

Exploring the Self-Regulation of Physicians and Medical Students
in Relation to their Well-Being and Performance

by

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B.Sc. Kinesiology, Université de Montréal, 2009

MASTER'S THESIS

Submitted to the Faculty of Graduate and Postdoctoral Studies in partial fulfillment of the
requirements for the degree of Master of Arts in Human Kinetics

School of Human Kinetics

University of Ottawa

September 2011

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Acknowledgments

The process of completing this Master's thesis has been both challenging and extremely gratifying. I would like to take the opportunity to thank the many people who helped me along the way, as I could not have done it without all of you. First of all, I would like to thank my thesis advisor, Natalie Durand-Bush - thank you for sharing your expertise with me and providing me with valuable feedback, while supporting me every step of this process. I have developed as a researcher and writer, as well as grown as a person during the last few years, and I owe a great deal of that to your mentorship and friendship. I wish to also thank my thesis committee, Dr. Denis Prud'homme and Dr. Bradley Young, for their advice and insight into this project.

Thank you to my fellow research colleagues for all your help along the way. Beyond your valuable feedback, you have also provided me with the motivation and inspiration to continue to push myself. Thank you to my family, friends and the love of my life Derek, for your emotional support and encouragement, and for helping me keep a sense of "balance" (although not always easy) throughout the process.

Thank you, everyone!

Table of Contents

Abstract.....	7
Chapter 1: Introduction	9
<i>Significance of the Study</i>	<i>14</i>
Chapter 2: Review of Literature	15
<i>The Evolution of Physician Health and Well-being Research</i>	<i>15</i>
Conceptualizing well-being	19
Planting the well-being seed during training	21
<i>Self-Regulation: A Potential Approach.....</i>	<i>25</i>
Self-regulation of feel	30
<i>Gaps in the Literature: A Rational for the Current Study</i>	<i>33</i>
Purpose of the study.....	34
Chapter 3: Results	36
Quantitative Article	37
Self-regulation: Can it Predict Well-Being, Stress, and Burnout in Physicians and Medical Students?....	37
<i>Abstract</i>	<i>38</i>
<i>Introduction and Literature Review</i>	<i>39</i>
<i>Purpose of the Study</i>	<i>47</i>
Hypotheses.....	47
<i>Methods.....</i>	<i>48</i>
Participants	48
Measures	49
Self-Regulation Capacity	49
Psychological Well-Being	50
Psychological Stress	50
Burnout	51
Data Analysis.....	52
<i>Results</i>	<i>53</i>

Internal Consistency of Scales	53
Descriptive Statistics	53
T-tests for Group status.....	54
Correlations	55
Multiple Regressions	55
<i>Discussion</i>	58
What is the Level of Self-regulation, Psychological Well-being, Psychological Stress, and Burnout of Physicians and Medical Students?	58
What are the Correlations Between Self-Regulation, Psychological Well-Being, Psychological Stress, and Burnout?	62
Does Self-Regulation Predict Levels of Psychological Well-being, Psychological Stress, and Burnout Among Physicians and Medical Students?	64
Does group status significantly moderate the association between self-regulation capacity and the outcome variables?	64
<i>Self-Regulation: A Skill that Can be Developed</i>	66
<i>Limitations, Strengths, and Future Research</i>	67
<i>Concluding Remarks</i>	68
<i>References</i>	70
<i>Tables and Figures</i>	79
Table 1. Cronbach's Alpha coefficients, means and standard deviations	79
Table 2. Correlation coefficients	80
Table 3. Hierarchal multiple regression analyses for status and self-regulation capacity	82
Figure 1. Significant interactions between group status, self-regulation capacity, and subscales of psychological well-being (i.e., (a) environmental mastery, (b) purpose in life, and (c) self-acceptance)	84
Qualitative Article	85
Exploring the Self-regulation of Physicians and Medical Students In Relation to Their Well-being and Performance: A Qualitative Inquiry.....	85
<i>Abstract</i>	86
<i>Introduction and Review of Literature</i>	87
Achieving Well-Being	88
Self-Regulation: A Potential Approach to Enhance Well-being?	90

Feel and the Process of Resonance	93
<i>Purpose of the Study</i>	97
<i>Methodology</i>	97
Participants	97
Data Collection Procedures	98
Data Analysis Procedures	98
<i>Results</i>	99
Standards of Self-Regulation	100
Self-Regulation Strategies	101
Self-Regulation Barriers	105
<i>Discussion</i>	109
Standards of Self-Regulation	109
Self-Regulation Strategies Facilitating Well-Being and Performance	112
Self-Regulation Barriers Inhibiting Well-Being and Performance	115
<i>Limitations and Future Research</i>	117
<i>Conclusion</i>	118
<i>References</i>	121
Figure 1. Social-Cognitive Model of Self-Regulation.	129
Figure 2. The Resonance Performance Model.....	130
Table 1. Standards of Self-Regulation	131
Table 2. Self-Regulatory (SR) Strategies Facilitating Well-being and Performance	132
Table 3. Self-Regulation (SR) Barriers Inhibiting Well-being and Performance	133
Chapter 4: General Discussion	134
<i>Quantitative Phase: Relationship between Self-Regulation and Well-Being Variables</i>	134
<i>Qualitative Phase: The Self-Regulation Process of Medical Students and Physicians</i>	135
Standards of well-being and performance	135
Self-regulation strategies.....	136
Self-regulation barriers.....	137

<i>Self-Regulation as an Approach: Needs for the Future</i>	<i>138</i>
Chapter 5: Conclusion	141
References	143
<i>Appendix A: Figure 1. Triadic interaction between personal, behavioural, and environmental factors</i>	<i>145</i>
<i>Appendix B: Figure 2. Cyclical phases of self-regulation</i>	<i>146</i>
<i>Appendix C: Figure 3. The Resonance Performance Model</i>	<i>147</i>
<i>Appendix D: Consent Form / Formulaire de consentement</i>	<i>148</i>
<i>Appendix E: Scales of Psychological Well-Being</i>	<i>152</i>
<i>Appendix F: Self-Regulation Questionnaire</i>	<i>155</i>
<i>Appendix G: Psychological Stress Measure</i>	<i>156</i>
<i>Appendix H: Maslach Burnout Inventory</i>	<i>157</i>
<i>Appendix I: Interview Guide</i>	<i>158</i>

