Dissecting study groups: A focus group investigation of informal small group work in anatomy

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Abstract

This study investigates the dynamics of study groups among second-semester medical students enrolled in a gross anatomy course at Aarhus University, Denmark, during the autumn of 2018. Study groups served as organising units that had beneficial motivational, learning, and social effects. They provided accountability, academic support, and progress monitoring. Shared beliefs within these groups, influenced by near-peers, shaped the social norms for studying. The study suggests enhancing the effectiveness of study groups by targeting these beliefs through formal education of social role models, such as student teachers. Recognising the limitations of homogenous groups, the paper advocates for diverse peer groups to develop teamwork and higher order thinking skills. These findings underscore the importance of considering both academic and psychological aspects of group dynamics to improve student wellbeing and academic performance.

Introduction

Small groups, where two or more students work together during the semester, provide personal support, foster student rehearsal of material, and shape group dynamics both inside and outside the classroom (Springer, Stanne, & Donovan, 1999). These groups are relevant to the university teacher designing both large lectures and small classes. However, study groups have unique social norms and dynamics depending on the context of their formation and further group development (Hubbell & Hubbell, 2010; Tuckman & Jensen, 1977).

In higher education, various terms describe self-organised peer groups: informal student groups, student reading groups, or simply study groups. In this paper, we will use the term study groups, defined as groups where students collaborate to understand course material, and navigate academic and social challenges.

Exploring study groups in higher education is important for two reasons. First, it helps explain the impact of study groups on student learning, social integration, and personal wellbeing. Second, understanding group dynamics is crucial for educators to facilitate a positive learning environment.

The need to study and contextualise informal social learning within medical education was emphasised in a scoping review by Keren, Lockyer, and Ellaway (2017). The review identified a clear role for social interaction such as participation in study groups.

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Belonging to a study group may improve both learning and wellbeing (Bowman, Miller, Woosley, Maxwell, & Kolze, 2019; Rayle & Chung, 2007; Robbins et al., 2004). Previous studies emphasise that students' emotional states are central to their learning processes (Boekaerts, 1993; Pintrich, 2004). Collaborative environments, such as study groups, are known to not only enhance cognitive understanding (Pintrich, 2004) but also foster emotional and psychological wellbeing by promoting emotional resilience (Hammond, 2004; McNeill, Kerr, & Mavor, 2014).

Wellbeing is an important driver of academic achievement and a key factor influencing dropout rates (Kaya & Erdem, 2021; Ryff, 1989; Suhlmann, Sassenberg, Nagengast, & Trautwein, 2018). From a personal, university, and societal perspective, it has great costs when students drop out of university, and in this context study groups may increase student retention by increasing social integration (Mishra, 2020; Tinto, 1975, 2012).

In medical education, study groups support learning outside class, help students rehearse material before exams, and provide social support (Bradshaw & Hendry, 2006; Hendry, Hyde, & Davy, 2005). Previous studies have shown that belonging to a study group enhances learning through social support and regulation (Bransen, Govaerts, Panadero, Sluijsmans, & Driessen, 2022; Chiriac, 2014; Hendry et al., 2005). Students working together may feel less isolated in their academic challenges, and the emotional safety provided by groups can allow them to engage more deeply with the material, as they are not distracted by emotional concerns. By promoting emotional resilience through social support, study groups become more than just academic tools; they evolve into environments that support holistic development (Hammond, 2004).

Participation in group work does not always result in improved learning and wellbeing. Group work can be perceived as frustrating and groups can fail for several reasons, as reviewed by Feichtner & Davis (1984) and Hall & Buzwell (2013). These reasons include, first, the problem of free riding, where some members contribute little but receive the same grade. Second, groups formed by students tend to be homogeneous and less effective. Third, group size and stability also affect cohesiveness and productivity. Fourth, groups must receive clear instructions, support, or feedback.

Background

Study groups are common in medical education, incorporating collaborative group work (Kamp, 2012; McMahon, 1997) and problem-based learning (Dolmans & Schmidt, 2006). Commitment to group work has been associated with higher academic achievement (Kamp, 2012).

Collaborative learning is defined as "working in a group of two or more to achieve a common goal while respecting each individual's contribution to the whole" (Roberts, 2004, p.205). This pedagogical approach aligns with active learning methodologies such as cooperative learning, team-based learning, and peer learning (Michaelsen, Davidson, & Major, 2014). Students engage in joint activities, often guided by a teacher or senior peer (Seifert & Sutton, 2019). This method enhances student outcomes, self-esteem, and attitudes toward learning and has been well-established through meta-analyses (Johnson, Johnson, & Smith, 2006; Springer et al., 1999).

