Ingroup attraction, coordination and individualism as predictors of student task group performance

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Abstract: *The impact of coordination, ingroup attraction, collectivism and individualism on group performance was investigated in educational settings. Fourteen groups of British students (N=52) undertook a group task whose marks contributed to their final degree results. Each group had a team captain who kept a group log. Regression analysis found that coordination and individualism were significant predictors of group performance, accounting for 25.7% of the variance. The results imply that individualism in student task groups should involve task-division, giving individual members unique responsibilities, that coordination should be monitored through group logs and that group leaders should have a facilitative role.*

Key words: *group attraction; group productivity; individualism; coordination; student task group; group performance; groupwork*

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Introduction

What are the best predictors of student task group performance? It is generally accepted that the actual performance of a group is likely to fall short of its potential performance (Steiner, 1972; Jung & Sosik, 1999). Group productivity losses arise from losses in motivation, losses arising from poor coordination, and losses arising from group dynamics (Brown, 2000a). Group process factors that result in productivity loss include strong ingroup cohesion or attraction (Janis, 1982; Turner et al., 1992). Ingroup attraction has been found to lead to poor group decision-making because the desire to maintain group harmony or to conform to group norms takes precedence over the desire to maintain objectivity, or to optimize use of information (see also Janis & Mann, 1979; Kamau & Harorimana, 2008).

There is a substantial amount of research on the impact of motivation losses on group performance (see Karau & Williams, 1993, for a meta-analytic review). However, there is little research on the impact of coordination losses and ingroup attraction on group performance – particularly in educational settings. This is important because many university degree programs include assessed group assignments. In addition, the impact of individualism on student task group performance in western European university settings has not been sufficiently explored.

What factors do we know predict group performance?

The impact of motivation losses on group performance has been widely explored. A meta-analysis by Karau and Williams (1993) concluded that 'social loafing,' which is the loss of motivation shown by people working in a group, who generally put in less effort than they would were they working alone, is an empirically robust phenomenon. In their classic experiment on social loafing, Latane, Williams and Harkins (1979) asked participants to clap or shout as loudly as they could. In one experimental condition, participants were asked to clap or shout while in a group and in another experimental condition participants did so while alone. Latane et al. (1979) found that the actual productivity of groups of two was only 71% of their potential productivity, that the actual productivity of groups of four was only 51% of their potential

productivity and that the actual productivity of groups of 6 was only 40% of their potential productivity. Potential productivity was calculated from 'aggregate groups' calculated from participants clapping/shouting individually. For example, to decide what the potential productivity of a group of four should be, the output of 4 individuals clapping/shouting alone was aggregated. Such findings have been widely replicated (see e.g. Price, Harrison & Gavin, 2006). Latane et al. (1979) argued that these productivity losses occurred because people feel less motivated to maximize their effort when they are working as part of a group. Social loafing has been found to limit the productivity of groups in a wide variety of settings (both experimental and naturalistic) and cultures (Karau & Williams, 1993).

Do motivation losses therefore impact student task group performance? Hoffman and Rogelberg (2001) argued that student task groupwork *increases* individual students' effort, such as in terms of reducing absenteeism. This implies that motivation losses are unlikely to arise in student task groups. If this is true, the implication is that – rather than suffering social loafing, student task groups may actually exhibit the opposite: social laboring or social facilitation. This is whereby individuals working in a group perform more than they would if working alone (Blascovich, Mendes, Hunter & Salomon, 1999). Social facilitation is thought to occur because the presence of others increases physiological arousal levels that then enhance performance (Zajonc, 1965; Blascovich et al., 1999). However, the social facilitation effect has mainly only been demonstrated in situations where the task is cognitively very simple (Allport, 1954), involves motor movements such as cycling or winding fishing reels (Triplett, 1898; Aiello & Douthitt, 2001), or involves tasks that are well learned (Blascovich et al., 1999). The tasks faced by students are likely to be cognitively challenging and novel, therefore social facilitation due to physiological arousal seems unlikely in student task groups.

Instead, if there is a lack of social loafing in student task groups (and if social facilitation does indeed occur), it may be because students place high importance on assessed groupwork, and because of the structural demands of academic assignments. Karau and Williams (1993) concluded from their meta-analysis that social loafing is least likely to occur if the group task is structured and of high importance. An exploration of social loafing in student task groups would therefore

not tell us anything new. What is lacking in existing literature is an investigation of the impact of other factors (coordination losses and group dynamics) on group performance in educational settings.

Coordination losses and group performance

Coordination was aptly defined by Janicik and Bartel (2003) as 'Knowing who is going to do what, when, and with whom … Explicit planning prior to task execution …' (Janicik & Bartel, 2003, p. 122). In other words, group coordination involves creating and following a structured plan. A number of studies in education settings found that structuring students' groupwork, with structuring being something that minimizes coordination losses, improved their performance (Brigman & Webb, 2007; Webb & Brigman, 2007). In many student task groups, it is up to group members to organize themselves and co-ordinate their activities in order to complete the given task. Coordination losses can arise from poor management of the group's efforts (Steiner, 1972). Coordination, by definition, involves bringing people together, management and organization. Leadership is therefore likely to be the starting point for good coordination in student task groups but there should be other indicators of group coordination –such as group meetings or labor division .

