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INVESTIGATIONS



Workplace Causality Orientations Moderate Impostorism and Burnout: New Insights for Wellness Interventions in Graduate Medical Education

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ABSTRACT

Theory: Impostor phenomenon (IP) is strongly linked to physician burnout, but the nature of this association is not well understood. A better grasp of the mechanism between these constructs could shed new light on ways to mitigate physician IP and burnout. Grounded in self-determination theory (SDT), the present study explores whether and how residents' general causality orientations at work—impersonal, controlled, and autonomous—each moderate the effect of IP on physician burnout. **Hypotheses:** We theorized that the autonomous orientation would buffer the facilitative effect of IP on burnout, while the controlled and impersonal orientations would each enhance it to varying degrees. **Method:** Two hundred forty-three residents from the Universities of Saskatchewan, Calgary, and Alberta, across various programs, specialties, and years of training, completed a survey containing demographic questions and three previously validated instruments: the Clance Impostor Phenomenon Scale, Causality Orientations at Work Scale, and Oldenburg Burnout Inventory. We used partial correlation analyses to test our moderation hypotheses. **Results:** In line with what we expected, the autonomous causality orientation buffered the facilitative effect of IP on burnout, while the controlled and impersonal causality orientations each enhanced it. **Conclusions:** Results suggest that possessing a stronger autonomous causality orientation (and creating learning/work environments that prime it) will dampen the effect of IP on burnout, while possessing a stronger controlled or impersonal causality orientation (and creating learning/work environments that prime them) will each augment it. Findings and their implications are discussed in terms of instigating theory-informed, system-level wellness interventions in graduate medical education.

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Introduction

Few learning environments are more inviting of impostor phenomenon (IP) and burnout than in medical education. Between hyper-competition, content density, assessment overload, daunting clinical schedules, and transitioning to a professional role, medical learners are at high risk for both.¹ Studies have investigated the prevalence and determinants of IP and burnout among physicians, including how various demographic factors might relate.^{2,3} The mechanism between these two constructs, however, is still not well understood—only that IP and burnout tend to co-exist.^{4,5} Moreover, one study found no association

between resident IP and burnout,³ suggesting a potential indirect relationship. Research to elucidate this mechanism has been called for in the medical education literature.^{3,5} Applying self-determination theory's (SDT) motivation framework, the present investigation aims to address that call by assessing whether individual differences in self-determination (general causality orientations—impersonal, controlled, and autonomous) moderate the relationship between IP and burnout. Findings stand to help us understand why only some residents who experience IP go on to develop burnout, and what residency programs can do, within the learning environment, to mitigate that process.

IP and burnout

IP refers to the experience of feeling like an intellectual fraud. It was originally defined by Clance and Imes, and has three main aspects—discounting achievements, attributing success to luck, and feeling like a fake—which are essentially internal judgments and negative self-talk.⁶ Research on IP shows that at least 60% of medical learners are affected by it,⁷ and that IP is among the strongest predictors of their distress, across undergraduate and graduate medical programs.^{2,3,8} This is particularly relevant for residents (graduate medical trainees), however, as their training is highly demanding, with strenuous workload/working hours, and an expectation for self-direction and self-regulation that is not always supported by graduate programs' curricular structure. Consequently, IP can predispose residents to burnout,⁹⁻¹⁰ a state of exhaustion and disengagement that stems from a mismatch between one's job demands and resources to manage them.¹¹

In 2017, a national survey by the Canadian Medical Association (CMA) found that 34% of residents were severely burnt out.¹² A more recent systematic review and meta-analysis of over 30,000 residents from 47 countries showed the prevalence of burnout to be closer to 47%.¹³ Like the CMA and others,^{14,15} we emphasize the urgent need to improve learning/work environments in residency education. While the learning/work environment is known to be the main driver of burnout (rather than individual attributes), there

is a lack of consensus on how best to address this issue.^{13,16} This is where motivation theories can be helpful; they focus on the interaction between individual and environment, and what people need to function optimally.