Pedagogies used to scaffold student groups in medical education are designed to foster collaboration, enhance peer learning, and develop essential skills such as communication, problem-solving, and teamwork. Due to the formal division of students into groups within these frameworks, we will refer to these groups as formal in contrast to self-organised, informal study groups that are constructed on the students' own initiative. An example of a formal approach is peer-assisted learning, where senior students guide juniors, help build content mastery while also developing leadership skills for senior students (Burford, 2012; Livingstone & Lynch, 2000).

Peer-assisted learning, and similar approaches, align with self-regulated learning theory, where the support provided by mentors can promote the development of autonomy and self-efficacy (Hendry et al., 2005). In this context, effective mentorship practices may include providing detailed feedback, modelling effective learning strategies, and facilitating discussions that help mentees make sense of difficult concepts.

Both formal and informal study groups may act as social groups and form norms for dynamics like interaction, communication, and cohesion (Bales, 1970). Moreover, the nature of the group task and other contextual elements further shape group dynamics, impacting overall outcomes (Hackman, 1990). Groups that collaborate on studying are likely to form social norms (Bales, 1951), i.e. shared expectations within a social group that shape how students interact, communicate, cooperate, and coordinate their study efforts. Previous studies have found social norms to be important for the construction of norms for judging academic performance (Bales, 1951; Lovell, 2015). Such norms are presumably important when medical students plan learning activities. As an example of this, Danish university students have been found to be sensitive to implicit and explicit norms for participating in group work (Bager & Herrmann, 2013), which highlights the potential significance of these norms in shaping how students organise study activities.

Medical students rely on peer comparison to set goals and reflect (Berkhout, Helmich, Teunissen, Vleuten, & Jaarsma, 2017; Raat, Kuks, van Hell, & Cohen-Schotanus, 2013). Peer feedback is particularly effective in preparing for anatomy exams, requiring extensive memorisation (Herling et al., 2017; Lerchenfeldt, Mi, & Eng, 2019). Medical students seek feedback from peers and senior doctors whom the identify with (Raat, Kuks, & Cohen-Schotanus, 2010). This is in line with Hattie and Timperley (2007) who stated that preferred sources of feedback are individuals who are perceived as less threatening to the individual student's self-esteem.

In general, people tend to seek out the company of others they perceive as similar to them (Fiske, 2002). This behaviour is not only associated with wellbeing in medical students, but also positive academic achievement when they belong to high-performing social groups (Keren et al., 2017; Vaughan, Sanders, Crossley, O'Neill, & Wass, 2015). Within a study group, such social processes may modulate outcomes differently depending on whether the group is formally or informally constructed. University teaching staff may approach these groups in distinct ways, with formal groups often receiving structured guidance to minimise potential risks of negative outcomes, while informal groups may involve more independent dynamics (Feichtner & Davis, 1984; Hall & Buzwell, 2013).

Methods

Study design

The study used a qualitative cross-sectional design where we analysed data from focus group interviews. This approach was chosen to explore participants' views and experiences through interaction. Focus groups enable participants to ask questions, share anecdotes, and reveal not just what they think, but why and how they think that way (Kitzinger, 1995). This method is ideal for understanding group dynamics and shared knowledge (Caillaud, Kalampalikis, & Doumergue, 2022).

During the interview, participants were encouraged to interact with one another and discuss topics through open-ended questions. By forming the focus groups from the existing study groups, we were able to uncover not only individual opinions but also collective meanings and group dynamics (Kitzinger, 1995) and evaluate how beliefs about learning were construed between group members and shared within the groups.

Study participants

Participants were second-semester medical students undertaking the course in gross anatomy at Aarhus

University, Denmark, in the autumn of 2018. At Aarhus University, students were assigned to formal study groups of five to six members by their tutors in the first month of medical school. These groups were constructed based on the student's own wishes. Hereafter, students were free to participate in informal group work, which more than 90% of bachelor students in medicine did according to Aarhus University's internal report on the study environment (Herrmann, Bager-Elsborg, Jensen, & Hansen, 2017).

We used a sampling strategy where we randomly chose one of nine possible classes of students. Of the 29 students in this class, 23 (79%) decided to participate, which corresponded to nine study groups. Two participants did not belong to any study group but agreed to be interviewed as a 10th focus group.

