes
Obs.	740	707	707	740	707	707	740	707	707
R-squared	0.007	0.039	0.040	0.003	0.021	0.022	0.004	0.025	0.025

Table 11: Regressions: undergraduates only

	1	2	3	4	5
	contribution1	contribution2	expectation2	groupmin1	groupmin2
City	-0.553**	-0.630**	-0.211	0.205	0.125
	[0.269]	[0.275]	[0.265]	[0.203]	[0.204]
Int	-0.624**	-0.685***	-0.340	-0.351*	-0.137
	[0.250]	[0.255]	[0.246]	[0.188]	[0.189]
CityInt	0.948***	1.158***	0.516	-0.0419	-0.0367
	[0.366]	[0.373]	[0.360]	[0.275]	[0.276]
male	0.260	0.169	0.436**	-0.0569	0.0215
	[0.194]	[0.198]	[0.192]	[0.146]	[0.147]
lottery_numA	-0.0703	-0.0941*	-0.105**	0.00510	0.00878
	[0.0484]	[0.0494]	[0.0477]	[0.0364]	[0.0366]
GSS	-0.396***	-0.351***	-0.353***	-0.167**	-0.105
	[0.0971]	[0.0991]	[0.0957]	[0.0731]	[0.0734]
Constant	6.480***	6.530***	5.172***	3.666***	3.434***
	[0.307]	[0.313]	[0.303]	[0.231]	[0.232]
Observations	555	555	555	555	555
R-squared	0.052	0.051	0.051	0.032	0.009

Standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table 12: Interaction of trust and group

	1	2	3	4	5	6
	contribution1	contribution1	contribution1	contribution2	contribution2	contribution2
City	0.0900	-0.218	-0.249	0.0173	-0.362	-0.383
	[0.239]	[0.251]	[0.260]	[0.243]	[0.255]	[0.264]
Int	-0.414*	-0.480**	-0.507**	-0.376	-0.488**	-0.507**
	[0.234]	[0.241]	[0.249]	[0.238]	[0.245]	[0.252]
CityInt	0.496	0.569*	0.624*	0.574*	0.698**	0.736**
	[0.328]	[0.331]	[0.353]	[0.333]	[0.336]	[0.358]
male		0.218	0.220		0.120	0.122
		[0.175]	[0.175]		[0.177]	[0.177]
undergrad		0.0652	0.0609		-0.0725	-0.0755
		[0.210]	[0.210]		[0.213]	[0.213]
lottery_numA		-0.0673	-0.0667		-0.0862**	-0.0858**
		[0.0422]	[0.0422]		[0.0428]	[0.0429]
GSS		-0.407***	-0.451***		-0.415***	-0.445***
		[0.0892]	[0.131]		[0.0905]	[0.133]
GSS_int			0.0816			0.0563
			[0.179]			[0.181]
Constant	5.899***	6.275***	6.290***	5.810***	6.468***	6.478***
	[0.172]	[0.342]	[0.344]	[0.174]	[0.347]	[0.349]
Observations	740	703	703	740	703	703
R-squared	0.011	0.045	0.045	0.009	0.046	0.046

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table 13: Interaction of trust and group (undergraduate sample)

	1	2	3	4	5	6
	contribution1	contribution1	contribution1	contribution2	contribution2	contribution2
City	-0.331	-0.553**	-0.537*	-0.436	-0.630**	-0.593**
	[0.265]	[0.269]	[0.278]	[0.270]	[0.275]	[0.283]
Int	-0.677***	-0.624**	-0.608**	-0.732***	-0.685***	-0.647**
	[0.253]	[0.250]	[0.260]	[0.258]	[0.255]	[0.265]
City_int	0.996***	0.948***	0.917**	1.209***	1.158***	1.088***
	[0.371]	[0.366]	[0.389]	[0.377]	[0.373]	[0.397]
male		0.260	0.257		0.169	0.163
		[0.194]	[0.195]		[0.198]	[0.199]
lottery_numA		-0.0703	-0.0707		-0.0941*	-0.0950*
		[0.0484]	[0.0485]		[0.0494]	[0.0495]
GSS		-0.396***	-0.371***		-0.351***	-0.295**
		[0.0971]	[0.143]		[0.0991]	[0.145]
GSS_int			-0.0459			-0.105
			[0.195]			[0.199]
Constant	6.118***	6.480***	6.476***	6.035***	6.530***	6.520***
	[0.182]	[0.307]	[0.308]	[0.185]	[0.313]	[0.314]
Observations	555	555	555	555	555	555
R-squared	0.017	0.052	0.052	0.021	0.051	0.051

