Motivations for learning of family medicine residents trained in competency-based education

Oksana Babenko, Olga Szafran, Sudha Koppula,[†] Lillian Au[†]

Department of Family Medicine, University of Alberta, Canada

Oksana Babenko, PhD, Assistant Professor and Medical Education Researcher
Olga Szafran, MHSA, Associate Director of Research
Sudha Koppula, MD, MClSc, Associate Professor and Director of Faculty Development
Lillian Au, MD, Assistant Professor and Assistant Director of Undergraduate Medical Education

Corresponding author: Dr. Oksana Babenko, Department of Family Medicine, 6-60L University Terrace, University of Alberta, Edmonton, Alberta, Canada T6G 2T4
Ph: 1-780-248-1729 Fax: 1-780-492-2593 Email: oksana.babenko@ualberta.ca

[†]Equally contributing co-authors.

Abstract

Background and objective: Family physicians regularly encounter clinical uncertainty and ambiguity and thus, are expected to engage in on-going learning to respond to changing needs of family practice. Using Achievement Goal Theory, the objective of this study was to examine motivations for learning of family medicine residents in a competency-based program.

Method: This was a cross-sectional study, employing a survey methodology with family medicine residents at the mid-point of training at a Canadian university. Multivariate analyses of variance and covariance were used to examine residents' goal orientations (performance approach, mastery approach, performance avoidance, mastery avoidance) for the group as a whole and to test for the effects of residents' gender and program stream (urban/rural), respectively.

Results: A total of 52 (67%) residents completed the survey. Overall, residents scored the highest on mastery approach and the lowest on performance avoidance, thus, exhibiting adaptive motivations for learning. Male residents demonstrated higher levels of performance approach, performance avoidance and mastery avoidance than female residents. No significant differences in goal orientations were found between urban and rural residents.

Conclusions: Family medicine residents trained in the culture of competency-based education appear to be mastery approach oriented. This motivation orientation is critical in the dynamic practice of family medicine and is consistent with the life-long learning mandate of the medical profession.

Keywords: motivation; Achievement Goal Theory; family practice; residency; competency-based education

Introduction

Family physicians are regularly tasked with clinical uncertainty and ambiguity as problems presenting in family practice are typically encountered at undifferentiated stages. Hence, motivations to engage in life-long learning in response to medical advances and patients' health care needs are essential in the practice of family medicine. A goal of family medicine residency

programs, thus, is to provide training that will foster in their learners motivations for life-long learning, including the understanding that the training period is only an initial foray into developing the required competencies, so that graduates are prepared to take an active role in addressing challenges in clinical practice. To this end and building upon the international movement toward competency-based medical education (CBME), the College of Family Physicians of Canada has adopted a CBME program[1]. CBME is "an approach to preparing physicians for practice that is fundamentally oriented to graduate outcome abilities and organized around competencies derived from an analysis of societal and patient needs. It de-emphasizes time-based training and promises greater accountability, flexibility, and learner-centredness."[2] Akin to apprenticeship training, residency training has elements of both education and service, wherein the focus is on learning a range of competencies (e.g., patient-doctor relationship, critical thinking, communication, professionalism) through observation and coached performance in the context of clinical practice. CBME places emphasis on engaging residents in taking an active role in their education, on-going assessment of their progress toward competence, and most importantly, ensuring that graduates are prepared for a life-long pursuit of expertise[3]. In pursuing this goal, it is yet to be determined what motivations and mindsets competency-based education fosters in family medicine residents.

While there are various motivation frameworks (e.g., causal attributions; implicit theories of intelligence; interest and value)[4], we applied Achievement Goal Theory (AGT)[5] to study motivations for learning of CBME-trained residents because this theory specifically focuses on individuals' motives behind competence pursuit and the assessment of one's own level of competence. AGT posits that individuals have an innate desire to feel competent; however, they respond to it by pursuing distinct achievement goals and using different yardsticks to measure

their competence. For example, individuals, who focus on developing their skills and measure their competence relative to their own past performance (self-referenced), are said to be mastery oriented. Those individuals, who focus on demonstrating their skills and measure their competence according to how well they perform relative to others (other-referenced), are said to be performance oriented.