In university settings, although students usually have equivalent access to important resources such as computers, library books, online databases, journal articles, and so on, it is nevertheless important for student task groups to strategize their access to these resources in order to maximize their benefits. Group members would need to have formal meetings about this. The presence of a leader would also arguably enable a student task group to do this. Proactive leadership (be it democratic or autocratic) has been found to lead to better performance than no leadership or laissez faire leadership (see, for example, Lippitt & White, 1943; see Peterson, 1997, for a review of the relative merits of different leadership styles). Democratic leadership has been found to lead to better group performance than autocratic leadership (Brown, 2000a), perhaps because a democratic leader plays an important role in organizing group meetings, ensuring all members' attendance, and coordinating access to resources (Peterson, 1997).

Although the impact of good coordination/leadership on group

performance has been investigated in educational settings (e.g. Brigman & Webb, 2007), more evidence is needed. We also need to establish the importance of coordination in student task groups, relative to other factors known to impact group performance – such as the amount of cohesion within a group.

Group dynamics and group performance: Is ingroup attraction detrimental?

Janis' (1982) groupthink theory postulated that poor quality group decision-making (that is, groupthink) occurs in groups with a high level of group cohesion. Group cohesion is also called ingroup attraction (Hogg & Hains, 1998). Recent evidence supporting Janis' argument includes that by Hogg and Hains, who found that ingroup attraction and symptoms of groupthink were positively correlated. The concept of ingroup attraction can be traced back to the Social Cohesion perspective (Lott & Lott, 1965; see Dion, 2000, for a conceptual review), which viewed interpersonal attraction as the thing that glues group members together and causes them to form or maintain a group. Although strong ingroup attraction may be enjoyable to group members and beneficial to group harmony, strong ingroup attraction is likely to impinge on group performance. This is because groups that have a high amount of ingroup attraction place higher emphasis on maintaining ingroup harmony than on completing a task optimally (Janis, 1982).

In some educational settings, students are either randomly allocated to task groups or they are allocated to groups consisting of students whom they do not know well. In such instances, ingroup attraction/ cohesion is likely to develop *after* the student task group has been formed. Therefore, in such groups, categorization precedes interpersonal attraction, and the latter is a consequence of categorization, as Social Identity Theory (SIT, Tajfel & Turner, 1979; Brown, 2000b) and Self-Categorization Theory (SCT, Turner et al., 1987) argued. However, whether students self-select their group memberships, or whether they are randomly allocated to groups (thus mirroring SIT's Minimal Group Paradigm), the psychological consequences would be the same (Turner et al, 1987). Levels of ingroup attraction are then likely to have important implications for group performance, as can be deduced from research on group cohesion as a major cause of groupthink (Janis, 1982; Hogg

& Hains, 1998). In particular, a high amount of ingroup attraction is likely to be associated with poor quality decision making – something which may be particularly detrimental for student task groups. Most academic tasks, including those assigned to groups, arguably involve decision-making (such as choosing the solution to a problem, choosing literature, and so on). Therefore, it would seem that the higher the ingroup attraction, the lower the group performance, because of poor quality decision-making.

At the same time, it is acknowledged that ingroup attraction may be associated with other variables that increase group performance. For example, it may be associated with collectivistic group behavior such as commitment to achieving group goals. Collectivism can be defined as a stronger concern for group wellbeing, group identity, group norms and group accomplishments over those of the self (Gudykunst & Lee, 2003). Conversely, individualism can be defined as a stronger concern for personal goals, personal identity and personal freedom over those of the group (Gudykunst & Lee, 2003.

Ingroup attraction and collectivist group behavior

Hornsey, Jetten, McAuliffe and Hogg (2006) argued that collectivist groups place high importance on ingroup harmony and self-sacrifice, whereas individualist group members are reluctant to expend costs that outweigh individual benefits. We would therefore expect that ingroup attraction is positively associated with collectivist group behavior. However, can groups within an individualist society (such as the US or Britain: see Hofstede, 1980; Smith, Bond & Kagitcibasi, 2007) be collectivistic, and can groups within a collectivist society (such as China; see Hofstede; Smith, Bond & Kagitcibasi, 1980) be individualistic? Several authors have argued that this is possible. Hornsey et al. (2006) and other authors (e.g. Jetten et al. 2006) argued that individualism and collectivism are individual difference variables, which means that the important variations in these variables arise within societies (say, within the US, China or Britain), rather than between them (say, comparing China and Britain). For instance, Hornsey et al. (2006) argued that, in any society, 'micro-cultures of individualism and collectivism' (Hornsey et al., p. 58) exist. Jetten et al. similarly argued that individualism and collectivism exist as group norms, thus suggesting that any group in

any given society can sufficiently adopt collectivist or individualist group norms. Eby and Dobbins (1997, p.276) went further by defining collectivism (and individualism) as a question of an individual's 'orientation' – such that some people have a 'collective orientation' and are enthusiastic about working in groups.

It is also important to consider the relationship between collectivism and group productivity. Karau and Williams' (1993) meta-analysis of 78 studies concluded that groups in collectivistic societies such as in the Far-East (e.g. China, Japan) are far less likely to suffer productivity deficits due to social loafing than groups in individualistic societies. This finding has led to the assumption that collectivistic groups perform better than individualist ones. However, Eby and Dobbins (1997) questioned the validity of this assumption. In support of their argument, they found that there was no significant correlation between the mean collective orientation of group members and their group performance. In fact, they found that the unique contribution of collective orientation to group performance was near-zero. Instead, the level of co-operation within the group was a better predictor of group performance.

