



## Motivation, learning and group work – the effect of friendship on collaboration

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**Abstract:** *Group work is an established practice in all levels of education, and skills in collaboration are valued graduate attributes of the University of Sydney (The University of Sydney, 2004). Sociocultural theory, which posits that individual learning and motivation emerge from participation in social activity, suggests that collaboration can be effective in promoting the emergence of both learning and motivation. A number of strategies for allocating students to groups are commonly used, including self-selection, random assignment or deliberate allocation, depending on the purpose and format of the work to be undertaken. Barron (2003) has suggested that friendship is a critical mediator of productive collaboration in that friends engage in more extensive talk which elaborate and extend expressed ideas. Further, friendship is also posited to mediate more effective collaboration through familiarity with ways of thinking and personal histories, and through increased motivation to work harder.*

*As part of a wider study of science learning among first year Pharmacy students, we investigated the interactions within two self-selected groups, one consisting of five individuals who claimed to be close friends and one consisting of six individuals who were mostly acquaintances. These groups were videotaped while undertaking classroom workshop activities designed to promote discussion and collaborative problem-solving, and each individual was interviewed on several occasions to elicit their perspectives on their group's functioning, together with their own motivations and extent of their learning. Using Rogoff's (1998) planes of analysis approach, which allows interdependent analysis of the interpersonal and intrapersonal dimensions of motivation, we evaluated the ways in which perceptions of friendship shaped and were shaped by the motivations of individuals, the nature of the collaboration apparent within the two groups, and the quality and persistence of individual conceptual development and learning.*

*In contrast to Barron (2003), we found a more complex relationship between friendship and productivity of collaboration, and that individual motivations were critical in mediating this complexity. Members of the "friends" group demonstrated significantly greater competitive behaviours towards each other than members of the "acquaintances" group, with the result that their friendships began to deteriorate over the study period. Individuals within the "friends" group were primarily motivated by the need for personal achievement, particularly in examinations, which was manifest in a range of behaviours towards each other and in relation to the activities in which they participated. Member of the "acquaintances" group, on the other hand, were motivated to a significantly greater extent by a focus on learning the material and assisting the others in their group to learn. The latter group, although less academically well-performed, demonstrated significantly greater persistence of their learning than the former, although the former outperformed the latter in the end-of-semester examination. A greater reported level of friendship was thus associated with the phenomenon of familiarity-breeds-contempt, whereas acquaintanceship was associated with politeness and respect. Individual and collective motivation thus mediated qualitative differences in the productivity of collaboration and extent of learning. These findings have not been previously reported, and the study thus contributes to a deeper understanding of the interactions between individual and collective behaviours, motivations and outcomes.*

### Introduction

Group work is an established practice in all levels of education, and skills in collaboration are valued graduate attributes of the University of Sydney (The University of Sydney, 2004). Sociocultural theory, which posits that individual learning and motivation emerge from participation in social activity, suggests that collaboration can be effective in promoting the emergence of both learning and motivation (Pressick-Kilborn, Sainsbury & Walker, 2005). Within sociocultural theory, primacy is accorded to the social world in that learning and motivation are regarded as emerging as a result of social processes in the first instance, however the individual is also critical as a constituent aspect of the social world. Further, the relationships between individuals also constitute important dimensions of the social, and it has been suggested that friendship between individuals is favourable for motivation and learning (Barron, 2003). Studies are therefore needed which investigate motivation



from both individual and social perspectives, and which take account of the mediating role of friendship. The study reported in this paper explored both motivation and learning in the context of groupwork which was designed to promote collaborative activity between group members, and in which different patterns of friendship were observed.