Elliot and McGregor's 2x2 AGT framework[5] further distinguishes four goal orientations: *performance approach* – the desire to demonstrate competence relative to others; *performance avoidance* – the desire to avoid demonstrating incompetence relative to others; *mastery approach* – the desire to improve performance and maximize learning (i.e., to gain new knowledge, improve skills); and *mastery avoidance* – the desire to avoid incompetence, i.e. a focus on mastering just enough skills needed to do one's work, often accompanied by a feeling of being unable to master all the material or skills and fear of making mistakes. Because goals represent different ways of pursuing and measuring one's own competence, theorists have posited that goal orientations should promote distinct thoughts, feelings and behavior[6,7], and by extension, facilitate or hinder individuals' growth as life-long learners. In the context of the medical profession, life-long learning is a key aspect of professionalism and, according to Veloski and Hojat[8], is a component of both excellence and self-regulatory and accountable behavior to ensure quality of care.

Earlier research conducted in the education domain, and specifically in a general student population, reveals that mastery approach goals are the most advantageous because they promote interest, use of deep learning strategies and self-regulated learning[9-11], all of which are deemed important attributes for life-long learning. In contrast, although performance goals positively correlate with high achievement, these goals are associated with low interest, surface learning,

choice of easy tasks and inefficient learning strategies[12,13], hence do not appear to be beneficial to fostering life-long learning behaviors.

Avoidance goals are considered maladaptive as they are associated with inadequate coping and poor psychological well-being. For an individual with a performance avoidance orientation, the prospect of a potential failure is likely to encourage self-protective withdrawal, hinder concentration and task involvement, and ultimately, lead to poor learning outcomes[6,7,14]. Mastery avoidance is associated with maladaptive forms of perfectionism, anxiety during task engagement, procrastination, low interest and poor achievement[5,15-18]. In contrast to avoidance goals, mastery approach goals have been found to relate to desired personal and professional outcomes such as job satisfaction, professional development and well-being[19-21], which in the context of the medical profession, are important factors in the provision of high-quality patient care.

Published literature has also reported age and gender differences in goal orientations, although the reported findings are mixed. In general, female students are more mastery-orientated, while male students are more performance oriented[22,23]. Yet in a study of pharmacy students, no significant gender differences were found[24]. With respect to age, no difference was observed in mastery goals among pharmacy students of different ages[24]. In a general population, however, mastery avoidance goals are reported to be common later in adulthood, with the focus on maintaining a current state or preventing loss in abilities[25,26].

To date, the AGT 2x2 framework[5] has not been applied in the context of competency-based training to study family medicine residents' motivations for learning. It is yet to be determined if CBME-trained residents develop a mindset of demonstrating competence relative to others (mindset of performance), or focus on acquiring and maintaining just enough

competencies needed for independent practice (mindset of achieving minimal competence), or become motivated to acquire proficiency in new skills and develop attitudes and behaviors toward life-long learning (mindset of life-long learning). As such, the objective of this study was to examine motivations for learning of family medicine residents trained in the CBME culture.

Method

Design

This was a cross-sectional survey of family medicine residents at the University of Alberta, Canada. This study was conducted in August 2016. Ethics approval was obtained from the Research Ethics Board 2 at the University of Alberta.

Setting

The two-year family medicine residency program at the University of Alberta transitioned to CBME in 2009 and draws on the best practices in competency-based instruction and formative assessment to facilitate residents' progressive development of outcome competencies required for independent practice[27,28]. In brief, as residents learn new and complex skills by performing them in various clinical settings, preceptors provide immediate feedback to residents on their performance and observed competencies. Upon discussing with residents, preceptors document their feedback in electronic FieldNotes, indicating one of three progress levels (PL) of observed competencies – 'Stop, Important correction', 'In Progress', 'Carry on, Got it'; as well as noting specific suggestions for improvement. Residents use the documented feedback to reflect on their performance and, together with their faculty advisors, formulate learning goals and strategies in light of the feedback they receive from multiple preceptors[27,28]

The residency program also has two distinct training streams – urban and rural. Urban residents are based at academic teaching sites and do clinical rotations in a large metropolitan

centre (Edmonton). Rural residents are based in three regional communities (Fort McMurray, Grande Prairie, Red Deer) and also do clinical rotations in small rural and remote sites.