Likewise, Sosik and Jung (2002) found that, although groups from a collectivist culture (Korea) had higher expectations of their group's performance than groups from an individualist culture (USA), the individualist groups performed better than the collectivist groups. Sosik and Jung therefore argued that groups in individualist cultures can perform as well as – or better than – groups in collectivist cultures. Recalling groupthink theory (Janis, 1982), was this finding because of stronger ingroup attraction in collectivist groups? If so, the ingroup attraction may have been effective because conformity pressure and a desire to promote uniformity within the group became detrimental to group performance. Hornsey et al. (2006) argued that 'individualist groups may be more creative and flexible in their decision-making' (Hornsey et al., 2006, p. 66). Janis' (1982) theoretical and empirical work suggests that groups which are highly cohesive are likely to make poor quality decisions because their cohesiveness predisposes them to conformity, self-censorship and other symptoms of groupthink. Kamau and Harorimana's (2008) review of research on groupthink concluded that other symptoms of groupthink also include selective information sampling and poor information pooling. This means that highly cohesive groups, which are likely to have a collectivist approach,

are likely to perform poorly at decision-making tasks.

Individualist groups may thus have an advantage over collectivist groups when the task involves decision-making because individualist groups may be less concerned with maintaining group harmony. Sosik and Jung (2002) did indeed find that groups in the individualistic culture held stronger perceptions of ingroup 'functional heterogeneity', whereby 'Functional heterogeneity represents group members' perceptions about the diversity of … [the group]' (p. 6). This is the opposite of the perception that there is uniformity within one's group, which would be expected in a collectivistic group. It is therefore disputable, from the literature, that collectivism within a group is necessarily associated with better group performance than individualism. This may depend on the nature of the task, with individualist groups probably doing better at decision-making tasks, such as those tackled by many student task groups.

The present study

Research was conducted to investigate the factors that could significantly predict the performance of student task groups in a cohort of final-year undergraduates. There is a lot of research on the impact of motivation losses on group performance, but there is less research on the impact of coordination and of group dynamics on group performance, particularly in real-life groups such as those in educational settings. There is also little research on the impact of individualism on group performance in educational settings. The present study was conducted in the United Kingdom which, like the United States and much of Western Europe, is described in cross-cultural psychology literature as an individualistic society, in comparison to China, Japan and other parts of the Far-East, which are typically described as collectivistic societies (see, for example, Hofstede, 1980; Smith, Bond & Kagitcibasi, 2007).

The current research involved student task groups completing a task that was to be assessed and whose marks would contribute to the students' final degree results. Students were placed in groups on the basis of their preferred debate topic, which they indicated several weeks in advance by filling in an online form. Therefore, the groups in the present study were not based on pre-existing interpersonal attraction

and it was expected that any ingroup cohesion that developed did so after the group was formed. The task of each group was to prepare for a formal debate (on a specific psychology topic) by searching for, analyzing and synthesizing appropriate literature, and building arguments. Each group was also expected to produce a PowerPoint presentation file to accompany their actual debate performance and they were encouraged to run rehearsals before the day of their debate. Each task group was advised to choose a 'team captain', and it was suggested that such a leader should help co-ordinate their group's activities. Team captains were asked to keep a group log, which was a record of the meetings held by a group (time/ duration/ location of meetings and members present in each). Indicators of group coordination were therefore defined in terms of the number of times a group met and the amount of time spent in group meetings on the task.

The assessed part of the task involved a 45-minute parliamentary-style debate performed on the stage of a lecture theatre. There were 7 debates in total, each addressing a particular, contentious issue in contemporary psychology (ethics; subliminal priming; co-education of children; nature-nurture, cross-cultural issues in perception; the mind-body debate; personality). The scope of the debate topics was defined by debate statements provided in the course handbook. There were two opposing task groups per debate topic. Each debate began with an opening statement from the proposing group, followed by an opening statement from the opposing group, then the proposing team's rebuttal and then the opposing team's rebuttal, after which there was an open session during which the two teams had a free debate, followed by the open floor section whereby audience members could ask questions, after which was the closing statement from the opposing team then the closing statement from the proposing team. Strict timekeeping was observed and a bell rung by a tutor if any group over-ran a particular section of the debate. Each debate was assessed by two tutors and also by audience members (these being students not taking part in the day's debate).

Aims and hypotheses

It was expected that coordination (indicated by the total number of group meetings and their duration), ingroup attraction and individualism

would have an impact on student task group performance. It was expected that ingroup attraction would have a negative impact on group performance. Whether individualism would have a positive impact on group performance was also explored. These hypotheses were tested by conducting regression analysis of data resulting from questionnaires, logs kept by the students, and marks obtained for the groupwork. First, in order to justify omitting social loafing as a key predictor of group performance in the present study, a preliminary study was conducted in order to measure the students' initial motivation towards the group task at the start of the term. It was expected (from the preliminary study) that students would exhibit moderate to high levels of motivation.

Method

Participants

In the preliminary study there were 31 participants, pooled from the main study sample early in the academic term. All participants were final year undergraduate students taking a psychology Bachelor of Science degree at a university in the United Kingdom. The preliminary study was questionnaire-based.

The main study was a naturalistic study with a correlational design for regression analysis. There were 14 groups with a total of 52 students. Ten of the groups consisted of 4 members and 4 of the groups consisted of 3 members. Students were allocated to a group on the basis of their preferred debate topics, with majority of students allocated to their first or second choices.