## Participants and context

As part of a wider investigation into the processes and outcomes of learning, eleven students enrolled in Introductory Pharmaceutical Science (IPS) (a compulsory unit of study in First Year of the Bachelor of Pharmacy) participated in this small-scale qualitative study. The students comprised two self-selected groups, each of which worked together throughout a complete semester in weekly two-hour workshops. One group consisted of two males and three females, four of whom were native English speakers; the other group comprised six females of whom only one was a native English speaker, however all participants were fluent in English. All participants were domestic students, aged between 17 and 19 years, and all attempting IPS for the first time. The workshops, which focused on aspects of chemistry of particular relevance to the pharmaceutical sciences, were designed to promote learning through stimulation of conceptual discussion and problem solving. As a consequence, students were expected to work together to complete the activities within their groups, with support and guidance from two tutors who acted as facilitators. Although a number of topics were addressed during the semester, the specific topic under investigation was 'Acids and bases'.

## Methods

### Data collection and analysis

Data was collected by individual interview of the participants and observation of their behaviours within the classroom. Each individual was interviewed three times during the study in order to investigate the processes and outcomes of the groupwork undertaken during the semester. The primary focus in the wider study was on the quality, extent and persistence of learning (Sainsbury, 2009; Sainsbury & Walker, 2007a) however the social functioning of each group was also explored as a critical element of the learning environment. During these interviews, therefore, students were invited to comment on their perceptions of the dynamics of their group, and to offer reasons for their opinions. Interviews were audiotaped and transcribed for analysis of content and emergent themes. Observation of classroom behaviours was performed by videotaping and audiotaping the groups as they engaged in normal activities during their workshop sessions. The audiotapes captured discussion more effectively than the videotape, and the combination of recording modes permitted a comprehensive description of both verbal and non-verbal interactions within the groups. The audiotapes were transcribed and aligned with audible talk from the video. Videotapes were viewed repetitively, firstly to construct a broad outline of the session by identifying episodes of individual work, within-group joint work between two or more students and whole-group work, and secondly to analyse selected episodes in greater detail. Details of episodes which were analysed included the extent and nature of participation by group members, and non-verbal behaviours which were observed. An individual was considered to be participating in group work if there was evidence of either active or passive engagement. Active engagement involved an individual contributing to the discussion, while passive engagement was inferred when the individual was clearly paying attention to the discussion while not adding a verbal contribution to it. Non-verbal behaviours included gesture, eye contact, gaze, posture, physical contact and use of tools or artefacts. The study was approved by the Human Ethics Committee of The University of Sydney.

## Results

### Learning

Findings relating to the quality, extent and persistence of learning have been reported elsewhere (Sainsbury, 2009; Sainsbury & Walker, 2007a, 2007b), however a brief summary is provided here. Distinctly different patterns of learning were apparent among the participants, however two dimensions emerged as critical in shaping individual learning trajectories during the study; firstly the extent and quality of prior knowledge and understanding of the topic, and secondly the group in which the student participated. These dimensions were relatively independent of each other in that both groups contained some individuals with strong backgrounds and others with weak.

Individual students differed markedly in their prior understanding of the topic from secondary study. Those with acknowledged (and demonstrated) strong foundations tended to be able to learn new material more effectively, at least in the short term, and to adopt generally conventional explanations for the phenomena being learned. On the other hand, students with considerably weaker backgrounds struggled to articulate their understanding and tended towards idiosyncratic explanations. Of greater significance, however, in shaping learning was the group in which each student worked. Interviews conducted immediately after the conclusion of IPS, and five months later, revealed that members of one group exhibited short-term learning with minimal persistence beyond the teaching and examination period, whereas members of the other group demonstrated significant persistence of learning to the end of the study. This learning took the form of the ability to discuss critical concepts (e.g. characteristics of acids/bases, strength and dissociation, pH and pKa) and to solve problems using these concepts (Sainsbury & Walker, 2007a). The between-group difference was consistent despite the presence in both groups of individuals with strong and weak backgrounds. The groups were described as the Transient Change (TC: Emma, Geoffrey, Janine, Larry, Lucy) and Persistent Change (PC: Alicia, Denise, Isabelle, Jasmine, Kellie, Veronica) groups respectively.