The total number of male and female students was calculated from publicly available information on the total number of students and the female/male ratio (Ohana, 2017). Average grades were calculated on the Danish grading scale consisting of 7 grades (-3, 00, 02, 4, 7, 10, 12). Averages were calculated as the sum of all grades divided by the number of graded students. Grades of -3 and 00 are failing grades. The rest are passing grades. See Table 1 for descriptive data comparing the study population to the entire semester. As evident from Table 1, our sample was similar to the full cohort, in terms of male-to-female ratio and average grade.

	Study cohort	**Entire cohort**
Number of students	23	233
Average age (years)	21.65	21.33
Male-to-female ratio	9/14	79/154*
Primary exam		
Number of students	23	216
Average grade	5.27	5.5
Failed total	5 (22%)	24 (11%)

Table 1: Descriptive data on the study sample compared to the entire cohort
*Estimated numbers from student uptake listings.

Interviews

Ten focus group interviews lasting between 35 and 60 minutes were conducted and audio-recorded. The research group discussed the study design, and interview protocol and the first author conducted the interviews in Danish and subsequently performed verbatim transcription, translation, and anonymisation. Interviews were semi-structured around themes pertaining to the research question such as learning and wellbeing.

To further aid the discussion, an interactive visual model of a study group was developed by the research group. This model included three categories of factors: Intrinsic, group-dynamic, and extrinsic. Participants were tasked with identifying factors that affect group work. Participants wrote factors on a post-it with a colour code:

Green=positive factor and red=negative factor. The post-it was put on the model in order to serve as a graphic organiser for the interview participants and to have a template that could be used as the basis for themes (King, 2012).

Quantitative data collection

All participants provided information on gender and age. At a later point in time, participants were contacted by phone to provide information on exam performance. Data on the entire semester was obtained from the student administration.

Ethical considerations

The study was registered in Aarhus University's records of processing activities (journal nr. 2016-051-0000001, running nr. 1326) in compliance with EU's General Data Protection Regulation and the Central Denmark Region Committee on Biomedical and Research Ethics according to which this study was exempt from ethical approval. In compliance with the declaration of Helsinki, all students gave written, informed consent prior to being included in the study.

Analysis

We used thematic analysis to code and analyse the transcribed interviews. Thematic analysis is a method for identifying, analysing, and reporting patterns (themes) within qualitative data (Braun & Clarke, 2006). This approach involves several steps: familiarisation with the data, generating initial codes, searching for themes among the codes, reviewing themes, defining and naming themes, and producing the final report.

Firstly, the interviews were transcribed verbatim to ensure the accuracy and richness of the data. Then, recurring themes were identified and coded. These codes represent the most basic elements of the raw data that are relevant to the research questions. The coded data were subsequently organised into broader thematic clusters, such as "wellbeing" and "learning". Clusters that pertained to the main research question were evaluated in terms of whether they should be recoded, reorganised, and reanalysed. Thus, we used a deductive strategy derived from the research question centred on student learning and wellbeing. This was coupled with an inductive strategy once the themes were organised into thematic units that were then used to search for patterns in the data.

Results

As shown in Table 1, our study cohort differed from the full cohort in exam performance, with a higher proportion of participants failing the primary exam.

To provide an initial overview of group formation, Table 2 details group size. Aside from two participants who studied alone, the study groups consisted of two or three members.

	Students
No group	2 / 23 (9%)
2 members	12 / 23 (52%)
3 members	9 / 23 (39%)

Table 2: Descriptive data on group organisation

Informal study groups as motivational constructs

For the study participants who participated in informal group work, belonging to these study groups provided motivational factors that supported academic endurance. We were able to isolate four motivational factors that were important indirect facilitators of learning: monitoring of progress, academic sparring, accountability, and encouragement.

Informal study groups serve to monitor progress, by offering a platform for members to track and share their academic progress. This constant monitoring helps individuals stay aware of their achievements and areas that need improvement. Members can set personal goals and receive constructive feedback from peers, fostering a sense of accomplishment and motivation. Furthermore, group members help each other locate areas of the curriculum that they need to improve upon:

> *"It might be that I get asked about the course of the deferential duct which I haven't learned properly, or read properly, and then I have a cool study group with two other guys who have understood it and can explain it to me, maybe even better than the book" (Alex, Group 2, 2018).*

Academic sparring within these groups involves healthy intellectual discussions and debates. Members challenge each other's perspectives and engage in thought-provoking conversations. This process stimulates critical thinking, expands one's understanding of the subject matter, and encourages a deeper level of learning beyond what traditional coursework might provide.

