

Unravelling residents' and supervisors' workplace interactions

Citation for published version (APA):

Olmos-Vega, F. M., Dolmans, D. H. J. M., Guzman-Quintero, C., Stalmeijer, R. E., & Teunissen, P. W. (2018). Unravelling residents' and supervisors' workplace interactions: an intersubjectivity study. *Medical Education*, 52(7), 725-735. <https://doi.org/10.1111/medu.13603>

Document status and date:

Published: 01/07/2018

DOI:

[10.1111/medu.13603](https://doi.org/10.1111/medu.13603)

Document Version:

Publisher's PDF, also known as Version of record

Document license:

Taverne

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

www.umlib.nl/taverne-license


Take down policy

If you believe that this document breaches copyright please contact us at:

repository@maastrichtuniversity.nl

providing details and we will investigate your claim.

Unravelling residents' and supervisors' workplace interactions: an intersubjectivity study

Francisco M Olmos-Vega,¹  Diana HJM Dolmans,² Carlos Guzmán-Quintero,³ Renée E Stalmeijer² & Pim W Teunissen^{2,4}

CONTEXT Successful engagement between residents and supervisors lies at the core of workplace learning, a process that is not exempt from challenge. Clinical encounters have unique learning potential as they offer opportunities to achieve a shared understanding between the resident and supervisor of how to accomplish a common goal. How residents and supervisors develop such a mutual understanding is an issue that has received limited attention in the literature. We used the 'intersubjectivity' concept as a novel conceptual framework to analyse this issue.

METHODS We conducted a constructivist grounded theory study in an anaesthesiology department in Bogota, Colombia, using focus groups and field observations. Eleven residents of different training levels and 18 supervisors with varying years of teaching experience participated in the study. Through iterative data analysis, collection and constant comparison, we constructed the final results.

RESULTS We found that residents and supervisors achieved a shared understanding by adapting to one another in the process of providing patient care. Continuous changes in

the composition of resident-supervisor dyads exposed them to many procedural variations, to which they responded by engaging in various adaptation patterns that included compliance by residents with supervisors' directions, negotiation by residents of supervisors' preferences, and the sharing of decision making. In the process, the resident played an increasingly key role as a member of the supervisory dyad. Additionally, experiencing these adaptation patterns repeatedly resulted in the creation of a working repertoire: an attuned working code used by the members of each supervisory dyad to work together as a team.

CONCLUSIONS The development of shared understanding between residents and supervisors entailed experiencing diverse adaptation patterns which resulted in the creation of working repertoires. Seeing supervisory interactions as adaptation processes has essential theoretical and practical implications regarding workplace learning in postgraduate settings. Our findings call for further exploration to understand learning in postgraduate education as a social process.

Medical Education 2018; 52: 725–735
doi: 10.1111/medu.13603



¹Department of Anaesthesiology, Medicine Faculty, Pontificia Universidad Javeriana y Hospital Universitario San Ignacio, Bogota, Colombia

²Department of Educational Development and Research, Faculty of Health, Medicine and Life Sciences, Maastricht University, Maastricht, The Netherlands

³Department of Anthropology, Pontificia Universidad Javeriana, Bogota, Colombia

⁴Department of Obstetrics and Gynecology, VU University Medical Centre, VU University Amsterdam, Amsterdam, The Netherlands

Correspondence: Francisco M Olmos-Vega, Department of Anaesthesiology, Hospital Universitario San Ignacio, Pontificia Universidad Javeriana, Carrera 7 N 42-00 Fourth Floor, Bogota DC 110231, Colombia. Tel: 00 57 3175 139922; E-mail: folmos@javeriana.edu.co

 INTRODUCTION

Learning in the workplace requires residents and supervisors to engage with one another successfully, a process that can be challenging.¹⁻⁴ Such engagement often occurs in clinical encounters that hold powerful learning opportunities for residents.⁵ The primary objective of these interactions is to provide patient care, but, to achieve this goal, residents and supervisors need to build a shared understanding of how to work together.⁴ However, how residents and supervisors arrive at such a mutual understanding of how to work together when providing patient care is an issue that has received limited attention in the current literature. Yet, we need to understand these social interactions between learners and supervisors better to successfully support workplace learning.⁶

One tool that might help us to understand residents' and supervisors' interactions in the workplace is the concept of intersubjectivity. Enjoying wide currency in fields such as psychology, cognitive sciences and philosophy,^{7,8} intersubjectivity has been defined by Zlatev et al.⁹ as 'the sharing of experiential content (e.g. feelings, perceptions, thoughts, and linguistic meanings) among a plurality of subjects'. In this view, the human mind is a shared mind in that people construct meaning through their social interactions. Billett went on to refine the concept by including a shared understanding, in this case between tutor and student, about the accomplishment of a common goal.^{10,11} He asserted that intersubjectivity helps learners to acquire the knowledge, attitudes and skills required to perform a craft while taking into account contextual challenges.¹² According to Billett's co-participation theory, learning in the workplace necessarily entails achieving intersubjectivity, which seems to be the factor able to facilitate learners' engagement in the activities that supervisors afford to them.^{4,10} Using Billett's understanding of the intersubjectivity concept as a lens through which to explore resident-supervisor interaction in the workplace would allow us then to understand the potential of this crucial relationship.

