Job Crafting to Persist in Surgical Training

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Job Crafting to Persist in Surgical Training: A Qualitative Study From the Resident's Perspective

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ABSTRACT

Background: Attrition in surgical training, a result of poor well-being at work, continues to rise. Work engagement and persistence, the other side of the coin, depend on the proactivity of residents to optimize the demands and resources in the workplace to achieve a better fit with the environment. This type of proactivity refers to job-crafting. In this study, we sought to explore the specific mechanisms underlying residents' job-crafting to enhance work engagement and persistence, as well as the role of supervisors in this endeavor.

Materials and methods: We used a constructivist-grounded theory design. We conducted semistructured interviews of active residents. During the analysis of verbatim protocols, we developed codes and categories and identified the main themes (job-crafting mechanisms) related to work engagement and persistence. We anticipated procedures to engage in reflexivity.

Results: The residents showed six job-crafting mechanisms (build trust with supervisors, manage proactively, seek help, see errors and frustrations as learning opportunities, find a suitable work–life balance, and seek challenges actively). The supervisors contributed to residents' job-crafting with four mechanisms (earning the trust of the residents, providing guidance and support, allowing residents to fulfill tasks befitting a surgeon in training, and offering increasingly challenging tasks to residents).

Conclusions: Work engagement and persistence in training are active processes that depend on the ability of residents to take advantage of resources and challenges and to diminish hindering demands at the workplace. Future research should focus on the perspectives of the supervisor, as well as on the effectiveness of job-crafting interventions, to enhance work engagement.

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Introduction

Attrition is a concept used to define departure from a program without successful completion.^{1,2} Up to 18% of surgical residents leave their programs.³ The cost of attrition is significant for the health care services, and it worsens the already existing crisis of the global surgery workforce.³⁻⁵ In addition, it entails significant losses in educational resources and leads to demoralization and failures in the cohesion of the remaining residents.^{6,7}

Extensive literature has focused on programmatic and individual factors to understand the causes of attrition and its possible solutions. Although most cases occur in the first year of training,^{8,9} the prevalence of attrition varies with the size, type, and tradition of programs.⁹⁻¹¹ In the programmatic perspective, the rates of attrition remain high despite reduced working hour schemes^{12,13} and interventions aimed to improve resident support,¹⁴ such as mentoring^{11,15} and remediation.^{7,16,17} Individual factors also have received attention. Some studies reveal a higher prevalence of attrition in women,^{3,9,18} whereas other studies do not confirm this association.^{12,19,20} Similarly, the lack of individual traits, such as grit,²¹ motivational behaviors,²² action-based learning style,²³ and realistic expectations of training²⁴ have been found more prevalent among leavers, but they have not been entirely accepted as the main causes of attrition. From this individual perspective, the solutions have focused on the selection of appropriate residents.^{18,25-27} The impact of selection on attrition, however, appears minimal.²⁸

The conflicting information from the programmatic and individual factors and the dual role of residents as workers and trainees have promoted a different perspective focused on resident well-being at the workplace.²⁹⁻³³ From this angle, poor well-being at work is considered one of the top triggers for attrition.^{6,11,34,35} In general, poor well-being has been explained by the excessive demands of training, such as workload and work pressure,^{3,7,36} inferior quality of teaching and mentoring,^{3,6,7,36,37} and mistreatment of residents, such as undermining and bullying.^{3,38-40} Interestingly, based on this perspective of focus on resident well-being, the academic conversation on work engagement and persistence, the opposite of resident attrition, has become more prominent. Theoretically, work engagement describes a positive and fulfilling state of mind of vigor, dedication, and absorption at work.⁴¹ In particular, work engagement depends on the proactivity of workers to optimize and handle their demands (such as workload and physical, emotional, and organizational demands) and resources (such as support, autonomy, and feedback) to achieve a better fit with the work environment.^{41,42} This type of proactivity refers to job-crafting. By using job-crafting, workers can achieve a feeling of ownership, gain control and knowledge at work, and aim to invest time and effort in their jobs.⁴²

In surgical training, a previous study confirmed the positive relationships of residents' job-crafting with their work engagement and persistence.²⁹ Unfortunately, the specific mechanisms underlying residents' job-crafting are not yet fully known.²⁹ Research to deepen this knowledge is important because it can contribute to the call to investigate and

elucidate the processes involved in residents' persistence in surgical education^{6,9,29} and, from a theoretical stance, to understand the mechanisms related with work engagement in specific job contexts.^{42,43} In particular, this type of research can add explanations to the mechanisms linking proactivity with specific outcomes at the workplace, focusing on the dynamic role of workers to craft their jobs (e.g., residents) and the influence of their leaders in this venture (e.g., supervisors).⁴² Given the paucity of evidence in this matter, the aims of the present study are to explore the mechanisms involved in residents' job-crafting to enhance their work engagement and persistence in the surgical program and identify the contributions of their supervisors to these endeavors from the residents' perspective. We sought to address the following research questions (RQ):

RQ1: Which job-crafting mechanisms are used by surgical residents to enhance their work engagement and persistence in the program from the residents' perspective?

RQ2: Which mechanisms are used by supervisors to stimulate surgical resident's job-crafting to enhance their work engagement and persistence in the program from the residents' perspective?