Participants & Procedures

Family medicine residents (N=85), who were at the mid-point (beginning of year 2) of their residency training, were invited to participate in the study. At the time of data collection, seven residents were on a personal leave from the program and, hence, were excluded from the study, resulting in 78 eligible participants (see Table 1 for demographic characteristics of the cohort). Data collection for this study was performed as part of a larger study on residents' experience in clinical teaching. At an academic half-day, each resident received a survey package that contained an information letter and a questionnaire which, among other measures, included measures of goal orientations and demographics. Taking part in the study was voluntary and residents were informed that their participation or non-participation would not affect their status within the program nor their educational evaluations. Consent was implied by the return of a completed questionnaire. Residents were instructed to choose response options without much deliberation, but which best represented the degree to which they agreed or disagreed with the statements in the questionnaire.

Instrument

After considering available goal orientation instruments, which were validated primarily with a general population of university students, Baranik, Barron, and Finney's 2x2 goal orientations instrument in a work domain[29] was chosen for this study. Given that family medicine residency training occurs within the workplace, rather than the classroom setting, Baranik et al.'s instrument was deemed to best capture the construct of goal orientations in the context of residency training; however, several adaptations were made to the original instrument. First, to

better reflect the nature of the medical profession and the resident population, some wording changes were made to the original statements. For example, the words 'job' and 'projects' were changed to 'work' and 'tasks', respectively. Second, given that Baranik et al.'s instrument was originally tested with introductory psychology students who currently or in the past held jobs, not all the mastery avoidance items in the original instrument were applicable to residency training. Of the 11 mastery avoidance items, four items were selected which were deemed to be the most representative of the construct of mastery avoidance in the context of family medicine residency training. The remaining three goal orientation scales in Baranik et al.'s instrument had four items each. In total, 16 statements were used to measure the four goal orientations of performance approach, performance avoidance, mastery approach, and mastery avoidance. Residents were asked to indicate their level of agreement with each goal orientation statement using a visual analog scale (VAS) (1=not at all agree; 10=completely agree). The VAS was chosen for several reasons. In contrast to Likert-type scales, the VAS has a built-in underlying continuum, with the focus on the level of agreement (from none to high), and thus, is arguably better suited for measuring individual's predispositions and tendencies, including goal orientations, and discouraging habitual response behavior[30,31]. It enables the examination of the dispersion in residents' responses, which otherwise would be difficult to do with a Likert-type or discrete scale. In addition, VAS has been argued to have superior measurement and statistical characteristics than discrete scales[32-34]. Finally, VAS is often used in clinical settings with various measures (e.g., discomfort, pain, quality of life) and, thus, would be familiar to the residents in the workplace. The adapted instrument was pilot tested with two recent graduates who finished their second and final year of residency a month earlier and with

two clinical faculty members who closely worked with residents in the role of preceptors. Minor wording adjustments were made based on the pilot-test.

Data analyses

Using SPSS 24, percentages were computed to determine the demographic composition of the respondents; means, standard deviations (SD), and ranges were used to examine the level of endorsement of each goal orientation item by the residents and the degree of potential social desirability bias in residents' responses. Reliabilities of the goal orientation scales were computed using Cronbach's alpha. For each resident, scores on the four goal orientations were calculated by averaging respective item scores, with higher scores indicating greater endorsement of specific goal orientations. To test for the mean differences in residents' goal orientations for the group as a whole, multivariate analysis of variance (MANOVA) was employed, followed by paired samples t-tests. The effects of residents' gender and program stream were tested using multivariate analysis of covariance (MANCOVA), with residents' age (measured in years) entered as a covariate. Pearson correlation coefficients were computed to examine the associations among the four goal orientations and residents' age, as well as the amount of shared variance (r^2) in the four goal orientations. An alpha level of 0.05 and Bonferroni correction for multiple comparisons were used in significance testing.

