Applying a collective academic supervision model to the undergraduate dissertation

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Despite the significance of the undergraduate dissertation both in student learning, and in staff workload, there is little discussion of best practice in research supervision. The majority of undergraduate students embark on an independent research project overseen by one member of staff, but this traditional model may cause undue stress and isolation for both students and staff. In this practice exchange paper, I provoke debate about traditional versus group models of research supervision through discussion of the effectiveness of collective academic supervision of a group of undergraduate students undertaking their mandatory research dissertation. This practice aimed to 1) improve the student experience and 2) increase efficiency of academic supervision. Under my supervision, 14 students conjointly participated in a high quality research programme while individually exploring tangible and level-appropriate research questions. Through self-reflective observation, I found this model of research supervision stimulated students through structured independent learning in a collaborative research community, and increased staff efficiency by decreasing workloads. The benefits and limitations of this practice are discussed.

THOUSANDS of students across universities and disciplines complete undergraduate dissertations. These dissertations generally entail independent research under the direct supervision of one staff member. In particular, graduates of psychology partaking in British Psychology Society accredited courses must complete an 'empirical psychology project [that includes] carrying out an extensive piece of empirical research that requires them *individually* [emphasis added] to demonstrate a range of research skills including planning, considering, and resolving ethical issues, analysis and dissemination of findings' (The British Psychological Society, 2019, p.13). Students and supervisors are aware of the significance of this piece of independent work as evidenced by media such as 'All-nighters and *self*-doubt [emphasis added]: Learn from our dissertation disasters' (Packham, 2016, p.1) or 'Overworked and *isolated* [emphasis added]-work pressure fuels mental illness in academia' (Shaw, 2014, p.1). The aim of this paper is to 1) question the traditional practice of the one-on-one, expert-apprentice model of student supervision, 2) describe the teaching practice of applying a Collective Academic Supervision (CAS) model (Nordentoft et al., 2013) to the undergraduate dissertation experience, and 3) discuss self-reflective observations of the benefits and limitations for students and staff of group research supervision models.

Traditionally, the research supervision model in higher education involves a dyadic relationship between a supervisor and a student (McCallin & Nayar, 2012). The supervisor, who is the expert, prepares the student, who is the apprentice, for *independent* research (Nulty et al., 2009). This model was designed for research students who typically are more experienced learners, having already completed an undergraduate degree. Assessments of the traditional supervision model find it typically suits intelligent, self-directed students who need minimal input from their supervisors (Manathunga & Goozee, 2007). This model might pose a problem when applied to research supervision of entire undergraduate classes with ranging academic abilities and motivations. However, this model is the most prevalent form of dissertation experience.

In recent years, changes in undergraduate courses have raised further issues chal-

lenging this traditional model of academic supervision (Rowley & Slack, 2004), some of which are particularly relevant to undergraduate dissertations in psychology. First, coursework is becoming more common as an assessment tool, in comparison to exams (Richardson, 2015). With increased coursework, there is more opportunity for the dissertation experience to build off skills already assessed in shorter pieces of coursework. Students, therefore, can be expected to come in to their dissertation year with more research and writing skills. Second, due to widening participation initiatives, students attending university today have a wider range of backgrounds and abilities. Therefore, research supervisors may be supervising a more diverse group of students with a wider range of academic literacy (Klinger & Murray, 2012). Lastly, academics report increased workload pressures with larger student classes and increased pressure for research publications and grants (e.g. Shaw, 2014). Universities also face issues in research supervision, including differences in quality of faculty, supervision pedagogy, and models of supervision (Boud & Lee, 2005; McCallin & Nayar, 2012). These changes in the undergraduate supervision process necessitate revisiting traditional supervision models in order to improve the student learning experience, as well as the efficiency of the supervision process. Under these circumstances, traditional 'apprenticeship' supervision models in which students conduct independent research in isolated one-on-one learning experiences can lead to negative outcomes such as student disengagement with the process, poor performance, and substandard research (Monahan, 1989).