Methods

Research design

We chose a constructivist-grounded theory design to answer the research questions. This design acknowledges the subjectivity of participants and researchers to understand the social reality.⁴⁴ The constructivist paradigm rebounds in the type of the present research because knowledge is actively coconstructed from human interactions, shared experiences, and relationships.⁴⁵ The background of the researchers and the theoretical framework had implications in this matter. LCD, AS, and LPS are active surgeons and clinical supervisors. Moreover, all three hold positions as directors of residency programs. DD and WdG, on the other hand, are educationalists and researchers with extensive experience in the field of medical education. They have theoretical perspectives on postgraduate training and workplace-based learning. In addition, the current literature on the job demands-resources theory (JD-R theory), which explains work engagement and job-crafting, guided our data collection and analysis.⁴¹ The JD-R is a dynamic model to understand and predict well-being at work, in terms of burnout and work engagement, their precursors (demands and resources), and performance.⁴¹ In the core of this framework is the idea that work engagement is crucial for job-related outcomes. Considering our background as researchers and the theoretical underpinnings, we anticipated our influences at different stages of this study. These issues engaged us in reflexivity with ourselves, with the research, and the audience. Reflexivity refers to the process through researchers reflect on their approach to knowledge generation.⁴⁶ Considering that the present research underlies on a constructivist perspective, this reflection is important because of our interactions with the participants in the surgical environment, our experiences, beliefs, and theoretical

assumptions as researchers. To achieve reflexivity, we completed the procedures for sampling, data collection, analysis, and presentation of findings according to preliminary recommendations^{46,47}

General context

The research took place in Colombia. Surgical training in Colombia consists of a 4-y university-based program, after which qualified surgeons can apply to train in second specialties, which lasts an additional 2 or 3 y. At the date of this study, 20 active programs offer 400 positions per year. Aspiring residents must apply directly at each university because there is no national admission system. Most programs still hold a long-standing Halstedian tradition of hierarchical teaching. Residents pay an annual fee to universities. In turn, the affiliated hospitals receive a reimbursement from universities for the tuition of the residents, but residents do not receive a salary. Residents work 66 h per wk according to the national regulations.

Participants

With formal consent of the program directors, we invited 25 residents of five programs in the two largest cities to participate. We aimed to recruit the maximum diversity of residents per program, gender, and postgraduate year of training by stratified sampling methods. These methods aimed to facilitate comparisons, enrichment, and transferability of findings.⁴⁸ Considering that LCD and AS are directors of two participant programs, they avoided participating in the recruitment, data collection, and member checking in their own programs. After recruitment, LCD and AS contacted the participants personally to explain the aims and scope of the study.

Data collection and analysis

The present study focused on the residents' perceptions and experiences in the workplace. We anticipated sensitive information on detailed and personal issues from participants. To face these issues, we preferred individual in-depth, semi-structured interviews, and we prepared, piloted, and fine-tuned an interview guide. At this stage (before data collection), we conducted a first process of translation of the main concepts (e.g., work engagement) from English into Spanish language. We followed preliminary recommendations,^{49,50} to develop a clear interview guide, free of technicalities and confusions for the participants. The interview guide was embedded in the situation, task, activity, result, and reflection model (STARR model), a funnel method to stimulate a regular conversation with the participants, based on their preliminary experiences at the workplace (please see [Appendix A](#)). From September to November 2017, we conducted and audiotaped the interviews in Spanish language. During data collection, we assured a second process of active translation from English into Spanish language, to preserve the meaning of the main concepts.^{49,50} After each interview, LCD and AS exchanged a summary of the main findings and impressions. Simultaneously, research assistants initiated the manual

transcription of the audio records in Spanish language. During this process, we used previous interview data to emphasize specific topics with the next participants, to get a deep knowledge of issues, while we preserved the main structure of our interview guide.

For data analysis, we followed a standardized stepwise procedure.⁴⁴ Preliminarily, we stored and organized the verbatim transcript using the Atlas.ti software in Spanish language. For member checking, we sent the verbatim transcript to the participants and asked on the accuracy of the interview, which did not result in comments. For the analysis, LCD and AS read the overall content of the verbatim transcripts independently. Both researchers developed inductive codes of the main range of ideas by *in vivo* coding, repetition, and exploration of underlying concepts in Spanish language. Simultaneously, they used deductive codes devised from the interview guide, the JD-R theory, and their professional experience as clinical supervisors (Step 1). Then, iteratively, LCD and AS compared the single codes (deductive and inductive) across the interviews in the data set, and by different subgroups of participants, to identify patterns and notice associations (Step 2). We reviewed all interviews, but we gained theoretical saturation and thematic sufficiency after 15 interviews. The third stage of the cycle refers to categorization and conceptualization of data (Step 3). Both researchers grouped codes with similar attributes into broad categories of concepts, and they translated these codes and categories into English language. At this point, all authors reviewed and performed an iterative process of forward and backward translations to fine tune and identify potential mistranslations of codes and categories according to preliminary recommendations.^{49,50} Then, the analysis was moved toward a more abstract level until all authors reached a consensus of the main concepts and themes (mechanisms) in English language. Finally, all components of the analysis were placed together to develop our theoretical understanding of resident's work engagement and persistence in surgical training (Step 4). At this stage, all authors approved the final framework after an iterative verification and refinement of the theory. We validated our findings by comparison with the available literature. Finally, the objects for the dissemination of findings (main concepts, themes, and quotations) were submitted to further processes of forward and backward translations,^{49,50} until all authors agreed with the final version and meaning of the text. The analytic cycle is presented in [Figure 1](#).

Research ethics

The Universidad de la Sabana (Colombia) granted the ethical approval (# 14/2015). All residents voluntarily participated and did not receive any incentives. The residents signed an informed consent form describing the purpose of recruitment and conditions of participation. We withheld detailed information of the participants to ensure confidentiality and anonymity.

Results

The interviews lasted from 31 to 71 min. Female residents represented 44% of participants. The distribution of

Fig. 1 – The analytic cycle (based on the standardized stepwise procedure described by Hennink MM, Hutter I, and Bailey A).⁴⁴ (Color version of figure is available online.)

participants by the postgraduate year of training corresponded to Year-1 ($n = 6$), Year-2 ($n = 7$), Year-3 ($n = 6$), and Year-4 ($n = 6$).