Materials

The preliminary study materials consisted of a devised feedback questionnaire with a 1-11 response scale with anchors (whereby 1=strongly disagree and 11=strongly agree). Eleven points were chosen to maximize the sensitivity of the response scale. The questionnaire consisted of 22 questions, including questions aimed at determining students' motivation levels specific to the group task ('I am dreading my debate,' 'I have negative expectations about the debate,' 'I feel confident

about this unit,' 'I do not like my allocated debate topic') and other questions, such as those on level of certainty about the group task (e.g. 'I feel uncertain about what I am supposed to do in this unit,'), attitude to groupwork in general ('I dislike groupwork'). This questionnaire was constructed in this way due to the need to tailor the questions towards such a specific context (that is, motivation towards a group debate). The rest of the questions were filler questions (such as 'I enjoy studying Psychology') meant to conceal the main concepts under investigation.

The main study materials were as follows:

- *Introductory handbook*
  As described in the introduction, each group was tasked with preparing for a formal 45-minute parliamentary-style debate on a contentious issue in psychology. Students were given a detailed 23-page course handbook with suggestions on how to prepare for a debate and with instructions relevant to the parliamentary debate style. The handbook advised task groups to choose a team captain, who would be responsible for coordinating the group's activities and updating their group log. The handbook also indicated to students that the final debate would be assessed by two tutors and by audience members (who were students not taking part in the day's debate).

- *Group log*
  Each group was asked to complete a group log. This asked the group captain to provide details of the group's meetings, such as where the meeting was conducted, its duration, and which members were present. A section of the group log asked the team captain to indicate the role or responsibility of each team member. There was also a section asking all the group members to sign the end of the group log *if* they agreed that it was a true representation of their group's activities.

- *Feedback questionnaire*
  Individual students were asked to complete a 10-item questionnaire with a 1-11 response scale (1=strongly disagree, 11=strongly agree; 11 points were chosen to maximize the scale's sensitivity). Questionnaire items were constructed for the purpose of this study

due to the lack of a suitable, short questionnaire to measure all the concepts under investigation within such a task-specific context. Due to the naturalistic nature of the study, there was the need to measure the constructs under investigation as briefly as possible. There were questions intended to measure such concepts as co-operation amongst group members ('The group as a whole was cooperative'), intragroup liking ('Members of our group liked each other very much'), task distribution ('Not all group members worked equally hard'). The full list of items can be observed in Table 2 in the results section.

• *Debate evaluation questionnaire*
A questionnaire to evaluate the debates was adapted from measures designed by previous tutors for the course. This questionnaire had 10 items and an 11-point response scale, with items such as 'They were well organized', 'They fashioned a coherent argument,' 'They demonstrated in-depth knowledge of the main issues.' Both the tutors and all the audience members were given this questionnaire to rate the proposing team and an identical questionnaire to rate the opposing team.

Procedure

Ethical considerations

This research was conducted as part of an exercise for a teaching qualification on gathering student feedback and using student feedback to inform teaching. The study conformed to the university's ethical regulations and the questionnaires used were vetted by a peer from a different faculty, and by a tutor running the teaching course. In both the preliminary study and the main study, the students' consent was sought verbally. No deception was used. It was made clear to students that their participation was optional, confidential, and that the feedback gained from the questionnaires was intended as a way of helping to optimize the delivery and planning of the course. To ensure that the contents of each group log were agreeable to all students concerned, students were asked to add their signature to it only if they agreed with its contents. To maintain confidentiality, each student was asked to submit his/her

feedback questionnaire individually, concealed from his/her other group members. To maintain anonymity once data was inputted, students' names were omitted from the data file used for analysis. It was made clear that the contents of the group log would not be used to determine the students' marks. To further ensure that the data obtained would have no bearing on the marks awarded, the data from the questionnaires and group logs were inputted and analysed only after the marking process was complete and marks had been submitted.

Procedure

At the beginning of the term, after being divided into groups according to their topic preferences, students were given the course handbook and introduced to the course by the tutors. A number of lectures were provided to give students a reasonable grasp of the course's objectives and to give them more information about planning and conducting a debate. It was mentioned that each group would complete a group log and submit it on the day of their assessment, and that each student would also complete a feedback questionnaire about how their groupwork had been. Students were asked to download the group log and questionnaire from the course's online page. Each group was asked to select a team captain, whose responsibility it would be to co-ordinate group activities and fill in the group log.

The preliminary study was conducted shortly after the introductory lectures early in the term. Students were asked to provide anonymous feedback on the course. Each student was given the pre-study questionnaire and given several minutes to complete it. Questionnaires were then collected and students thanked.

For the main study, students were asked to look at the group log before their captain submitted it, and to add their signature only if they agreed with the contents as a true representation of their activities. Students were also asked to submit an individual questionnaire. The group task (the formal debate) for the main study was described earlier on in the introduction.

Evaluation of task group performance

On the day of the debate, each team captain submitted the group log and the individual members submitted their individual questionnaires. Evaluation questionnaires were distributed to the two course lecturers,

and the same questionnaires were distributed to the audience members (these were students not taking part in the day's debate). Afterwards, the audience submitted their evaluation questionnaires and the session came to a close. Individually, each lecturer completed their evaluation questionnaire. Afterwards, the two lecturers held a meeting to discuss their marks and to agree on joint marks. Data from the audience members' questionnaires were inputted into SPSS 16.0 for Windows.