Self-determination theory

Self-determination theory (SDT) concerns itself with the social conditions that promote and forestall people's motivation, development, and well-being.¹⁷ This theory identifies three broad types of social contexts—amotivating, controlling, and autonomy-supportive—that affect how people orient to their environment and regulate their behaviour in response (see Figure 1). SDT refers to these orientations as general causality orientations—impersonal, controlled, and autonomous—each arising from the above environments and differing in their degree of self-determination. Although these three orientations exist within an individual to a certain extent and are considered relatively enduring aspects of an individual's personality, each can be socialized and primed, or “brought forward,” and therefore vary in strength across particular contexts (e.g., at home or at work). When any one of these orientations is primed, it can significantly affect a person's experiences and well-being, even if that orientation is, in general, relatively weaker within the individual.

When individuals perceive their environment as uncontrollable (when they sense little or no ability to

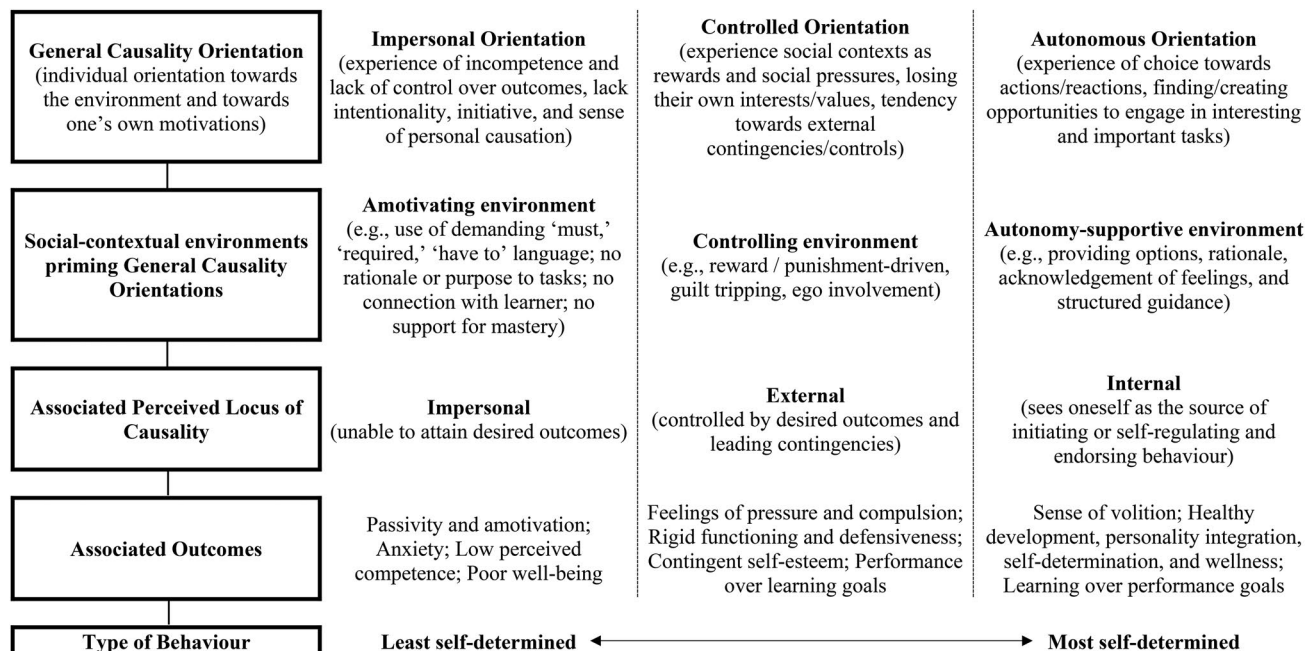


Figure 1. Association of social context, general causality orientation, perceived locus of causality, and outcomes.