Table 14: Contributions and announcements r4-6

	1	2	3	4	5	6	7
	rnd4_c1	rnd4_c2	rnd5_c1	rnd5_c2	rnd6_c1	rnd6_c2	ann_c2
ann_c1	0.0198	0.0712	0.0227	0.0727*	0.585***	0.0523	0.200***
	[0.0445]	[0.0433]	[0.0429]	[0.0415]	[0.0419]	[0.0481]	[0.0598]
Constant	7.242***	7.036***	7.151***	7.047***	2.627***	6.943***	6.554***
	[0.348]	[0.338]	[0.336]	[0.325]	[0.327]	[0.376]	[0.454]
Obs.	535	535	535	535	535	534	176
R-squared	0.000	0.005	0.001	0.006	0.268	0.002	0.060

Note: c1 refers to the first composition and c2 refers to the second composition

Table 15: Informativeness and Contributions (second composition)

	Second composition			
	5	6	7	8
	Realised shift 32	Realised shift 32	Realised shift 62	Realised shift 62
Suggested shift	0.270***	0.272***	0.517***	0.515***
	[0.0293]	[0.0313]	[0.0338]	[0.0359]
Constant	0.0288	-0.0368	0.0393	0.114
	[0.0984]	[0.339]	[0.113]	[0.389]
Controls		yes		yes
Observations	446	419	446	419
R-squared	0.160	0.173	0.346	0.351

Experiment Instructions and Survey

Welcome!

Please carefully follow the instructions below to make your decision, your decisions will affect your earnings as well as the earnings of members in the group. If you have any questions about the instructions, please raise your hand and someone will come by to individually answer your question.

You may appear in a live video stream of the room. The video is not being recorded and you will not be identifiable.

The experiment will last about an hour.

The Experiment

The experiment will be carried out twice, once with local participants and once with international participants. In each experiment there are six rounds. You will play each round in a group of four participants. You will not know who else is in your group and there is no way for group members to identify you in the experiment. When making your decision, you are not allowed to communicate with others. Make the decision based on your own reasoning and how you think the other participants in your group will behave.

In each round, each participant is provided 9 tokens. (1 token=0.5 GBP [1 token=1 yuan]). You will individually choose how many tokens to contribute to the group investment. The remainder is kept as private earnings, to keep for yourself.

The group investment has an initial value of 20 tokens per group member. The investment loses value based on the minimum contribution of the 4 participants in your group. The larger the minimum contribution, the smaller the level of loss. The level of investment loss and the corresponding group earnings are shown below. Each member of the group earns the same group earning.

Your total investment earnings are the sum of your private earnings (the amount you did not contribute) plus your group earnings. The following table summarises your possible total earnings:

A summary of your earnings and the minimum group contributions will be provided at the

Table 16: Payoffs from the Group Investment

Minimum contribution of your four person group	Group earnings per group member
9	18
8	16
7	14
6	12
5	10
4	8
3	6
2	4
1	2

Table 17: Total payoffs

Your contribution	Minimum contribution of your four person group								
	1	2	3	4	5	6	7	8	9
1	10								
2	9	11							
3	8	10	12						
4	7	9	11	13					
5	6	8	10	12	14				
6	5	7	9	11	13	15			
7	4	6	8	10	12	14	16		
8	3	5	7	9	11	13	15	17	
9	2	4	6	8	10	12	14	16	18

end of the study.