To date, the concept of intersubjectivity has been theorised mainly in other fields and applied to settings outside medical education,^{7,8,13-15} with few exceptions. Billett, for example, contends that intersubjectivity is crucial for interdisciplinary teams

to work efficiently when providing patient care and that it can be achieved if team members participate in joint problem solving and communicate their decision-making processes to one another.¹⁶

Whether this holds true for pairs with asymmetrical levels of competence, such as supervisory dyads, is a premise that still needs to be explored. In a study by Sheehan et al.,¹⁷ who identified the factors that influence medical interns' engagement in workplace activities within a team, intersubjectivity arose from prolonged interactions between interns and supervisors. Having a shared understanding allowed the interns to participate in patient care activities without continually having to negotiate what to do and how to do it within the team. To develop such understanding, interns required constant guidance and support from their supervisors. However, the study¹⁷ did not describe what intersubjectivity development entailed in students with a more central role in patient care or the nuances of the processes involved in such development.

The purpose of this study, therefore, was to explore how residents and supervisors come to a shared understanding of how to jointly provide patient care and the processes that are involved in such development. To answer these questions, we designed a constructivist grounded theory study using data from focus groups and field observations with a group of residents and supervisors from an anaesthesiology residency programme.

 METHODS

Methodology

We used constructivist grounded theory to study the social processes that help residents and supervisors achieve intersubjectivity.¹⁸ We chose this approach because the iterative collection and analysis of data allowed us to generate empirically grounded conceptualisations that could help answer our research questions.¹⁹ In addition, it enabled us to integrate existing theory^{6,20-22} with participants' and researchers' conceptions of the reality into the constructed theory. As well as following the principal constructivist grounded theory tenets of iterative data collection and analysis, constant comparison and theoretical sampling to ensure the robustness of our findings,^{19,23} we used diverse data collection methods to enhance the credibility of our conclusions.²⁴

Research team

We assembled an interdisciplinary team to broaden the range of perspectives from which to analyse the collected data. The research team consisted of an anaesthesiologist pursuing a PhD in health professions education (FMO-V), an anthropologist pursuing a Master's degree in bioethics (CG-Q), two educationalists, of whom one has expertise in learning environments (DHJMD) and the other in workplace learning (RES), and an obstetrician with expertise in workplace learning (PWT).

Reflexivity

Malterud described reflexivity as 'attending systematically to the context of knowledge construction, especially to the effect of the researcher at every step of the research process'.²⁴ Regarding context, we follow a sociocultural approach to learning to inform and conduct this research,^{1,25} meaning that we believe learning arises from our social interactions within a specific context. Concerning the influence of the researchers upon the constructed results, we should clarify that the first author was a supervisor in the anaesthesiology department in which the study was conducted and therefore interacted with participants during his working duties. The rest of the team can be considered as outsiders to the research field and only CG-Q had contact with the participants during the study. That FMO-V was an insider inevitably resulted in preconceptions about how residents' and supervisors' interactions usually unfold. Continuous exploration of his role as an insider within the research field through memo writing clarified and explored FMO-V's relation with and interpretations of the data. Achieving consensus and resolving disagreements about the interpretation of results within the team strengthened the robustness of our claims. For an example of this, please refer to Appendix S1, in which we include a memo co-constructed between FMO-V and CG-Q.

Setting

The study was conducted in the Anaesthesiology Department at Pontifical Xavierian University (Pontificia Universidad Javeriana), Bogota, Colombia, which has a 3-year anaesthesiology residency programme. In Colombia, students access residency upon the completion of undergraduate

training (which includes an internship year) and a rural service period in which they work as general practitioners. The anaesthesiology programme enrolls six residents per year for a total cohort of 18 in any given year. Residents rotate through subspecialties according to a yearly individual rotation schedule, with only one resident participating in each rotation at a time. Most rotations, such as those in cardiovascular anaesthesia and neuro-anaesthesia, last 2 months, whereas the general anaesthesia rotation may span 1–5 months, depending on the resident's schedule. This programme has a one-on-one matching system: each resident is paired with a personal supervisor for any given patient case in supervisory dyads, which allows for rich and intense interaction between residents and supervisors. However, it is important to emphasise that this does not amount to longitudinal supervisory arrangements: all supervisory dyads change continuously, even within the same rotation. At the time of the study the department had 31 supervisors and 18 residents. Eleven residents and 18 supervisors were invited and agreed to participate in one or more parts of the study.