While research supervision is generally an under-researched area in higher education, there is a developing literature assessing different supervision models of postgraduate research in recent years. In group research supervision, a relationship exists between a supervisor and a student, as well as between the student and other students to provide cohort interaction (McCallin & Nayer, 2012; Wisker et al., 2007). Collective peer learning fosters collaboration, communication skills, and 'learning to learn' (Slavin, 1990). This collaborative approach to inquiry actively involves students in the research process to inspire creativity and engagement (Reason & Bradbury, 2001), but, also allows students who are shy or lack confidence to learn through observations of conversation between peers or between a peer and the supervisor (Vehviläinen, 2009). By encouraging students to both engage with their cohort and observe interactions, there is more potential for an emotionally supportive learning community where students feel safe, support each other, and can work as a group through common issues (Burnett, 1999). Furthermore, group supervision allows opportunities for 'interthinking,' or the 'use of language for thinking together, for collectively making sense of experience and solving problems,' found to facilitate effective learning (Mercer, 2000, p.1). Overall, there is a developing body of evidence that group supervision models improve both the student experience and the efficiency of postgraduate supervisory arrangements (Agne & Morkenstam, 2018; Buttery & Ruchter, 2005; Parker, 2009; Simons, 2005; Stevens et al., 2016; Stracke, 2010).

Nordentoft et al. (2013) developed the CAS model of group supervision of master's students on a Guidance and Counselling Programme. In this model, students participated in three sessions during which they exchanged writing on their research and then participated in group discussions of their research questions, theories, methodologies, analyses, and conclusions. The CAS model is based on the idea that productive learning in higher education is more likely to occur when students are exposed to multiple sources of information in a research community (Lilleford & Dysthe, 2007). Thus, the CAS model integrates students' individual learning experiences with participation in an academic community, aiming to promote a more productive and engaging dissertation experience (Nordentoft et al., 2013). This

model requires the supervisor to structure student learning through interdependence, akin to cooperative learning experiences (Slavin, 1995). The 'collective' in CAS refers to a collective of students engaging in independent, but related, research projects, allowing a dynamic exchange of theoretical and empirical perspectives. The term 'academic' in CAS refers to such conversations occurring within a scientific community, focused on systematic and critical dialogue (Nordentoft et al., 2013).

Evaluations of the CAS model found both benefits and challenges for postgraduate students and supervisors (Nordentoft et al., 2013; Wichmann-Hansen et al., 2015). Overall, students assessed CAS positively and enjoyed meeting with and receiving feedback from peers (Nordentoft et al., 2013). Students met learning outcomes of the project development sessions. Some students reported starting their work earlier so that they could receive peer feedback, and others reported greater development of their oral and written communication, an important transferable skill. Importantly in terms of academics' growing workloads, the CAS model alleviates some supervision requirements of academic staff through supervising more than one student at a time. In group supervision models, there are also often group workshops offered to cover topics that a supervisor would have taught individually in the traditional model, such as research design, literature reviews, and methods and analysis. However, CAS also presented challenges for supervisors in facilitating equal participation within groups of students who have varying levels of motivation and expertise, balancing structure and student involvement, and developing students' analytical skills (Wichmann-Hansen et al., 2015). It is understandable that postgraduate students may have varying levels of need and desire for independent versus structured group learning. However, collective learning may be particularly well received by undergraduate dissertation students who are often embarking on their first independent research experience.

In this practice exchange paper, I discuss how I adapted CAS (Nordentoft et al., 2013) to encourage peer collaboration within a structured independent research experience for final-year undergraduate students. Like Nordentoft et al. (2013), I aimed to provide a framework for structured individual learning through systematic, progressive, and academic input from peers and supervisors. In this practice, all students participated in a mandatory dissertation module with their cohort. I provided my students access to a structured research experience (Rowley & Slack, 2004), an accessible academic peer community in which to exchange ideas and engage in critical dialogue (Nordentoft et al., 2013), and additional supervisory support when needed. Importantly to fulfil the British Psychological Society's (2019) standard of students carrying out independent empirical investigations, while students collaborated in data collection and analysis, the year culminated in an independently written research report.