Ten overarching mechanisms to enhance the resident's work engagement and persistence in the program, in line with the concept of job-crafting, were identified. Mechanisms 1-6 were related to RQ1, and mechanisms 7-10 were related to RQ2. We present a description of these mechanisms and representative quotations of the participants. We also present a diagram of the main findings (Fig. 2).

One year after completing the interviews (November 2018), none of the residents had left the training. All participants of Year-4 of training finished the program successfully. The remaining continue as active residents in their respective programs.

Mechanisms of residents' job-crafting to enhance their work engagement and persistence in training

Mechanism 1: build trust with supervisors to diminish distance toward them

Showing responsibility for the safety of patients, being honest, and showing awareness of one's limitations were essential to developing trust with supervisors. These aspects aimed to guarantee the legal obligations of the supervisors during patient care.

"In surgery, you have to establish a relationship of trust with supervisors because they are lending their name and title to treat patients. They believe that one should strive to not make any errors and that one will not harm the patients" (second year resident).

Responsibility was perceived by residents as gathering knowledge and commitment to following up with patients, as well as in their efforts to prevent complications and keep supervisors informed. Honesty, in particular, was observed as "not telling lies" and in the trustworthy delegation of tasks to other team members. A resident of third year of training, for

Fig. 2 – An explanation of job-crafting mechanisms and the contributions of supervisors to enhance residents' work engagement and persistence in surgical training from the residents' perspective. This figure shows the job-crafting mechanisms (right) and the mechanisms used by supervisors to foster the residents' job-crafting (left). The intersection of circles represents the contributions of both residents and supervisors to residents' work engagement and persistence in training.

instance, describes the scope of honesty on trust with supervisors.

“Supervisors are very emphatic that if you do not know something, you should say so ... They do not judge because you do not know; they judge because you tell lies” (third year resident).

When residents felt they could rely on their supervisors, they felt motivated and important, which diminished feelings of fear and distance toward them. As a result, they gained power and meaning at work and thus persisted in training.

“I have an important role, and they trust me a lot (supervisors). To the extent to which you interact and show who you are, they have confidence in you and give you power; otherwise, there is no way to endure this (residency training)” (first year resident).

Mechanism 2: manage proactively to gain responsibility and increase participation

Residents perceived the importance of being proactive in the decision-making process, demonstrating initiative and negotiating capabilities with their supervisors. Active participation was related to their ability to argue coherently based on medical knowledge and selection and organization of relevant clinical information.

“If one shows interest and proves to be prepared, more doors will be opened, and more possibilities will be presented [...], one must always be ahead of what one believes [...] as one develops throughout the residency, one knows which information is relevant and which is not” (third year resident).

Initiative was perceived in the ability to coordinate patient care or to start actions in critical situations without immediate supervision. These abilities, together with those of assertive communication, were essential for negotiation. When residents were proactive, they perceived more trust from their supervisors. They also gained autonomy and responsibility and challenges at the workplace, which contributed to strengthening their motivation, meaning at work and will to persist.

“Being proactive, I feel good, and they (supervisors) do not tell me what to do ... I also see that they have more confidence in what I say ... it is the empowerment that I give to myself. I’ve learned a lot from this. It makes me feel committed to patients and never leave a patient whom one is treating. It makes me feel that this is really what I want... It makes me more convinced of what I am doing” (first year resident).

Mechanism 3: seek help from peers and the social environment to deal with the demands of the residency

Residents recognized that surgical training may be strenuous and demanding and is difficult at times to face alone. Being aware of their place into the hierarchy and knowing their own limits were important issues for asking for help. Residents developed relationships with others within (e.g., peers, supervisors) or outside the workplace (e.g., family and friends), who had the potential to assist them when clinical load, complexity, or pressure and stress surpassed their resilience.

“If you need help, you have to ask for it. Fortunately, among us, we are partners, and if there is any doubt, we try to take time to help each other. It is important to rely on other doctors such as emergency doctors and nurses because they are a good help... that relieves the workload” (third year resident)

Similarly, support of others allowed them to obtain feedback, develop a sense of meaning at work, get advice in facing difficult situations, reach career goals, and persist.

“I have strong ties of friendship with my peers of the same level of training. We help each other, we collaborate, and we rescue each other. Sometimes residency is like a football game. There are heated moments and moments of friction because of the work stress, so having a good team is fundamental to survival” (second year resident).

“I’m not just a doctor... I am a daughter, wife, sister, friend and I have to fulfil all those roles...my life is not just surgery. They help me continue this (residency program)” (fourth year resident).

Mechanism 4: see errors and frustrations and their handling as learning opportunities

Errors in-patient care, within a strict culture of surgical training, were perceived as a foremost cause of loss of confidence from supervisors and source of frustration. Facing errors with honesty and emotional intelligence were felt to be important tools by residents to manage committed errors and to rebuild trust with their supervisors. A senior resident, for instance, described how emotional intelligence helped to overcome errors and difficulties in training.

“When I make a mistake, the first thing I have to do is to ask to myself what was wrong, why I failed, and how I am going to improve. The second thing is to convince myself that everything that I do is not wrong. From ten things that I do, nine are good and one can go wrong. I have to assume that error. My strategy is to think about good things and self-assess bad situations. Later on, when I am in a similar situation, I will know how to act and prevent it from happening again. My supervisors realize that. This strategy allows me to have clarity about what I want (to be a surgeon)” (third year resident).

Support of others (also observed in mechanism 3) was critical for dealing with errors and frustrations and to recover motivation. It allowed one to overcome difficulties, to develop tenacity, and persist in becoming surgeons.

“During my first year of residency, I had a supervisor who bullied me a lot due to my performance [...] He could not terrify me, and I decided to seek him out more [...] He noticed that I took greater charge of patient care and follow-up [...] and then he gave me the opportunity to do everything [...] I used many tools, one of which was to request the help of my senior resident and seek his advice in dealing with that situation [...] I reached the conclusion that my goal is to be a surgeon, and if they mistreat me, it does not matter; I am going to be a surgeon! That is my instrument, to become transcendental and to find the

strength in reaching my objective [...] I often thought of leaving the program, many times, but when you strengthen yourself with these tools, you see the road clearly" (second year resident).