Data collection and analysis

We collected data employing focus groups and field observations. First, we held three focus groups: one with seven residents of different levels of training, and two with six supervisors each, also with various backgrounds and years of experience. We invited those participants based on purposeful and convenience sampling in order to gain a broad spectrum of perspectives based on the traits mentioned above. The residents and supervisors who did not attend the focus groups reported conflicting schedules as their reason for not participating. The focus groups allowed us to get a better grasp of how participants translated the intersubjectivity concept into day-to-day situations and to create preliminary categories that could inform our initial observations. To this end, we created a questioning route for all focus groups (Appendix S2), which was based on the principal elements of Billet's definition of intersubjectivity.¹⁶ The questioning routes were constructed in collaboration with all members of the team. While FMO-V moderated the focus groups, CG-Q acted as an observer and took notes of participants' reactions and interactions, which we used in the analysis.²⁶ Briefly, after the focus groups, the two moderators met to discuss their impressions and to reflect on the influence of FMO-V upon

participants' answers. Those discussions were further explored in FMO-V's memo writing as part of the reflexivity component of the study (Appendix S3). The focus groups were audiorecorded and transcribed verbatim. Subsequently, FMO-V and CG-Q independently analysed the transcripts using open coding techniques.¹⁹ They discussed this first round of analysis and created preliminary categories using focused coding techniques. We used sensitising concepts from sociocultural learning models to inform the coding process,^{1,20,22} in line with the constructivist approach.¹⁹ Preliminary categories informed the next phase of the study through a theoretical sampling of the participants.

What followed next was a 5-month observation phase, during which CG-Q observed interactions among six residents and 13 supervisors during daily patient care activities in various workplace settings (outpatient clinic, hospital wards, labour ward, pain service and operating room [OR]). As mentioned earlier, each resident was paired with a supervisor in what we call a 'supervisory dyad'. CG-Q performed the observations as he has received specific training and has previous experience in ethnographic methods. As an outsider, CG-Q could more easily see and question things an insider might take for granted. He was primarily concerned with observing and was never a caregiver. As an outsider to the workplace, the observer may have triggered participant reactivity,^{27,28} which we tried to minimise by making sure that he stayed in each setting for at least 1 month and by actively asking participants about their perceptions of being observed. We also included an analysis of these data.²⁹

We held two observation sessions per week on average, lasting about 6 hours each, for a total of 140 hours spread over 24 sessions and within various workplace settings. On each occasion, CG-Q presented himself to the supervisory dyad to be observed as a member of the research team, answered any clarifying questions about the research goals, and stressed that the observation was not an assessment exercise. He took notes and transcribed them into comprehensive field notes soon after the observation session. The field notes focused on situations related to our ongoing analysis and to incidents that caught CG-Q's attention. These resulted in detailed descriptions of clinical encounters in the workplace that FMO-V and CG-Q coded independently using selective coding (coding whole situations or scenes), which is

more conceptual, instead of using the traditional line-by-line approach for interview transcripts.²⁷ Both researchers used focused and axial coding to develop and consolidate the main categories.¹⁹ The two researchers met once a week to discuss the preliminary findings, performing a constant comparison of previously collected and new data. In those meetings, they discussed in detail *what* and *who* to observe in subsequent observations, sampling new supervisory dyads using theoretical sampling. This strategy included sampling residents at different levels of training, rotating in different settings and various types of rotation (i.e. obstetrics anaesthesia, neuro-anaesthesia, etc.). The protocol also included sampling of supervisors with varying years of experience and training. Written reports were shared periodically with DHJMD, PWT and RES, who helped to refine interpretations and facilitated reflection by questioning both the logic of the final analysis and its grounding in the data.

Finally, after the fifth month, theoretical sufficiency was reached.³⁰ We organised and coded all focus group transcripts and field notes using ATLAS.ti for Mac, Version 1.0.18 (Scientific Software Development GmbH, Berlin, Germany). We also performed a member check by sending an English-language summary of the results to all participants and asking if they agreed with how we had presented the quotes and interpreted the findings, in response to which we did not receive any suggestions for change or withdrawal of any quotes.

Translation procedures

All data, including focus group transcriptions and observational field notes, were obtained in Spanish. FMO-V and CG-Q coded the raw data in English in order to be able to share interpretations with the rest of the team, to allow a more analytical approach to data analysis and to code more comfortably using gerunds.³¹ FMO-V translated the transcripts used in the final draft of the paper. Intermediate drafts that were shared with the entire team were in English, including translated transcripts that were used in the analysis process. During member checking, we also asked participants to determine if the translations preserved their conceptual meaning.

Ethics

The research group obtained permission to conduct the study from the Research Ethics Committee of San Ignacio University Hospital (Hospital

Universitario San Ignacio) and Pontificia Universidad Javeriana. FMO-V presented the study before starting data collection, including its objectives and methods, to the Anaesthesiology Department. Participants made no objections or suggestions. We obtained informed consent from each person who agreed to participate in the study. By anonymising all transcripts and replacing participant names with 'supervisor' or 'resident' as appropriate, we guaranteed the confidentiality of the data. All participants were free to withdraw from the study if they so desired and could request not to be cited in the final draft. Moreover, during the observations, they were able to ask the observer to leave the room or to stop taking notes at any point in the session, although such a situation never occurred.

RESULTS

Intersubjectivity as adaptation

From the focus group analysis, we realised that, according to residents and supervisors, the development of intersubjectivity was a matter of adaptation. More specifically, to come to a shared understanding, the resident and supervisor needed to adapt to each other's preferences with regard not only to what to do (concerning the provision of patient care), but also to how to do it

(concerning how to work together). Every supervisor had his or her own opinion of how a task should be performed, which created an environment in which supervisory dyads needed to come to agreements continually in view of the amount of procedural variation among their members. Table 1 presents the categories that emerged from the focus group data, illustrated by representative quotes.