Abstract

According to the Canadian Medical Association (CMA, 2003, 2007), developing sustainable, healthy physicians is a priority because research has shown that physicians today are largely ill-equipped to manage much of the adversity they face in their career and personal life, and many have lost sight of their personal well-being. Beyond affecting health, reduced well-being (e.g., dissatisfaction, distress, and burnout) can have negative repercussions on physicians' performance as health care providers (Shanafelt, Sloan, & Habermann, 2003). One potential approach to improve well-being is self-regulation. Self-regulation capacity allows individuals to manage their thoughts, feelings, and actions to attain personal goals (e.g., well-being and performance), as well as adjust to their changing social and physical environment (Zimmerman, 2000). However, self-regulation as a positive adaptive skill and process has not been examined in relation to well-being in the context of medicine.

The purpose of the current study was to examine self-regulation with 37 medical students and 25 supervising physicians to determine whether or not it may enhance well-being and performance, and reduce stress and burnout. A mixed-methods design was used to collect and analyze the data, and findings from the quantitative and qualitative phases were presented in two separate articles. In the quantitative phase, participants completed four questionnaires to assess levels of psychological well-being, psychological stress, burnout and self-regulation capacity. Results indicated that self-regulation capacity significantly correlated with all outcome variables and significantly predicted physicians' and medical students' levels of psychological well-being, psychological stress, and burnout. In the qualitative phase, 10 medical students and 10 physicians participated in individual interviews to explore their self-regulation standards, strategies, and barriers. Strategies reflecting Zimmerman's (2000) social-cognitive self-regulation process were

identified and categorized in three phases including forethought, performance or volitional control, and self-reflection. Both internal and external barriers inhibiting effective self-regulation were identified. Physicians and medical students perceived these barriers as diminishing their capacity to achieve desired levels of well-being and performance, and cope with stress and burnout. The self-regulatory needs of this population as well as suggestions for future research and interventions are provided. Self-regulation capacity appears to be an important skill that may help both physicians and medical students to meet the demands of the medical profession and maintain an adequate level of well-being and performance in their work and daily life.

Chapter 1 - Introduction

Physicians today face excessive and conflicting demands between the organizations that employ them, the patients for whom they care, and their own personal needs (Goldman, Myers, & Dickstein, 2000). They are expected to “speed up” and efficiently adjust to the endless changes made to the practice of medicine that are out of their control (e.g., increased accountability, excessive workload and productivity demands; Wallace, Lemaire, & Ghali, 2009), while attending to their personal lives (Sotile & Sotile, 2002). In response to their challenging working conditions and in order to live up to the performance expectations of their profession, it appears that many physicians may have prioritized their career at the expense of their well-being (Shanafelt, Sloan, & Habermann, 2003; Sotile & Sotile, 2002).

Sotile and Sotile’s (2002) extensive work as consultants with physicians has led them to conclude that many of these professionals are unprepared to cope with the stressors they face on a daily basis. Indeed, physicians who are negatively affected by the stress of their work are more at risk of developing maladaptive behaviours (e.g., substance abuse; Firth-Cozens, 2001), and experience psychological and physical distress leading to burnout (Chopra, Sotile, & Sotile, 2004; Shanafelt et al., 2003). Moreover, despite the troubling nature of these implications for their well-being and health, there is growing evidence that physicians do not seek proper help or take care of themselves effectively when they are not well (Firth-Cozens, 2001). Either as means of preparing for adversity or reactively coping with it, it seems that the development and adoption of effective self-care practices is difficult for physicians to accomplish due to the individual, professional, and organisational barriers they face every day (Wallace et al., 2009).

The urgency of this matter is apparent, as “distress and burnout may have more serious implications for physicians than for other professionals” (Shanafelt et al., 2003, p. 513). Beyond

decreased health and well-being, stress and burnout are associated with reduced work performance (Maslach & Leiter, 2008; Wallace et al., 2009). This means that when physicians are not performing at their best, the potential risk of making medical errors and negatively impacting patient outcomes is likely to be much greater (Arnetz, 2001; Firth-Cozens, 2001; Goldman et al., 2000). These alarming repercussions address a wider societal concern that extends beyond the individual physician and implicates stakeholders (e.g., health providers and purchasers, insurance companies), policy makers and just about every Canadian who seeks medical care as a patient.

In light of the growing evidence indicating that many Canadian physicians are “unwell” (Wallace et al., 2009, p. 1714), the Canadian Medical Association (CMA, 2007) has made the development of sustainable and healthy physicians a priority (Puddester, 2001). Although there is an obvious need for organizational restructuring to reduce the demands placed on physicians (Dunn, Arnetz, Christensen, & Homer, 2007; Shanafelt et al., 2003), such amendments could take time and would be difficult to maintain as health care systems will continue to reform (Shanafelt, 2009; Tidd & Friedman, 2002). Strengthening the individual physician therefore seems like a plausible and promising first approach to meet the priority set forth by the CMA (2007).

This recourse implies a need for physicians to take responsibility to first assess their own strengths and deficiencies, and then attend to what they need to do in order to be able to continuously adapt to their changing environment and profession (Epstein, Siegel, & Silberman, 2008). Although the responsibility to adjust to the demands of the profession should be assumed for the most part by the physicians themselves (Epstein et al., 2008), there is an opportunity for

educators and mentors to help impart to medical practitioners the necessary skills needed to manage and balance their professional career with their personal life.