Now, let's play an example round with fictitious group members. Suppose the fictitious members chose x,y,z, these contributions have been chosen randomly. In the actual game these will be the contributions of your group members. [x,y,z represents the randomly assigned numbers, this should be different for each participant].

What would your private earnings (the amount you did not contribute) be at the end of the round? [leave this free to enter any number] Please hit enter.

What would your group earnings be at the end of the round? [leave this free to enter any number] Please hit enter.

The correct calculation is: total earnings: _____=_____(private)+_____(group) [Your earnings are:__+___=___ provide the correct answer, or just say you are correct if they

are right.]

Are you confident you understand the game? Yes/no

Would you like to play another example round? Yes/no [Loop this until everyone is confident, to a maximum of four rounds] [Meanwhile other players can have a screen with a "waiting for other participants" graphic] [new screen]

Now we are ready to begin the game. [new screen]

[-----begin local----]

Local game

Your group is made up of four participants in this room. Your group is the same in each round. Your decision in one round has no effect on earnings in future rounds. You will be paid at the end of the study for a randomly selected round of the local game (1 token=0.50 GBP [1 token=1 yuan]).

[new screen]

[Round 1]

Choose your contribution: [buttons 1-9]

[new screen]

In each of the following rounds you will be asked to choose your contribution and to provide an estimate of the most likely minimum contribution of your group excluding yourself. One of these rounds will be randomly selected to test the accuracy of your estimate. If your estimate is correct you will receive a bonus payment of 1 token.

[new screen Round 2]

Choose your contribution: 1-9

What is the most likely minimum contribution of your other group members? 1-9

[the order of rounds 3-5 are randomized by participant]

[new screen Round 3]

In the first round, we observed that the maximum contribution participants made in the room was ___.

Does this information change your decision? Yes /no

Choose your contribution: 1-9

What is the most likely minimum contribution of your other group members? 1-9

[new screen Round 4]

Now suppose that the success of the group investment is uncertain. If the investment is unsuccessful your group earnings will be zero. If the investment is successful your group earnings will be 20. The larger the minimum group contribution, the more likely the investment is successful.

The table below shows the probability of failure based on the minimum group contribution.

Minimum contribution of your four person group	Probability of failure	Probability of success
9	10%	90%
8	20%	80%
7	30%	70%
6	40%	60%
5	50%	50%
4	60%	40%
3	70%	30%
2	80%	20%
1	90%	10%

Choose your contribution: 1-9

What is the most likely minimum contribution of your other group members? 1-9

[new screen Round 5]

Now suppose that group earnings depend on how your group performs compared to other groups. The groups will be ranked based on the group minimum contribution, from the highest to the lowest. If your group's minimum is ranked within the first half of groups (that is your group minimum is larger or equal to the median group minimum), then your

group will receive the regular group earnings. However, if your group is ranked within the bottom half, your group will receive half the group earnings. Your private earnings remain unaffected.

Choose your contribution: 1-9

What is the most likely minimum contribution of your other group members? 1-9

[new screen Round 6]

[only one participant sees this:] You have been randomly selected to announce a contribution to your group. You are not bound to this contribution and nor are the members of your group. It is only an announcement. What contribution would you like to announce? [restricted to 1-9]

[all participants see this] A randomly selected individual in each group has been asked to announce a contribution amount. In your group this is ___. You are not bound to this contribution amount and nor are any members of your group (including the announcer). It is only an announcement.

Choose your contribution: 1-9

What is the most likely minimum contribution of your other group members? 1-9

[------end local------]

[new screen]

We are now going to play the game again with different participants.

[------begin international----]

International Game

Your group is made up of participants in this room and participants in [Xiamen University, China or the London School of Economics, United Kingdom]. There are equal numbers of London and Xiamen based students. Your group is made up of four participants and is the same in each round.