### Interactions

In addition to demonstrating different learning trajectories, members of the two groups also engaged in interactions of different productivity. Specifically, the interactions between members of the PC group were significantly more productive than those of the TC group. As described by Roschelle (1992), interactions which are more productive for learning include iterative conversational turn-taking involving cooperative construction of ideas, sharing new ideas in common frames of reference, and repairing differences and divergences in discourse and understanding. In the current study, productive interactions were those which promoted discussion and exploration of concepts and approaches to solving problems, and which allowed each participant to contribute and gain benefit. A higher incidence of more productive interactions and behaviours was apparent in the PC group: these included cooperation, equality of status, engagement in extensive and progressive discourse, a focus on learning, and persistence. In contrast the TC group was characterised by competition, inequality of status, engagement in less and more poorly coordinated discourse, a focus on task completion, and lower persistence (Sainsbury, 2009).

The cooperative nature of the PC group's interactions was clearly apparent in their propensity for working together on the same problem, pursuing consensus and attempting to ensure that everyone in the group was able to understand as well as to write an answer. On the other hand, members of the TC group worked independently to a greater extent, and consensus was rarely an objective. The PC group would generally wait for everyone to complete an activity, whereas TC group members worked at their own pace and moved ahead as they finished each task. Janine in particular was prominent in demonstrating the latter behaviour, and was perceived by her group as highly competitive, even to the extent of wanting to be the first to finish. However the level of unspoken competition between Janine and Larry also contributed to the tension underlying their interactions, as



Larry believed that Janine's approach placed additional pressure on the remaining members of the group, himself included. These cooperative and competitive behaviours revealed and resulted from the personal focus of each participant, preferentially either on others or on the self. The group whose participants showed a greater outward focus (PC) engaged in more cooperative behaviours than the group whose participants were characterised to a greater extent by a focus on their own needs (TC).

Status or interpersonal ranking within a group may be explicit or implicit, but is frequently revealed through the actions of group members (Chiu & Khoo, 2003). Within the TC group Janine was perceived as possessing the highest academic status, and Lucy the lowest. Janine regarded herself as academically superior, and the others also explicitly accorded her the status of 'expert' on the grounds of her greater knowledge. The status of expert can, however, be used in more or less productive manners, and Janine's status and behaviours did not result in consistent benefit for the other members of her group. Lucy's status was less explicit, but the behaviours of others towards her made it clear that her academic opinion was poorly valued, despite the fact that on a number of occasions she was closer than anyone else to articulating an appropriate approach. Within the PC group, variations in status were significantly less apparent, and no individual appropriated the role of expert for herself. The group perceived all of the other members to be helpful, and shared the role of temporary expert at different times. Similarly, no individual was regarded as possessing lower status than any other, although it was acknowledged that some were quieter and more reticent. The greater equality of perceived status among group members was associated with greater levels of cooperation.

Substantial differences were apparent in the extent and nature of the discourse of the two groups. In terms of productivity, the critical difference lay in the extent to which discourse was coordinated and progressive. In this regard, the PC group was clearly more productive, in that episodes of progressive discourse, involving coordination of speaking turns and co-construction of understanding were both more frequent and longer than was the case in the TC group. Coordinated discourse was present on occasion in the TC group's interactions, but it generally lacked the key features of progressive discourse which include a common commitment to construction of shared understanding and critical evaluation of a range of ideas. Poorly coordinated discourse was also frequently apparent in the TC group's interactions, whereas it was rare for the PC group.

The workshops in IPS were specifically designed to create an environment where the learning of ideas was promoted, and the tasks were planned as a means to this end. However the intention of the workshop designer is not automatically 'imprinted' on the participants, and all facets of the context, including the participants, interact to create environments which are unique to each occasion. Particularly significant in this study were the motivations and attitudes of participants towards the workshop activities, and while both groups were keen to complete the tasks, the TC group tended to perceive them as an end in themselves. As a consequence, they were motivated primarily by achieving the correct answer, and only peripherally by the significance of the task for conceptual understanding. In contrast, the PC group displayed attitudes more closely aligned with the workshop design, in that they were primarily motivated by a desire to learn from the tasks and only secondarily by their completion. The underlying motivations for attending workshops and completing the activities thus played a critical role in channelling effort into more (PC) or less (TC) productive endeavours.

