

Motivational Mechanisms Underlying Physicians' Occupational Health: A Self-Determination Theory Perspective

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Abstract

Numerous studies have documented deteriorating occupational health among practicing physicians. This trend poses a serious risk not only for physicians but also for the many patients under their care. Past research finds that one protective factor involves the quality of physicians' motivation. When physicians are more autonomously motivated, they tend to experience better occupational health. However, few studies have identified antecedent factors that support physicians' autonomous work motivation. To identify and model potential root causes of physicians' autonomous work motivation and occupational health, the current study assessed physicians' intrinsic aspirations and need satisfaction at work. Hypotheses were tested in a sample of 2,116 U.S. practicing physicians. Structural equation modeling showed that physicians who endorsed intrinsic aspirations more strongly reported better occupational health, and that this association was mediated by physicians' need satisfaction and autonomous work motivation. Implications for designing more effective individual- and system-level interventions to improve physician occupational health are discussed.

Keywords

intrinsic aspirations, occupational health, psychological need satisfaction, autonomous work motivation

The work that physicians do is socially valued and personally vitalizing. Yet a large and growing body of evidence reveals physicians' occupational health at serious risk (Chen et al., 2019; *The Lancet* Editorial, 2019), and particularly, in the United States (Thomas et al., 2018). Occupational health can be viewed as a broad set of mental, physical, and behavioral health indicators tied to work. While estimates of physicians' work-related burnout and depression vary as a function of assessment methods and study quality (Rotenstein et al., 2018), many larger and more rigorous studies find that physicians report high levels of both (Shanafelt et al., 2015; Shanafelt et al., 2019). Poor occupational health among practicing physicians is also observed in trainees. Meta-analyses have found elevated prevalence of depression or depressive symptoms among resident physicians (28.8%: ranging from 20.9% to 43.2%; Mata et al., 2015), as well as elevated risk for depression or depressive symptoms (27.2%) and suicidal ideation (11.1%) among medical students (Rotenstein et al., 2016).

Guided by conservation of resource theory, a recent systematic review by Williams et al. (2020) framed physician burnout as a dynamic loss spiral that unfolds over time (i.e., a "burnout cascade"). They found that one component of burnout, emotional exhaustion, had the greatest impact on

downstream occupational health outcomes, relative to other components of burnout (depersonalization and lack of professional accomplishment). In addition to outcomes directly experienced by physicians (distress and despair), Williams et al.'s systematic review looked at a physician's work activity, finding associations between burnout and reduced empathy for patients, declining to take on activities beyond their basic practices, and higher intentions to leave their job or their profession. Fewer studies have investigated whether a negative association exists between physician burnout and quality of patient care, and those studies have produced mixed findings.

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A 2017 systematic review reported moderate evidence linking physician burnout with safety-related quality of care, and mixed support linking burnout with patient acceptability-related quality of care (Dewa et al., 2017). Another 2018 systematic review by Rathert et al. (2018) found physicians' self-reported burnout was correlated with self-reported errors, but now with independent clinical outcomes. Similarly, Rathert et al.'s review found that burnout was related to lower patient ratings of care, but not with specific behaviors.

Collectively, the literature suggests that physician burnout is a problem that has cascading, and potentially wide-ranging implications, especially for physicians themselves, and potentially for patients too. For these reasons, Noseworthy et al. (2017) have called physician burnout a public health crisis, and called on health system leaders to invest more resources toward studying and addressing this growing problem. As Shanafelt et al. (2017) pointed out, there are both moral and economic arguments for investing more resources into protecting physicians' well-being—but how should those resources be invested?

Unfortunately, past investments in physicians' occupational health have had relatively limited effectiveness. Most interventions have been short in duration and focused at the individual-level (e.g., mindfulness-based stress reduction trainings; Krasner et al., 2009), returning short-term benefits. In recognition of these limitations, an expert panel convened by the National Academies of Sciences, Engineering, and Medicine (2019) recently concluded that system-level (rather than individual-level) reforms are needed to improve physicians' deteriorating occupational health. This report outlines many specific reforms that could be considered. While expansive in scope, the National Academies report lacked any overarching theoretical framework to guide both understanding and implementation. A well-developed, empirically supported theory can: support cohesive, big picture thinking; facilitate knowledge transfer from past research contexts; and help researchers identify promising new hypotheses. Furthermore, applying a well-developed theory can facilitate the task of evaluating and refining complex, and typically slow-moving, system-level interventions or changes. While physicians' occupational health (and ultimately population health) may be the primary target of a system-level intervention, the effect of a system-level change may take months or years to unfold; more proximal psychological variables identified by a well-developed theory may be swifter to change, providing opportunities for ongoing evaluation and optimization.

New Contributions

The present research fills important gaps by introducing a macro-theory of human motivation, self-determination theory (SDT), as a framework for understanding physicians' occupational health, and by testing a series of SDT-informed hypotheses. One of the SDT-informed hypotheses tested relates to a claim that health care professionals have widely

asserted for decades using only intuition and anecdotal evidence (Peabody, 1927; Schwenk, 2018). That is, many have claimed that intrinsic aspirations (i.e., life goals that include helping others and personal growth) fundamentally support the occupational health of physicians. The current research evaluates several models linking physicians' intrinsic aspirations to occupational health. Specifically, based on SDT, physicians' intrinsic aspirations, and psychological need satisfaction at work were identified as potential antecedents of autonomous motivation and occupational health, and modeled using a large and representative sample of working U.S. physicians. This empirical, cross-sectional investigation represents an important step toward providing justification for significant future investments in costly implementation of multilevel interventions designed to promote physicians' occupational health, and longitudinal assessments of their effectiveness. In the general discussion, we offer suggestions for how our findings could be used by health services researchers, policy makers, managers, and practitioners interested in promoting physicians' occupational health and achieving maximum return on investment.