Results

Preliminary study results

Factor analysis was conducted to find out whether items intended to measure motivation levels would emerge within the same factor. The items in Table 1 with high loadings onto factor 1 meant that this factor was construed as indicating motivation levels. The means in Table 1 suggest that the students' motivation levels were moderate, since they were based on a 1-11 response scale. The results were also that students moderately disliked groupwork (Mean=6.43, based on a 1-11 scale; *SD*= 3.05). The pre-study therefore supports the idea that the students in the cohort were moderately motivated to perform the group task and had a moderately positive attitude towards groupwork. The students' motivation levels were therefore not deemed to be problematically low and therefore social loafing was unlikely to be a key predictor of group performance in the main study. This justified the main study's focus on the other potential predictors: coordination, ingroup attraction and individualism.

Main Results

After data collection, items #1, #2, #4, #5, #7 of the feedback questionnaire were reverse-coded. The 10-items were then subjected to reliability analysis and Cronbach's alpha[1] was found to be .77, which is a satisfactory level of internal reliability. Factor analysis[2] of all 10 items was then conducted using the principal axis factoring extraction method. Before this, in order to determine the number of factors to retain, parallel analysis using Monte Carlo PCA 2.3 for Windows

Table 1

Factor loadings and means for items on motivation

| | Factor 1 ('Motivation levels') | | |
	Factor loading	Mean	Standard Deviation
I am looking forward to my debate	.72	5.36	2.55
I feel worried about this unit (R)	.65	4.77	2.74
I am dreading my debate (R)	.83	5.32	2.7
I have negative expectations about the debate (R)	1.00	5.29	2.42
I feel confident about this unit (R)	.66	5.71	2.27

(Watkins, 2008) was conducted[3]. This is a simulation program that runs principal component analysis on random data sets with the specified parameters (in the present case, 52 cases and 10 variables) and with the requested number of replications (100 replications were requested). The result of the parallel analysis suggested that 5 factors should be retained in the actual factor analysis, since 5 factors with random Eigenvalues greater than 1.0 emerged in the parallel analysis. Using the present study's data, factor analysis using the principal axis factoring extraction method and the promax rotation[4] method (chosen because it was expected that the factors would be correlated) was conducted, specifying that 5 factors should be extracted. The rotation converged in 11 iterations. The pattern matrix in Table 2 shows the rotated factor solution with the values representing items' factor loadings. Factor loadings greater than .60 are highlighted in bold font.

The factor solution[5] in Table 2 suggests that items #6, #8, #9, #10 all load onto factor 1, which can be defined as ingroup attraction. Factor 2 can be defined as collectivism because item#7, which involves equity of labor within the group, loaded highly onto it. Factor 3 can be described as concerning leadership because item#5, which considers the extent to which the leader was chosen unanimously, loaded reasonably highly onto it. As no item loaded highly onto Factor 4, it is ambiguous but appears to represent consensus in group decision-making, considering the loading for item #4. Factor 5 can be defined as individualism because item#1, which involves individual responsibility, loaded reasonably highly onto it.

Looking at the factor correlation matrix in Table 3, it is interesting

Table 2. Pattern matrix of item loadings

	Factor 1 Ingroup Attraction	Factor 2 Collectivism	Factor 3 Leadership	Factor 4 (Non-specific)	Factor 5 Individualism
1. No one in our group had a unique responsibility. (R)	0.09	0.10	-0.06	-0.05	0.62
2. Our preparation for the debate was unstructured. (R)	0.19	0.49	0.05	-0.13	0.07
3. Our team captain behaved in a democratic manner.	0.11	0.16	0.32	0.05	-0.02
4. During group meetings, there were many disagreements. (R)	0.21	.043	0.20	0.56	-0.09
5. Our team captain was not chosen collectively. (R)	-0.08	-0.02	0.64	0.15	-0.07
6. Members of our group liked each other very much.	0.78	-0.01	-0.09	0.22	-0.24
7. Not all group members worked equally hard. (R)	-0.08	0.88	-0.03	0.27	0.07
8. Members of our group share many similarities.	0.75	-0.10	-0.11	0.29	0.26
9. The group as a whole was cooperative.	0.80	0.26	-0.05	-0.13	-0.15
10. Members of our group had similar capabilities and skills.	0.71	0.01	0.21	-0.04	0.21
Variable Mean	9.02	8.75	9.17	N/A	6.18
Standard deviation	1.92	2.99	3.28	N/A	3.47
Skewness	-1.44	-1.36	-1.85	N/A	-.09
Kurtosis	2.52	.57	1.93	N/A	-1.36

Table 3: Factor correlation matrix

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Factor 1 (Ingroup Attraction)	1.00	.66	.28	.38	-.26
Factor 2 (Collectivism)		1.00	.38	.41	-.27
Factor 3 (Leadership)			1.00	.20	.03
Factor 4 (Non-specific)				1.00	-.22
Factor 5 (Individualism)					1.00

but not surprising that ingroup attraction and collectivism are positively correlated, that ingroup attraction and leadership are moderately positively correlated, and that ingroup attraction and individualism are negatively correlated. It is also unsurprising that collectivism and leadership are positively correlated, whereas collectivism and individualism are negatively correlated. It is also interesting that leadership and individualism have almost no correlation.