Either a learning focus or a task focus could in theory lead to high levels of persistence, however a clear difference between the two groups was apparent in the extent to which they persisted both with individual activities and within the workshop itself. The relationship between persistence and productivity is not straightforward. On the one hand, if the students 'give up' before reaching a satisfactory conclusion or consensus, the full benefits of attempting the activity will not be realised, and this was frequently apparent in the TC group when some members were willing to copy the correct answer with little or no understanding of how it was achieved. On the other hand, if the



students spend excessive time on a question in an attempt to reach understanding and consensus, they risk leaving insufficient time to complete other equally valuable activities. The latter was characteristic of the PC group, which 'finished' only one workshop during the semester. Clearly a balanced approach with efficient use of time is ideal, however the unique constitution of each group resulted in differences in how balance was both perceived and achieved. Members of the PC group were aware of their slowness in workshops, but most believed that the time was generally well spent, and the solid grounding they achieved in the fundamentals allowed them to construct the more complex concepts themselves. The TC group on the other hand, appeared to be more concerned with task and workshop completion, although they did not always remain long enough for the latter.

Persistence is both an individual and group characteristic, where individual motivations and preferences interweave to create group behaviours. It is more likely that a group composed of individuals with compatible attitudes towards persistence and cooperative behaviours (PC) will achieve a mutually satisfactory balance than one where less compatible attitudes and less cooperative behaviours are evident (TC).

### **Group dynamics and friendship**

The TC group indicated in their initial interviews that they were close friends, although they had only met earlier in the year. Their connection was that they all lived in adjacent residential colleges, and thus spent considerable time together outside class, including attendance at a number of social events. Apart from two individuals who had known each other at school, PC group members described themselves initially as friendly acquaintances who knew each other a little from the previous semester. By the end of the study, the TC group's friendships had seriously deteriorated, whereas the PC's friendships had significantly strengthened. The latter finding is discussed in a later section.

## **Discussion**

Rogoff (1998) has outlined an analytical framework which allows interdependent consideration of the role of both individual and interpersonal behaviours in shaping processes and outcomes of learning. This planes-of-analysis approach is useful in exploring the creation of distinctive cultures within the two small groups through the interweaving of motivations and behaviours, and of evaluating the role of friendship in creating and maintaining these cultures. Rogoff argues that the individual and interpersonal can only be understood by considering both together, although it is useful and necessary to focus on one at a time against the background of the other.

### **Group culture**

The culture of the PC group can be described as collaborative and learning-focused, whereas the culture of the TC group was competitive and task-focused. As discussed above, the major difference between the groups was the productivity of their interactions, and thus the difference between the two cultures was both shaped by and reflective of the group interactions and behaviours. The PC group, with its more productive interactions was associated with the creation of a collaborative culture which more effectively promoted learning than the more individualistic culture created within the TC group. A further dimension which differentiated the culture of the two groups was the extent to which each group engaged in polite or impolite behaviours (Chiu and Khoo, 2003). Members of the PC group were unfailingly polite and courteous in their interpersonal speech and behaviours, and sought to include, support and encourage their peers. On the other hand, members of the TC often lapsed into speech which was mocking or insulting towards each other, and their behaviours included brusque responses and ignoring the contributions of others. They were willing to make negative comments about each other, and individuals outside their group. Whereas the PC group tended to laugh with each other, the TC group were more likely to laugh at each other. In terms of motivation, the collaborative culture of the PC group was underpinned by a group focus on learning as the reason



for completing the tasks, whereas the TC group culture was shaped by a desire to finish the tasks so that group members could leave the classroom as quickly as possible.