Mechanism 5: find a suitable work–life balance

Residents valued the adequate balance between work, personal, and family life to be engaged and to persist in training. Healthy detachment from the workplace to take advantage of other facets of life and prevent "alienation" was important for recovering, "enduring" and enjoying training. This mechanism allowed the residents to reflect on difficult situations and improve their relationships with others. Similarly, meaning was found at work when the residents balanced training with other dimensions of their life.

"I am doing the residency to have better opportunities to develop myself as a person. For that reason, I wanted to be a surgeon. But that does not mean that I have to kill myself. There are other things in life that are also important. Now I'm on the countdown to finish my training" (fourth year resident).

Mechanism 6: actively search for opportunities to be engaged in challenging surgical tasks

Residents mentioned that searching for complex cases and challenging tasks was crucial to strengthen themselves as surgeons in training. Their proactivity and trust from their supervisors were crucial in these endeavors. Successfully accomplished and challenging tasks improved their motivation and performance, contributing to reaffirming their career goals. A resident in the third year of training, for instance, described the relationship between his proactivity, challenges, and motivation during an emergency situation.

"A patient arrived with a precordial wound with cardiac tamponade [...] then he entered into cardiac arrest [...] in that situation, losing any second is detrimental to the patient's life. So, while the surgeon was scrubbing in, I said, "Doctor, I'm going to open". I did the sternotomy and the pericardiotomy, and I took out the blood clots and gave him direct cardiac massage. Then, the supervisor arrived, and he realized the gravity of the situation and what I did. For the first time, he congratulated me on my initiative [...] That day, all my efforts were rewarded, all that I did during night shifts, all the late nights, everything I've done. The patient is alive; he left ICU and was transferred to the surgical ward [...] A surgeon has to have that initiative... I open him, or he dies ... I'm more motivated than ever!" (third year resident).

Mechanisms of supervisors to foster resident's job-crafting to enhance work engagement and persistence

Mechanism 7: earn the trust of the residents and treat them respectfully

For residents, trustworthy supervisors are essential for motivation. They were deemed as such if they were responsible educators, who demonstrated respect for the resident, adopted the role of a guide, and showed openness and transparency in the residents' assessment. When supervisors took

on this role, the residents experienced "real teaching," an increased feeling of autonomy and eagerness to seek opportunities to further build trust with the supervisors and themselves.

"Doctor X has encouraged me a lot to complete surgical procedures for my level (...). He always helps me, and he is my "surgical assistant". So, he guides me and tells me that I am doing a good job (...) That helps a lot and feels good because that shows that they (supervisors) trust me and that they are expecting good things from me (...) I feel happy and stimulated" (third year resident).

Residents perceived respect when supervisors avoided derogatory judgments, mistreatment, and discrimination. A junior resident, for instance, described the relationship between disrespect and the loss of trust in his supervisor.

"When I had an encounter with the instructor and we talked, or I felt mistreated, then one loses the initiative and confidence. Many times, surgeons confuse exigency with respect. So, when they (supervisors) cross that line, one wants to be away from that person. One does not take the initiative, but one does unfortunately have the minimum requirement to comply" (second year resident).

Finally, transparency and objectivity during assessments and avoiding retaliatory and punitive practices were perceived as trustworthy behaviors of supervisors. Residents, for instance, mentioned how retaliation was related to the lack of trust and, ultimately, with the intention to leave training.

"If I fail as a resident, I wish the supervisor would tell me, "Hey, you're failing in this aspect and I'm going to assess you in this way", but instead he puts more pressure on me, taking me to the maximum limit of stress. This situation, instead of helping me in my shortcomings as a future surgeon, brings me to a state of stress in which the only way out is deciding to leave training" (second year resident).

Reliability of supervisors was important for residents' proactive desire for new challenges and seeking help. Ultimately, reliability creates an environment for motivation.

"If you are in an environment where you feel good, you find yourself enjoying the residency, but on the contrary, if the environment makes you feel uncomfortable and the supervisors do not trust you, then you will lose interest in doing things and end up doing them just because it is your obligation" (third year resident).

Mechanism 8: maintain the autonomy and responsibility of the residents by providing good supervision and support

Residents appreciated that the supervisors were available and receptive to support their needs at work (e.g., in cases of substantial clinical burden or complexity). Good supervisors are believed to avoid restrictions or excesses in residents' autonomy and, in this way, enhance responsibility during their participation in-patient care and decision-making.

"One must be responsible... but should be supervised (...) Responsibility is a double-edged sword. If one has clear conceptual tools, that is extraordinary ... you become the

owner of your patient, and that is very satisfactory: you cure his/her wounds, you see him/her every day, you are noting his/her clinical evolution ... and you are taking the whole approach with the patient ... If you are responsible for a patient with a highly complex case and you do not have the conceptual tools, that becomes a scenario of anguish. Improper responsibility generates distress in a resident. That is one of the biggest problems... an anguish regime" (second year resident).

Furthermore, residents felt adequately supervised when they received permanent, respectful and constructive feedback, not only in cases of low performance but also when they did a good job.

"The best way to teach is to make positive reinforcements both about what is good and what is negative. The supervisor must avoid only negative or even contemptuous judgments because it causes the resident to lose confidence in him/herself" (second year resident).

Autonomy and supervision helped to improve residents' motivation and performance. They especially found it important to seek new challenges and proactivity. They also foster trust in supervisors and better management of frustrations, contributing to strengthening their meaning at work and persistence.