Study groups also inspired students to alternative learning strategies by exposing them to diverse learning approaches. Through interactions with other group members, individuals may discover alternative study methods, resources, or perspectives that resonate with their unique learning styles, though this sometimes requires additional work to incorporate into individual approaches:

> *"I've come to the conclusion that I can understand a rule or a system that one of the others have made, but I still need to go home and go through it again to properly learn it" (Ethan, Group 2, 2018).*

The exchange of ideas within the group could inspire members to explore unconventional avenues for learning, fostering creativity and adaptability in their academic pursuits. Alex and the other participants found that group members with different learning strategies than themselves, were better suited for academic sparring since they often applied different strategies to a specific learning task that could be assimilated.

The informal nature of these study groups created a sense of accountability among group members. Knowing that others are relying on them for collaboration and support motivated participants to stay committed to their academic goals.

Accountability towards other group members fostered a sense of responsibility, pushing students to meet deadlines, complete assignments, and actively participate in group activities:

> *"It's probably the responsibility that you've promised that you'll get something done and then you're also going to get it done. If you've made a deal, then you come and you're ready. That coincidentally means that you learn a lot and have to work with the material" (Tomas, Group 8, 2018).*

The sense of commitment to fellow group members was fuelled by the mutual expectation for individual preparation ahead of group meetings. These factors motivated Tomas and his peers to dedicate additional time and effort to their studies. Moreover, certain participants found motivation in the presence of other enthusiastic and adept students.

Informal study groups served as a source of emotional support and encouragement. Though no groups directly articulated this need, it was evident from the synthesis of the visual models. Nine out of ten groups indicated that the social relationship between group members was an important mediator of learning and wellbeing. Eight out of ten groups indicated that the same was true for a safe learning environment. Group dynamic factors such as honesty, safety, support, tolerance, trust, and empathy were all mentioned in this context.

Advice from more experienced students shapes beliefs about effective group work

Participants in the study highlighted the influential role of peers and near-peers at the beginning of their gross anatomy course. These near-peers included tutors, student teachers, and occasionally older siblings, who acted as key mediators in organising informal group work. Samuel provided a notable example of this influence. He recounted how a student teacher introduced a plan for rehearsing material before the exam:

> *"I remember the first time I saw the plan I thought: No! I don't want to do that! - I thought it was too early to begin rehearsing. But she has been a student teacher for a long time, and she has a lot of experience, so you must trust her" (Samuel, Group 8).*

This quotation illustrates Samuel's initial reluctance but eventual acceptance of the student teacher's advice due to her experience and authority. The study found that participants frequently adhered to the advice of older students, demonstrating a belief in the effectiveness of explanation as a learning technique. This technique involves students explaining concepts to each other to achieve learning objectives.

The investigation revealed that the belief in the centrality of explanation was introduced by an influential student teacher and became a widely accepted social norm within the cohort. The participants' limited exposure to a variety of near-peers from different levels of academic hierarchy meant there were few opportunities to challenge this shared belief. Consequently, this specific belief about group work and the importance of explanation became predominant among the participants. This highlights how social norms regarding studying are shaped by influential individuals and are reinforced by the limited diversity of perspectives within the learning environment.

All study groups in this study had two to three members. This is in contrast to the five to six members that groups consisted of, at the beginning of the first year. We found that the reorganisation into smaller study groups was a deliberate act, driven by the above-mentioned shared belief that explanation was the central learning activity to attain the learning objectives for the course in gross anatomy. From the participants' perspectives, smaller groups meant that each participant would spend more time actively explaining instead of listening to the other group members' explaining. Some students, such as Selma, were very attentive to the social norms for studying. Selma was aware that her study group failed to adhere to the perceived optimal group structure of a two-member study group:

"You get told that you have to be two in a study group. When you are three, there is a little less time to speak and I think that might be a challenge. But at the same time, I also think we have so much to contribute that it all comes together" (Selma, group 1, 2018).

The formation of a three-member group had been a necessity due to conflict in another study group, however, Selma expresses positive experiences with being in a larger group where each member could contribute. Significant concerns emerged among students about the potential negative impacts on their learning outcomes if they diverged from the established norm of participating in a two-member study group. Those not belonging to a study group felt vulnerable to stigmatisation from their peers. Keaton, who experienced a period without a study group, stated the following:

"You are instructed to have a study partner [...] what I notice is; that people think it's a little strange when they get told that a person studies alone. They think: How can you do that? Can't you function socially?' You are met with all kinds of prejudices when you study alone" (Keaton, group 10, 2018).