affect desired outcomes), they will tend to feel ineffective, lack motivation, and focus on the obstacles that prevent them from achieving their goals. This type of context will tend to prime the *impersonal* causality orientation, which corresponds to amotivation and a perceived locus of causality (PLOC; perceived cause for one's own behaviour¹⁸) that is relatively inert. For example, an impersonal-oriented individual might feel like an impostor but just accept that as their reality, resigning to the stress and exhaustion that it brings. In line with this idea, studies show that the *impersonal* causality orientation is associated with having an external locus of control (i.e., belief that external forces, and not oneself, are more responsible for events in one's life), low self-esteem, emotion dysregulation, and behavioural disengagement.¹⁹

In contrast, when social contexts are perceived as controlling (where incentives, threats, and punishments are introduced into environments), individuals will tend to focus on rewards, gains, and approval. This kind of context will tend to prime the *controlled* causality orientation, which corresponds to a more external PLOC (E-PLOC; where desired outcomes and the contingencies they bring are the main drivers of behaviour). For instance, a control-oriented resident might study for a clinical rotation mainly to reduce performance anxiety, impress their staff, and achieve a strong evaluation. This kind of externally regulated or "controlled" motivation tends to produce stress and ill-being because of how pressuring and psychologically taxing it is.²⁰ Studies show, for example, that control-oriented individuals tend to respond to stressors in rigid ways and regulate negative emotions by suppressing and hiding them from others,²¹ making them more prone to fatigue and maladjustment.²² A control-oriented person might thus try to cope with IP by perpetually "out-working" it to prove their competence to others and to themselves.

In social contexts where individuals perceive support for their autonomy (i.e., where rationales for tasks, acknowledgements of feelings, options and structured guidance are offered), they will tend to orient to their environment out of interest, and to see possibilities for choices and self-regulation. This context will thus tend to prime the *autonomous* causality orientation, which is associated with having a more internal PLOC (I-PLOC; belief that one is the initiator and sustainer of one's own actions). This causality orientation correlates with types of motivation that are more internally regulated or "autonomous" (based on personal importance, interest, and joy), which facilitate better learning, performance, and well-being outcomes. For example, an autonomy-

oriented resident might study a certain topic, even if they dislike it, mainly because of its potential importance and value. These individuals are known to take an active interest in processing their emotions, whether positive or negative,²² which enables them to better integrate experiences and overcome adversity.²³ An autonomy-oriented resident might thus try to understand their impostor feelings, in a non-judgmental way, rather than avoid or resign to them.

Current study

General causality orientations are known to moderate outcomes that are important in medicine, including people's creativity and well-being,²⁴ subjective vitality,²⁵ and risk for stress and burnout.²⁶ To date, however, no studies have investigated whether these orientations moderate the link between IP and burnout. A study on medical students did report a positive association between the impersonal orientation and IP symptoms.²⁷ However, the authors found no relation between the controlled and autonomous orientations and IP symptoms, suggesting that these two orientations might play more of a role in shaping one's response to IP and subsequent risk for ill-being. The present study tests this hypothesis within the residency education context. Findings could help explain why only some residents who experience IP also develop burnout. They may therefore serve as a guide for medical educators in creating theory-informed wellness interventions that address the learning/work environment, to mitigate that process.

Based on studies in the SDT and medical education literature, we hypothesized that:

1. Resident IP and burnout would positively correlate.
2. The autonomous orientation would buffer the facilitative effect of IP on burnout.
3. The controlled orientation would enhance the facilitative effect of IP on burnout.
4. The impersonal orientation would also enhance the facilitative effect of IP on burnout, and to a greater extent than controlled orientation.