"Having autonomy and letting go more in the surgical procedures makes one enjoy the work more and start to be calmer, less dependent on external things, more involved in the residency (...) It motivates me to keep doing things well, to improve more and to overcome difficulties (...) Finally, it is what one is going to do in the future, and if they (supervisors) are delegating and trusting, that motivates me ... one wants to receive more delegation and more trust. Then, it is a process of self-demand to overcome all difficulties. At the end one wants to surpass oneself" (fourth year resident).

Mechanism 9: allow residents to fulfill tasks be fitting a surgeon in training and a member of the surgical team

For residents, the value that supervisors add to their role as surgeons in training was essential from the beginning of the program. Nonetheless, frequently during the first years of training, they perceived that supervisors valued their work more in terms of "secretaries" (e.g., dealing with paperwork) rather than residents. Feeling valued as a resident was perceived when their opinions were listened appreciatively, when they could participate actively in in-patient care and introduce themselves to patients, families, and other clinical departments as members of the surgical team.

"One begins to see that they (supervisors) are no longer treating me as the student but that they are also giving me the position of surgeon, even when I have not graduated ... one begins to take patient care personally. Instead of thinking "I'm going to ask my supervisor", one begins to make decisions and take charge of everything that is happening [...] one is gaining more confidence" (second year resident).

Thus, when residents perceived themselves in the role of surgeons, they experienced meaning at work and motivation.

Those outcomes further strengthen trust with supervisors, which, in turn, enhances engagement and the drive to persist.

"Feeling important is when your opinion is taken into account [...] that you have value or significance for others [...] if you feel important, it makes staying in the residency much more comfortable in persisting and achieving what you want" (third year resident).

"Doctor X lets us focus on patients, do everything, schedule patients for surgery. He trusts us and lets us operate. One says, what a sensation! He is letting us "be surgeons" with the supervision of others. So, it's very rewarding ... it makes one feel that one is not just a "secretary" who came here to do the work for them (supervisors), but that he/she is my patient, I scheduled, operated, followed and discharged him/her. Then, it is a complete process. When they allow us to operate, it is a magical sensation! (...) When they let us be one... they let us reach the Promised Land" (second year resident).

Mechanism 10: offer increasingly complex challenges to strengthen the resident's performance

Residents mentioned that challenges in the work environment (e.g., participating in complex surgeries and leading other residents) offered by their supervisors nourished the feeling of wanting additional challenges. Such challenging opportunities were important to help them overcome their fears and weaknesses, strengthen them, and improve their performance. A resident in the second year of training, for example, described her perceptions when she successfully completed her first total gastrectomy.

"He (supervisor) helped me lose my fear because in one way or another, one is always afraid ... during surgery, he told me "believe it!" It is a very nice satisfaction ... I feel that I will be ready for this [...] is something very rewarding for me and for him" (second year resident).

These challenges were related to the trust and autonomy received from their supervisors as well as with their motivation. In their perception, supervisors offered more challenges when they perceived more proactivity and desire of the resident to seek challenges. Through these opportunities, residents also gained power in the environment, value and autonomy, contributing to strengthening their meaning at work, performance, and intention to persist.

"What motivates me the most is that they (supervisors) allow me to increase my participation in complex surgeries because they recognize my potential and believe in my capabilities to perform more and more complex surgeries. During the last months, they have motivated me a lot (supervisors). I have to stay a lot of time in the hospital. If I have to arrive at the hospital at 3 AM, it does not matter; all that I want is to operate" (third year resident).

"I believe that one feels power ... That one has the ability, that if one is doing what one likes ... one feels a lot of power, and I feel able to finish (residency training)" (second year resident).

Discussion

Our study aimed to provide insights into the mechanisms that surgical residents use and value to optimize their demands and resources at the workplace to maintain their engagement and persist in training. These mechanisms illustrate residents' behaviors (building trust with supervisors, managing work proactively, seeking help from peers, seeing errors and frustrations as learning opportunities, finding a suitable work-life balance, and seeking challenges) and the supervisors' contributions to the ability of residents to handle demands and resources (earning the trust of residents, providing guidance and support, allowing residents to perform the tasks befitting a surgeon in training, and offering increasingly challenging tasks to residents).

Our type of research reveals other information in comparison with previous studies that have focused more on static programmatic and individual factors that promote attrition, but they reveal limitations in understanding persistence. The present findings show that persistence is an active process developed in the workplace, which depends on the proactive initiatives of residents. The findings are in line with previous studies, which demonstrate that proactivity is essential for the autonomy, responsibility, and participation of trainees in complex tasks⁵¹⁻⁵³ as well as to increase their supervision, adaptation, and socialization.⁵⁴ In these earlier studies, however, the concept of proactivity is conceptualized as individual attitudes and habits of mind related to reflexive self-assessments and feedback seeking behaviors in the trainees.^{51,54} Our study, however, offers a different perspective of proactivity beyond personal or individual habits and is focused on the ability of residents to manage the demands and resources at the workplace to achieve a sense of ownership and control and fits with the training and the environment.

The first six mechanisms illustrate this type of proactive person-environment fit behavior, in line with the concept of job-crafting. In particular, we observed permanent endeavors of residents to take advantage of structural and social resources in their daily work (e.g., by taking the initiative and autonomy, interacting with their supervisors and peers and nurturing trust with supervisors), to increase their participation and responsibility in-patient care (mechanisms 1-3), and to handle errors and frustrations (mechanism 4). Similarly, we observed proactive initiatives to increase challenging demands when engaging in complex tasks (mechanism 6) and to diminish hindrances, such as workload, pressure, and conflict (mechanisms 3-4) to achieve a suitable work-life balance (mechanisms 5). These endeavors, however, would not be fruitful without the contribution of supervisors. Our study highlighted that supervisors should treat residents respectfully and offer good support to strengthen their competence and confidence for independent practice (mechanisms 7-8), offer opportunities for meaningful participation (mechanism 9), and exposure to complex cases and challenges (mechanism 10). These mechanisms exemplify the resources that supervisors can offer at the workplace to encourage the residents to craft their jobs. Preliminary evidence supports the leadership of supervisors in this realm when they maintain