From Keaton's account, it is evident that medical students are told by instructors and older students to participate in informal group work. The quotation reflects the prevalent social norm, but even a stereotype, surrounding the danger of being alone in university. This norm is contrary to one about the importance of independent (but not solitary) study practice (Wallace, 1992). Keaton's observation underscores the commonly held belief that studying alone is unconventional and a source of social isolation. This negative sentiment highlights that the prevailing norm among these students values collaborative study approaches over individual efforts.

The above quotations from Selma and Keaton point to the importance of the development of social norms for studying and their effects on wellbeing. Their experiences indicate that failing to adhere to social norms for studying can contribute to psychological stress.

Informal study groups tend to be homogenous – a feature that protects against conflict

In general, participants continuously used comparison with peers to obtain a frame of reference for self-reflection and to contextualise experienced stress. We found that groups shared norms on expectations of exam performance and time investment, which modulated wellbeing in opposite directions:

"It means a lot whether you feel like you live up to the number of hours. Sometimes I've calculated how many hours I spend in a week myself, and I think I should at least reach 50 hours a week and I'm far beyond that right now. I think there's a general expectation that this is the time you should spend" (Hazel, Group 3, 2018).

"We don't exactly know where the bar is and how much work to put in. None of us want to fail so we put in the extra time to be safe and that stresses a lot of people. Even though there is no competition for grades, which is nice, you still want to pass and do well" (Zara, Group 9, 2018).

Zara hints at a shared belief that any passing grade was sufficient for academic success. This belief was shared by seventeen of the study participants who all expressed that their aim was merely to pass the exam. This belief served to protect self-esteem in the studied cohort and had been introduced by tutors, presumably as a conscious action.

As illustrated in the quotes by Hazel and Zara, the final exam was a source of stress providing a risk for failure. Failing the final exam was a fear that was shared among many of the students. The origin of this fear was not identified in the interviews and it is possible that this is a shared belief that preexists university, i.e. formed in

primary school or high school.

Zara and Hazel identify another stressor in the perceived social expectation for the time needed to invest in studying. This social belief was mentioned frequently by participants. Again, it seemed that this belief originated from near-peers in the academic hierarchy; one participant was able to identify an older student, who had given an instructive course on time management, as the source of this belief. We saw signs that this belief modulated behaviour differently within the study cohort. Whilst some groups such as group 3 studied for fifty-plus hours per week, other participants such as Madeleine developed another strategy. Madeleine had chosen not to participate in informal group work:

> "I think I would be much more frustrated and probably also stressed if I were in a study group. [...] This thing about being able to do this and being able to do that. Like, you can't do this yet?! [...] Even if you are on an equal level, there are just things that one person knows that the other does not. And, at least in my experience, many others get frustrated by that, and I know that I would be myself" (Madeleine, studying alone, 2018).

Whilst other participants described how group work could relieve stress when another group member affirmed their knowledge, Madeleine seemed to focus more on the instances where group work would reveal areas of her knowledge that required further studying. To avoid the associated stress, she had actively chosen to evade participation in informal group work.

It was evident, that study groups also served as a source of psychological support for group members:

> "That is something we talk about in the study group when we talk deep. I don't want to study medicine if I have to study like this for all the semesters. I miss spending time with my friends and feel like I have the energy to do such things" (Shannon, Group 6, 2018).

Evidently, the core of a well-functioning study group is a good social relationship. The social relationship was important in forming a safe environment in which feedback could be delivered and psychological support could be exchanged. A negative social relationship caused conflict, and emotional distress and could ultimately result in disbanding of the group. Selma gave a concrete example of a situation where she felt betrayed by a former group member:

> "In my first group, where I just didn't understand anything in genetics; it was so frustrating - and the others knew all the answers. Then, I found out that one of them had sat with the answers open (on her laptop) and didn't tell us. Then it's obvious you know the answers! Why would you do something like that? I really didn't feel very clever and maybe, neither was she, but she had the answers open" (Selma, Group 1, 2018).

Selma struggled to identify with the members of her former study group. The group as a whole had difficulty communicating their expectations for the group work. This situation led Selma to compare her intrinsic knowledge with that of someone who was, in fact, reading from a computer screen. Overall, comparing themselves to peers was central to how students evaluated their own academic development. The availability of certain peers for comparison played a crucial role in whether students felt reassured that they were meeting academic requirements. In Selma's case, the uncomfortable group dynamic resulted in the disbanding of the study group.