Theory

Self-Determination Theory, Work Motivation, and Occupational Health

SDT (Deci & Ryan, 2000; Ryan & Deci, 2017) is a motivational macro theory that has gained wide attention in organizational psychology in terms of explaining the implications of work environments and work characteristics on employees' motivation, work functioning, and occupational health (for a review, see Olafsen & Deci, 2020). In particular, SDT's important contribution to this field lies in its focus on goals, basic psychological needs, and qualities of motivation as central organizing principles explaining the implications of individual- and system-level work factors on workers' functioning and well-being.

One of the major distinctions drawn by SDT is between two qualities of motivation: autonomous and controlled (Ryan & Deci, 2017). Autonomous motivation is characterized by feeling free and fully endorsing one's actions. By contrast, controlled motivation is characterized by feeling pressured by external or internal forces. Both forms have the potential to very powerfully motivate human behavior and, in many contexts, each have fueled high-level achievements. That said, decades of research findings suggest that autonomous motivation is frequently more adaptive than controlled motivation in a variety of ways—in particular, not only in terms of associated mental and physical health but also in terms of sustained effort, learning, and creativity (for a review, see Ryan & Deci, 2017).

In a wide range of different work and organizational settings, autonomous motivation has been consistently associated with superior occupational health (Olafsen & Deci,

2020). Furthermore, a number of studies have investigated the association between work motivation and occupational health, specifically, among physicians and other health care workers. An earlier paper using a more limited data set from the current study's sample provided validation of a revised measure of work motivation tailored for physicians (i.e., the Physician Work Extrinsic Intrinsic Motivation Scale; Moller et al., 2019). That paper also reported a consistent pattern of associations between work motivation and occupational health. Autonomous work motivation was found to be positively related to six of six indicators of physicians' occupational health, while controlled work motivation was negatively related to three of six.

This SDT evidence base has led medical researchers and educators to champion the value of promoting autonomous motivation in medical education (Kusurkar, 2019; Kusurkar et al., 2011). Several of the primary paths to doing so, as predicted by SDT, have not yet been tested in a health care setting, and thus represent the primary focus of the present research. First, optimizing autonomous motivation and occupational health in medical practice may involve selecting trainees based on evidence for their endorsing *intrinsic aspirations* related to pursuing medicine, and supporting those intrinsic aspirations throughout training and decades of professional practice. Second, physicians' autonomous motivation can be supported by creating conditions in the work environment that support *psychological need satisfaction*. Next, we will explore the empirical evidence for each psychological process, involving aspirations and psychological needs, one at a time.

SDT, Intrinsic Aspirations, and Occupational Health. Aspirations are defined as long-term, life goals that reflect people's values, and working in the SDT tradition, researchers differentiate between intrinsic and extrinsic aspirations (Grouzet et al., 2005; Sheldon & Kasser, 2008). Intrinsic aspirations reflect the pursuit of values that are consistent with an innate human orientation toward growth. They are associated with promoting greater autonomous motivation and eudemonic well-being. More specifically, SDT researchers have found that intrinsic aspirations tend to fall into three different intrinsic value domains: self-acceptance, affiliation, and community feeling. By contrast, extrinsic aspirations reflect the pursuit of values learned from external socializing agents. Extrinsic value domains include the following: money, image, and popularity. A 1-year longitudinal study of aspiration attainment found that while attaining intrinsic aspirations was positively related to psychological health, attainment of extrinsic aspirations was not. Surprisingly, attainment of extrinsic aspirations was, in fact, associated with indicators of ill-being (Niemi et al., 2009).

Past research suggests that physicians and trainees frequently cite intrinsic aspirations as a central reason for initially pursuing a career in medicine (McManus et al., 2006). Furthermore, some have speculated that intrinsic aspirations play an important role in vitalizing physicians and protecting

them from burnout (Peabody, 1927; Schwenk, 2018). Over 90 years ago, Peabody (1927) posited that "the secret of physician well-being is in the caring for the patient." In 2018, Schwenk reiterated that hypothesis, and further posited that a root cause of deteriorating physician well-being over the past 60 years has been macro-level factors, especially in the U.S. health care system "that prevent physicians from caring for and entering into deeply satisfying relationships with patients" (p. 1544). To summarize, Schwenk hypothesized that market-driven features of the U.S. health care system have over time contributed to decreasing physicians' commitment to intrinsic aspirations (community feeling) by redirecting their attention toward extrinsic aspirations (money), a shift in aspirational focus that has undermined occupational health. A major report on physician burnout by the National Academies of Sciences, Engineering, and Medicine (2019) included a similar assertion that system-level features of the U.S. health care system may conflict with physicians' values: "humanism and professionalism are two major motivating factors for most clinicians, and many aspects of the modern work environment conflict with these fundamental ethical norms" (p. xiv). Humanism and professionalism are motives that underlie the SDT concept of intrinsic aspirations. Unfortunately, few prior studies have empirically investigated these claims about the association between physicians' aspirations and occupational health.