patient safety,^{37,55} enable learning,^{51,56} and cultivate trust with trainees.^{51,57} In this line of reasoning, we believe that job-crafting is crucial for the entrustment of professional activities at the workplace. From a theoretical stance, job-crafting can add new explanations to preliminary models describing how trust enables clinical participation and independent participation of residents in the patient care.⁵¹ In particular, the factors influencing a supervisor's trust in a trainee are related to the supervisor, trainee, the supervisor-trainee relationship, task, and context. Our results contributed to understand the role of job-crafting on these factors in a complex environment for training. For instance, resident's behaviors toward proactivity by increasing structural resources (e.g., seeking for autonomy and responsibility), social resources (e.g., seeking for supervision, feedback, and collaboration at the workplace), challenging demands (e.g., seeking for complex challenges), and diminishing hindrances at work, explain the contributions of trainees to the entrustment of professional activities. Similarly, supervisors' behaviors play a major role to strive the progressive entrustment of a wide range of complex tasks in surgical training, which ultimately also increases resident's job-crafting.

In addition, in our perspective, residents' job-crafting contributed to work engagement and persistence for several reasons. First, job-crafting can contribute to strengthening residents' motivation in the context of training. This observation is in line with the idea that work engagement is cultivated by interactions in the social context through the individual abilities to anticipate, change, and take control.⁵⁸ Second, job-crafting could strengthen the perception of residents about their own work as something meaningful. In our findings, for instance, we observed that residents' job-crafting was crucial to feeling valuable, responsible, and active on the surgical team. Previous research supports these findings,^{43,59} as well as the role of supervisors to encourage employees to move toward higher purposes and meaning.⁶⁰ Finally, resident's job-crafting is perceived to contribute to improving residents' performance and competence, especially when residents experience more autonomy and opportunities of participation in complex tasks. The preliminary research supports that resident's work engagement is related to their autonomy and competence.^{61,62}

To our knowledge, no other studies have shed light on the mechanisms developed by surgical residents to control the work environment in terms of engagement and persistence. The present study adds new insights from a positive stance and a qualitative perspective in that residents who are more proactive, able to build and maintain trust with their supervisors, or who see errors and frustrations as learning opportunities are more likely to stay in the program because they will experience greater work engagement. These findings open the door for new explanations of persistence or, on the other hand, attrition. Finally, considering that the JD-R model falls short of explanatory mechanisms to explain work engagement,^{42,43} we added first-hand information about these relationships from the surgical context. The study also entails limitations. We explored residents' perspectives of themselves and their supervisors but not those of supervisors. Similarly, our results are based on self-perceptions only

because we did not observe residents' behaviors at the workplace. Finally, we did not explore the influence of organizational and institutional issues on resident's job-crafting and work engagement. For instance, the level of specialized care, the type and amount of pressure for quality standards, and the culture and values at the organizational level might influence residents' job-crafting.

The study offers implications for practice. Our insights offer tools for residents and supervisors to actively intervene in the process of residents' persistence in training. This study highlights the mechanisms that residents recognize to control the environment and succeed in training. This information can contribute to residents' self-assessments and reflection on their proactivity and performance. In practice, job-crafting is more than an individual phenomenon,⁶³ thus modeling job-crafting behaviors in the residents can influence the job-crafting of other residents and indirectly the work engagement at the collective level. This form of dissemination of job-crafting behaviors can transform positively the work environment for training. Similarly, our observations reveal different dimensions of the residents' development and support to rethink coaching and mentoring strategies by faculty at the clinical workplace. In particular, our findings recognized the role of supervisors on the resident's ability to gain control at the workplace (resources and demands), to achieve ownership, and reach the intention to invest time and effort in their job. These findings have implications to support entrustment decisions at the workplace.

From the limitations, the present study also offers opportunities for further research and interventions to improve the surgical work environment for training. We call for studies focused on the perceptions of supervisors related with their ability to strengthen resident's job-crafting and work engagement (e.g., through empowerment, transformational, and servant styles of leadership) and those aimed to observe residents' job-crafting at the workplace (e.g., ethnographic studies). Similarly, job-crafting interventions can be developed and implemented to diminish burnout and increase work engagement.^{64,65} Particularly, job-crafting interventions, aimed to increase the resources at work (e.g., autonomy, supervision, feedback), have proved to be more effective than those to diminish demands or react to the stressors at the workplace (e.g., active coping).⁶⁴ Further research is needed on the effectiveness of these interventions in surgical training. Supervisors also deserve attention. For instance, interventions focused on developing the leadership abilities of supervisors⁶⁵ as well as on improving their clinical role to provide effective resources at the workplace (e.g., social support, feedback performance)⁶⁶ are areas of interest with regard to residents' work engagement.

In conclusion, our study provides new insights into the mechanisms that surgical residents use to effectively control the work environment for training, in line with the concept of job-crafting, to maintain their engagement, and persist in training. It also focuses on the resources provided by supervisors and how residents take advantage of them. Finally, this study offers a new perspective from a positive stance to understand residents' attrition and persistence and to conduct future interventions focused on work engagement.

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Disclosure

The authors reported no proprietary or commercial interest in any product mentioned or concept discussed in this article.