Methods

Procedure

Approval was obtained from the Research Ethics Board at the University of Saskatchewan (# 3245) and

Universities of Calgary and Alberta (#23-0469). All residents were invited to complete an anonymous online survey, using Qualtrics, distributed *via* 3rd party email address and online resident newsletter. The survey was sent in October 2023 and was open for eight weeks, with one reminder on Week 4. It contained demographic questions about gender, medical program, and year of training, followed by three scales (see *Measures*). Participation implied residents' free and informed consent, and all were given the option to enter their email into a random draw (not linked to survey responses), to possibly win one of four \$50 Starbucks gift cards.

Participants

In total, 291 out of approximately 1,200 residents (24.3%) participated in the survey. However, only surveys with at least one completed scale were assessed. Thus, 48 surveys (16.4%) were excluded, leaving a final sample of 243 participants (20.2%). A minimum sample size of 160 was considered sufficient, based on a 20 observations per predictor rule.²⁸ Table 1 provides a detailed sample breakdown.

Measures

The Clance Impostor Phenomenon Scale (CIPS) is a 20-item instrument that measures the degree to which individuals are experiencing IP.²⁹ We received

permission to use it in this research. The CIPS uses a 5-point Likert scale from 1 (not at all true) to 5 (very true), where higher scores indicate more frequent and severe symptoms. This scale has been validated and shown to have a stable three factor structure,³⁰ and is among the most used measures of IP, with good reliability estimates in studies of medical students and residents.³¹ In most studies, however, an aggregated CIPS score is used, where symptom scores under 40 indicate mild, 41-60 indicate moderate, 61-80 indicate severe, and 81-100 indicate intense IP.³¹ In this study, we computed a total CIPS score for each resident, and used the conservative score of 61 or greater³¹ to determine the prevalence of IP among the residents in the sample.

The Causality Orientations at Work Scale (COWS) measures the strength of the three motivational orientations within an individual in the work setting: impersonal, controlled, and autonomous.³² It is freely available online, and has previously been validated and shown good reliability in studies of various adult populations, including medical learners.³³ The COWS consists of 11 vignettes, each presenting 3 different options to rate how one would most likely respond, using a 7-point Likert scale from 1 (very unlikely) to 7 (very likely). Hence, there are three subscales—one for each orientation—and a person receives a score on each. We adapted the wording from “manager” to “preceptor” (an experienced physician who supervises residents), to best represent the workplace context in residency. An example vignette is: “Imagine: your preceptor suggests new routines to improve work performance. You will probably think/feel: A) It will be important for me to try this to see if it improves my work (autonomous); B) I have to do this to satisfy my preceptor (controlled); and C) I will be afraid I won't be able to manage the tasks (impersonal). We computed mean scores for each subscale, where higher scores indicate a stronger workplace causality orientation of that type.

The Oldenburg Burnout Inventory (OLBI) is a 16-item scale measuring the degree to which individuals are afflicted by occupational burnout. It is freely available online and has two subscales—exhaustion and disengagement—each validated and used with residents.³⁴ The OLBI uses a 4-point Likert scale from 1 (strongly agree) to 4 (strongly disagree) and participants indicate how much they experience burnout in their daily lives. Scores range from 16 to 64, where higher scores indicate more severe burnout. We used a score of 35 or greater³⁵ to determine the prevalence of burnout in the sample, and aggregated total mean OLBI scores for our analyses.

Table 1. Participant characteristics (N=243).

		n (%)
University	Saskatchewan	96 (39.5)
	Calgary	79 (32.5)
	Alberta	68 (28.0)
Gender	Woman	187 (77.0)
	Man	53 (21.8)
	Non-binary	2 (0.8)
	Prefer not to answer	1 (0.4)
Year in Program	Year 1	104 (42.8)
	Year 2	65 (26.7)
	Year 3	36 (14.8)
	Year 4	17 (7.0)
	Year 5	21 (8.6)
Program	Family medicine	91 (37.4)
	Surgery (general and specialties)	36 (14.8)
	Pediatrics (general and specialties)	33 (13.6)
	Internal medicine (general and specialties)	16 (6.6)
	Anesthesia	11 (4.5)
	Psychiatry	10 (4.1)
	Radiology	10 (4.1)
	Emergency medicine	8 (3.3)
	Other direct entry programs (e.g., neurology, pathology, psychiatry)	28 (11.5)

Note: in Canada, the Family Medicine residency program is two years plus the option to complete a third “enhanced skills” year. All other residency programs are five years.