SDT, Psychological Needs, Work Motivation, and Occupational Health

SDT identifies three basic psychological needs that must be supported in order for humans to be optimally healthy, at work or otherwise. These needs are for autonomy (the need to feel volition and to endorse one's behavior), competence (that one can achieve desired outcomes), and relatedness (that one feels warmly and positively connected to others). In organizational contexts, satisfaction of these basic psychological needs has been related to positive outcomes for workers' functioning and well-being, while frustration has been found to produce poorer occupational health. For instance, in a recent meta-analysis of need satisfaction in the workplace, Van den Broeck et al. (2016) found that satisfaction of the needs for autonomy, competence, and relatedness was positively related to indicators of well-being (i.e., positive affect, engagement, general well-being, life satisfaction) and inversely related to ill-being (i.e., negative affect, strain, burnout). Furthermore, for job attitudes, results showed that satisfaction of the three needs was positively related to job satisfaction and affective commitment, while inversely related to turnover intentions. For work behavior, the meta-analytic findings showed a positive relation between satisfaction of each need, performance, and effort, and a negative relation to deviance. Another recent study by Williams et al. (2014) looked specifically at employees' perceptions of managerial support for basic psychological needs, finding that managers' support for need satisfaction was inversely

associated with somatic symptom burden, or the experience of physical symptomatology without a medical explanation. These results go to show the importance of satisfying basic psychological needs in the work domain both structurally (job design) and interpersonally.

Several studies have investigated the relations between satisfaction of the basic psychological needs and qualities of work motivation (Olafsen & Frølund, 2018; Olafsen & Halvari, 2017; Trépanier et al., 2015). Of particular interest is the study by Olafsen et al. (2017), which showed how basic psychological need satisfaction predicted autonomous work motivation using a model that accounted for reciprocal relations. In turn, in industrial and organizational contexts, past research shows how different types of work motivation differentially predict workers' depression, anxiety, somatization, intention to leave current job, and work performance (Gonzalez et al., 2014; Olafsen & Deci, 2020; Williams et al., 2014). Hence, the motivational process through basic psychological needs satisfaction and quality of work motivation is important to take into account when studying how work environment factors relate to workers' functioning and occupational health.

The most relevant literature to the current study includes a small number of studies that have linked intrinsic work aspirations to occupational health, and which found that this association could be mediated by psychological need satisfaction and/or autonomous work motivation. A series of two studies conducted by Vansteenkiste et al. (2007) collected data from two heterogeneous samples of Belgian workers, each finding a positive association between valuing intrinsic work aspirations and well-being at work (job satisfaction) and home (life satisfaction, life happiness). Furthermore, the second study found that this association between valuing intrinsic work aspirations and occupational health was mediated by the satisfaction of workers' psychological needs for autonomy, competence, and relatedness.

Although no studies have tested the above referenced Vansteenkiste et al. (2007) path model using a sample of practicing physicians, two related studies have been conducted using samples of other health care workers (i.e., with dentists and nurses). A cross-sectional study by Montasem et al. (2014) assessed professional aspirations and subjective well-being in a sample of 583 dentists in England. The authors found that the perceived importance and likelihood of achieving intrinsic aspirations were positively associated with positive affect, while perceived likelihood of achieving intrinsic aspirations was also positively related to job and life satisfaction. Another key study by Galletta et al. (2016) was conducted with a sample of 304 nurses from an Italian hospital. The authors found that nurses perceived organizational support (relatedness) and job autonomy was positively associated with their occupational health, and that this association was mediated by autonomous motivation. Recently, Hartzband and Groopman (2020) published an NEJM perspective piece speculating about the utility of adopting an

SDT-perspective, focused on psychological need satisfaction, to address physician burnout; however, it is noteworthy that none of the SDT literature cited included data collected from physicians.

Based on this literature, we hypothesized that the predicted association between physicians' intrinsic aspirations and occupational health (Hypothesis 1) would be mediated by physicians' basic psychological need satisfaction and autonomous work motivation (Hypothesis 2).

Finally, we collected data on a number of individual physician characteristics we speculated might be associated with occupational health. These included age, gender, and categories of work environment related to ownership (full or partial owner, employee, or contractor). No a priori hypotheses were offered with regard to these individual physician characteristics.

Method

Ethical Review

The study was deemed exempt by the University of Illinois at Chicago Office for the Protection of Research Subjects. The research protocol was seen as involving no more than minimal risk to participants, and although participants could potentially be identified through their demographics, codes linked to identifiers were de-identified (assigned a unique identifying number) and data are only reported in aggregate. Furthermore, any inadvertent disclosure of participants' responses could not reasonably place them at risk of criminal or civil liability or be damaging to their financial standing, employability, insurability or reputation.

Data Sources

A random, national sample of 4,000 practicing physicians, excluding those in residency and fellowship training, was selected from the American Medical Association Physician Masterfile, a database that includes virtually every U.S. physician. Paper-and-pencil surveys were mailed to potential respondents with a postage paid return envelope. Data collection was conducted in three waves between October 2014 and May 2015. A \$10 bill was included in the second wave to increase the rate of participation. Respondents were assured confidentiality and were free to skip any questions. Subsequent to the survey mailings, 411 physicians were found to be study ineligible (no longer practicing medicine [71], no longer at the clinical practice on record [54], or survey was returned as undeliverable [286]), and were excluded, bringing the sample of eligible invited physicians to 3,589. There were missing data for a number of variables (see Online Supplemental Table 1). The final confirmatory factor analysis (CFA) is based on a completed-cases analysis (listwise deletion of missing values), resulting in a final working sample of 2,116 physicians. The relatively high response

rate (59%) may be attributed to physicians' concern for their own occupational health and the occupational health of their colleagues.