These adaptive skills are part of what some researchers consider to be our most important quality as humans; our capability to self-regulate (Zimmerman, 2000). There is a growing body of literature in the psychosocial domains of research surrounding how the “self maintains control over itself and makes the adjustments that it deems best to maintain harmony with its social and physical environment” (Vohs & Baumeister, 2004, p. 3). It is believed that self-regulation has enabled the human specie to survive and flourish, and to live as social and cultural beings (Vohs & Baumeister, 2004; Zimmerman, 2000).

From a social cognitive perspective, self-regulation involves generating thoughts, feelings, and actions that are planned and cyclically adapted to the attainment of personal goals in changing social and physical environments (Zimmerman, 2000). In other words, it refers to the regular exercise of control over oneself in order to adapt (Zimmerman, 2000) and bring oneself in line with preferred standards (Carver & Scheier, 1998; Vohs & Baumeister, 2004). The social-cognitive perspective therefore nurtures a sense of personal agency to adopt performance and health-related practices that are congruent with one’s personal and evolving standards and goals. As such, it best describes self-regulation as a process in which self-regulation capacity can be enhanced rather than a singular trait or innate ability (Zimmerman, 2000).

Recognition of the importance of self-regulation for human functioning stems from its profound impact on everyday living (Vohs & Baumeister, 2004). The self-regulation process goes beyond explaining how we cope with adversity and how we strive for optimal functioning; it addresses our dysfunctions as well. Vohs and Baumeister (2004) believe that many issues we

face daily involve a failure or an inability to effectively self-regulate. In line with the concept of regulation that delineates this process, we can argue that physicians who experience well-being or performance-related problems may not be effectively managing personal behaviours, thoughts, and feelings that are consonant with achieving desired health and performance outcomes on a consistent basis; in other words, they may possess low and/or ineffective self-regulatory skills. In the same light, it stands to reason that physicians who effectively regulate themselves by using and adapting well-being and performance-facilitating strategies on a daily basis may be more likely to maintain an adequate level of well-being and performance in the face of adversity (e.g., work-related stress).

Given the growing evidence that “many physicians have lost sight of their personal well-being” (Shanafelt et al., 2003, p. 513), it is necessary to address and promote well-being early on when physicians are in training (Dunn, Iglewicz, & Moutier, 2008). Medical students should learn through their curriculum to practice and effectively use methods or strategies that nurture their well-being and health while developing the competencies needed to perform as medical professionals (Dunn et al., 2008). In reality, however, the structure of medical education programs is believed to contribute to the development of poor health habits and self-care practices (e.g., sleep deprivation, substance use; Ball & Bax, 2002). Research has shown that many medical students fail to effectively adjust to the stressors of their training environment (Dunn et al., 2008; Estabrook, 2008; Firth-Cozens, 2001; Lee & Graham, 2001; Rakel & Hedgecock, 2008), which can lead to decreased academic performance and well-being, and have important repercussions on their future as physicians (Ball & Bax, 2002). Although they learn about what constitutes health, like the physicians who supervise their work, “students often

sacrifice their own [health] to meet the demands that the medical culture has created for them” (Rakel & Hedgecock, 2008, p.633).

One could argue that there is a need for medical students and physicians to move beyond merely understanding what they need to do to take care of themselves, and learn to regulate behaviours, thoughts, and feelings in order to systematically take control of their life (Zimmerman, 2000). Exploring the process of self-regulation specific to the context of medicine may be of significant value in determining to what extent self-regulatory practices are currently being adopted by physicians and medical students and how these influence their well-being and performance.

It is noteworthy that self-regulation has been recently examined in an intervention-based study, guided by the Resonance Performance Model, with medical students and linked to increases in their well-being and performance (Simon & Durand-Bush, 2009). Although there is a growing body of literature on potential stress management and burnout prevention interventions and strategies for physicians and medical students, Simon and Durand-Bush were the first to investigate a self-regulation intervention in the medical training context. These authors presented four in-depth case studies to better understand the students’ ability to learn to regulate how they felt, thought, and behaved in their performance context by participating in a 17-week person-centered, feel-based intervention. Similar to Ball and Bax (2002), they concluded that helping students to build a strong foundation of self-care skills at the onset of their training could better prepare them to effectively respond to the needs of their profession and offer quality patient care as physicians. They also suggested that in order to put forth the most appropriate interventions, it would be important to also examine the self-regulation of physicians

as they serve as models (Pololi & Knight, 2005) and play a crucial role in the training of medical students (Dyrbye, Thomas, & Shanafelt, 2005; Estabrook, 2008; Simon & Durand-Bush, 2009).

In light of Simon and Durand-Bush's (2009) findings highlighting the positive impact of self-regulation on medical students' performance and well-being, and the apparent dearth of studies demonstrating the use and effects of self-regulation within the medical context, future research is warranted. As such, the purpose of the study was to investigate the self-regulation of medical students and physicians in relation to their well-being and performance.

Significance of the Study

This study is significant for different reasons. First, the participants were recruited from a Canadian university that promotes the well-being of its medical students and faculty members. This university represents the shift that is taking place across Canada, tackling physician health and well-being nationally, provincially and municipally (Puddester, 2004). Choosing a sample from a context that already favours well-being-centered education will allow researchers to provide insight into what may lead to successful self-regulation or more specifically, the regulation of healthy behaviours while performing.

This study will also bring attention to the self-regulatory barriers of medical students and physicians, and could serve as an impetus for additional research and future interventions. Given the benefit and practical significance of engaging in effective self-regulation to better one's life and environment (Vohs & Baumeister, 2004), this study could contribute to the Canadian Medical Association's call to find ways to help physicians take responsibility for their own health and move towards a vision of a "health care system led by example-where physicians are as well and healthy as they wish their patients to be" (Puddester, 2001, p. 7).

Chapter 2 - Review of Literature

This section will review the existing literature on physician and medical student well-being and highlight the gaps in research that need to be addressed. The self-regulation framework that guided this research along with relevant findings on this topic will also be presented. Furthermore, the specific research questions will be introduced.