The observational data (including both within- and across-supervisory dyad data) allowed us to expand and more clearly describe the focus group categories, and thereby clarify how residents and supervisors developed intersubjectivity. Through the analysis of clinical encounters, it became clear that supervisory dyads mainly communicate about what to do and almost invisibly or tacitly acquire an understanding of how to do it while working together. We found recurrent processes in the data that reflect such interpretation, processes that we called 'adaptation patterns'. We identified three related patterns: residents complying with supervisors' directions; residents negotiating supervisors' preferences, and both parties engaging in shared decision making. Moreover, supervisory dyads might move between some of these adaptation patterns during a single encounter, adjusting themselves to each step in the patient care process. We describe each of these patterns in detail.

Table 1 Preliminary categories with representative quotes from focus group analysis

Preliminary category	Quotes
Adapting to each other	<p>'I think it is very subjective, adapting to each other, it's like finding commonalities between you and the other person, it's like building bridges that bring us together' (Supervisor 9)</p> <p>'The thing is that I'm a first-year resident, and you're in this process for the whole year, so, let's say I think that as everything is new to me, I'm just open to what comes, and I try and adapt to all my supervisors, because this is the way it is' (Resident 2, year 1)</p> <p>'I think that we adapt to each other according to the circumstances. The way I talk to this month's resident is different from the way I did with the previous one; there might be a standard way to proceed, but there are nuances to each interaction' (Supervisor 5)</p>
Facing a lot of procedural variation	<p>'They [the residents] face like 30 forms of doing stuff, how I handle the syringes, how I cleanse the system; I think there is a lot of variabilities, and it is not easy to achieve an agreement on that fast enough' (Supervisor 3)</p> <p>'Sometimes you see good things in the supervisors, and you start to adopt those things in your practice; But what one considers as a good thing to copy from a supervisor, can be seen as a terrible idea by another' (Resident 6, year 2)</p>

Complying with supervisors' directions

This pattern refers to residents following supervisors' orders as to how to perform a task. The supervisors took the lead, showing the residents how to do things and imposing their preferences. Sometimes, but not very often, supervisors articulated the reasons behind their choices. At times, the resident explicitly asked how the supervisor wished to proceed. We observed this pattern of behaviour in supervisors who interacted with first-year residents and with residents who had just started a new clinical rotation, regardless of their training level. The following transcript exemplifies this pattern.

The resident and the supervisor are preparing the OR for a new patient. He is a first-year resident, 14 days into his obstetrics anaesthesia rotation. She has been a clinical supervisor in the labour room for the past 25 years. [...]

The supervisor is clear while imposing her preferences: 'We always notify the nurse that we are going to start the anaesthesia induction'; 'Organise the syringes and don't forget to label them', 'We always put the anaesthesia machine near to us'. The resident concurs. 'Three or five electrodes?' [Electrodes are used to monitor heart rhythm during surgery] the resident asks the supervisor. The latter answers: 'Five! Three only with younger patients!' with a tone of determination in her voice. The resident complies with the instruction [...]

The resident looks less proactive than he had in the morning while working with another supervisor; he now asks questions and avoids formulating any clear proposal. [...]

The surgery goes as planned until suddenly the monitor registers an increase in the airway pressure. 'The pressure is up, let's see, what would you do?' asks the supervisor. 'I can put her on manual or perhaps I can administer an additional dose of the muscle relaxant,' answers the resident in a trembling and hesitant voice. 'Do the latter,' orders the supervisor. (Resident 2 and supervisor 13, observation, labour ward)

As this excerpt shows, the resident assumed a more passive role within the dyad, obeying the supervisor's orders and asking for directions. The pattern of their interaction was marked by the attitudes of each actor: the supervisor used a tone

of determination when talking to the resident, whereas the latter answered with hesitation.

Negotiating the supervisor's preferences

This pattern builds upon the previous one in that the resident tries to change the supervisor's course of action by proposing an alternative. The residents assumed a more active role within the supervisory dyad by challenging supervisor preferences and exposing their own. The negotiation did not necessarily result in a change in the course of action. The following transcripts are good examples of instances in which residents tried to modify a supervisor's decision by putting forward their suggestions.

The resident is a third-year student in her thoracic anaesthesia rotation. Unlike the labour ward supervisors, this supervisor is young and quite proactive. As soon as she enters the room, she takes over what the nurse assistant was doing while saying: 'I can finish this for you, please go to the pharmacy for the Remi in the meantime.' [Remifentanyl is an opioid used during general anaesthesia.] [...]

Everybody is running around preparing the OR for the next patient. The nurse assistant brings in the patient and helps him to lie down on the operating table. The supervisor works side by side with the resident; she shows herself to be affable and collaborative with the resident, who, in turn, displays a determination to assume a more active role in all team duties; the supervisor talks the patient through what they are going to do next, calming him down, while the resident attaches the leads necessary to monitor the patient's vital signs, obtains i.v. access and then starts to administer oxygen through a face mask. [...]