Measure Specifications

Intrinsic Aspirations. Intrinsic aspirations (long-term goals) were assessed using three revised items from the aspiration index (Kasser, 2002), one item reflecting each of three intrinsic aspiration categories: meaningful relationships, personal growth, and community contributions. Participants rated each aspiration for importance (1 = *very untrue of me*; 7 = *very true of me*). In each item the word "life" was replaced with the word "work." The resulting intrinsic aspiration items were the following: "It is important for me to help others improve their lives" (meaningful relationships); "It is important for me that I am able to look back on my work as being meaningful" (personal growth); "It is important for me to work for the betterment of society" (community contributions). The reliability for this measure was $\alpha = .86$. See Online Supplemental Table 1.

Need Satisfaction at Work. Basic psychological need satisfaction at work was assessed using a nine-item measure, three items for each of the three needs: autonomy, competence, and relatedness, revised to reflect physicians' experiences at work (Deci et al., 2001). Statements were rated using a 7-point Likert-type scale (1 = *very untrue of me*; 7 = *very true of me*). Examples of items include the following: "I feel I have a great deal of choice in how I do my work providing patient care" (autonomy, $\alpha = .68$); "I feel confident in my ability to treat my patients effectively" (competence, $\alpha = .88$); "There are not many people at work whom I am personally close to" (relatedness, reversed, $\alpha = .71$). The reliability for the composite score of this need satisfaction measure was $\alpha = .80$.

Work Motivation. Physician work motivation was assessed using the eight-item revised Physician Work Extrinsic and Intrinsic Motivation Scale (Moller et al., 2019). Statements related to "Why do you do your work providing patient care?" using a 7-point Likert-type scale (1 = *very untrue of me*; 7 = *very true of me*). A composite measure of autonomous work motivation (characterized by feeling free and volitional; $\alpha = .84$), included intrinsic work regulation (e.g., "Because I derive much pleasure from learning new things"; $\alpha = .77$) and integrated (e.g., "Because it has become a fundamental part of who I am"; $\alpha = .79$) work regulation.

Occupational Health. Occupational health indicators that were selected for this study were informed by published research identifying decline among U.S. physicians on various facets of occupational health and SDT-guided research assessing the relationship between worker motivation and well-being (Olafsen & Deci, 2020). The six indicators selected were: general health status, depression risk, burnout

(specifically, emotional exhaustion), job satisfaction, intentions to leave current practice, and intentions to leave medicine entirely. Overall health status was measured using a single item from the 36-item Short Form Health Survey: In general, how would you rate your health (Brazier et al., 1992)? Depression risk was measured using the two-item Patient Health Questionnaire, a validated depression screener that inquires about how frequently an individual has experienced depressed mood and anhedonia over the past 2 weeks ($\alpha = .86$; Kroenke et al., 2003). Physician burnout was assessed using a validated single-item measure (Rohland et al., 2004). This measure of burnout correlates strongly ($r = .64, p < .0001$) with the Maslach Burnout Inventory emotional exhaustion subscale. Another single item measure was used to assess job satisfaction (Friedberg et al., 2013). Separate items were used to assess intent to leave current practice within 2 years, and intent to leave medicine as a profession within 2 years (Friedberg et al., 2013).

Respondent Characteristics. Age, gender, race, and ethnicity were derived from the American Medical Association Physician Masterfile, with race and ethnicity data populated in the Masterfile using MD Matriculation reports and the GME Census to ACGME-accredited Programs. Participants self-reported the following with regard to their work setting: Are you full or part owner of your main practice? Response categories included "yes, I am a full or part owner;" "no, I am an employee;" and "no, I am an independent contractor."

Data Analysis

The analyses are based on structural equation modeling in *Mplus* (Muthén & Muthén, 1998-2012) if not otherwise specified. First, confirmatory factor analyses (CFAs) were conducted for the measurement scales used. After finding acceptable model fit for the latent variables in the CFA, internal consistency was evaluated by score reliability using SPSS Statistics 26 (Cronbach, 1951). The CFA tested the psychometric properties of the latent study variables (i.e., importance of intrinsic aspirations, need satisfaction, autonomous work motivation, depression risk). Given that need satisfaction consists of three dimensions (i.e., autonomy, competence, and relatedness) and autonomous work motivation consists of two dimensions (i.e., integrated regulation, and intrinsic motivation), all assumed to be separate constructs, these variables were specified as second-order constructs in the CFA. The fit of the model was acceptable: χ^2 (degrees of freedom [df] = 159) = 870.07, $p < .001$, CFI = .94, standardized root mean square residual (SRMR) = .048, and root mean square error of approximation (RMSEA) = .046, 90% confidence interval [CI: .043, .049]. However, the factor loadings of one item for autonomy need satisfaction and one item for relatedness need satisfaction was very low (<.3); these two items were also uniquely reverse coded. Thus, a model excluding these items was compared with the full measurement model. This model showed significantly better fit:

$\chi^2(df = 124) = 594.55, p < .001, CFI = .96, SRMR = .038,$ and $RMSEA = .042, 90\% CI [.039, .046],$ Satorra–Bentler (S-B) $\chi^2_{diff} = 304.58 (\Delta df = 35), p < .001.$ Hence, this measurement model was used in the primary analyses. All first-order factor loadings were significant and ranged between .63 and .89. All second-order factor loadings were significant and ranged between .66 and .90. Online Supplemental Table 1 summarizes factor loadings from the CFA.