The Evolution of Physician Health and Well-being Research

Health advances have been paralleled by profound rapid changes in the medical profession and the Canadian health care system in the past decade (Puddester, 2001; Wallace et al., 2009). As a result, demands placed on physicians have increased (Shanafelt et al., 2003) while their professional autonomy has declined (Sotile & Sotile, 2002). It is believed that while the medical field pushes to cure more diseases and heal more people, the healers themselves have been ironically left to suffer. This yields a paradox regarding our societal values and common assumption that healers must first be healed before they can effectively heal others (Novack, Epstein, & Paulsen, 1999).

It has been estimated based on different statistics that 15% of physicians in America will at one point in their career become impaired (Boisaubin & Levine, 2001). Impairment includes disease and mental illness, as well as dysfunctional behaviours (e.g., alcoholism, drug addiction; Yamey & Wilkes, 2001) that define physicians as no longer suitable to fulfill their professional and personal responsibilities (Boisaubin & Levine, 2001). Moreover, results from a survey conducted by the Canadian Medical Association indicated that while 18% of Canadian physicians were reportedly depressed, only 25% of them considered getting help and only 2% actually did (CMA, 2003). In 2007, the Canadian Medical Association reported that 55% of its

physician members claimed that they personally, along with their family, suffered because they chose medicine as a profession.

In light of the current reality of physician impairment and dissatisfaction, the Canadian Medical Association (CMA, 2007) has made the development of sustainable and healthy physicians a priority and has called for research to address this problem (Puddester, 2001). Consequently, the health of our medical professionals has been the focus of many researchers' work, studying causes and consequences to better understand the current state of our "stressed out" and "burnt out" physicians (CMA, 2003; Goldman et al., 2000).

Beyond the stressful demands and challenges physicians face in their profession, many possess a strong drive for achievement, as well as similar performance attributes such as perfectionism, unwavering commitment, and high standards of excellence (Boisaubin & Levine, 2001). Although advantageous for success in medicine, ironically, such characteristics and traits can predispose physicians to experience stress and anxiety (Buchman, Sallis, Criqui, Dimsdale, & Kaplan, 1991; Vitaliano, Maiuro, Russo, & Mitchell, 1989; Yiu, 2005). Stress is defined as the outcome of an imbalance between the demands an individual faces and his or her perceived capability to respond to such demands in a situation where failure to meet them has important consequences (McGrath, 1970). Although stress can be positive (i.e., eustress) in that it can express challenge and lead to pleasant emotions (e.g., excitement and satisfaction; McGrath, 1970), the imbalance physicians face on a daily basis, accompanied by restricted control to adjust to their demands, can lead to a high occurrence of negative stress, also known as distress (Wallace et al., 2009). Distress tends to have unpleasant consequences such as anxiety and job dissatisfaction, and can lead to impaired physical and mental health (Maslach & Leiter, 2008), as well as weakened relationships (Sotile & Sotile, 2002). According to Lazarus' (1991)

transactional model of stress, the effect of stressors on well-being depends on one's ability to cope with these stressors. Therefore an individual's perceptions of and reactions to stress produced by the work environment may vary, differentially predisposing him or her to burnout (Thomas, 2004).

Professional burnout, a syndrome reflecting emotional exhaustion, depersonalization, and a sense of low personal accomplishment, is the result of chronic work-related stress and of excessive workload (Maslach & Leiter, 2008). Following a nation-wide survey assessing physician burnout levels using the Canadian Medical Association Physician Resource Questionnaire, Boudreau, Grieco, Cahoon, Robertson, and Wedel (2006) reported that 46% of a total of 2251 Canadian physicians who completed the survey were classified as being in advanced phases of burnout. In addition to negatively impacting health, burnout has been linked to decreased work-related performance, as well as reduced career satisfaction (Maslach, Jackson, & Leiter, 1996). This is particularly troublesome given the negative effect such reductions can have on patient outcomes and quality of overall care (Eckleberry-Hunt et al., 2009; Freeborn, 2001; Shanafelt, Bradley, Wipf, & Back, 2002; Shanafelt et al., 2003; Taub, Morin, Goldrich, & Benjamin, 2006). The seriousness of the implications of physician burnout and its alarming prevalence are indeed cause for concern and action (Shanafelt, 2009).

To this day, the study and diagnosis of disease, distress, impairment, or dysfunction dominates the literature on physician health (Compton, 2005). As a result, researchers have given comparatively less attention to investigating the promotion and achievement of physician well-being (Dyrbye et al., 2005; Shanafelt et al., 2003; Wallace & Lemaire, 2007; Weiner, Swain, Wolf, & Gottlieb, 2001). In accordance to this tendency for research to focus on pathology (Yamey & Wilkes, 2001), intervention-based studies in the medical literature have centered

primarily on managing impairment and disease in physicians and medical students rather than preventing its occurrence (Moss & Smith, 2006). In contrast, many psychologists have recognized that the disease model does not move us closer to the prevention of illness or health-related problems (Seligman & Csikszentmihalyi, 2000). This has led to the initiation of prevention research guided by a more positive perspective, centered on building strengths rather than merely correcting weaknesses. This type of research is warranted in the medical field as it will help to determine what allows today's health care practitioners to adapt and thrive in their fast-paced and outcome-oriented working environment and maintain an adequate level of well-being.

This shift towards a science of positive psychology devoted to “nurturing what is best” suggests that there is more to well-being than merely the absence of disease and illness (Seligman & Csikszentmihalyi, 2000). Well-being is best viewed as a complete state characterized by the relative presence or absence of both negative and positive states in different areas of our life and different functions of our being (i.e., physical, mental, emotional and social; Keyes & Waterman, 2003). This comprehensive view of well-being reflects a recent shift in the past decade in the medical literature surrounding physician well-being. Beyond the medical disease model, physician well-being has been acknowledged to include “being challenged, thriving, and achieving success in various aspects of personal and professional life” (Shanafelt et al., 2003, p. 514). From an early focus on substance abuse and impairment, to disease prevention and more recently the promotion of health and well-being (Goldman et al., 2000), we must continuously move towards discovering what keeps physicians well and performing at their best (Wallace et al., 2009; Yamey & Wilkes, 2001; Yiu, 2005). As such, research in the medical context that conceptualizes well-being as a marker of positive health and functioning is needed in

order to create true positive change. Integrating well-being theories from the psychosocial literature could also help shed light on how well-being can be measured, developed, and sustained with physicians.