Analyses

We computed means, standard deviations, and Cronbach alpha reliability estimates for all variables. We then calculated the prevalence of IP and burnout in the sample. Data from all 243 participants were included in analyses, regardless of whether they met the IP and burnout criteria, as the study aimed to determine how different levels of IP related to different levels of burnout, and how different workplace causality orientations influenced that relationship. Following these steps, all continuous variables were standardized, and relationships were assessed using Pearson correlation coefficients. We then used partial correlation for our main analyses, which is a measure of the strength and direction of a linear relationship between two continuous variables, while controlling for the effect of one or more other continuous variables.³⁶ This approach allowed us to examine how the relationship between IP and burnout changes based on the addition or removal of a moderator(s)—in this case, each workplace causality orientation.

Results

In total, 226 residents (93.0%) completed the CIPS: 4 (1.7%) reported mild IP symptoms, 70 (30.9%) reported moderate symptoms, 117 (51.7%) reported severe symptoms, and 35 (15.4%) reported intense symptoms. The prevalence of IP was therefore 67.2%. For occupational burnout, 227 (93.4%) completed the OLBI, and 151 scored 35 or greater. The prevalence of occupational burnout was therefore 66.5%.

Table 2 presents the means, standard deviations, and Pearson correlation coefficients for the main study variables. Results showed that IP and burnout positively correlated, the controlled and impersonal causality orientations positively correlated with IP and burnout, and the autonomous causality orientation negatively related to these factors. The Cronbach

alphas for the IP, causality orientation, and burnout variables ranged from .79 to .91, which were considered satisfactory.

Next, we assessed the partial correlation between IP and burnout when controlling for the interaction between IP x workplace causality orientation. This allowed us to isolate the potential moderating effect of each orientation in the link between IP and burnout.

IP and burnout (H_1)

We first determined, based on the zero-order correlation between IP and burnout ($r = .449$, $p < .001$), that IP accounted for 20.2% of the variance in residents' burnout symptoms. The direction and strength of this association aligned with a priori hypotheses and informed the following analyses.

IP, autonomous orientation, and burnout (H_2)

Second, when the IP x autonomous interaction was controlled for, the adjusted relationship between IP and burnout was strengthened ($r = .571$, $p < .001$). This was consistent with a partial moderation and equated to an R^2 increase of .122, which was a medium effect. The autonomous causality orientation therefore buffered the facilitative effect of IP on burnout by 12.2%.

IP, controlled orientation, and burnout (H_3)

Third, when we controlled for the IP x controlled interaction, the adjusted relationship between IP and burnout was weakened ($r = .159$, $p = .024$). This again was consistent with a partial moderation and equated to an R^2 decrease of .290, which was a medium-large effect. The controlled causality orientation thus augmented the facilitative effect of IP on burnout by 29.0%.

Table 2. Means, standard deviations, and intercorrelations of study variables.

	1	2	3	4	5
1. IP	—				
2. Aut	−0.12*	—			
3. Con	.46***	−0.19***	—		
4. Imp	.35***	−0.47***	.46***	—	
5. Burn	.44***	−0.41***	.37***	.49***	—
Mean	67.1	5.2	4.4	2.3	40.3
Std. Dev.	13.2	.9	1.0	.9	7.4

IP: impostor phenomenon; Aut: autonomy general causality orientation; Con: controlled general causality orientation; Imp: impersonal general causality orientation; Burn: aggregated burnout.

* $p < .10$.