Second, the hypothesized structural paths were added to a modified CFA to test the hypothesized model. Due to the cross-sectional nature of the data, three alternative models were tested in order to verify the order of variables. In these alternative models the order of the variables was changed to compare the fit of the hypothesized model to that of the three alternative models, which were created based on theoretical and/or statistical considerations. Furthermore, because research has highlighted the importance of distinguishing between the basic psychological needs (Van den Broeck et al., 2016), an additional model where each need was separately accounted for was tested in addition to the more parsimonious hypothesized model. In addition to the hypothesized relations, the structural models that included gender, age, and work setting were added as covariates given that these showed significant correlations with several of the occupational health outcome variables.

Because the data showed multivariate nonnormality, the S-B scaled χ^2 and robust standard errors adjustment to the maximum likelihood estimator was used. Given the nature of the reported measurements, the structural models consisted of both latent and observed variables. Model fit for all models was evaluated with the χ^2 and its df , the RMSEA and its CI, the SRMR, and the CFI. Acceptable fit indices are between .05 and .08 for the RMSEA and SRMR (Hu & Bentler, 1999). Values above .95 for the CFI are generally recommended for good-fitting models (Hu & Bentler, 1999), although values over .90 are seen as acceptable (Hoyle, 1995).

Results

Sample Characteristics

The mean age of physicians in the sample was 52.3 years ($SD = 11.3$); 68% of respondents were male; 56% were White, 15% Asian, 5% Hispanic or Latino, 4% Black or African American, 2% other, and 19% were listed as “unknown.” Compared with nonrespondents, non-White physicians responded less frequently than White physicians but no other differences were observed. See Online Supplemental Table 2.

Preliminary Analyses

Online Supplemental Table 3 summarizes zero-order correlations between variables included in our models. As predicted, the pattern of correlations revealed a consistent

positive association between intrinsic aspirations and occupational health.

Primary Analyses

The Hypothesized Model. The fit of the hypothesized model was satisfactory: $\chi^2(df = 292) = 1492.28, p < .001, CFI = .93, SRMR = .052,$ and $RMSEA = .044, 90\% CI [.042, .046].$ The paths coefficients displayed in Figure 1 showed that importance of intrinsic aspirations ($\beta = .76, p < .001$) were significantly positively related to need satisfaction, and need satisfaction was significant positively related to autonomous work motivation ($\beta = .77, p < .001$). Furthermore, autonomous work motivation was significantly negatively related to depression risk, intention to leave practice, intention to leave medicine, perceived ill health, and burnout, while significantly positively related to satisfaction with work.

Covariates. As for the individual characteristics, gender was significantly related to depression risk such that women were at greater risk, yet gender was also significantly related to intention to leave practice such that women were less likely to report intentions to leave their practices. Age was significantly positively related to intention to leave practice, intention to leave medicine, perceived ill health, and significant negatively related to burnout. Last, being an independent contractor was significantly positively related to depression risk.

Alternative Models. To test the placement of intrinsic aspirations, we ran three models where the order of intrinsic aspirations, need satisfaction, and autonomous work motivation were altered. In the first model, basic psychological need satisfaction was specified to predict intrinsic aspirations. Intrinsic aspirations predicted autonomous motivation, which, in turn, predicted the outcome variables. This model did not show a better fit than the hypothesized model: $\chi^2(df = 292) = 1497.931, p < .001, CFI = .93, SRMR = .059,$ and $RMSEA = .044, 90\% CI [.042, .046].$ In the second model, basic psychological need satisfaction was specified to predict autonomous motivation, autonomous motivation predicted intrinsic aspiration, which, in turn, predicted the outcome variables. This model did not show a better fit than the hypothesized model: $\chi^2(df = 292) = 1602.746, p < .001, CFI = .93, SRMR = .063,$ and $RMSEA = .046, 90\% CI [.044, .048].$ In the third alternative model, need satisfaction was specified to predict both work motivation and intrinsic aspirations, which in turn predicted the outcome variable. This model did show a decrease in χ^2 compared with the hypothesized model: $\chi^2(df = 286) = 1479.423, p < .001, CFI = .93, SRMR = .053,$ and $RMSEA = .044, 90\% CI [.042, .047],$ but this decrease was not a significant improvement of fit: S-B $\chi^2_{diff} = 11.31 (\Delta df = 6), p > .05.$

Indirect Relations in the Hypothesized Model. The results showed that valuing intrinsic aspirations was indirectly related to