In general, the study participants preferred being in study groups with individuals they perceived as being similar to themselves. All groups articulated this preference with regard to at least one of three important parameters in which experienced similarity was important. Three groups mentioned similar ambition for exam performance, seven groups mentioned similar attitudes towards groupwork and seven groups indicated that a similar

academic level was important. Malik reflected on what similarity meant for the group dynamic:

> *"Contributing to the balance is that the level of ambition is very equal. It gives a natural balance. Maybe, more than we talk about balance, we talk about equal ambitions and similar academic levels" (Malik, Group 2, 2018).*

It seemed that, when study groups were homogenous, group members did not feel the need to negotiate expectations for group activities. Instead, these activities seemed to develop organically without verbalising the different members' needs. In this way, homogenous study groups seemed to protect students from conflict since disagreement was less likely to occur.

Nonetheless, the proximity to equally inexperienced peers carried the potential for the formation of misguided shared beliefs. Oswaldo offered an illustration from a past study group experience, wherein an all-male composition fostered a notably competitive group dynamic:

> *"We had studied all wrong. We had put too much focus on details because the underlying atmosphere was that the guy who knew the most was the guy who knew a detail that the others didn't. We focused on details instead of the whole and instead of helping each other" (Oswaldo, Group 10, 2018).*

Oswaldo's statement is another example of how shared beliefs can be constructed in small cohorts of students. In this example, the constructed learning objectives were derailed from the formal learning objectives which hindered Oswaldo and his former group members' academic achievements.

Discussion

Effects of study groups on individual learning and wellbeing

We were surprised to discover that learning activities rarely revolved around deeper thinking. In contrast, study groups primarily existed as motivational constructs creating structure and accountability as well as opportunities for process monitoring. Hence, the primary function of informal group work, in the context of the course in gross anatomy, seemed to be the facilitation of individual learning.

In general, an inclination toward homogenous groups seemed to be a central driver of group reorganisation which meant that students chose study partners they perceived as similar to themselves with regards to having similar ambitions, attitudes towards group work, and academic levels. This aligns with previous research on informal study groups, showing that their effectiveness depends on social cohesion, mutual trust, and a shared commitment to learning, with benefits for academic performance and retention (Hendry et al., 2005). Indeed, homogeneity is a strong driver in group formation. Experimental evidence on designing optimal peer groups, where lower-achieving students are grouped with higher-achieving students, has shown negative effects on low-achieving students, as they tend to seek out more homogeneous groups (Carrell, Sacerdote, & West, 2013).

We speculate that homogeneity played a crucial role in securing mental wellbeing in first-year medical students. The notion of social comparison may be key to understanding the importance of homogeneity. We found that social comparison both occurred between individuals and between groups, which is similar to the findings of other studies (Lovell, 2015; McNeill et al., 2014). Presumably, social comparison with identifiable peers provides opportunities for reflecting on the perceived social norms for medical students. Consequently, group members reconstruct their perception of the medical student role to be more identifiable to themselves. This would most likely improve wellbeing since identification as a medical student has been found to have a significant effect on psychological wellbeing (Lovell, 2015). Furthermore, homogenous groups protect against conflicts since similar

personalities and values reduce disagreements (Fiske, 2002; Sampson, 1984), which may further increase wellbeing.

First-year students may adjust their self-concept through social comparison and achievement (Rosman, Mayer, Leichner, & Krampen, 2020). Comparison with dissimilar peers may induce a feeling of inadequacy, negatively affecting wellbeing. Therefore, informal study groups may be superior in ensuring wellbeing – especially in first-year students.

However, informal study groups may be inferior in facilitating deeper learning of essential skills such as communication and teamwork. Since we found that informal study groups reorganised based on perceived similarity, this entails that students may be less likely to encounter new ideas, learning techniques and personalities which they would otherwise be exposed to with formal group allocation. This may ultimately have a negative impact on learning.

How social norms for studying were shaped

Participants were overall very reflective of their learning activities. Participants were novice medical students and to compensate for the resulting lack of intrinsic knowledge, many participants recruited knowledge from more experienced individuals. Student teachers, tutors, and, sometimes, older siblings were available through everyday attendance at university. Since participants drew on advice from a small group of individuals, we suspect that socially shared beliefs about studying were developed.