Conceptualizing well-being. Congruent with the positive psychological approach used in this study, subjective well-being is perceived to reflect both positive and negative emotions and evaluations of how satisfied we are with life in general and in specific life domains such as work, education, health, and relationships (Diener, 2009). Thus well-being comprises an *affective* and *cognitive* dimension (Diener, Suh, Lucas, & Smith, 1999). The affective dimension is a hedonic evaluation individuals make based on the emotions and feelings they experience; it therefore reflects both the presence of positive affect and the absence of negative affect. The cognitive dimension is an information-based appraisal they make of their life whereby they judge the extent to which their life measures up to their expectations and resembles their envisioned “ideal” life.

Ryff and Keyes’ (1995) research adds to the theory of subjective well-being, indicating that there is more to being well than feeling happy and satisfied with life. These authors integrated multiple frameworks of positive functioning to generate a multidimensional model of well-being including six distinct components of psychological well-being that target “positive evaluations of oneself and one’s past life (Self-Acceptance), a sense of continued growth and development as a person (Personal Growth), the belief that one’s life is purposeful and meaningful (Purpose in Life), the possession of quality relations with others (Positive Relations With Others), the capacity to manage effectively one’s life and surrounding world (Environmental Mastery), and a sense of self-determination (Autonomy)” (Ryff & Keyes, 1995, p. 720).

Research on physician well-being is timely as the general public is gaining awareness of the importance of health practices and adopting models of multidimensional well-being (Taub et al., 2006). It seems that people are becoming more health-conscious and are assuming more responsibility for their own well-being (Lee & Graham, 2001). While the medical system is increasing its commitment to patient health and broadening its definition of health to include well-being, physicians should take advantage of this positive change to focus on their own health and well-being (Taub et al., 2006).

In addition to researching the factors that define and nurture well-being, researchers have studied the consequences of experiencing well-being (Diener & Ryan, 2009). Well-being has been shown to significantly improve life by sustaining productivity and work performance, socially desirable behaviors, positive mental and physical health, and social relationships (Diener & Biswas-Diener, 2008; Keyes & Waterman, 2005). Evidence suggests that high levels of well-being are not only beneficial for the individuals who experience them, they also contribute to the effective functioning of societies (Diener & Ryan, 2009).

Patient safety is another aspect at the forefront of the research surrounding physician health and well-being (Goldman et al., 2000; Shanafelt, 2009; Taub et al., 2006). Although there is a need for more studies in this area (Shanafelt et al., 2003), suboptimal patient care has been identified as a detrimental effect of physician ill-being (Boisaubin & Levine, 2001; Estabrook, 2008; Firth-Cozens, 2001). Even for physicians who are not necessarily impaired, excessive workload and fatigue have been found to contribute to patient care errors (Firth-Cozens, 2003; Fletcher et al., 2008; West et al., 2006; 2009). It is likely that helping physicians to achieve and maintain adequate levels of health and well-being will likely decrease opportunities for errors, and therefore increase effective patient care practices (Goldman et al., 2000).

Furthermore, research has shown that physicians who regulate positive health habits and practice good self-care are more likely to educate and encourage their patients to do the same (Frank, Rothenberg, Lewis, & Belodoff, 2000; Rakel & Hedgecock, 2008). In other words, promoting and presenting physicians with the tools and strategies to stay healthy could have a ‘trickle down’ effect and enhance the health and lifestyles of patients. Research has further demonstrated a cyclical relationship between physicians and their patients, whereby having a positive impact on patients can buffer the negative effects of emotionally-demanding work on the well-being of physicians (Wallace & Lemaire, 2007). Although more studies linking physicians’ well-being to patient outcomes are needed (Gerrity, 2001; Shanafelt et al., 2005, Wallace et al., 2009), research could start by focusing on enhancing physician well-being first and then examining how this impacts their performance (Wallace et al., 2009). Early training to acquire sound self-care skills may provide physicians with the necessary foundation to ensure the sustainability of these skills throughout their career (Ball & Bax 2002; Hassed, de Lisle, Sullivan, & Pier, 2009).

Planting the well-being seed during training. The implications of physician well-being “should be a strong call to action for academic medicine” (Shanafelt et al., 2003, p. 516) to teach medical students early on how to cope with the inevitable stressors associated with their profession and to thrive as resilient future physicians (Dobie, 2007; Estabrook, 2008; Rakel & Hedgecock, 2008; Simon & Durand-Bush, 2009; Wright et al., 2006). Unfortunately, it appears that during training, medical students do not elude the stressors of the medical profession (Estabrook, 2008). It has been shown that medical students experience high levels of stress that can impede their performance, professionalism, and overall health (Dyrbye et al., 2005; Lee & Graham, 2001). In fact, medical students have higher rates of overall psychological distress, and

may also be more vulnerable to health problems than the general public and age-matched peers (Dyrbye et al., 2005).

It is believed that maladaptive behaviours are produced by the medical culture itself, prioritizing performance over personal care (Rakel & Hedgecock, 2008). As such, poor self-care habits are thought to be developed during medical training, which may explain why students' mental health worsens as they progress through medical school (Ball & Bax, 2002; Puddester, 2001). The inherent goal of medical education is to graduate high-quality physicians (Dyrbye et al., 2005), and students often sacrifice their own health and well-being in order to achieve this goal (Rakel & Hedgecock, 2008). While medical students are educated to care for their patients in medical school, they are not always adequately prepared to take care of themselves (Lee & Graham, 2001).