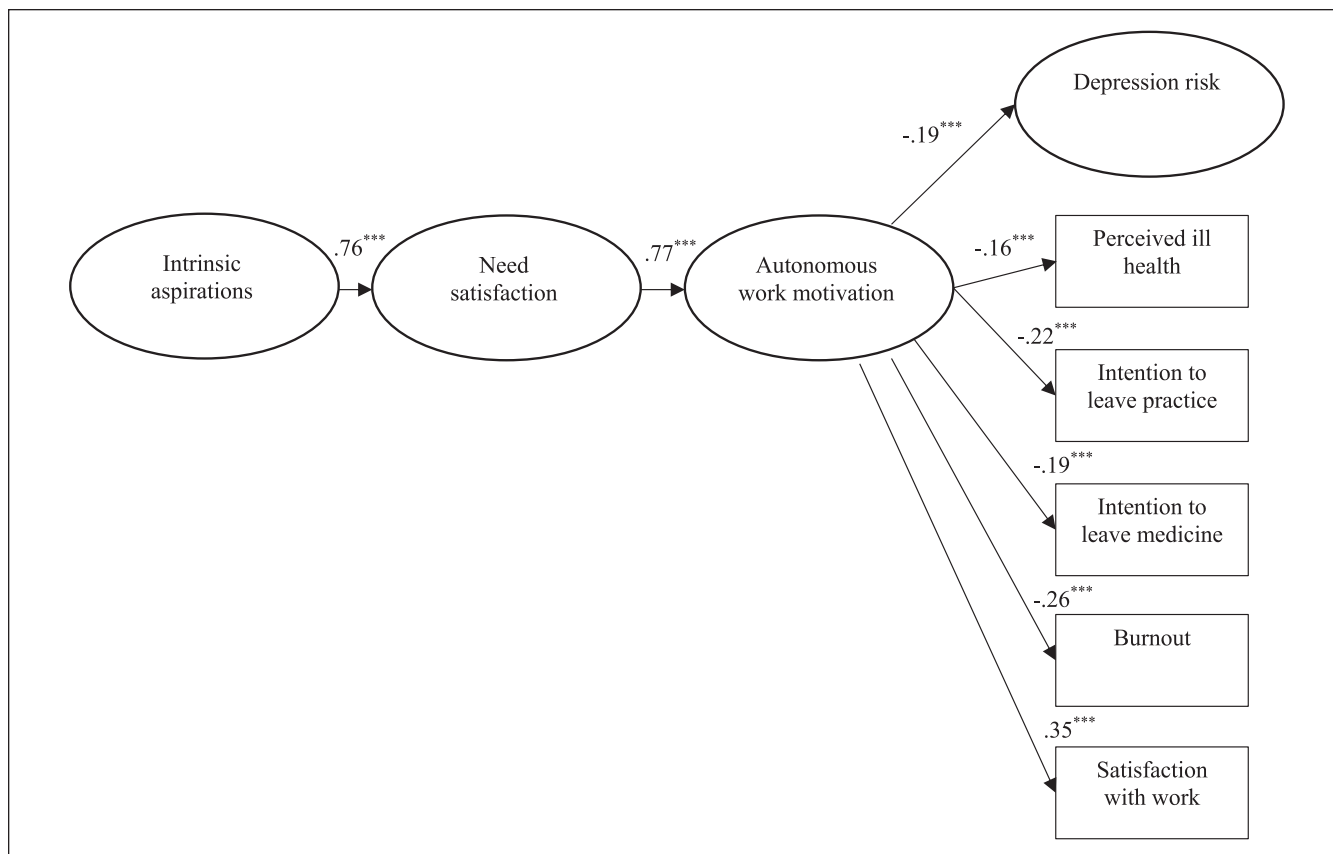


Figure 1. Structural equation model with composite psychological need satisfaction as mediator.

autonomous work motivation through need satisfaction. Furthermore, need satisfaction was indirectly related to satisfaction with work, intention to leave practice, intention to leave medicine, depression risk, perceived ill health, and burnout.

The Hypothesized Model With Separate Needs. To test the significance of each basic psychological need, an additional model where the three needs were separated was tested. This model showed acceptable fit to the data: $\chi^2(df = 291) = 1931.997, p < .001, CFI = .91, SRMR = .060,$ and $RMSEA = .052, 90\% CI [.049, .054]$. The path coefficients showed that intrinsic aspirations was significantly and positively related to autonomy need satisfaction, competence need satisfaction, and relatedness need satisfaction. Autonomy need satisfaction, competence need satisfaction, and relatedness need satisfaction were significantly positively related to autonomous work motivation. Furthermore, autonomous work motivation was significantly related to all six indicators of occupational health in the predicted directions. See Figure 2.

Discussion

The importance of intrinsic aspirations for physicians' occupational health was long hypothesized (Peabody, 1927; Schwenk, 2018), but under researched. This study

conceptualized physicians' intrinsic aspirations and psychological need satisfaction at work as antecedents of physicians' autonomous work motivation and occupational health. Study results showed that physicians' intrinsic aspirations related positively to their basic psychological need satisfaction and, in turn, to their autonomous work motivation. Furthermore, physicians' autonomous work motivation related positively to their work-related well-being (i.e., job satisfaction) and negatively to their work-related ill-being (i.e., depression risk, perceived ill-health, burnout, intentions to leave current practice, and intentions to leave medicine entirely). This empirical model underscores the importance of motivational process for understanding physicians' declining occupational health.

Specifically, the present findings support an SDT-informed model that highlights two antecedents of physicians' autonomous work motivation and occupational health, intrinsic aspirations and need satisfaction (Hope et al., 2019), finding support within a large sample of working U.S. physicians. While SDT-guided research on occupational health has tended to focus more on the importance of need satisfaction (Van den Broeck et al., 2016), the consideration of intrinsic aspiration has been less well studied. Insights from this model can be leveraged to design more effective physician-health interventions, targeting and treating root causes,