In this study, the clearest example of such a socially shared belief was the centrality of a strategy referred to as explaining, where one student explains the subject matter to fellow group members to attain learning objectives. We saw that this shared belief had a monumental influence on study group organisation. All pre-existing groups were dissolved and reorganised into smaller groups to maximise individual time spent explaining.

Since learning objectives for the course in gross anatomy are predominantly based on memorisation of factual information, learning strategies were very specific to rehearse this skill. It is interesting to speculate on what this could potentially mean for the students' future academic endeavours. One could speculate that some students would be able to contextualise that the adopted learning strategies are course specific. Other students may continue to apply these strategies for future courses, with negative effects on learning as a consequence.

Social norms for studying may lead to maladaptive behaviour

Our study highlights how advice from social role models can serve to homogenise the learning strategies of a large cohort of students. Presumably, such socially shared beliefs hold the potential for both beneficial and detrimental effects on student learning. Previous studies on medical students have found that being part of high-performing social groups increases students' academic performances (Woolf, Potts, Patel, & McManus, 2012). This could indicate that these shared beliefs are beneficial to the cohort as a whole. However, some students may develop maladaptive behaviours if they struggle to contextualise the social norms for studying. It has been speculated that identification with a specific social group can drive individuals to adopt maladaptive norms within the group (McNeill et al., 2014). If such maladaptive norms are held by a socially influential individual, such as a student teacher, this may negatively impact the academic achievement and wellbeing of students exposed to this individual.

Our study population adhered to a number of shared beliefs that drove social norms for studying. Our study was not designed to determine whether these norms represented maladaptive behaviour. However, our findings that students who fail to adhere to these norms expressed stress could indicate that some students do not benefit from these social norms for studying. For instance, the participants indicated that studying alone was

not in line with dominant norms for student behaviour (Wallace, 1992). The norm for participating in group work was a strong driver of student behaviour in our cohort. The generalisability of this finding is supported by Aarhus University's internal report showing that 92-93% of students frequently participate in group work (Herrmann et al., 2017).

Because students have a need for social belonging and conformity, individuals may experience pressure to conform to perceived norms, potentially leading to feelings of being stigmatised or misunderstood (Baumeister & Leary, 1995). This highlights why such social norms are important to address from educational institutions: to secure motivation for academic prosperity for all.

How educational institutions can facilitate group learning

Since group work is so abundant in medical school, it is preferable if work within study groups prepared students for the collaborative nature of healthcare environments (Burford, 2012; Swanson, McCulley, Osman, Scammacca Lewis, & Solis, 2019). Challenges in group work often arise from unequal participation and issues with workload distribution (Hommes et al., 2014). To address these concerns, assigning structured roles such as leader, recorder, and presenter can improve participation and group cohesion (Hansen, 2006). Implementing structured roles helps prevent "social loafing" and ensures that every student is engaged in the learning process (McKendall, 2000).

Allowing reorganisation of study groups when conflicts arise may not be preferable, since this would prevent development of important skills such as communication and teamwork. Our results showed very clearly that group conflict was associated with mental stress, which highlights the potential benefit for educational institutions to mentor group work.

Mentors can play a pivotal role in moderating discussions, offering alternative perspectives and creating a supportive environment for tackling both academic and emotional challenges (Hendry et al., 2005). Keren et al. (2017) highlights that social learning in medical study groups provides motivation, accountability, and emotional support – all of which are integral for maintaining wellbeing in high-pressure environments. When anatomy teaching assistants adopt a mentorship role, they can provide both cognitive support and socio-emotional encouragement, helping students navigate the stressors associated with anatomy courses and medical education more broadly. Such interactions has been shown to foster a sense of community and shared responsibility for learning among students, further contributing to their overall wellbeing (Lachman, Christensen, & Pawlina, 2013).

The study groups in the present study were neither formally constructed, nor led by faculty or trained facilitators. Without formal guidance, such informal study groups risk reinforcing misconceptions or overlooking critical content (Rybczynski & Schussler, 2011). Using more structured and mentored approaches would enable educational institutions to provide structure and ensure that students stay on track, focusing on areas that need further exploration (Shimazoe & Aldrich, 2010). Tutor-led groups ensure comprehensive material coverage and engage students in higher-level cognitive tasks such as applying knowledge to clinical scenarios (Christian & Talanquer, 2012). A blended approach combining both methods may enhance both autonomy and structured learning (Zaher & Ratnapalan, 2012).