Results

A total of 52 (67%) family medicine residents completed the survey. Table 1 illustrates the characteristics of the respondents and the response rates by residents' gender and program stream. Overall, 52% of the respondents were female, 65% were in the urban stream, with the mean age of respondents being 28.8 (SD=3.2; range=24-38) years. Given the potential for social desirability bias in residents' responses, means, SDs and ranges for each item were examined for

variability. Except for one item in mastery avoidance, residents tended to respond using the full range of response options (Table 2). The reliability of the goal orientations instrument as a whole was 0.87. Except for the mastery avoidance scale (0.40), scale reliabilities were acceptable for performance approach (0.82), performance avoidance (0.83), and mastery approach (0.72). Given the suboptimal reliability of the mastery avoidance scale, multivariate analyses were performed both with and without the mastery avoidance scale as an outcome; the observed results were similar. As such, the results are presented with the mastery avoidance scale included in the analyses, followed by the examination of mastery avoidance item-level results to account for the suboptimal reliability of the scale.

Results of the MANOVA indicated statistically significant mean differences (Table 2) in residents' goal orientations for the group as a whole ($p<0.001$). Of the four goal orientations, the highest mean score was on the mastery approach scale (mean=7.8, SD=1.2) and the lowest on the performance avoidance scale (mean=4.8, SD=1.9). Except for the mean difference between performance approach (mean=6.0, SD=1.8) and mastery avoidance (mean=6.4, SD=1.3), all pair-wise mean differences in the goal orientations (Table 2) were found to be significantly different ($p<0.001$), suggesting that the observed tendencies in the group as a whole were unlikely due to chance.

When residents' gender and program stream (urban/rural) were entered into analyses, the interaction of these two variables was not significant ($p=0.58$), i.e. no significant differences in goal orientations were found between male residents in the urban and rural streams and between female residents in the two streams. The main effect of program stream was not significant ($p=0.73$), indicating that residents in the urban and rural streams had comparable levels of the goal orientations, respectively. When testing for the main effect of gender, however, male

residents had higher levels of the four goal orientations than female residents overall (Table 3), with significantly higher mean scores on performance approach, performance avoidance and mastery avoidance ($p<0.05$).

Finally, correlational analysis with age revealed a significant positive correlation between mastery approach and residents' age ($r=0.41$, $p<0.01$), suggesting that with an increase in residents' age the orientation toward mastery approach tended to be higher. Significant positive correlations were also found among the four goal orientations (Table 4), indicating that residents tended to endorse multiple goals. Performance approach and performance avoidance goals shared almost 50% of variance, whereas mastery approach and mastery avoidance goals shared slightly under 10% of variance. Mastery avoidance appeared to have more common variance with performance avoidance (42%) and performance approach (30%) than with mastery approach.

Discussion

Our research is unique in applying motivation theory, specifically AGT, to the study of motivations for learning of family medicine residents trained in CBME. There are five findings to highlight from this study. First, family medicine residents had on average higher scores on mastery goals than on performance goals. Second, of the four goals, residents scored the highest on mastery approach and the lowest on performance avoidance. Third, compared to female residents, male residents demonstrated higher levels of performance approach, performance avoidance and mastery avoidance orientations. Fourth, there were no significant differences between urban and rural residents in goal orientations. Fifth, although residents in our study were predominantly mastery approach oriented, we also observed a tendency toward mastery avoidance orientation. These findings are discussed in light of residency programs' mandate to

provide the conditions that nurture learners' motivation for taking an active role in their education and fostering their growth as life-long learners.

The finding that at the mid-point of their training family medicine residents were more mastery than performance oriented speaks to the mindset of learning and self-referenced measure of one's own competence. This is not unexpected given that the focus of CBME is on scaffolding the resident's acquisition of more complex competencies through skill modeling, coaching and provision of detailed feedback that is referenced to the resident's actual performance. The residents in this study indicated that they were willing to take on and enjoyed challenging work tasks from which they could learn new skills, as opposed to working on tasks to demonstrate their competence relative to others.

Of the four goals, residents endorsed mastery approach the most and performance avoidance the least. Earlier research has shown that, in contrast to mastery approach, performance avoidance is highly associated with concerns of ego-protection and impression-defense, resulting in less feedback- and help-seeking for fear of being perceived incompetent[35-37] and as such hindering learners in their development of competence. In this study, residents indicated that they looked for opportunities to develop their competence in the workplace, as opposed to avoiding tasks for the fear of being perceived incompetent. This speaks to residents' motivation in taking an active role in developing their competence rather than focusing on ego-protection and impression-defense. Although we did not examine feedback-seeking behaviour among the residents in this study directly, the finding that performance avoidance was endorsed the least by residents suggests that overall residents feel comfortable in seeking feedback and receiving specific suggestions for improvement to propel them toward competence.