** $p < .05$.

*** $p < .01$.

IP, impersonal orientation, and burnout (H_4)

Lastly, we determined that when the IP x impersonal interaction was controlled for, the adjusted relationship between IP and burnout was weakened ($r = .192$, $p = .006$). This again was consistent with a partial moderation, this time with an R^2 decrease of .257. This equated to a large effect, similar in direction and magnitude to the controlled orientation. The impersonal causality orientation therefore augmented the facilitative effect of IP on burnout by 25.7%.

Discussion

Informed by SDT, this study investigated the mechanism between IP and burnout, and the influence of residents' motivational orientation to their learning/work environment. More specifically, we looked at whether and how different general causality orientations at work (impersonal, controlled, and autonomous) would moderate the facilitative effect of IP on burnout. Below, we discuss how the results address our proposed hypotheses, the implications of our findings, and the study's strengths and limitations, with suggestions for future research.

In assessing the prevalence of IP and burnout in this study, several key findings were apparent. First, close to 70% of residents not only met the conservative CIPS criteria for IP but endorsed severe or intense symptoms, which are considered very bothersome and detrimental to well-being.²⁹ These results parallel other studies in the medical education and IP literature.^{2,7,9,37} Additionally, about 65% of the residents met the OLBI criteria for burnout, which has also been documented in the literature.^{3,16,38} These findings are troubling and highlight the ongoing need for urgent action by medical leaders to improve the learning/work environment.

Next, we assessed the relationships between the study variables. In line with Hypothesis 1, and results from prior studies,^{4,5} IP positively related to burnout. Along with Hypotheses 2, 3, and 4, we then observed that the autonomous causality orientation buffered the facilitative effect of IP on burnout, while the controlled and impersonal causality orientations enhanced this effect. These results suggest that possessing a stronger autonomous orientation (and creating learning/work environments that prime it) can facilitate an adaptive response to IP that shields residents from burnout, while possessing a stronger controlled or impersonal orientation (and creating environments that prime them) can facilitate a maladaptive response to IP that increases risk for burnout. These findings extend prior research by linking all three causality orientations to

IP and burnout in medical learners—autonomous being protective, and controlled and impersonal being harmful.²⁷ They also support the predictive utility of these motivational orientations,³⁹ which help us better understand how residents perceive the clinical work environment, and function within it.

Interestingly, the controlled orientation was the strongest correlate of IP, and moderator of the relation between IP and burnout. We expected the impersonal orientation to take the lead, due to its link to having an external locus of control, which “impostors” seem to have.⁴⁰ Upon reflection, however, the controlled orientation being the strongest moderator made sense: it is more taxing to regulate one's behaviour on the basis of controlled motivation, and to constantly avoid negative emotions like IP, than it is to just resign to those emotions,^{21,22} which an impersonal-oriented (i.e., amotivated) person will tend to do.^{39,41} Clance and Imes claimed to be amazed by the self-perpetuating nature of the impostor feelings people have, with “discounting of achievements, fears of failure, and an inability to break the cycle, despite repeated successes.”^{6(p.242)} They also described “impostors” as being strongly motivated to prove themselves and others wrong, and to overcome IP, where they would work incessantly to prevent the “discovery” of their phoniness and gain the approval of others.^{6(p.244)} This is precisely, as SDT outlines, what control-oriented individuals will most concern themselves with: rewards, gains, and what other people might think.³³

Research in SDT shows that autonomy-supportive work environments promote engagement, confidence, and well-being,^{42,43} which are essentially the opposite of IP and burnout. In turn, autonomy-oriented individuals will tend to be more resilient in the face of stress, due to having a more I-PLOC for behavior. Conversely, control- and impersonal-oriented individuals will tend to respond to challenges and setbacks in more defensive or passive ways, due to having a more E-PLOC or inactive PLOC, respectively.³⁹ This is because individuals with a more I-PLOC generally feel more self-determined, exert greater effort, and experience more satisfaction in performing an activity than those with a more inactive or E-PLOC.^{18,44} These differences explain why residents who perceive more autonomy at work might deal with IP more effectively (thus preventing burnout) than residents who perceive less autonomy, or no autonomy at all.