Research surrounding the antecedents of medical student distress has mainly focused on educational programs as a primary source; however, the latter are not entirely to blame as personality and temperament also play a very important role in determining an individual's capacity for well-being (Diener & Ryan, 2009). Like their preceptors, many students who choose medicine as a career already possess certain 'type A' characteristics, placing them at increased risk of stress (Buchman et al., 1991; Vitaliano et al., 1989; Yiu, 2005). High personal standards and expectations, not respecting one's limits, maladaptive perfectionism and excessive concerns about academic performance (Dyrbye et al., 2006; Enns, Cox, Sareen, & Freeman, 2001; Shanafelt et al., 2003; Sotile & Sotile, 2002; Wallace et al., 2009) can lead medical students to make poor health-related choices, such as working long hours without a break, depriving themselves from sleep, and not taking the time to eat and exercise in order to achieve their

performance goals (Yiu, 2005). As previously discussed, this type of imbalance could eventually lead them to experience burnout during their training, even before becoming physicians.

As an example, a survey completed by 545 American medical students indicated that 45% of the participants reported symptoms of burnout. The findings from this study showed that burnout rates seemed to increase during schooling and although they were primarily associated with work-related stress, personal life events also contributed to the syndrome. The authors therefore suggested that both personal and curricular factors be addressed in order to avoid burnout in medical students (Dyrbye, Thomas, & Shanafelt, 2006). They also pointed out that while calls for changes to the training experience have been made, little is known about how the curriculum contributes to distress and how it should be changed to reduce it and enhance well-being. In line with this research, it seems plausible to suggest that both the training environment of medical students, which include social (e.g., preceptors and mentors) and physical (e.g., tools) resources or lack thereof, in combination with their skills and predisposition to cope with adversity, can influence their behavioural choices (e.g., maladaptive work and lifestyle habits) and subsequently, their overall health and well-being.

Research shows that in addition to experiencing personal maladjustments while facing the pressures and demands associated with medical training, medical students are hesitant to seek help for fear of jeopardizing their academic standing due to the stigma associated with health-related counselling (Wallace & Lemaire, 2007). Estabrook (2008) proposed that medical students opt to treat or care for themselves rather than to seek outside care in order to avoid not only judgment by their peers and preceptors, but also feelings of guilt associated with taking extra time to attend to their own well-being. This is important as ultimately, failure to seek help or to

cope with maladjustments could lead to future professional impairment and decreased career satisfaction (Estabrook, 2008).

What's more, it is believed that many medical students learn maladaptive behaviours from their medical preceptors and educators, who serve as formal or informal models and mentors (Estabrook, 2008; Lee & Graham, 2001; Rakel & Hedgecock, 2008; Wallace et al., 2009). Consequently, a shift in the culture of the medical education system is needed, whereby both educating physicians and medical students recognize the importance of adopting well-being practices and developing necessary skills to master the knowledge they require to perform, adjust to their changing environment, and effectively regulate their own life (Dobie, 2007). It would thus be noteworthy to include both physicians and medical students in future research to shed more light on strategies they learn and use to enhance their well-being.

In sum, while the term well-being is a well-cited construct in more recent research surrounding physician and medical student health (e.g., CMA, 2007; Shanafelt et al., 2003), it remains largely under-developed. Strategies and resources identified in the medical well-being literature are mostly restricted to coping with and preventing stress, burnout and impairment, rather than achieving and enhancing well-being and positive functioning (e.g., Jensen, Trollope-Kumar, Waters, & Everson, 2008; Lee, Stewart, & Brown, 2008; Meldrum, 2010). With very little evidence on what actually keeps physicians "well", the literature distorts perceptions of what is optimal well-being in the medical environment, and limits the promotion and achievement of positive and healthy living (Shanafelt et al., 2003; Wallace et al. 2009; Weiner et al., 2001; Yamey & Wilkes, 2001). Research is still needed to understand how well-being strategies can be developed and integrated into the medical culture (Moss & Smith, 2006) to allow both medical students and physicians to adopt and regulate them in their daily life.

Self-Regulation: A Potential Approach

Yamey and Wilkes (2001) proposed two major themes with regards to developing physician well-being: (a) the ability of physicians to exercise choice and shape their own well-being and (b) the need for them to have some control over their work environment. Providing physicians with a sense of control has shown promising results as it has been linked to perceived reductions of distress and burnout, as well as perceptions of increases in job satisfaction and well-being (Dunn et al., 2007; Krasner et al., 2009; Shanafelt et al., 2003). Dunn and colleagues suggested that benefits also include physician retention, increased productivity, and a reduction in medical errors (i.e., enhanced medical performance). This may be explained by the fact that self-control and related positive outcomes allow individuals to work towards successfully achieving their set goals (Diener et al., 1999; Scheier & Carver, 1985).

Discussed throughout the literature on self-regulation, the term “control” has been used interchangeably with the term “regulation.” Specifically, self-regulation is defined as the ability to exercise control over oneself, with regard to bringing the self into line with preferred standards (Vohs & Baumeister, 2004). From a social-cognitive perspective, self-regulation is a process in which individuals recurrently attempt to manage their thoughts, actions, and feelings in order to meet their personal standards and achieve their goals in their changing environment (Zimmerman, 2000). A key perspective in Zimmerman’s (2000) self-regulation model is that we are agents of our own life and have the ability to define our preferred standards and manage our personal, behavioural, and environmental processes. We exercise a reciprocal influence on our environment and as a result, those “who neglect to use social and physical environmental resources or who view them as an obstacle to personal development will be less effective in regulating their lives” (Zimmerman, 2000, p. 24). Therefore, despite the continued presence of

medical demands and stressors, Zimmerman would argue that physicians and medical students can still exert some control over themselves and their environment in order to achieve their performance, health, and well-being goals.