At 09.20 hours another patient is lying on the operating table when the supervisor enters the OR. The resident is on the left side of the patient trying to locate a good i.v. access when the supervisor gives her an instruction: 'Let's try a 16 [the size of the venous catheter].' The resident nods, but responds tersely: 'We can put in an 18, but we should have a 16 ready to hand in case we need it, don't you think?' The supervisor seems to disagree initially but then concedes calmly: 'OK, but... let's use an 18 if you want, he has small veins.' (Resident 9 and supervisor 8, observation, OR)

In significant contrast with the previous pattern, the interaction in this example was marked by the collaborative manner of the supervisor, which created the opportunity for the resident to assume a more active role in taking care of the patient. Even when the supervisor articulated a clear preference regarding some choices, the resident felt empowered to propose an alternative, which is first contemplated and subsequently agreed by the supervisor.

Sharing decision making

In this adaptation pattern, the resident and supervisor make a joint effort to solve a problem during the delivery of patient care. This pattern differs from the previous one in that both actors propose alternative courses of action or complement each other's intentions. Both actors work together, deciding on how to proceed jointly. Moreover, the supervisor takes the resident's suggestions more seriously. We observed this pattern in senior residents and intermediate residents at the end of clinical rotations:

This is the second month of her [the resident's] neuro-anaesthesia rotation. She has spent most of the time with the same supervisor. They seem to get along well; the resident looks relaxed while they work together; in fact, the resident often addresses the supervisor with *tu* [an informal pronoun used in Spanish, the formal version of which, *usted*, is used by most residents to speak to their supervisors] while talking about work-related issues. [...]

Today they're working together on a patient who needs delicate surgery to remove a brain tumour. As usual, they seem to work fluently together while preparing the patient. The resident is positioned behind the operating table and is holding the breathing mask to the patient's face, and the supervisor is to the side administering the drugs. [...]

The patient seems to be stable after the anaesthesia induction. The resident says: 'I think we can put in a little bit more fluids.' The supervisor replies: 'Are you sure, why?' The resident replies: 'The urine output is low, and he is young, I think it'll work.' The supervisor looks up the anaesthesia record, and, confirming what the resident has just said, says: 'You're right, let's do that.' [...]

After being outside the OR for about 30 minutes, the supervisor returns to hear a report from the resident about the patient's condition during her absence. The supervisor listens carefully. 'I decreased the remifentanyl dose [an opioid drug used during general anaesthesia] and put a saline bolus, but the pressure is still low,' says the resident. They are both looking at the monitor screen, analysing the problem. 'What are you going to do next?' asks the resident, in a way that seems to reverse their roles. The supervisor answers immediately: 'I'll put in some epinephrine [a vasopressor drug used to increase blood pressure]'. The resident makes a gesture of approval while nodding. (Resident 7 and supervisor 12, observation, OR)

In this excerpt, the interaction shows a condition of equality between the resident and supervisor, which is illustrated by their use of the familiar form of the pronoun with which they address each other. They both focused their attention on a patient problem and engaged in a collegial conversation to find a solution. Further, the resident felt comfortable enough to ask questions to the supervisor, not with the intention of following an instruction but to access her opinion and verify whether they shared a common understanding of the possible solution.

Intersubjectivity as a working repertoire

From our analysis of the observational data, we also inferred that by repeatedly experiencing the adaptation patterns previously described, each supervisory dyad established a mutually attuned working repertoire. We called this a 'repertoire' in order to emphasise both its rehearsal nature and its flexibility with regard to the facing of new challenges. Working repertoires could emerge within a week of repeated interaction between members of a supervisory dyad, but we also observed them in dyads that included senior residents in the course of one observational session. The following transcripts give examples.

They [the supervisor and resident] have to take care of yet another patient, and it happens very quickly, in a hurry. The patient is there to have a caesarean delivery. The resident takes the patient's history, along with the undergraduate student. Then, the resident and the supervisor enter the OR and, following protocol, mark every syringe, prepare the anaesthesia machine, set up the monitor and the breathing circuit and calculate the drug doses. The nurses bring the

patient to the OR. The resident and supervisor place the monitor cables on the patient and position her on her side to perform spinal anaesthesia. On this occasion, the resident acts more freely and the supervisor does not provide any new indications and locates himself at the back, always paying attention to the monitor. (Resident 2 and Supervisor 3, observation, labour room)

'Are we going to set up [provide anaesthesia] this one?' asks the resident. The supervisor answers in a hurry: 'We are going to set this patient up.' Each seems to know exactly what to do, including preparing the anaesthesia drugs, setting up the anaesthesia machine, the monitors, the breathing circuit and the fluids that will allow them to provide the entire anaesthesia. (Resident 7 and supervisor 12, observation, OR)

Everything happens really fast; they have five surgeries scheduled for the day. The resident and supervisor work together to prepare the OR for the first patient. The resident explains to me the reasons why they prepare everything before the patient is brought into the OR. The supervisor says to the resident: 'I'll go for a warm blanket.' Despite all the hurry, resident and supervisor look synchronised. They both do different but apparently corresponding tasks. They barely

speak to each other but they manage to have everything ready by the time the patient enters the room. (Resident 9 and supervisor 8, observation, OR)

These examples depict situations in which resident and supervisor have acquired a shared understanding of what should be done and how it should be done. As a result of this concordance, the resident and supervisor work fluently together without much talking or needing to engage in any of the adaptation patterns described earlier. By establishing a working repertoire, both members of the supervisory dyad intuitively disentangle the elements of a given situation, sense what is required of them at each step to resolve any incidents and move along. The transcripts correspond to the same three residents in the same scenarios we used to illustrate the adaptation patterns in order to give the reader a broader context for these last transcripts. We use this strategy to underpin how working repertoires result from the experiencing of the adaptation processes described earlier. Figure 1 gives a visual summary of the process whereby supervisory dyads achieved intersubjectivity.