Description of the dissertation year

Importantly, my dissertation supervision was embedded as part of a larger 'Psychology Thesis' module that provided bi-weekly lectures and workshops on parts of the dissertation experience applicable to the entire undergraduate cohort. These topics included ethics, literature reviewing, writing the introduction, preparing data for analysis, writing the methods and results, statistics for the dissertation workshops (held twice), and writing the discussion. This module was an additional support for students and might be considered in the adoption of a collective supervision model. However, these topics can alternatively be taught and assessed through other courses across the undergraduate curriculum so students come into their dissertation year armed with the necessary tools to succeed.

Key processes in collective supervision include 1) preparing and structuring a

broad research paradigm, while 2) leaving space for student engagement, innovation, and learning. To provide a structured research experience I begin planning over the summer before students arrive. I brainstorm (often with other colleagues) broad research questions and accessible data collection methods that fit within my larger research programme. I believe supervising student research that falls within my broader research programme helps my engagement and investment in the collective process. I typically collaborate with postgraduate students and undergraduate research volunteers over the summer to design and gain ethics to conduct a large study designed for undergraduate dissertation data collection. This past year, we designed a project investigating children's and adults' preferences for, and categorisation of, culturally relevant symbols and labels across Northern Ireland. We chose this topic as it is relevant to many of our students who are from Northern Ireland and it allows for data collection in either university student or primary school populations that are accessible to students. While I largely designed the overarching research questions to provide structure, I left flexibility for student input into the research design. While piloting the broad research designs, undergraduate students were encouraged to raise any issues or tweak the methods. After learning the overarching questions and design, students were allocated to a project best matching their interests based on their writing of a short research proposal.

Here, I outline the main activities in CAS of seven final year undergraduate student pairs (14 students) over the course of an academic year. These meetings were modelled on the description of CAS practice in Nordentoft et al. (2013). In their practice the authors describe the following activities across three sessions: 1) a getting started meeting that included choosing topics, drafting research questions, and drafting the project design, 2) a halfway response meeting in which students discussed theory and analysis, and 3) a work in progress meeting where students present and receive feedback on their projects. In order to provide more regular student support through supervision, I extended on this practice to include six group supervision meetings over the course of an academic year. One of the meetings added (meeting 3 discussed below) focused on field-specific experimenter training, but the content of this meeting is easily adapted for research methods and project design in other academic fields. Students were provided an outline of topics and dates of meetings and intermediary deadlines from the start of the academic year.

Group Meeting Schedule

Meeting 1: Getting started. I held an informal meeting for all of my undergraduate dissertation students for introductions and an icebreaker aimed to establish affinity. We then had a structured exchange of ideas about research related to the development of social cognition, and the research projects available to work on. Students submitted a short discussion of their research interests, any relevant experience, and access to particular research populations.

Meeting 2: Research questions. After allocation to a project based on expressed interests, students were asked to narrow down a specific research question with at least two independent variables and one dependent variable. This ensured students had a manageable project for the undergraduate level, though students were provided the option to include further variables in their final write up. Students were emailed a worksheet with guidelines for writing a research question, pairs drafted a research question after independent reading, and then engaged in a peer workshop to revise questions, during which I visited each pair for additional feedback.

Meeting 3: Experimenter training. We reviewed experimental design and methods as a larger group, leaving plenty of time for student input to improve the research design. Students practiced administering

tasks in rotating pairs, allowing stronger students to lead others, while I provided feedback. To promote quality research, each student had a final run through of the study with me before being approved to testing participants.

Meeting 4: Midway party. We discussed the joys and challenges of data collection. I responded to issues that arose based on student feedback. We collectively brainstormed solutions.

Meeting 5: Analyses. Student pairs brought their completed data files and engaged in peer-review of research design and analysis. Students often overlapped on at least one of the variables measured in their research questions. I provided further feedback, and then students returned to peer review to share any newfound expertise. Between this meeting and the next, I also provided written feedback on their results sections.

Meeting 6: End-of-year presentations. We celebrated the successes of the year. Students presented their research questions and findings, providing a final chance for peer and supervisor feedback before individual project write-ups were due. Students were encouraged to provide informal feedback on the dissertation year.

Benefits and limitations of the CAS model for undergraduates and supervisors

After engaging in self-reflective practice and evaluating informal student feedback, I discuss the benefits and limitations of the CAS model for undergraduates and supervisors based on the quality of data students collected, peer and student-supervisor interactions, and student engagement and mastery of learning outcomes and transferable skills.