While clearly generated by interactions, the cultures created within the TC and PC groups also highlighted the impact of specific individual motivations and behaviours. In the TC group, Janine's self-focus acted to create division within the group as the others responded to her actions and her perceived motivations, and the culture that resulted was heavily coloured by this division. In the PC group, Jasmine acted in ways that promoted inclusion, particularly of the quieter members of the group, and this inclusiveness was a key characteristic of the collaborative culture created within the group. Thus the culture which emerged as characteristic of the group was created and sustained by the interdependent motivations and behaviours of individual members.

### **The role of friendship in establishing and maintaining group culture**

Barron (2003) comments that "a relational factor that is infrequently found in the literature on situative learning but is certainly important is that of personal relationship or friendship" (p. 350). Her review of the literature indicated that interactions between friends were more productive and more likely to promote collaboration than interactions between individuals who were not friends. However the results from the current study suggest a considerably more complex relationship between friendship and culture.

At the start of the project the TC group claimed to be friends from college, having built relationships based on their shared experiences of college life and course of study. Analysis of their off-task talk supported their identification as friends since the topics were consistent with their shared social experiences and displayed a higher level of intersubjectivity or shared understanding than most of their on-task discussion. However, the friendship dimension did not in this case promote effective collaboration, and their often negative attitudes and behaviours suggested an element of "familiarity breeding contempt". Combined with their individualistic culture, this aspect of their relationships created an environment where interactions were less productive. In addition, later interviews provided evidence that the friendship had become tenuous towards the end of the year, and that the group culture had contributed to this development. The PC group on the other hand appeared to benefit from friendship, and indeed to strengthen in friendship through the semester of the study. However, while members of the PC group socialised with each other outside class, they did not live in such close proximity to each other as the TC group, and were less vulnerable to 'familiarity breeding contempt'. Their language and interpersonal behaviours were such as to maintain a positive environment in which productive interactions leading to persistent learning were promoted.

Barron (2003) offers a further clue to the differential impact of friendship in commenting that "intense interaction between partners nurtures achievements *when partners share interests, knowledge, personal history, and a commitment to the work*" (p.308, emphasis added). Members of the TC group certainly shared some interests and personal history based on their common experience of college life, but differed in their knowledge and commitment to the work. Janine was regarded by all in the group (including herself) as the most knowledgeable and as the most committed to studying as a means of achieving high examination performance, whereas other group members willingly indicated that they knew less and were not as dedicated as Janine. Members of the PC group, on the other hand, were closer in terms of knowledge as indicated by their greater status equality, and more importantly were equally committed to learning from their workshop activities. That they also shared some personal history and interests was evident from some of their off-task talk, thus the conditions for nurturing achievement were more favourable.



## Conclusion

This study has demonstrated the significance of motivation for student learning in the context of group work. Two small groups, comprised of individuals with different motivations for attending and participating in workshop classes, displayed significantly different patterns of interaction, and as a consequence, considerable differences in the productivity of their groupwork. The latter was strongly associated with persistence of conceptual learning, with members of the more productive group demonstrating learning for at least five months longer than their less productive peers. In addition, the study has highlighted the potentially complex role of friendship. In contrast with previous findings (Barron, 2003), this study suggests that friendship is not always associated with productivity and favourable outcomes. Groups including individuals whose lives are perhaps too closely linked, through circumstance or shared history, may in fact demonstrate behaviours and attitudes which can be described as familiarity breeding contempt, and this was clearly apparent in the verbal and non-verbal behaviours of the TC group. Friendship which is less close, as evidenced in the PC group, may have some advantages in that some level of shared history permits easy conversation while still maintaining the politeness of individuals who are not completely familiar with each other. These results, arising from a small scale qualitative study, suggest that more specific studies, focusing on the complex nature of friendship and the role of interpersonal interactions and motivations, would be of benefit in elucidating important aspects of the relationship between groupwork and learning.

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