DISCUSSION

In the present study, we sought to better understand how supervisors and residents interact in the workplace to achieve the common goal of providing patient care. We used Billett's definition of intersubjectivity as a theoretical lens through which to analyse this process. We found that interaction within a supervisory dyad was mostly a process of continuous and, as their relationship matured, mutual adaptation, which resulted in the development of a shared working repertoire. In previous studies, this adaptation process has often been reported to be unidirectional: either residents adapt to their supervisors^{32,33} or supervisors adapt their practices to their resident's level of training.^{34,35} We contend that the adaptation process in residency training is a bidirectional one in that both members of the supervisory dyad adapt to each other's preferences as the relationship between them matures. Consequently, both members must change their practices to work together, thereby transforming the meaning of their practice as their relationship gradually develops. Some dyads might require more adaptation from the supervisor than from the resident or vice versa as both parties work towards meeting each other's preferences, but not necessarily at a halfway point.

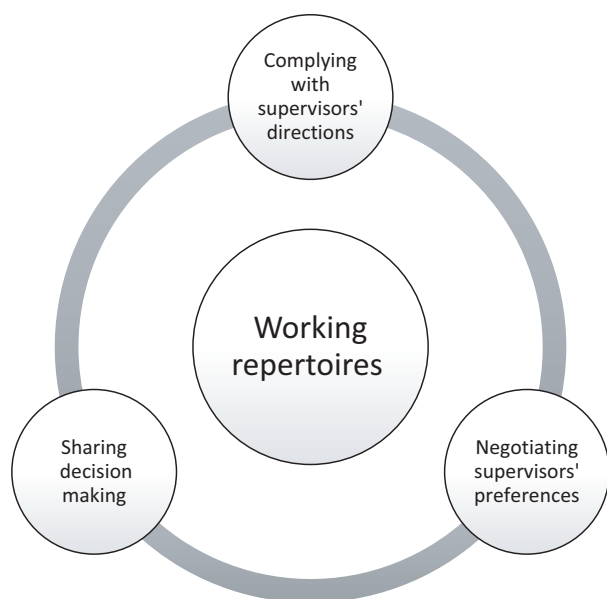


Figure 1 The process whereby supervisory dyads achieved intersubjectivity by engaging in various adaptation patterns which resulted in the consolidation of shared working repertoires

The ability to move between adaptation patterns provided a flexible set of tools that residents and supervisors could use to move back and forth in response to challenges posed by the unpredictable workplace setting. This 'dance' has also been described as a resource in the context of negotiation between clinical supervisors and senior residents on how to provide teaching and supervision to students and interns,³⁶ and in that of collaborative interpretation of visual cues to difficult laparoscopic findings.³⁷

Understanding the resident's and supervisor's interaction as a process of adaptation has important theoretical implications. As Apramian et al.³⁸ describe, clinical supervisors' and residents' preferences may differ to various degrees. Residents whose preferences are better matched with those of their supervisors may appear to be more competent and vice versa. We add to this the discovery that working together allowed residents and supervisors to adapt to each others' preferences and to reach a mutual understanding about how to provide patient care. Theoretically, the supervisor's assessment of the resident's competence may then change depending on the stage of their relationship; the more time they have to adapt to each other, the closer their preferences will become.

Our results can also be related to a broader literature on workplace learning. Understanding residents' and supervisors' interactions as the development of intersubjectivity and the associated evolution of their working repertoires as described in this study builds upon Wenger's theory of communities of practice.¹ We provided evidence about how communities of practice create shared repertoires through the development of intersubjectivity, in this case within individual supervisory dyads. Furthermore, the developmental trajectories of the supervisory dyads seem to follow common patterns in which the practice of jointly providing patient care leads to a reification of the relationship between the members of the dyad.²¹ Using the concept of intersubjectivity not only gave us the appropriate lens through which to elucidate the development of supervisory relationships, but also allowed us to uncover such reifications.

Our study also complements the findings of Brown et al.⁵ about help-seeking supervisory encounters in senior general practice trainees. We found similar patterns of interaction, but we also add details about how such patterns contribute to the development of working repertoires. Some of the difference may be

explained by differences in the settings of the two studies: we analysed intense and long-lasting interactions, whereas Brown et al.⁵ observed ad hoc help seeking and therefore brief encounters. It may be that working repertoires are more palpable in our type of encounter, whereas in ad hoc situations residents just decide not to seek help because they already know how the supervisor will proceed.

Our findings indicate several practical implications for exploration. Firstly, maximising the potential of clinical encounters seems to require that residents and supervisors understand how working side by side constitutes an effort to build bridges between the two members of the dyad. Secondly, it may be useful for both parties to understand all the possible adaptation patterns they could use to arrive at a common understanding, from compliance with the supervisor's orders to the sharing of decision making. Thirdly, recognising that there is a group of tools available for their use might ease the way the interaction develops during day-to-day activities. Some circumstances will require the supervisor to take the lead, whereas other contexts will enable both the resident and supervisor to work as equals, giving the resident a more pivotal role within the dyad.