Factor composite scores were created from raw item scores for Ingroup Attraction (mean of items 6, 8, 9, 10), 'Collectivism' (item 7), Leadership (item 5) and Individualism (item 1). The means and standard deviations for these are reported at the bottom of Table 2. Looking at Table 2, the mean ingroup attraction score was quite high since the mean is based on a response-scale range of 1-11.

Before regression analysis could be conducted, normal distribution checks were conducted. In a normal distribution the curve should be bell-shaped, and so kurtosis values are needed to indicate the extent to which the peak of the distribution curve deviates from that, whereas skewness values are needed to indicate the asymmetry of the curve. Based on rules of thumb suggested by Coolican (2008), the distribution of ingroup attraction is quite leptokurtic (kurtosis=2.52 is greater than twice the standard error of the kurtosis, .65), indicating a curve with a 'taller' peak than a normal distribution. The distribution of ingroup attraction is also slightly positively skewed (skewness=-1.44, which is greater than twice the standard error of the skewness, .33), as is the case for some of the other variables (see the bottom of Table 2). Positive skewness indicates a curve with a right tail 'longer' than a normal distribution. Although these values were not all normally distributed, the decision was made not to transform them because most of the skewness/kurtosis values involved were still within the -2 to +2 range

and log transformation led to increases in skewness/kurtosis.

There was a significant correlation[6] between the lecturers' ratings of the groups' performance and the audience's ratings (r=.37, p=.006)[7]. The lecturers' ratings were chosen for further analysis because, in the situation, the tutors represent 'expert raters.' The lecturers' ratings of the groups' performance had a normal distribution (skewness =-.78, kurtosis=-.81). The lecturers' ratings of the group performance will from here onwards be labeled 'group performance'.

The significant correlations (p<.05) were those between: ingroup attraction and collectivism (r=.61), ingroup attraction and total number of meetings (r=.35), number of meetings and total duration of meetings (r=.76), number of meetings and group performance (r=.28), total duration of meetings and group performance (r=.41).

What were the significant[7] predictors of group performance – coordination (number of meetings/ their total duration), ingroup attraction, collectivism, leadership or individualism? A linear regression model[8] tested the extent to which these variables predicted group performance (i.e. marks given by the tutors). Collinearity diagnostics[8] showed that there were no problematic tolerance values, as all ranged from .32 to .92, and the Variance Inflation Factors were satisfactory, as they ranged from 1.1 to 3.13 (thus <5.0).

The overall regression model was significant (F=3.94, p=.003). R was .6 and R^2 was .35, meaning that the predictors contributed to 34.9% of the variance (adjusted R^2 was .26) in group performance. A regression equation representing the results can now be written, based on the format [$\ddot{Y}$= a + βX_1 + βX_2 +…… +Error], whereby $\ddot{Y}$ is the criterion variable, 'a' is the constant, β is the intercept associated with a given predictor variable, and X_1, X_2 are predictor variables. We arrive at the following, using un-standardized beta coefficients:

[Group Performance = 4.98 + -.05*Number of meetings + .05*Total duration of meetings + -.003* Ingroup Attraction + -.04*Collectivism + .02*Leadership + .05*Individualism +.48].

Although the predictors in the above model jointly accounted for 34.89% of the variance in group performance, the only significant unique predictors of group performance were: the total duration of meetings (t=3.37, p=.002), which had a substantially large standardized

$β$ coefficient (.73), and individualism (t=2.33, p=.024), which had a moderate standardized $β$ coefficient (.3). This means that the total duration of meetings was the most important predictor of group performance, followed by individualism.

Looking at the partial correlations for the variables that were significant unique predictors, the partial correlation between the total duration of meetings and group performance was positive (partial r=.45), and the partial correlation between individualism and group performance was also positive (partial r=.33). This shows that both the total duration of meetings and individualism were each positively correlated with group performance, even after controlling for the other variables in the regression model.

Therefore, are the other predictors necessary? A regression model in which the total duration of meetings and individualism were the only predictors of group performance was significant (F=8.32, p=.001), R was .51, R^2 was .26, meaning that they accounted for 25.7% of the variance in group performance, and the t statistics for both predictors were significant (p<.05).

Discussion

It was expected that predictors of group performance would be coordination (both the number of group meetings and their total duration), ingroup attraction (liking, similarities and co-operation amongst members), collectivism (equal labor by group members), leadership (the captain being chosen collectively) and individualism (members having unique responsibilities). Regression analysis was conducted to test hypotheses regarding the prediction of group performance by these variables. Although a regression model involving all these predictors was significant and it explained 34.9% of the variance in group performance, the significant unique predictors of group performance were the total duration of meetings and individualism. This means that, although a third of the variance in group performance could be explained by the combined effects of the predictors inputted, what could independently predict group performance was one aspect of coordination and individualism, whereas there was interdependence amongst the other predictors (duration of meetings, ingroup attraction,

collectivism, leadership). A second regression model involving only the two significant unique predictors (individualism and total duration of meetings) was significant and accounted for about a quarter of the variance in group performance. The most important predictor of the student task groups' performance was the total duration of their meetings. These results will now be discussed.

Total Duration of Meetings as a Predictor of Group Performance

It was not surprising that the total duration of meetings, as an example of coordination, had a positive impact on group performance, and the partial correlation between these two variables was positive and reasonably high. It had not been expected, as was found, that the total duration of meetings would be the most important predictor of group performance. It can be speculated that groups may have spent their meetings planning their individual responsibilities, co-ordinating their literature searches, bringing together their debate arguments, organizing the content of their debate, and so on. This means that the total duration of task groups' meetings probably represented the amount of effort that went into coordinating task group members' individual input. The finding that the total number of meetings was positively correlated with group performance adds strength to the conclusion that good coordination was associated with good group performance.