With respect to gender, male residents in this study demonstrated higher levels of endorsement of maladaptive goals – performance approach, performance avoidance and mastery avoidance – than female residents. This finding is consistent with earlier research conducted with undergraduate learners in medicine, pharmacy and nursing[38]. Madjar and colleagues[39] found that medical students with performance orientations (those who wished to attain positive external evaluation of their abilities) were more likely to report lower perceived ability to deal with stress and tolerate frustrations. Further, individuals with performance orientations tend to believe that competencies are a fixed ability rather than an incremental attribute that can be developed with effort, and perceive feedback on their performance as an attack on personality rather than a means to help them in the development of competence[35]. Such connections of performance approach and avoidance goals with maladaptive coping may inform residency programs in developing interventions for residents in difficulty and for resident well-being, and in providing professional development to residents in seeking and accepting constructive feedback on their clinical performance. Earlier research has also reported links between the promotion of feedback-seeking by preceptors and provision of high-quality feedback to residents, on the one hand, and motivation to seek feedback for self-improvement and reduction in concerns of ego-protection and impression-defense (i.e., avoidance orientation) among residents, on the other[35-37]. This has direct implications for faculty development on the importance of providing high-quality feedback and promoting feedback-seeking among residents, in particularly in light of the differences in goal orientations of male and female residents observed in this study. Finally, the finding that residents in both the rural and urban program streams displayed similar patterns in goal orientations is reassuring and points to the similar implementation of CBME in both program streams and/or similarly motivated residents in the two streams.

Although our findings do provide evidence in support of a mindset of mastery and life-long learning among family medicine residents, we also observed a tendency toward mastery avoidance (a mindset of achieving minimal competence) in that residents highly endorsed the item "I hope to master enough skills so I am competent at my work". We hypothesize that this speaks to the way residents may perceive residency training, namely as a period of time during which they need to acquire as many skills and competencies as possible for their independent practice. Residency programs need to ensure that their learners understand that residency is only an initial foray into developing of required competencies and that expertise is a life-long pursuit. Qualitative research is also needed to elucidate the effect of progress levels on residents' long-term motivation and orientation toward life-long learning. Specifically, 'Carry on, Got it' may not necessarily be fostering in residents a mindset of life-long learning and on-going progression from being competent to being an expert over the course of their professional careers.

The AGT framework has the potential to provide a strategy for assessing and addressing a concern raised about CBME, namely whether it promotes a mindset of achieving minimal competence rather than excellence and life-long pursuit of expertise. In order to determine if mastery avoidance is indeed linked with the mindset of achieving minimal competency, rather than avoiding making errors, better tools are needed to assess achievement goals in the context of CBME.

Limitations and future directions

A limitation of our study is that it was based at one university and may not be generalizable to residents trained in other family medicine programs. Although the response rate in this study was relatively high (close to 70%), it remains unknown whether motivations observed among the responding residents are similar to motivations of 30% of residents, who, for whatever reasons,

did not complete the survey. This was a cross-sectional survey that provided a preview of family medicine residents' motivations for learning at a point in time, specifically at the mid-point of their residency training. As such, longitudinal studies are needed to examine stability/change of goal orientations during and after residency training, as well as the associations between goal orientations and professional outcomes of family physicians. We intend to conduct surveys with the same residents at the end of their residency training and at one and three years following completion of the residency program to examine changes in residents' goal orientations upon completion of the program and in practice, and the involvement of our graduates in clinical teaching, which arguably is one of the best avenues in the pursuit of life-long learning in family practice. Future studies are needed to determine if the positive correlation of mastery approach with residents' age has a developmental nature or perhaps competency-based education has a differential effect on learners of different ages. It is important to consider the role of socio-cultural factors in achievement settings. Dekker and Fischer[40] found that performance goals were higher in less developed countries and in embedded cultures, where individuals feel strongly connected to their groups, compared to cultures valuing autonomy. Mastery goals were more strongly related to the egalitarian versus hierarchical dimension. Given the socio-cultural diversity among individuals pursuing residency training in Canada, studies examining differences in motivations for learning between Canadian medical graduates (CMG) and those who obtained their undergraduate medical education elsewhere (international medical graduates (IMG)) are also warranted. With only a few IMG residents in this study, however, we were unable to pursue this line of research using survey methodology. Qualitative research may provide further insights into socio-cultural aspects of motivations in medical education.