According to Zimmerman (2000), self-regulation is a fundamental quality of humans, and as such, every individual has the capability to self-regulate to optimize personal functioning. What distinguishes effective from ineffective forms of self-regulation is not whether or not one possesses such capabilities but rather “the quality and quantity of one’s self-regulatory processes” (Zimmerman, 2000, p. 15). High and low self-regulators can therefore be differentiated by their level of awareness, the adequacy of their choices, and their effective use of self-regulation strategies and skills to control their inner states and ensure they are congruent with their exterior world.

Self-regulation is influenced by a triadic interaction between personal, behavioral, and environmental factors (Zimmerman, 2000, see Figure 1 in Appendix A) that are cyclically observed and adjusted using three self-oriented feedback loops. More specifically, covert self-regulation involves monitoring and adjusting both cognitive and affective states through skills such as focusing, imagery, and relaxation, while behavioral self-regulation pertains to “observing and strategically adjusting performance processes” (Zimmerman, 2000, p. 14). Finally, environmental regulation involves “observing and adjusting one’s environmental conditions and outcomes” (Zimmerman, 2000, p. 14). These interrelated self-regulatory processes, which allow individuals to plan and adjust their thoughts, feelings, and actions in order to attain personal goals, are present in the following three cyclical sub-regulatory phases: (a) Forethought, (b) Performance or Volition Control, and (c) Self-reflection (see Figure 2 in Appendix B, Zimmerman, 2000).

The *forethought phase* relates to planning prior to performing tasks/skills within one's context (e.g., medicine) and consists of examining key motivational beliefs, analyzing tasks to be performed, identifying learning or performance outcomes, and setting personal standards and goals in order to complete the tasks to the best of one's ability. Strategies used in this phase include goal setting and strategic planning. Motivation and self-efficacy reflecting intrinsic interest and values are essential in order to initiate the *forethought phase* and establish self-regulatory strategies (Zimmerman, 2000).

The *performance or volitional control phase* involves the use of self-control, self-observation, and self-recording processes during the execution of tasks (e.g., studying, performing manual medical techniques, writing an exam). While self-control refers to one's ability to maintain focus on current tasks and to optimize efforts towards goal attainment, self-observation consists of observing and tracking specific aspects of one's performance and environment during task completion, and subsequent efforts produced in response to such data. Self-recording (e.g., journaling, rating performances) increases the effectiveness and accuracy of feedback and leads to self-awareness by providing relevant personal and environmental data that can be synthesized into future adapted strategies.

The *self-reflection phase* occurs following the performance of tasks and consists of comparing self-monitored data with a standard or goal (i.e., determining where one is in relation to where one wants to be), and assigning attributions or causal significance to the results. Determining satisfaction regarding one's task-related performance and making adaptive inferences to improve future regulatory attempts are also part of this process (Zimmerman, 2000).

Self-regulation is a highly cyclical process because feedback information from previous experiences is used to make adjustments during current and future efforts of regulation (Zimmerman, 2000). Predominant in the context of education, a key contribution of Zimmerman's social-cognitive perspective of self-regulation is its emphasis on learning as well as on socializing agents (e.g., preceptors, students, patients) and the reciprocal effect they have on one's actions and development of self-regulation (Zimmerman, 2008). According to Schunk and Zimmerman (2003), self-regulation is a social, dynamic phenomenon that requires nurturing: "Self-regulation does not develop automatically with maturation, nor is it acquired passively from the environment. Systematic interventions assist the development and acquisition of self-regulatory skills" (p. 72). This is important since it suggests that medical students and physicians may need assistance in developing sound self-regulation skills. Seligman and Csikszentmihalyi (2000) postulated that "the majority of 'normal' people need examples and advice to reach a richer and more fulfilling existence" (p.10). Meldrum (2001), who studied exemplary resilient and successful physician leaders, found that self-regulation is a necessary skill that can be acquired by practicing, and learning from others who do it all and do it well.

Zimmerman's self-regulation model does not claim to predict why some people are better than others at self-regulating, nor does it assume that because one is effective at self-regulating in one area of life, such as work, he or she will be as effective self-regulating in another, for example, at home with family. Even in terms of specific techniques and strategies, "no self-regulatory strategy will work equally well for all persons, and few, if any, strategies will work optimally for a person on all tasks or occasions" (Zimmerman, 2000, p. 17). For this reason, it is important to develop a wide variety of strategies that may be applicable in different contexts and

situations. Furthermore, the planning and selection of strategies requires continuous adjustments because of constant personal, behavioral, and environmental changes (Zimmerman, 2000).

An extension of Bandura's (1991) social-cognitive theory of self-regulation, Zimmerman's model focuses on both proactive and reactive elements of self-regulation, empowering individuals to proactively strive for optimal experiences and functioning. Believing in one's capabilities is a reflection of personal self-motivational beliefs that allow one to set higher goals and remain committed to these goals. This proactive stance highlights the importance of strategic planning, monitoring, and reflection, as well as deliberate practice, as effective self-regulation requires more than mere exposure to learning opportunities (Zimmerman, 2000). In other words, regardless of the level of self-regulation capacity individuals possess, they can always endeavor to improve by learning from others, consciously practicing, and refining effective and individualized skills and strategies.

Appropriate selection and effective use of self-regulatory strategies can enhance performance by allowing individuals to control cognitive and affective states, and direct task execution (Zimmerman, 2000). For example, studies show that when students strategically prepare and monitor their actions, thoughts and feelings, they reflect on their performance and they attribute outcomes to their strategies, their learning becomes self-regulated, and they display increased self-efficacy, greater intrinsic motivation, and higher academic achievement (Zimmerman, 1990). Self-regulation may also foster well-being through increases in life and job satisfaction, positive relations with others, environmental mastery, and autonomy (Ryff & Keyes, 1995).