Implications for graduate medical education

Competency-based medical education intends to place greater ownership of learning with residents, create more

opportunities for observation and feedback, and outline stages of resident progress.^{45,46} The reality, however, is that not all residents will internalize that responsibility the same way, and this model has not necessarily resulted in autonomously motivated or “well” residents.⁴⁷ Whether because the concepts of autonomy and independence continue to be confused by medical educators,^{48,49} and/or because gaps remain between what medical educators envisioned and designed, what is being delivered, and what residents truly need and experience in their training, discords still seem to exist between what staff and learners perceive as autonomy.^{50,51}

Our findings suggest that medical programs can address this issue and mitigate resident burnout by (i) supporting their residents’ autonomous motivation, and being explicit of the curriculum designed around it, and (ii) addressing aspects of the clinical environment that prime the controlled and impersonal causality orientations. In line with other studies on the culture of perfectionism and shame in medical education,^{52–53} our results also imply that *how* residents respond to IP matters when it comes to their mental health and risk for experiencing burnout. Another consideration for residency programs is therefore to (iii) create safe spaces for residents to learn about IP and how common it is, so they identify and respond to it more adaptively.

Limitations and future directions

This study has several limitations. First, it used surveys and self-report measures, which may lend to social desirability bias. Second, the correlational and cross-sectional design prevents causal conclusions. Researchers may thus wish to explore how causality orientations moderate the link between IP and burnout over time, or the link between IP and other outcomes, such as the pursuit of perfection vs. excellence.⁵⁴ Third, despite the medium-large effect sizes, the strengths of the moderations were not overly high in this study, suggesting that more proximal environmental factors might be involved in the mechanism between IP and burnout, which future studies could assess. That said, causality orientations tend to have relatively small effects on people’s motivation, behaviour, and well-being,⁵⁵ and we only assessed the effect of each orientation separately, which likely accounted for less variance in residents’ IP and burnout than the three orientations would, together. While non-response bias is always a possibility with surveys, the residents’ mean CIPS and OLBI scores were similar to others in medical education.⁴

We attempted to minimize these limitations in several ways. We grounded our hypotheses in well-established theory (SDT), and used validated and reliable scales (CIPS, COWS, and OLBI) that were specific to our research questions. The specificity of the COWS may have accounted for the significant correlations in this study—between the three causality orientations and IP—that were not seen in prior studies that used the GCOS.²⁷ We also collected data from residents across a variety of backgrounds, specialties, programs, and stages of training, which brings different experiences and perspectives on IP and burnout. These aspects strengthen the findings and their generalizability.

Conclusion

In this study, general causality orientations moderated the association between resident IP and burnout. Residents with a more autonomous workplace orientation appear to be protected from IP and burnout, whereas residents with a more controlled or impersonal workplace orientation appear to be worse off. These findings align with SDT and suggest that learning/work environments that support vs. hinder residents’ self-determination will shape their motivational response to IP and, in turn, their risk for experiencing burnout. Wellness interventions should therefore aim to maximize autonomy support in clinical learning environments, and minimize counterproductive aspects that are controlling and amotivating.

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Authors’ contributions

AN and GM contributed to the study’s original design. Ethics approval and data collection were facilitated by AN, GM, and OB. Data analysis and writing of the first draft of the manuscript were done by AN. All four authors met to review and discuss preliminary findings, and all reviewed initial versions and approved the final manuscript.

Disclosure statement

The authors declare no conflicts or financial interests in the research, and that all procedures contributing to this work comply with the ethical standards of the relevant institutional committees.

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Data availability statement

The data from this study can be made available upon reasonable request.

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