Limitations

This study has several limitations. Firstly, its cross-sectional design introduces potential recall bias among participants, making it difficult to determine whether the selection of similar study partners is a deliberate,

rational choice or influenced by unconscious factors, such as personal biases. Additionally, post-hoc rationalisation of conflicts in previous informal study groups could also contribute to this pattern. Alternatively, the observed phenomenon may result from individuals learning within well-functioning groups, which fosters a heightened perception of similarity.

Moreover, the homogeneity of our participant group, Danish native speakers, and individuals of predominantly white ethnicity, may limit the generalisability of our findings. However, given the random assembly of the class, it is likely that at the inception of medical school, they were representative of other novice Danish medical students in terms of study and social skills.

Another limitation is that data collection was conducted in the autumn of 2018, which presents a risk that our results may not be reproducible in the present time. Furthermore, considerable differences exist within Denmark regarding pedagogical approaches to group work. Aalborg University uses a problem-based learning model focused on collaboration to solve real-health problems. The University of Southern Denmark emphasises interdisciplinary group work and team-based activities in the clinic and medical simulations. The University of Copenhagen highlights study groups and collaborative learning and clinics to enhance both academic and teamwork skills centred on technical and non-technical skills training. At Aarhus University, the study plan was revised in 2020. There is a constructivist approach to teaching with a focus on student centred learning.

Each educational institution has its own social structure, which might limit the generalisability of our results since they stem from a single institution. Nevertheless, the formation of study groups at the medical school at Aarhus University has not changed for the anatomy course[2]. The study groups in this study were neither formally structured nor led by faculty or trained facilitators. In the absence of formal guidance, these informal groups risk reinforcing misconceptions or neglecting critical content.

Conclusions

First-year medical students often compensate for a lack of intrinsic knowledge by seeking advice from peers and near-peers. This shared guidance within a cohort fosters the development of social norms for studying. In this study it was found that in studying anatomy, medical students primarily use study groups as motivational constructs that provide accountability, academic support, encouragement, and progress monitoring, ultimately supporting individual learning.

Informal study groups are important for wellbeing, which is an essential prerequisite for learning. Optimal pedagogical approaches to group work in higher education should adress both. Our results suggest that informal study groups are important sources of motivation and social support. However, informal study groups were also small and homogenous, which may limit their utility for developing more complex skills such as communication and teamworking. It was evident how the participants' approach to group work was conciously and unconsciously driven by social processes. Participants were conciously adhering to social norms for group size that originated from more experienced peers. More unconciously, participants seemed to reorganise to minimise group conflict.

Our findings highlight important considerations for educators when organising group work – whether utilising a formal or an informal approach. Independently of the framework used, educational institutions should target socially shared beliefs through the formal training of social role models, such as tutors, student teachers, or mentors. This approach can help counteract maladaptive behaviours from developing when students interact

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[2] Personal communication, email correspondence with the course coordinator in October 2024.

with these individuals.

An informal approach is likely sufficient in the context of a course in gross anatomy, with an emphasis on memorisation and little presumed benefit of constructive disagreements. It may actually be beneficial in novice medical students where identification with the medical student role is likely important for wellbeing. If educational institutions instead use a formalised framework, it is important to have mentoring with emphasis on teamworking skills to ensure that students can resolve conflicts. Furthermore, it is important to ensure a source of identifiable peers to students, to facilitate identification, social belonging, and wellbeing.

It is also important to recognise that informal study groups are likely not ideal for all types of learning, as members often have similar personalities and academic strategies. This would be evident in courses which, in contrast to gross anatomy, have more emphasis on developing more complex skills such as communication, teamwork or problem-solving. For this purpose, formal study groups are likely preferable due to their diversity and potential for constructive disagreements. However, identifiability is still an important mediator of feedback internalisation which underlies the importance of facilitating communication and teamwork through mentoring to ensure a safe learning environment.

Educators should note that informal study groups offer an important opportunity for social interactions with peers and social identification that can produce student wellbeing. These social interactions can help novice medical students develop a stronger identification with the medical student role, which can be important for student retention (Smith & Reimer, 2022). However, it is important to underline that informal study groups are not protected from conflicts that can result in breakup of the group. In an informal framework, reorganisation may be difficult to some individuals without immediate access to new potential group members.

Acknowledging the complexity of social dynamics and the difficulty in forming the optimal educational strategies used by both students and teachers in grasping fully the potential of group life and learning is an ongoing research endeavour.

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