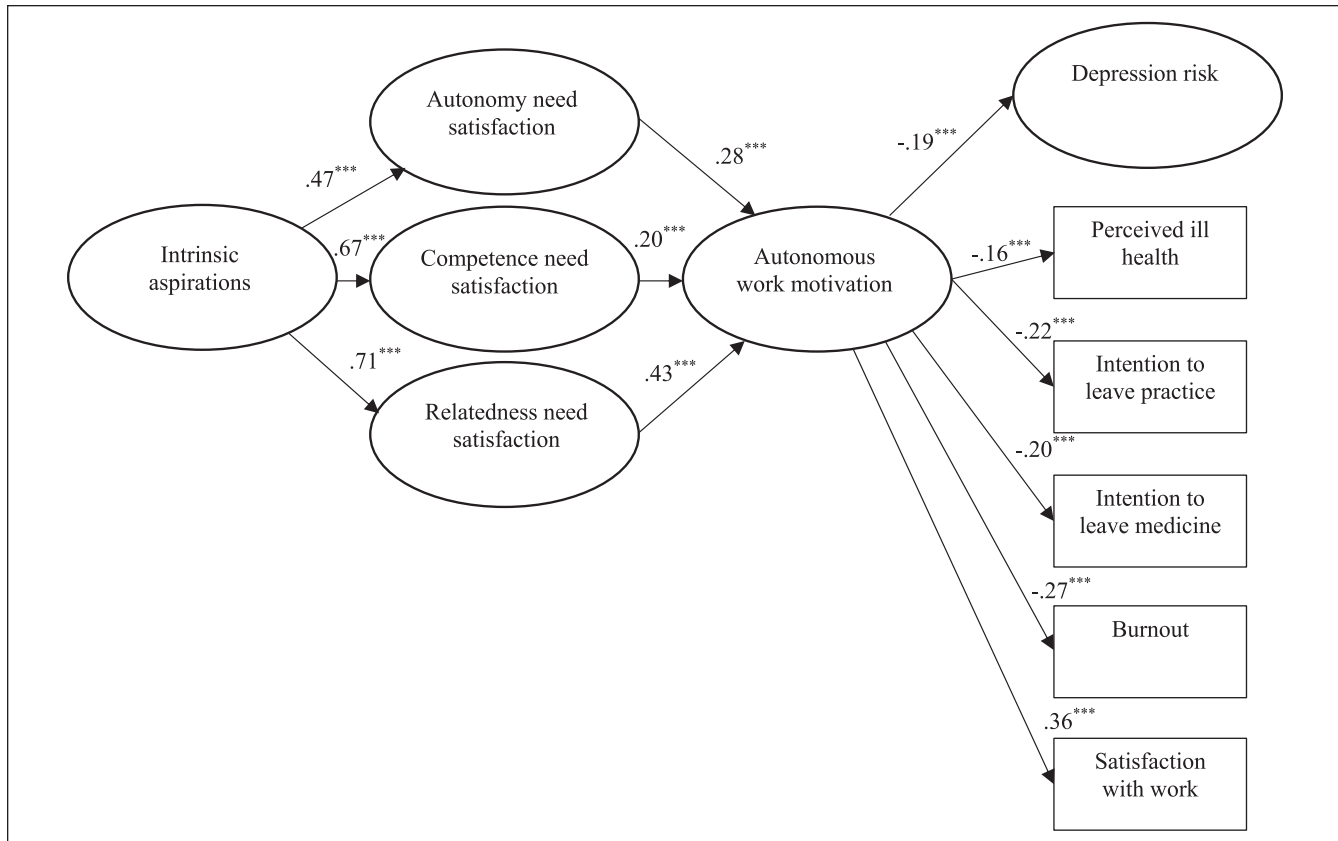


Figure 2. Structural equation model with satisfaction of three psychological needs as independent mediators.

as opposed to late-stage symptoms, and considering factors that operate at both individual- and system-level. We found support for our hypothesis that valuing intrinsic work aspirations has a cascading, positive impact on physicians' psychological need satisfaction, autonomous motivation, and health.

Implications

Some readers may find these findings unsurprising, or fail to appreciate the practical implications. After all, physicians already endorse intrinsic aspirations as a modal reason for pursuing medical training, and medical schools already value intrinsic aspirations as a selection criterion. Furthermore, physicians have been writing anecdotal accounts and postulating about the vitalizing potency of intrinsic aspirations for decades (Peabody, 1927; Rosenthal & Verghese, 2016; Schwenk, 2018). We argue that measuring and empirically documenting these associations was a critical step toward developing more effective interventions because it helps justify future long-term investment required to target and treat these root causes. This approach is in line with the recent National Academies of Sciences, Engineering, and Medicine (2019) report on physician burnout, recommending large-scale, especially system-level, changes to mitigate clinician burnout and promote well-being, all of which will require major investments of resources.

It may also be illustrative to consider our findings in relation to the historic COVID-19 pandemic that is currently straining physicians in the United States and around the world to a degree and duration unmatched in the past century. As argued in the Introduction, the occupational health of physicians in the United States was poor before the COVID-19 pandemic. Numerous indicators suggest the COVID-19 pandemic has made matters far worse, in the United States and globally (Amanullah & Shankar, 2020). A question many physicians are now confronting is whether sacrificing their health, even their very lives, for their occupation is worth it. We believe the affirmative answer to this question is far more likely when a physician's intrinsic aspirations are strong and strongly supported by their work culture, and far less likely when extrinsic aspirations become foundations for work motivation. Another unfortunate feature of the COVID-19 pandemic, especially in the United States, has been the loss of employer-sponsored health insurance, as millions of Americans became unemployed. As a result, many physicians in the United States have faced patients who can no longer afford to receive their care. This dynamic puts U.S. physicians in a uniquely gut-wrenching position, one that was experienced prepandemic, but is now playing out on a far larger scale. Our findings speak to the reasons this dynamic undermines physicians' autonomous motivation and well-being. Namely, it

thwarts physicians' intrinsic aspirations and basic psychological need for relatedness.