Supplementary data

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REFERENCES

1. Rovai AP. In search of higher persistence rates in distance education online programs. *Internet High Educ.* 2003;6:1–16.
2. Park CL, Boman J, Care WD, Edwards M, Perry B. Persistence and attrition: what is being measured? *J Coll Student Retent Res Theory Pract.* 2008;10:223–233.
3. Khoushhal Z, Hussain MA, Greco E, et al. Prevalence and causes of attrition among surgical residents: a systematic review and meta-analysis. *JAMA Surg.* 2017;152:265–272.
4. Hoyler M, Finlayson SRG, McClain CD, Meara JG, Hagander L. Shortage of doctors, shortage of data: a review of the global surgery, obstetrics, and anesthesia workforce literature. *World J Surg.* 2014;38:269–280.
5. Moris D, Karachaliou G-S, Pawlik TM, Nwomeh B. Attrition in general surgery residency: can global and rural surgery shift the paradigm? *J Surg Res.* 2018;224:166–168.
6. Bongiovanni T, Yeo H, Sosa JA, et al. Attrition from surgical residency training: perspectives from those who left. *Am J Surg.* 2015;210:648–654.
7. Wasserman MA. A strategy to reduce general surgery resident attrition: a resident's perspective. *JAMA Surg.* 2016;151:215–216.
8. Sullivan MC, Yeo H, Roman SA, et al. Surgical residency and attrition: defining the individual and programmatic factors predictive of trainee losses. *J Am Coll Surg.* 2013;216:461–471.
9. Yeo HL, Abelson JS, Symer MM, et al. Association of time to attrition in surgical residency with individual resident and programmatic factors. *JAMA Surg.* 2018;153:511–517.
10. Shaw C, Sarosi GA. Reducing surgical resident attrition. *JAMA Surg.* 2018;153:717–718.

11. Gifford E, Galante J, Kaji AH, et al. Factors associated with general surgery residents' desire to leave residency programs: a multi-institutional study. *JAMA Surg.* 2014;149:948–953.
12. Yeo H, Bucholz E, Ann Sosa J, et al. A national study of attrition in general surgery training: which residents leave and where do they go? *Ann Surg.* 2010;252:529–534.
13. Shweikeh F, Schwed AC, Hsu CH, Nfonsam VN. Status of resident attrition from surgical residency in the past, present, and future outlook. *J Surg Educ.* 2018;75:254–262.
14. Rangel EL, Smink DS, Castillo-Angeles M, et al. Pregnancy and motherhood during surgical training. *JAMA Surg.* 2018;153:644–652.
15. Freischlag JA, Silva MM. Preventing general surgery residency attrition - it is all about the mentoring. *JAMA Surg.* 2017;152:272–273.
16. Yaghoubian A, Galante J, Kaji A, et al. General surgery resident remediation and attrition: a multi-institutional study. *Arch Surg.* 2012;147:829–833.
17. Schwed AC, Lee SL, Salcedo ES, et al. Association of general surgery resident remediation and program director attitudes with resident attrition. *JAMA Surg.* 2017;152:1134–1140.
18. Yeo HL, Abelson JS, Mao J, et al. Who makes it to the end?: a novel predictive model for identifying surgical residents at risk for attrition. *Ann Surg.* 2017;266:499–507.
19. Carter JV, Polk HC, Galbraith NJ, et al. Women in surgery: a longer term follow-up. *Am J Surg.* 2017;216:189–193.
20. Brown EG, Galante JM, Keller BA, Braxton J, Farmer DL. Pregnancy-related attrition in general surgery. *JAMA Surg.* 2014;149:893–897.
21. Salles A, Lin D, Liebert C, et al. Grit as a predictor of risk of attrition in surgical residency. *Am J Surg.* 2017;213:288–291.
22. Symer MM, Abelson JS, Yeo HL, Sosa JA, Rosenthal MZ. The surgical personality: does surgery resident motivation predict attrition? *J Am Coll Surg.* 2018;226:777–783.
23. Quillin RC, Pritts TA, Hanseman DJ, Edwards MJ, Davis BR. How residents learn predicts success in surgical residency. *J Surg Educ.* 2013;70:725–730.
24. Abelson JS, Sosa JA, Symer MM, et al. Association of expectations of training with attrition in general surgery residents. *JAMA Surg.* 2018;153:712–717.
25. Kelz RR, Mullen JL, Kaiser LR, et al. Prevention of surgical resident attrition by a novel selection strategy. *Ann Surg.* 2010;252:537–541.
26. Gardner AK, Grantcharov T, Dunkin BJ. The science of selection: using best practices from industry to improve success in surgery training. *J Surg Educ.* 2018;75:278–285.
27. Hughes BD, Perone JA, Cummins CB, et al. Personality testing may identify applicants who will become successful in general surgery residency. *J Surg Res.* 2019;233:240–248.
28. Stephenson-Famy A, Houmard BS, Oberoi S, Manyak A, Chiang S, Kim S. Use of the interview in resident candidate selection: a review of the literature. *J Grad Med Educ.* 2015;7:539–548.
29. Domínguez LC, Stassen L, de Grave W, Sanabria A, Alfonso E, Dolmans D. Taking control: is job crafting related to the intention to leave surgical training? *PLoS One.* 2018;13:e0197276.
30. Salles A, Lin DT, Liebert CA, Esquivel M, Mueller C. Belonging, well-being, and attrition in general surgery. *J Am Coll Surg.* 2016;223:e40–e41.
31. Bell RM, Fann SA, Morrison JE, Lisk JR. Determining personal talents and behavioral styles of applicants to surgical training: a new look at an old problem, Part II. *J Surg Educ.* 2012;69:23–29.
32. Yoo PS, Tackett JJ, Maxfield MW, Fisher R, Huot SJ, Longo WE. Personal and professional well-being of surgical residents in new England. *J Am Coll Surg.* 2017;224:1015–1019.
33. Lee N, Appelbaum N, Amendola M, Dodson K, Kaplan B. Improving resident well-being and clinical learning environment through academic initiatives. *J Surg Res.* 2017;215:6–11.
34. Adams S, Ginther DN, Neuls E, Hayes P. Attitudes and factors contributing to attrition in Canadian surgical specialty residency programs. *Can J Surg.* 2017;60:247–252.
35. Ginther DN, Dattani S, Miller S, Hayes P. Thoughts of quitting general surgery residency: factors in Canada. *J Surg Educ.* 2016;73:513–517.
36. Elmore LC, Jeffe DB, Jin L, Awad MM, Turnbull IR. National survey of burnout among US general surgery residents. *J Am Coll Surg.* 2016;223:440–451.
37. Teman NR, Gauger PG, Mullan PB, Tarpley JL, Minter RM. Entrustment of general surgery residents in the operating room: factors contributing to provision of resident autonomy. *J Am Coll Surg.* 2014;219:778–787.
38. Forel D, Vandeppeer M, Duncan J, Tivey DR, Tobin SA. Leaving surgical training: some of the reasons are in surgery. *ANZ J Surg.* 2018;88:402–407.
39. Wild JRL, Ferguson HJM, McDermott FD, Hornby ST, Gokani VJ. Undermining and bullying in surgical training: a review and recommendations by the association of surgeons in training. *Int J Surg.* 2015;23:S5–S9.
40. Ling M, Young CJ, Shepherd HL, Mak C, Saw RPM. Workplace bullying in surgery. *World J Surg.* 2016;40:2560–2566.
41. Bakker AB, Demerouti E, Sanz-Vergel AI. Burnout and work engagement: the JD–R approach. *Annu Rev Organ Psychol Organ Behav.* 2014;1:389–411.
42. Wang H, Demerouti E, Bakker AB. A review of job crafting research: the role of leader behaviors in cultivating successful job crafters. In: Sharon K, Parker UKB, eds. *Proactivity at Work: Making Things Happen in Organizations*. 1st ed. New York: Routledge; 2016:77–104.
43. Bakker AB, Demerouti E. Job demands-resources theory: taking stock and looking forward. *J Occup Health Psychol.* 2017;22:273–285.
44. Hennink MM, Hutter I, Bailey A. *Qualitative research methods*. London: SAGE; 2011:304.
45. Watling CJ, Lingard L. Grounded theory in medical education research: AMEE Guide No. 70. *Med Teach.* 2012;34:850–861.
46. Ramani S, Könings KD, Mann K, van der Vleuten CPM. A guide to reflexivity for qualitative researchers in education. *Acad Med.* 2018;93:1257.
47. Tracy SJ. Qualitative quality: eight a“big-tent” criteria for excellent qualitative research. *Qual Inq.* 2010;16:837–851.
48. Creswell JW. Qualitative inquiry & research design: choosing among five approaches. *Australas Emerg Nurs J.* 2007;11:100.
49. Santos HPO, Black AM, Sandelowski M. Timing of translation in cross-language qualitative research. *Qual Health Res.* 2014;25:134–144.
50. van Nes F, Abma T, Jonsson H, Deeg D. Language differences in qualitative research: is meaning lost in translation? *Eur J Ageing.* 2010;7:313–316.
51. Hauer KE, ten Cate O, Boscardin C, Irby DM, Iobst W, O'Sullivan PS. Understanding trust as an essential element of trainee supervision and learning in the workplace. *Adv Health Sci Educ.* 2014;19:435–456.
52. Ten Cate O, Chen HC, Hoff RG, Peters H, Bok H, Van Der Schaaf M. Curriculum development for the workplace using entrustable professional activities (EPAs): AMEE guide No. 99. *Med Teach.* 2015;37:983–1002.
53. Ten Cate O, Hart D, Ankel F, et al. Entrustment decision making in clinical training. *Acad med.* 2016;91:191–198.
54. Crommelinck M, Anseel F. Understanding and encouraging feedback-seeking behaviour: a literature review. *Med Educ.* 2013;47:232–241.