Quality of research output

Undergraduate students with varying skills, motivations, and backgrounds collaborated to conduct quality, publishable research. This is particularly notable given the contemporary challenges of research supervision of heterogeneous groups due to widening participation initiatives across universities (Klinger & Murray, 2012). A large, multi-site project would not have been feasible for one undergraduate student dissertation, but as a collective, students collected data from over 500 primary school children and parents across a range of surveys and experimental tasks. Students reported enjoying being part of a high quality project that was more akin to a postgraduate level or faculty project than the typical undergraduate dissertations their peers outside the group engaged in.

Quality research output also has obvious benefits for research supervisors. In a traditional research supervision model, a supervisor may supervise multiple, small-scale research projects, none of them conclusive in their own right. However, with a group research supervision model, students collected a large sample of data with strong study design. The findings from this research led to one empirical journal publication and a successful grant application thus far, providing obvious benefit to the supervisor. Continued project funding also enabled interested students to continue to volunteer as research assistants on the project, providing a trained research team for further data collection.

Individual research questions increase student engagement

Because research on the development of social cognition especially lends itself to multicultural investigations, students were encouraged to incorporate their own social and cultural expertise when selecting samples or adapting research questions. For instance, one student tested participants in her hometown to add a rural sample for comparison to our urban sample, and another student recruited an integrated primary school to compare to schools largely segregated by religious background. In traditional supervision models, students might feel research is impersonal, external, or merely an intellectual exercise. Alternatively, when rooted in

their own and others' experience, research can be personally interesting, relevant, and a social process for students (Marshall & Reason, 1993). Students who were able to choose research questions of personal relevance also reported enjoying the dissertation experience, and felt the experience was more relevant to future employability. Lastly, collective supervision led to engagement with further research. For instance, one student continued on the project through a summer research scheme and another applied to be a developmental psychology research assistant in another research group. In addition to bolstering student and supervisor productivity, engaged research students can also form a community that re-invigorates the supervisor, and provides a contemporary, relevant perspective on research questions.

Peer collaboration

Students reported feeling more supported knowing that they could either come to me for supervision, other staff members involved in the project (e.g. lab manager), or to their peers who had the same experimental training and overlapping research questions. Ultimately, I observed students going to their peers with questions first. This enabled horizontal versus vertical learning, and increased opportunity for peer support. Students were able to develop peer leadership skills, as the academically stronger students were able to teach their peers. Students who were not as confident in one area could confidently contribute in another, for example, a student with strong organisational skills but weak statistics skills could lead others in organising data collection. Students also reported learning teamwork skills from collecting data with varying partners from the group. Peer collaboration fostered highly valuable transferable skills such as adaptability, leadership, self-confidence, teamwork, communication, and organisation, and such skills are highly sought after by graduate employers (Bennett, 2002). However, students reported that having not worked as closely with one-on-one supervision, they did not learn how to work in collaboration with an academic supervisor. The supervisory relationship does indeed change in a CAS model, and the 'close professional relationship' may be lost (Nordentoft et al., 2013). Lastly, peers can provide emotional support that can be quite important when encountering adversity or warding off feelings of isolation (Boud & Lee, 2005; Nordentoft et al., 2013). The students reported forming a Facebook message group that was highly influential in feeling part of an academic community and feeling morally supported throughout the dissertation process.

Meeting student learning outcomes

The quality of student research questions, analyses, and writing improved based on exposure to a wide range of methods and a larger research paradigm. The students reported feeling that they had accomplished the aims of the course, including demonstrating the ability to perform all the stages involved in a real research project, from choice of problem, operationalisation, literature review, experimental design, quantitative analysis, and production of a research report. Students also learned how to manage their time better. Like in Nordentoft et al. (2013), students appreciated having dates for supervision sessions and deadlines planned beforehand. However, students did report that one-on-one feedback with their academic supervisor would have been more helpful than the group workshop at the stage of analysis, because students had slightly different research questions and therefore different analyses to undertake. The group approach was less successful here. Overall, each student met the learning outcomes for the undergraduate student dissertation.