This study, however, was not without limitations. Firstly, seeing residents' and supervisors' interactions as an adaptation process is the result of our use of Billett's concept of intersubjectivity¹⁶ to unravel such interactions. We may have overlooked certain aspects of the supervisory dyads' interactions, such as the reasons behind their decisions to adapt to each other, or why some supervisors seem to rely more on a certain adaptation pattern. Secondly, observational research inherently harbours the risk for participant reactivity. In the present study, participants may have perceived the observation sessions as evaluation exercises, which may have caused them to behave differently and created an artificial environment. This, in turn, may have led to the absence of difficulties or tensions between participants, influencing the emerging theory. To minimise this risk, we followed best practices in observational research by explicitly attending to participants' reactions to the observations, asking them proactively about their feelings²⁹ and by conducting long sessions and making sure the observer stayed in each setting long enough. Finally, the context of the intensive resident-supervisor contact inherent in anaesthesiology training raises doubts about how the present results might be transferred to other types of supervisory

arrangement, including those in which supervisors work with a group of residents or when contact between residents and supervisors is scarce or occurs at a greater distance.

Our study has raised new questions that future research might seek to address: How do intersubjective relations evolve? Do these working repertoires hold in the long term or does this depend on the adaptation pattern used? Are these working repertoires unique to individual supervisory dyads or do they reflect the whole community's working repertoires? We also managed to understand how supervisory dyads arrive at a shared understanding of what to do when providing patient care but failed to explain why they decide to come to such understanding. Another question concerns whether this intersubjectivity model can be extrapolated to interdisciplinary collaborations and peer interactions, whether the same adaptation patterns are in place and how organisational infrastructures influence interdisciplinary working repertoires.

Contributors: FMO-V contributed to the study design, conducted the focus groups and collected the data. DHJMD and PWT contributed to the study design. CG-Q contributed to data collection, acted as an observer in the focus groups and conducted all field observations. All authors contributed to the iterative analysis of the data and to the drafting and revision of the paper and approved the final manuscript for publication. All authors hold complete accountability for all aspects of the work in ensuring its accuracy and integrity.

Acknowledgements: the authors wish to thank all members of the Anaesthesiology Department at Pontificia Universidad Javeriana who participated in the study, Janet Arbelaez for her assistance in transcribing the interviews and the focus groups, and Angelique van der Heuvel (Department of Educational Development and Research, Faculty of Health, Medicine and Life Sciences, Maastricht University) for her English-language corrections.

Funding: the study was completely funded by a PhD scholarship awarded to FMO-V from the Pontifical Xavierian University.

Conflicts of interest: none.

Ethical approval: this study was approved by the Research Ethics Committee of the Pontifical Xavierian University and San Ignacio Hospital (21 April 2016; reference no. 2016/45).

REFERENCES

- 1 Wenger E. *Communities of Practice: Learning, Meaning and Identity*. New York, NY: Cambridge University Press 1999.
- 2 Teunissen PW, Boor K, Scherpbier AJ, van der Vleuten CP, van Diemen-Steen Voorde JA, van Luijk SJ, Scheele F. Attending doctors' perspectives on how residents learn. *Med Educ* 2007;**41** (11):1050–8.
- 3 Teunissen PW, Scheele F, Scherpbier AJA, van der Vleuten CPM, Boor K, van Luijk SJ, van Diemen-Steen Voorde JA. How residents learn: qualitative evidence for the pivotal role of clinical activities. *Med Educ* 2007;**41** (8):763–70.
- 4 Olmos-Vega FM, Dolmans DHJM, Vargas-Castro N, Stalmeijer RE. Dealing with the tension: how residents seek autonomy and participation in the workplace. *Med Educ* 2017;**51** (7):699–707.
- 5 Brown J, Nestel D, Clement T, Goldszmidt M. The supervisory encounter and the senior GP trainee: managing for, through and with. *Med Educ* 2018;**52** (2):192–205.
- 6 Bleakley A. Broadening conceptions of learning in medical education: the message from teamworking. *Med Educ* 2006;**40** (2):150–7.
- 7 Crossley N. *Intersubjectivity: The Fabric of Social Becoming*. Thousand Oaks, CA: Sage Publications 1996.
- 8 Zlatev J, Racine T, Sinha C, Itkonen E. *The Shared Mind: Perspectives on Intersubjectivity*. Philadelphia, PA: John Benjamins Publishing 2008.
- 9 Zlatev J, Racine T, Sinha C, Itkonen E. Intersubjectivity: what makes us human? In: Zlatev J, Racine T, Sinha C, Itkonen E, eds. *The Shared Mind: Perspectives on Intersubjectivity*. Philadelphia, PA: John Benjamins Publishing 2008;1–14.
- 10 Billett SR. Workplace pedagogic practices: co-participation and learning. *Br J Educ Stud* 2002;**50** (4):457–81.
- 11 Rogoff B. *Apprenticeship in Thinking. Cognitive Development in Social Context*. New York, NY: Oxford University Press 1990.
- 12 Billett SR. The practices of learning through occupations. In: Billett S, ed. *Learning through Practice. Professional and Practice-Based Learning, Vol 1*. New York, NY: Springer 2010;59–81.
- 13 Cait CA. Implications of intersubjectivity for supervisory practice. *Clin Soc Work J* 2005;**34** (3):253–65.
- 14 Hui D, Russel D. Understanding innovative professional development for educators through the analysis of intersubjectivity in online collaborative dialogues. *Int J Inform Commun Technol Educ* 2007;**3** (3):25–38.
- 15 Ligorio MB, Cesareni D, Schwartz N. Collaborative virtual environments as means to increase the level of intersubjectivity in a distributed cognition system. *J Res Technol Educ* 2008;**40** (3):339–57.
- 16 Billett SR. Securing intersubjectivity through interprofessional workplace learning experiences. *J Interprof Care* 2014;**28** (3):206–11.
- 17 Sheehan D, Wilkinson TJ, Billett S. Interns' participation and learning in clinical environments in a New Zealand hospital. *Acad Med* 2005;**80** (3):302–8.