55. Sandhu G, Magas CP, Robinson AB, Scally CP, Minter RM. Progressive entrustment to achieve resident autonomy in the operating room: a national qualitative study with general surgery faculty and residents. *Ann Surg.* 2017;265:1134–1140.
56. Duijn CCMA, Welink LS, Bok HGJ, Ten Cate OTJ. When to trust our learners? Clinical teachers' perceptions of decision variables in the entrustment process. *Perspect Med Educ.* 2018;7:192–199.
57. Sheu L, Kogan JR, Hauer KE. How supervisor experience influences trust, supervision, and trainee learning. *Acad Med.* 2017;92:1320–1327.
58. Cook DA, Artino AR. Motivation to learn: an overview of contemporary theories. *Med Educ.* 2016;50:997–1014.
59. Berg JM, Dutton JE, Wrzesniewski A. Job crafting and meaningful work. In: Dik BJ, Byrne ZS, Steger MF, eds. *Purpose and meaning in the workplace.* 1st ed. USA: American Psychological Association; 2013:81–104.
60. Rosso BD, Dekas KH, Wrzesniewski A. On the meaning of work: a theoretical integration and review. *Res Organ Behav.* 2010;30:91–127.
61. Scheepers RA. Physicians' professional performance: an occupational health psychology perspective. *Perspect Med Educ.* 2017;6:425–428.
62. Scheepers RA, Arah OA, Heineman MJ, Lombarts KM. In the eyes of residents good supervisors need to be more than engaged physicians: the relevance of teacher work engagement in residency training. *Adv Health Sci Educ Theory Pract.* 2014;20:441–455.
63. Bakker AB, Rodriguez-Muñoz A, Sanz Vergel A. Modelling job crafting behaviours: implications for work engagement. *Human Relat.* 2015;69:169–189.
64. Demerouti E. Strategies used by individuals to prevent burnout. *Eur J Clin Invest.* 2015;45:1106–1112.
65. Bakker A. Strategic and proactive approaches to work engagement. *Organ Dyn.* 2017;46:67–75.
66. van den Berg JW, Mastenbroek NJJM, Scheepers RA, Jaarsma ADC. Work engagement in health professions education. *Med Teach.* 2017;39: 1110–1118.