Conclusion

Family medicine residents trained in the culture of competency-based education appear to be mastery approach oriented. This motivation orientation is critical in dealing with clinical ambiguity and ever-changing family practice, and is consistent with the life-long learning mandate of the medical profession.

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References

[1] Tannenbaum D, Kerr J, Konkin J, Organek A, Parsons E, Saucier D, Shaw L, Walsh A. Triple C competency-based curriculum. Report of the Working Group on Postgraduate Curriculum Review – Part 1. Mississauga, ON: College of Family Physicians of Canada; 2011. Available from: www.cfpc.ca/uploadedFiles/.../WGCR_TripleC_Report_English_Final_18Mar11.pdf. Accessed May 21, 2017.

[2] Frank JR, Mungroo R, Ahmad Y, Wang M, de Rossi S, Horsley T. Toward a definition of competency-based education in medicine: A systematic review of published definitions. Med Teach. 2010;32:631-637.

[3] Taber S, Frank JR, Harris KA, Glasgow NJ, Iobst W, Talbot M. Identifying the policy implications of competency-based education. Med Teach. 2010;32:687-691.

[4] Linnenbrink-Garcia L, Patall E, Pekrun R. Adaptive motivation and emotion in education: Research and principles for instructional design. Policy Insights Behav Brain Sci. 2016;3(2):228-236.

[5] Elliot AJ, McGregor HA. A 2 x 2 achievement goal framework. J Pers Soc Psychol. 2001;80:501-519.

[6] Poortvliet PM, Darnon C. Toward a more social understanding of achievement goals: The interpersonal effects of mastery and performance goals. Curr Dir Psychol Sci. 2010;19(5):324-328.

[7] Darnon C, Dompnier B, Poortvliet PM. Achievement goals in educational contexts: A social psychology perspective. Soc Personal Psychol Compass. 2012;6(10):760-771.

[8] Veloski J, Hojat M. Measuring specific elements of professionalism: Empathy, teamwork, and lifelong learning. In: Stern DT, editor. Measuring medical professionalism. New York (NY): Oxford University Press; 2006. p. 117-146.

[9] Harackiewicz JM, Barron KE, Carter SM, Lehto AT, Elliot AJ. Predictors and consequences of achievement goals in the college classroom: Maintaining interest and making the grade. J Pers Soc Psychol. 1997;73:1284-1295.

[10] DeVoe PA. Learning in medical school: Relationships among achievement goals and approaches to learning and studying in three classes of medical students. Dissertation Abstracts International Section A: Humanities and Social Sciences. 2012;72(12-A):4416.

[11] Boekaerts M. Motivation and self-regulation: Two close friends. Adv Motiv Achiev. 2010;16B:69-108.

[12] Elliot AJ. Approach and avoidance motivation and achievement goals. Educ Psychol. 1999;34:169-189.

[13] Wolters CA, Yu SL, Pintrich PR. The relation between goal orientation and students' motivational beliefs and self-regulated learning. Learn Individ Diff. 1996;8:211-238.

[14] Hoffman RL, Hudak-Rosander C, Datta J, Morris JB, Kelz RR. Goal orientations in surgical residents: A study of the motivation behind learning. J Surg Educ. 2014;190:451-456.

[15] Stoeber J, Uphill MA, Hothman S. Predicting race performance in triathlon: The role of perfectionism, achievement goals, and personal goal setting. J Sport Exerc Psychol. 2009;31:211-245.

[16] Putwain DW, Daniels RA. Is the relationship between competence beliefs and test anxiety influenced by goal orientation? Learn Individ Diff. 2010;20:8-13.

[17] Howell CS, Watson DC. Procrastination: Associations with achievement goal orientation and learning strategies. Pers Individ Diff. 2007;43:167-178.

[18] Baranik LE, Stanley LJ, Bynum BH, Lance CE. Examining the construct validity of mastery-avoidance achievement goals: A meta-analysis. Hum Perform. 2010;23:265-282.