- 18 Bryant A, Charmaz K. *The Sage Handbook of Grounded Theory*. Thousand Oaks, CA: Sage Publications 2007.
- 19 Charmaz K. *Constructing Grounded Theory: A Practical Guide through Qualitative Analysis*. Thousand Oaks, CA: Sage Publications 2006.
- 20 Billett SR. Learning through health care work: premises, contributions and practices. *Med Educ* 2016;**50** (1):124–31.
- 21 Teunissen PW. Experience, trajectories, and reifications: an emerging framework of practice-based learning in healthcare workplaces. *Adv Health Sci Educ Theory Pract* 2014;**20** (4):843–56.
- 22 Eraut M. Informal learning in the workplace. *Stud Contin Educ* 2004;**26** (2):247–73.
- 23 Watling C, Lingard LA. Grounded theory in medical education research: AMEE Guide No. 70. *Med Teach* 2012;**34** (10):850–61.
- 24 Malterud K. Qualitative research: standards, challenges and guidelines. *Lancet* 2001;**358** (9280):483–8.
- 25 Lave J, Wenger E. *Situated Learning: Legitimate Peripheral Participation*. Cambridge: Cambridge University Press 1991.
- 26 Stalmeijer RE, McNaughton N, van Mook WN. Using focus groups in medical education research: AMEE Guide No. 91. *Med Teach* 2014;**36** (11):923–39.
- 27 Charmaz K, Mitchell R. Grounded theory in ethnography. In: Atkinson P, Delamont S, Coffey A, Lofland J, Lofland L, eds. *Handbook of Ethnography*. Thousand Oaks, CA: Sage Publications 2007;150–65.
- 28 Hammersley M, Atkinson P. *Ethnography: Principles in Practice*. New York, NY: Routledge 2007.
- 29 Paradis E, Sutkin G. Beyond a good story: from Hawthorn Effect to reactivity in health professions education research. *Med Educ* 2017;**51** (1):31–9.
- 30 Varpio L, Ajjawi R, Monrouxe LV, O'Brien BC, Rees CE. Shedding the cobra effect: problematising thematic emergence, triangulation, saturation and member checking. *Med Educ* 2017;**51** (1):40–50.
- 31 Helmich E, Cristancho S, Diachun L, Lingard L. 'How would you call this in English?' Being reflective about translations in international, cross-cultural qualitative research. *Perspect Med Educ* 2017;**6** (2):127–32.
- 32 Apramian T, Cristancho S, Watling C, Ott M, Lingard L. Thresholds of principle and preference: exploring procedural variation in postgraduate surgical education. *Acad Med* 2015;**90** (11 Suppl):70–6.
- 33 Apramian T, Cristancho S, Watling C, Ott M, Lingard L. 'They have to adapt to learn': surgeons' perspectives on the role of procedural variation in surgical education. *J Surg Educ* 2016;**73** (2):339–47.
- 34 Kennedy TJ, Lingard LA, Baker GR. Clinical oversight: conceptualising the relationship between supervision and safety. *J Gen Intern Med* 2007;**22** (8):1080–5.
- 35 Piquette D, Moulton CA, LeBlanc VR. Model of interactive clinical supervision in acute care environments. Balancing patient care and teaching. *Ann Am Thorac Soc* 2015;**12** (4):498–504.
- 36 Balmer DF, Giardino AP, Richards BF. The dance between attending physicians and senior residents as teachers and supervisors. *Pediatrics* 2012;**129** (5):910–5.
- 37 Cope A, Bezemer J, Kneebone R, Lingard L. 'You see?' Teaching and learning how to interpret visual cues during surgery. *Med Educ* 2015;**45**:1103–16.
- 38 Apramian T, Cristancho S, Sener A, Lingard L. How do thresholds of principle and preference influence surgeon assessments of learner performance? *Ann Surg* 2017; <https://doi.org/10.1097/sla.0000000000002284>. [Epub ahead of print.]

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article:

Appendix S1. Co-constructed memo.

Appendix S2. Questioning route for the three focus groups.

Appendix S3. Reflexivity memo.

Received 14 November 2017; editorial comments to author 19 January 2018, accepted for publication 16 March 2018