What does this mean in practice? It can be said that successful coordination should be process-oriented, in terms both of monitoring the productivity of individual group members and optimizing information pooling. A group log maintained by a team captain can, as was the case in the present study, enable coordination to be process-oriented. The group log was a simple record of each meeting (the date, duration, location and members present) and a simple record of each member's responsibilities. This concept of a group log can be tailored and adapted by practitioners to suit any group. The fact that the log is kept and maintained by the group also means that the group log can be a valuable document in the event of disputes amongst members that require mediation by a practitioner. By monitoring such factual issues as attendance of meetings, the productivity of group members can be monitored in a manner that seems procedural rather than authoritarian.

A tool such as a group log can also be extended by practitioners to

facilitate the process by which groups sub-divide and complete tasks. Specifically, practitioners need to ensure that there is an optimum exchange of information about the task amongst group members. In the present sample, advice given to students (via introductory lectures and the course handbook) can lead us to assume that task groups spent at least part of their group meetings sharing information about their individual literature searches. Practitioners can adapt the group log to help groups record exchanges of such information amongst group members. The marking criteria used to assess the debate groups was such that members needed to demonstrate in-depth knowledge and to fashion consistent arguments, which would only have been possible with optimum information pooling during group meetings. Thorough information pooling is known to be a successful strategy against groupthink (e.g. Kamau & Harorimana, 2008). It is therefore possible that the total duration of group meetings was the best predictor of group performance because time spent in meetings may have denoted time spent sharing information amongst group members. The finding that the number of group meetings also correlated with group performance also suggests that meetings played an important role in information sharing. The implication is also that more frequent information sharing is beneficial. Therefore, the time spent by members in meetings is an important predictor of group performance because it is associated with monitoring of members' productivity and with pooling their output.

Individualism as a predictor of group performance

Individualism was the second most important predictor of group performance. It was also interesting that individualism had a positive impact on group performance, with a positive, moderately high partial correlation value between individualism and group performance. Individualism in the present study was measured in terms of the extent to which individual members had unique responsibilities. We can therefore define this as task-oriented individualism and conclude from the results that it is a significant, positive predictor of group performance. One element of the group log asked team captains to indicate the individual responsibilities of each group member. Individual group members (in their individual questionnaires) then rated the extent to which people in their group had unique responsibilities. These self-reported perceptions

are likely to have been a good reflection of the actual task division that took place. Therefore, the kind of individualism that positively predicts group performance can be said to be individualism that divides labor amongst members in a manner that minimizes task overlaps between members and maximizes the individual responsibility of each group member.

These findings support Latane et al.'s (1979) conclusion that:

> We think the cure will come from finding ways of channeling social forces so that the group can serve as a means of intensifying individual responsibility rather than diffusing it. (p. 832)

Effectively, promoting task-oriented individualism in a group can help prevent what Latane et al. called 'diffusion of responsibility', which causes group productivity deficits. The present findings also support Eby and Dobbins (1997), Sosik and Jung (2002) and Hornsey et al. (2006), who argued that individualism in groups is beneficial to group performance, in terms of encouraging diverse problem-solving approaches. It can also be deduced from Janis (1982) that individualism in groups prevents groupthink by enabling dissent, preventing conformity and preventing unquestioning support for the group leader. In practice, this may have meant that groups with a high amount of individualism made decisions on an objective basis – that is, based on information sources found.

In practice, such individualism can be implemented during the first group meeting. Chaired by the team captain or external facilitator, negotiations amongst student task group members can take place, such that labor is divided equitably. These negotiations should be based on practicalities and be task-oriented. For example, it was suggested to the task groups that they could sub-divide their searches of bibliographic databases chronologically (e.g. one member can search for literature published between 1892-1850, and another from 1951-2008) or according to search keywords (such that each member has their own list of keywords). In practice, as was the case in the present study, student task groups should be told about the advantages of task division and team captains should be asked to keep a record of the task division that occurred.

What about ingroup attraction?

The results of factor analysis were that ingroup attraction denoted liking amongst members, perceptions of similarity, co-operation and perceptions of uniformity amongst group members. It had been expected that ingroup attraction would negatively predict group performance. However, ingroup attraction was not a significant unique predictor of group performance. Why was this? One explanation may be that ingroup attraction was antithetical to individualism, which was predictive of group performance. Individualism was a significant (and positive) predictor of group performance, and (looking at the factor analysis correlation matrix) there was a negative correlation between the ingroup attraction factor and the individualism factor. Individualism might therefore have suppressed potential negative effects of ingroup attraction on group performance. However, this inference needs to be tested in future research because conditions for the statistical phenomenon known as suppression were not met by the zero-order correlations amongst ingroup attraction, group performance and individualism.