Future Research Directions

While some may question whether it is possible to increase the intrinsic aspirations of medical students and practicing physicians, this is an important, empirically testable question. Future interventions should target intrinsic aspirations and need satisfaction in a range of different ways, at both the individual- and system-level. Individual-level interventions might strive to better select for and sustain intrinsic aspirations through years of training and practice (Kusurkar, 2019; Kusurkar et al., 2011), such as by setting aside protected time for meaningful work and by funding those initiatives (e.g., a payer might fund physicians' time to volunteer with organizations like the MAVEN Project, Volunteers in Medicine, or Doctors Without Borders). Consistent with this, Linzer et al. (2014, p. 19) proposed, "protected time for meaningful activities," to prevent physician burnout, specifically, "at least one-half day per week for clinicians to do what they are most passionate about." Another individual-level intervention that has been empirically shown to increase intrinsic aspirations in the general population involves encouraging deep reflection on mortality (Grant & Wade-Benzoni, 2009; Prentice et al., 2018). Although prior research has found that physicians tend to become more comfortable with patients' mortality over time (Dickinson & Tournier, 1994), few studies have explored physicians' thoughts about their own mortality, or the implications of this for physicians' aspirations and occupational health.

Because intrinsic aspirations are positively predictive of psychological need satisfaction, the interventions described above should also result in greater downstream need satisfaction. That said, multilevel interventions could also directly target psychological needs. For example, future interventions can directly support physicians' autonomy by increasing flexibility and respecting physicians' ability to make clinical judgments about patient care. A recent meta-analysis of interventions to reduce physician burnout found that giving doctors more flexibility in their schedules and increasing their participation in decision making were associated with reduced burnout (Panagioti et al., 2017). Another recent intervention by Locke et al. (2020) found that giving faculty at an academic medical center an anonymous feedback tool improved their well-being. Competence could be directly supported by providing physicians with more focused, informational feedback on their performance for the purpose of increasing mastery, and by presenting physicians with opportunities for optimally challenging work (e.g., inviting their input on hard-to-diagnose cases). Finally, relatedness could be directly supported with consideration of both interprofessional care team interactions and interactions with patients (e.g., by training and promoting narrative medicine and sensitive interviewing skills). As the COVID-19 pandemic has accelerated a shift from in-person practice to telemedicine,

researchers should also consider how the affordances of telemedicine platforms either support or thwart physicians' psychological need satisfaction.

Future research and interventions to increase and maintain physicians' intrinsic aspirations and need satisfaction should also focus on what the National Academies of Sciences, Engineering, and Medicine (2019) report called the *system-level*, by targeting the structure, organization, and culture of health care. Across U.S. health care organizations there is variability in terms of how compensation models emphasize intrinsic relative to extrinsic aspirations. For example, the Cleveland Clinic and Kaiser Permanente have shifted toward paying physicians salaries, and away from incentives for volume of services performed (i.e., fee-for-service; Hayes et al., 2020), a model that may support intrinsic aspirations to a greater extent by deemphasizing financial incentives. Consistent with this, the National Academies of Sciences, Engineering, and Medicine (2019, p. 10) report broadly recommended that organizations "align incentives, compensation, and reward systems for clinicians and work units with organizational and professional values."

On an even broader level, Schwenk (2018) hypothesized that "the current [U.S. health care] system is the consequence of the (mistaken) belief that health care is most appropriately managed like other parts of the US economy, as a market-driven, competitive enterprise" (p. 1544). Schwenk argued that the current market-driven U.S. health care system is the root cause of physicians' declining occupational health. National policy makers in the United States are actively debating systemwide changes consistent with those proposed by Schwenk (2018), for example, proposals for Medicare-for-all and Public Plans (Neuman et al., 2018). If and when these major, systemwide policy changes materialize, we believe researchers should be measuring whether there are associated downstream changes in physicians' intrinsic aspirations, need satisfaction, work motivation, and occupational health.

Limitations

One limitation of this study concerns the use of abridged scales to assess physicians' perceived importance of intrinsic aspirations, psychological need satisfaction at work, and occupational health. This limitation was accepted as a trade-off during the study design phase, out of consideration for physicians' limited and costly time and a desire to maximize response rate and representativeness of sample. However, follow up studies should consider using the more comprehensive 105-item aspiration index (Kasser, 2002) and the expanded 24-item Basic Psychological Need Satisfaction and Frustration Scale (Chen et al., 2015). This would make using more nuanced, latent profiling methods possible (Bradshaw et al., 2021). Similarly, although the pattern of results was relatively consistent across all six short-form indicators of occupational health, long-form measures of each indicator would be better.

Another limitation to the present research is the cross-sectional design. As such, an important direction for future research involves funding significantly more costly longitudinal observational studies and experimental (i.e., RCT) tests of interventions designed to promote physicians' intrinsic aspirations and measure downstream consequences. That said, prior longitudinal research has supported the proposed directionality of the link between work motivation and occupational health (Dagenais-Desmarais et al., 2018).

Finally, it is important to recognize that physicians' aspirations, need satisfaction, and autonomous motivation are not the only factors important to physicians' occupational health. These motivation-related factors are primarily concerned with prevention. The National Academies of Sciences, Engineering, and Medicine (2019) report on physician burnout provides a more comprehensive review of causes and treatments, including the burden of tedious tasks and the use of technology to reduce burdens and redundancies. Their report also points to reducing stigma for clinicians seeking help, and making assistance more accessible.

Conclusion

This research provides empirical support for the hypothesis that dedication to intrinsic work aspirations (i.e., long-term goals tied to valuing meaningful relationships, personal growth, and community contributions) can help protect physicians from experiencing poor occupational health. Furthermore, we found that the positive association between intrinsic aspirations and occupational health was mediated by need satisfaction and autonomous motivation. We hope these findings can help guide health services researchers, policy makers, managers, and practitioners to promote physicians' health, and ultimately patient (population) health, as well.

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Supplemental Material

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