On your screen you will see a live video stream of the participants in [Xiamen, China or London, United Kingdom]. Your decision in one round has no effect on earnings in future rounds. You will be paid at the end of the study for a randomly selected round of the international game [1 token=0.50 GBP, 1 yuan].

[Round 1]

Choose your contribution: [buttons 1-9]

[new screen]

In each of the following rounds you will be asked to choose your contribution and to provide an estimate of the most likely minimum contribution of your group excluding yourself. One of these rounds will be randomly selected to test the accuracy of your estimate. If your estimate is correct you will receive a bonus payment of 1 token.

[new screen Round 2]

Choose your contribution: 1-9

What is the most likely minimum contribution of your other group members? 1-9

[the order of rounds 3-5 should be randomized by individual]

[new screen Round 3]

In the first round, we observed that the maximum contribution across participants in [London or Xiamen] was ___.

Does this information change your decision? Yes /no

Choose your contribution: 1-9

What is the most likely minimum contribution of your other group members? 1-9

[new screen Round 4]

Now suppose that the success of the group investment is uncertain. If the investment is unsuccessful your group earnings will be zero. If the investment is successful your group

earnings will be 20. The larger the minimum group contribution, the more likely the investment is successful.

The table below shows the probability of failure based on the minimum group contribution.

Minimum contribution of your four person group	Probability of failure	Probability of success
9	10%	90%
8	20%	80%
7	30%	70%
6	40%	60%
5	50%	50%
4	60%	40%
3	70%	30%
2	80%	20%
1	90%	10%

Choose your contribution: 1-9

What is the most likely minimum contribution of your other group members? 1-9

[new screen Round 5]

Now suppose that group earnings depend on how your group performs compared to other groups. The groups will be ranked based on the group minimum contribution, from the highest to the lowest. If your group's minimum is ranked within the first half of groups (that is your group minimum is larger or equal to the median group minimum), then your group will receive the regular group earnings. However, if your group is ranked within the bottom half, your group will receive half the group earnings. Your private earnings remain unaffected.

Choose your contribution: 1-9

What is the most likely minimum contribution of your other group members? 1-9

[new screen Round 6]

[only one participant sees this:] You have been randomly selected to announce a contribution to your group. You are not bound to this contribution and nor are the members of your group. It is only an announcement. What contribution would you like to announce? [restricted to 1-9]

[all participants see this] A randomly selected individual in each group has been asked to announce a contribution amount. In your group this is ___. You are not bound to this contribution amount and nor are any members of your group (including the announcer). It is only an announcement.

Choose your contribution: 1-9

What is the most likely minimum contribution of your other group members? 1-9

Thank you for playing the interactive game. We now have a few questions for you to answer.

[Demographic information (collected through database) Gender, Age, Department, Grade, International/domestic]

How many siblings do you have? 0 1 2 3 4 5 6+

Have you studied abroad? [list of regions as in translation table]

Where did you grow up? [Provide list of countries, We do not need this question for China]

For each of the following lottery choices choose A or B. One of the lottery choices will be randomly selected to be paid at the end of the study. [each lottery choice is shown on a separate screen]

[new screen]

On a scale of 1 to 7 with 1 being strongly disagree and 7 being strongly agree, score each of the following statements.

1. People who know me would describe me as a cautious person. [buttons 1-7, with strongly disagree over 1 and strongly agree over 7]

2. I associate the word "risk" with "opportunity". [buttons 1-7]

3. I don't like to put something at stake, I would rather be on the safe side. [buttons 1-7]

[new screen]

Please read the following questions carefully, and check the answer you most agree with:

Table 18: Table of lotteries

Lottery	Option A	Option B
1	1/10 chance of 2 tokens, 9/10 chance of 1.5 tokens	1/10 chance of 3.5 tokens, 9/10 chance of 0.1 tokens
2	2/10 chance of 2 tokens, 8/10 chance of 1.5 tokens	2/10 chance of 3.5 tokens, 8/10 chance of 0.1 tokens
3	3/10 chance of 2 tokens, 7/10 chance of 1.5 tokens	3/10 chance of 3.5 tokens, 7/10 chance of 0.1 tokens
4	4/10 chance of 2 tokens, 6/10 chance of 1.5 tokens	4/10 chance of 3.5 tokens, 6/10 chance of 0.1 tokens
5	5/10 chance of 2 tokens, 5/10 chance of 1.5 tokens	5/10 chance of 3.5 tokens, 5/10 chance of 0.1 tokens
6	6/10 chance of 2 tokens, 4/10 chance of 1.5 tokens	6/10 chance of 3.5 tokens, 4/10 chance of 0.1 tokens
7	7/10 chance of 2 tokens, 3/10 chance of 1.5 tokens	7/10 chance of 3.5 tokens, 3/10 chance of 0.1 tokens
8	8/10 chance of 2 tokens, 2/10 chance of 1.5 tokens	8/10 chance of 3.5 tokens, 2/10 chance of 0.1 tokens
9	9/10 chance of 2 tokens, 1/10 chance of 1.5 tokens	9/10 chance of 3.5 tokens, 1/10 chance of 0.1 tokens
10	10/10 chance of 2 tokens, 0/10 chance of 1.5 tokens	10/10 chance of 3.5 tokens, 0/10 chance of 0.1 tokens

1. Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people? _____ A. "most people can be trusted"; B. "can't be too careful" C. "depends"

2. Do you think most people would try to take advantage of you if they got a chance, or would they try to be fair? A. "would take advantage"; B. "would try to be fair"; C. "depends"

3. "Would you say that most of the time people try to be helpful, or that they are mostly just looking out for themselves?" A. "try to be helpful"; B. "just look out for themselves"; C. "depends"

4. Approval or disapproval to the statement "You can't count on strangers anymore." A. more or less agree; B. more or less disagree

5. Approval or disapproval to the statement "I am trustworthy." A. "disagree strongly" B. Disagree C. More or less disagree D. More or less agree E. Agree F. "agree strongly"

[new screen]

On a scale of 1 being very low and 7 being very high;

1. How would you rate your environmental awareness? [buttons 1-7 [with the word very low over 1 and the word very high over 7]

2. How important do you think individual coordination is to improve environmental problems? [buttons 1-7]

3. How important do you think national coordination is to improve environmental problems? [buttons 1-7]

4. How important do you think international coordination is to improve environmental problems? [buttons 1-7]

5. Rate your level of understanding of your Government's policy on environmental protection? [buttons 1-7]

6. How important is climate change to you? [buttons 1-7]

7. How would you rate your government's performance in tackling climate change? [buttons 1-7]

[new screen]

If the group investment in the game was maintaining the environment, would your answers change? [provide buttons No change, increase contribution, decrease contribution, comment box to allow for explanation if desired.]

[new screen]

Did you find the experiment difficult? [provide buttons 1-5, with 1 being very easy and 5 being very difficult]

[new screen]

Your results

Local experiment

Round	Your contribution	Group minimum	Success or failure & tournament level	Group earnings	Your total earnings	Randomly selected round
1						
2						
3						
4						
5						
6						

Round	Your estimate of the minimum	Group minimum	Your payment	Randomly selected round for payment
2				
3				
4				
5				
6				

International experiment

Round	Your contribution	Group minimum	Success or failure & tournament level	Group earnings	Your total earnings	Randomly selected round
1						
2						
3						
4						
5						
6						

Round	Your estimate of the minimum	Group minimum	Your payment	Randomly selected round for payment
2				
3				
4				
5				
6				

1. Lottery payment:

2. Payment from Local Experiment

Round chosen randomly:

Your total payment for the round:

3. Payment from International Experiment

Round chosen randomly:

Your total payment for the round:

4. Bonus for accurate estimate of the minimum contribution in your group

Local round chosen randomly:

Your payment:

International round chosen randomly:

Your payment:

Your total payment: ___tokens

[new screen]

You have finished. Thank you for your participation.