It was also interesting that, despite the fact that the sample was from a country usually thought of as an individualist country (the UK), the distribution of ingroup attraction score was leptokurtic and slightly positively skewed. The implication is that student task groups in individualistic societies *can* exhibit very high levels of ingroup attraction. Ingroup attraction correlated positively with the total number of times that a task group met which, although not a significant unique predictor of group performance, was positively correlated with the total duration of a group's meetings (which was the most important predictor of group performance). This suggests that, although ingroup attraction is associated with a higher frequency of group meetings, ingroup attraction is not directly associated with the quality of the group's performance. What ingroup attraction *is* associated with is a tendency to have more frequent group meetings, which can be considered a good correlate of coordination. The argument, presented in the introduction, that ingroup attraction is detrimental to group performance therefore needs to be investigated further. In practice, these results mean that – on the basis of the present findings – student task groups should not be discouraged from having high levels of ingroup attraction because there

was no evidence that it had a negative impact on group performance. At the same time, based on groupthink literature (e.g. Janis, 1982), the implication is that task groups should not be actively encouraged to develop high levels of ingroup attraction.

Further research should also investigate whether demand characteristics were (even in part) responsible for the distribution of ingroup attraction. It is possible that the students exaggerated the level of harmony in their group because they imagined that this would have positive consequences for their marks, even though it was made clear that that would have no bearing on the marks that they received. Another possibility is that there were cognitive dissonance effects (see Festinger, 1961, on cognitive dissonance). Students may have felt the need to exaggerate their liking for their groups in order to justify the time that they had spent with them and the work that they had put into the group task. One solution is to measure ingroup attraction several times across the life of the group – including after they have received their marks. An average ingroup attraction score can then be calculated.

Further research

A limitation of the present study is that groupthink was not measured. The performance of the student task groups was measured, but the quality of their decision-making during group meetings was not measured. It would be beneficial for further research to directly measure groupthink, which can be done by measuring its symptoms (e.g. poor information sharing, selective information sampling, opinion conformity, protection of the leader from opposing viewpoints, self-censorship in conformity to the group, and suppression of dissent; see Janis, 1982; Kamau & Harorimana, 2008, for a review). This can be done by introducing a more detailed group log with a section for each group meeting, in order to code its content for analysis. However, whether groupthink symptoms can be measured in real student task groups undertaking assessed groupwork is debatable, because if students become aware that they have exhibited groupthink symptoms, and if they realize that groupthink is detrimental to their eventual performance, they may correct their approach. Therefore, further research should probably involve introducing an intervention regarding groupthink and testing

the impact of that intervention on the performance of that student cohort, relative to a previous student cohort with which no intervention was introduced.

Further research should also investigate whether the present study's findings can be replicated in a sample of students within a collectivistic society such as China or Japan (as defined by Hoftsede, 1980). The findings that individualism had a positive impact on group performance (and the likelihood that it minimized groupthink) may only hold true for groups in individualistic societies, since most groupthink research has been conducted in the West (see e.g. Janis & Mann, 1979; Hogg & Hains, 1998). In collectivistic societies, groups may already possess strategies that prevent groupthink while avoiding individualism, therefore further research should investigate whether individualism within a group would have a positive effect on group performance in a collectivistic society such as China, as was found to be the case in the British study sample used in the present study.

Conclusion

At least in an individualistic society such as Britain or the United States, it appears that the best predictors of student task group performance are time spent on coordination (specifically the total duration of group meetings) and task-oriented individualism. Group facilitators can implement the results of the present study by developing group logs that enable groups to engage in effective coordination and in task-oriented individualism. Further research should investigate whether the present findings can be replicated in student task group samples from collectivistic societies such as China.

Notes

1. Cronbach's alpha is a statistical measure of internal reliability. A questionnaire with good internal reliability consists of items measuring the same sort of concepts, therefore participants' responses to the various items within a questionnaire should be well correlated.
2. Factor analysis is a statistical method of identifying commonalities within

data. If particular items in a questionnaire measure the same psychological construct, and there should be systematic variation in all participants' responses to those particular items. As an example, supposing we ask participants to rate themselves on each of these variables: talkative, friendly, welcoming. If factor analysis reveals commonalities in participants' scores on all three items, this would tell us that the three variables are most likely measuring the same construct - extroversion.

3. Factor analysis is sometimes criticized because it produces results which often require interpretation, in terms of how many factors emerge from the data. Rather than making a theoretical decision on how many factors to retain, and rather than using a generalist rule of thumb (e.g. retain all factors with an Eigenvalue greater than 1), parallel analysis gives us an objective rationale when deciding how many factors to retain from the results of factor analysis.

4. When conducting factor analysis, we can choose one of several 'extraction' methods, and we can choose one of several 'rotation' methods.

5. A factor solution gives as an idea of which underlying psychological constructs (i.e. factors) are captured by which items. A factor loadings is a value that indicates how well an item reflects each underlying construct. The higher the value, the better the item represents the factor in question.

6. A correlation coefficient is a value (labelled r) telling us how related two variables are, and whether the relationship is positive or negative. For example, there is a perfect (i.e. +1.0) correlation between length in metres and length in yards.

7. *p* is a value that indicates the significance of the result of a statistical test. For instance, a correlation can be seemingly large, but is it significant? In other words, what is the chance of that result being due to error? The *p* value indicates the probability of the result being due to error. The smaller the *p*, the lower the probability of error. In the social sciences, a 5% probability of error is the maximum allowed (that is, the rule of thumb is that *p* should be less than or equal to 0.05).

8. Regression analysis investigates how responsible predictor variables are for the variation in a dependent variable. For instance, if we want to predict eating of ice-cream (a dependent variable), we might observe several dozen people and record the air temperature, their hunger and their proximity to ice-cream (the predictor variables). If there is too much similarity between any of the predictor variables, then there is a collinearity problem and so one of those variables is redundant in the regression model.

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