[19] Yanssen O, Van Yperen NW. Employees' goal orientation, the quality of leader-member exchange, and the outcomes of job performance and job satisfaction. Acad Manage J. 2004;47:368-384.

[20] Kaplan A, Maehr ML. The contributions and prospects of goal orientation theory. Educ Psych Rev. 2007;19:141-184.

[21] Nitsche S, Dickhäuser O, Fasching MS, Dresel M. Teachers' professional goal orientations: Importance for further training and sick leave. Learn Individ Diff. 2013;23:272-278.

[22] Kool A, Mainhard T, Brekelmans M, vanBeukelen P, Jaarsma D. Goal orientations of health profession students throughout the undergraduate program: A multilevel study. BMC Med Educ. 2016;16:100. DOI: 10.1186/s12909-016-0621-5.

[23] Kusurkar RA, Croiset G, Gallindo-Garre F, ten Cate O. Motivational profiles of medical students: Association with study effort, academic performance and exhaustion. BMC Med Educ. 2013;13:1-8.

[24] Gavaza P, Muthart T, Khan G. Measuring achievement goal orientations of pharmacy students. Am J Pharmaceut Educ. 2014;78:1-6.

[25] de Lange AH, Van Yperen NW, Van der Heijden BIJM, Bal PM. Dominant achievement goals of older workers and their relationship with motivation-related outcomes. J Vocat Bahav. 2010;77:118-125.

[26] Senko C, Freund AM. Are mastery-avoidance achievement goals always detrimental? An adult developmental perspective. Motiv Emot. 2015;39:477-488.

[27] Ross S, Poth CN, Donoff M, Humphries P, Steiner I, Schipper S, Janke F, Nichols D. Competency-Based Achievement System: Using formative feedback to teach and assess family medicine residents' skills. Can Fam Phys. 2011;57(9):e323-e330.

[28] Donoff MG. Field notes: Assisting achievement and documenting competence. Can Fam Phys. 2009;55(12):1260-1262.

[29] Baranik LE, Barron KE, Finney SJ. Measuring goal orientation in a work domain: Construct validity evidence for the 2 x 2 framework. Educ Psychol Measur. 2007;67:697-718.

[30] Lange F, Söderlund M. Response formats in questionnaires: Itemized rating scales versus continuous rating scales. SSE/EFI Working Paper Series in Business Administration. 2004:13.

[31] Viswanathan M, Bergen M, Dutta S, Childers T. Does a single response category in a scale completely capture a response? Psychol Market. 1996;13(5):457-479.

[32] DeVellis RF. Scale development: Theory and applications. Sage Publications, Inc.: Thousands Oaks, CA; 2003.

[33] Hasson D, Arnetz BB. Validation and findings comparing VAS vs. Likert scales for psychosocial measurements. Int Electron J Health Educ. 2005;8:178-192.

[34] Reips UD, Funke F. Interval-level measurement with visual analogue scales in Internet-based research: VAS Generator. Behav Res Methods. 2008;40(3):699-704.

[35] Bose MH, Gijselaers WH. Why supervisors should promote feedback-seeking behavior in medical residency. Med Teach. 2013;35:e1573-e1583.

[36] Teunissen PW, Stapel DA, van der Vleuten C, Scherpbier A, Boor K, Scheele F. Who wants feedback?: an investigation of the variables influencing residents' feedback-seeking behavior in relation to night shifts. Acad Med. 2009;84(7):910–917.

[37] Delva D, Sargeant J, Miller S, Holland J, Alexiadis Brown P, Leblanc C, et al. Encouraging residents to seek feedback. Med Teach. 2013;35(12):e1625–e1631.

[38] Perrot LJ, Deloney LA, Hastings JK, Savell S, Savidge M. Measuring student motivation in health professions' colleges. Adv Health Sci Educ Theory Pract. 2001;6:193-203.

[39] Madjar N, Bachner YG, Kushnir T. Can achievement goal theory provide a useful motivational perspective for explaining psychosocial attributes of medical students? BMC Med Educ. 2012;12:1-6.

[40] Dekker S, Fischer R. Cultural differences in academic motivation goals: A meta-analysis across 13 societies. J Educ Res. 2008;102:99-110.