Reduction in supervision workload

There was a substantial reduction in my undergraduate dissertation supervision workload by participating in CAS. I moved from meeting seven pairs of students bi-weekly over the academic year (84 hours) to meeting one group of 14 students six

times over the academic year (six hours). Importantly, this was in part made possible by dissertation supervision being embedded as part of a larger 'Psychology Thesis' module (see description of this module above). This is a dramatic reduction in hours spent in student supervision meetings. Students found the six group meetings were sufficient in meeting their supervisory needs since they had a peer community with whom to engage. While there was still a great deal of preparation time involved in structuring a large research project and organising supervision meetings, this time was more focused on a research project that was relevant and productive for my academic research programme. Moreover, once a model for CAS has been created, it can be built upon in future years and adopted as a common structure across supervisors, increasing equality in student supervision across members of staff (Nordentoft et al., 2013). I also received fewer emails from students asking about minor details of their studies because they first contacted their peers, thus reducing time spent in email communication with students. Training engaged and motivated dissertation students proved to be pleasurable, and saved time and resources.

Summary and recommendations for supervision pedagogy

This paper discusses the effectiveness of applying CAS (Nordentoft et al., 2013), originally formulated for postgraduate research supervision, to the undergraduate dissertation experience. Undergraduate students were advised in structured research activities as a group by an academic supervisor, while independently investigating tangible, level-appropriate research questions. Largely, applying this model to the undergraduate dissertation experience proved successful. First, students provided positive informal feedback on their student experience. In particular, students felt they had met the learning outcomes of the course, they found choosing their own sub-research questions meaningful and personally relevant, they felt supported by their peers in the research experience, they gained transferable skills, and several students continued on to further research aspirations.

Also important, CAS improved efficiency of research supervision for staff. First, the combination of the course being embedded in a larger module with lectures and workshops relevant for all students freed up supervisor's time to work with students on parts of the research specific that particular project. Second, given a peer support network, students went to their peers for answers to questions, only coming to their supervisor later if the group needed further support. And lastly, moving from supervision of seven student pairs to supervision of one group of 14 students saved hours of supervision time.

While applying the CAS Model to the undergraduate dissertation was largely beneficial both to the student experience and efficiency of supervision, limitations to this model should be discussed. First, some students felt more one-on-one time with an academic supervisor, in addition to the group meetings, would have been beneficial. In their evaluation of CAS, Nordentoft et al. (2013) state some students also report worries that they do not receive close supervisory contact, though other students did not miss the pressure of individual supervision. In response, I have adapted my programme moving forward to include two one-on-two meetings with each pair, specifically around the time of research question formation and statistical analysis. Second, one pair of students failed to engage with their peer group, resulting in very little dissertation support. This lack of engagement seemed to be a result of students missing the initial meeting, so moving forward it will be important to make group meetings mandatory. Two further critiques in the literature evaluating CAS are relevant here, although they were not problematic for this particular cohort. One is that there is potential for students to 'exchange common ignorance' when involved in peer discussions (Nordentoft et

al., 2013). Another limitation is that it can be difficult to facilitate equal participation within heterogeneous student groups, and some students may feel they are pulling a greater amount of the weight (Wichmann-Hansen et al., 2015). However, these are also common issues involved in teamwork of any capacity, and exposure to such issues can foster teamwork skills. While there are limitations to CAS, it is important to weigh the costs with the benefits of improved student experience and efficiency in supervision.

The practice of collective supervision of undergraduate dissertations is in its infancy with only two formal evaluations (Nordentoft et al., 2013; Wichmann-Hansen et al., 2015), but at the least it should spark the debate about the possibilities for improving the student experience and supervision efficiency with group versus individual supervision models. Academic research in the isolation of the ivory tower has become an antiquated metaphor, and is now often replaced by academic research teams in collaborative laboratories. Employers too prioritise collaborative skills. Communication, teamwork, and interpersonal skills were within the top five most specified transferable skills found across 1000 job advertisements (Bennett, 2002). Thus, involving undergraduate students in collaborative peer groups while providing structured opportunities for independent thinking may be the way forward in research supervision. Future research should formally evaluate collective supervision versus individual supervision at the undergraduate level.

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