Self-regulation of feel. While affect and its related constructs (i.e., emotions, feelings, and mood) have been addressed to some extent in several self-regulation theories and models, it is not sufficiently clear how the regulation of affect plays a role in the overall self-regulation process (Vohs & Baumeister, 2004). More specifically, although Zimmerman (2000) addresses the control of covert processes in his theory, it is not evident how and when affect is self-regulated throughout the phases of his model. One group of researchers has attempted to shed more light on this by studying the concept of “feel” using the Resonance Performance Model (RPM, Simon & Durand-Bush, 2009, see Figure 3 in Appendix C). Resonance, as depicted in the RPM, is a self-regulatory process that allows individuals to control their felt experiences by proactively striving to feel the way they want, and also by reactively reducing discrepancies when they do not feel a desired way (Simon & Durand-Bush, 2009). In this context, feel is defined as a subjective, multidimensional, and dynamic experience that is mediated by one’s ability to perceive, to be aware of, or to be conscious of one’s inner self and external environment (Simon & Durand-Bush). As such, it is a broader concept that can be differentiated from emotions and feelings (Hanin, 2007; Vallerand & Blanchard, 2000). While one’s felt experiences incorporate an emotional dimension (e.g., I feel happy), they can include physical (e.g., I feel strong), cognitive (e.g., I feel confident), social (e.g., I feel connected to the group), and spiritual (e.g., I feel at peace) dimensions as well (Callary & Durand-Bush, 2008; Simon & Durand-Bush, 2009).

Similarly to the cyclical phases in Zimmerman’s (2000) social-cognitive model of self-regulation, the RPM includes cyclical components that facilitate the achievement of desired felt experiences. Resonance as a process allows individuals to (a) identify how they want to feel in different situations and aspects of their life, (b) prepare to feel the way they want, (c) identify

obstacles that prevent them from feeling the way they want, and (d) reconnect with the way they want to feel when necessary (Callary & Durand-Bush, 2008). Through sub-regulatory processes such as planning, self-monitoring, and self-reflection, individuals who develop the skill to manage the way they feel and experience harmony between their inner self and external environment on a daily basis are more likely to experience optimal levels of performance and well-being (Arcand, Durand-Bush & Miall, 2007; Callary & Durand-Bush, 2008; Collins & Durand-Bush, 2010; Doell, Durand-Bush, & Newburg, 2006; Guérin, Arcand, & Durand-Bush, 2010; Lussier-Ley & Durand-Bush, 2009; Simon & Durand-Bush, 2009).

While most studies on resonance have been conducted in different sport contexts, Simon and Durand-Bush (2009) examined the implementation of a resonance intervention in the context of medicine, and found that it enhanced the well-being and performance of four female medical students. Specifically, the purpose of this multiple case study was to explore the process in which four female medical students learned to regulate how they felt by participating in a feel-based, person-centered intervention. The extensive qualitative results, synthesized through an analysis of narratives, showed how their felt experiences were multidimensional, self-defined, and varied over time. Through the intervention, each student was able to “identify how they wanted to feel based on different dimensions, observe how these mediated each other, and learn how to regulate their felt experiences to optimize performance and well-being” (Simon & Durand-Bush, 2009, p. 228).

Like Zimmerman’s (2000) social-cognitive approach to self-regulation, the RPM views the social and physical environment as a resource and individuals as proactive agents in constant exchange with this resource. Individuals who create and live in an environment that continually nurtures their desired feel, can better enjoy quality performance and everyday living because it

gives them the motivation and energy necessary to sustain their endeavours over time and attain their goals (Newburg, Kimiecik, Durand-Bush, & Doell, 2002). The medical profession is one environment in which individuals are in constant interaction and must form relationships (e.g., with patients, students, preceptors, physicians, administrators). Although these relationships can cause stress and lead to excessive demands (Wallace & Lemaire, 2007), connections with patients and with co-workers can also be a source of satisfaction, energy (Dunn et al., 2007) and a source of competency (Borrell-Carrió & Epstein, 2004). In Simon and Durand-Bush's study (2009), the participants discovered the importance of establishing and maintaining positive connections with their peers, preceptors, and patients in their quest to attain optimal performance. As such, they became increasingly aware of and put in place strategies to be able to regulate this social dimension of their felt experiences. The ability to remain self-aware of emotions and to regulate attention has been highlighted by Borrell-Carrió and Epstein (2004) to help physicians to function better in clinical situations. Physicians who are attuned to their own selves and can self-adapt are better able to support their patients' needs (Patrick & Williams, 2009) and optimally perform by providing quality patient care (Estabrook, 2008; Firth-Cozens, 2001; Wallace et al., 2009).

The resonance intervention allowed the four participating students to learn to recognize, monitor, and adapt their inner states (i.e., how they felt and what they thought) and their behaviours in relation to their preferred standards and changing environment (Simon & Durand-Bush, 2009). In light of findings, the RPM seems like a valuable model to examine the subjective standards and goals that guide Zimmerman's (2000) social-cognitive model of the self-regulation process. Furthermore, the RPM has proven to be a successful tool to identify context specific desired and undesired felt experiences, either in relation to well-being or performance.

After examining medical students' desired standards of performance and observing how these evolved as a result of participating in a self-regulation intervention, Simon and Durand-Bush (2009) stated that it would be valuable to further explore these in an attempt to help students find ways to regulate and optimize their performance. Although this study was limited to four in-depth case studies, it appears as though the development of self-regulation skills to define, plan for, and respond to various performance demands in medicine may be an important avenue of research as it is scarce. Furthermore, developing subjective standards of performance and well-being and using them in conjunction with more objective standards emerged as a rewarding practice as it increased the students' sense of control and provided additional resourceful ways to self-assess within their performance environment.

Gaps in the Literature: A Rationale for the Current Study

The study by Simon and Durand-Bush (2009) was the first to give insight into the self-regulation of multidimensional felt experiences in the context of medicine. The authors acknowledged the limited number of participants in their inquiry, which nonetheless provided in-depth knowledge but did not allow for a broader generalization of insights. They called on future researchers to expand their findings with a wider range of students and extend them by including physicians.

Self-regulation as a process and model grounded in theory has not been sufficiently explored in the medical literature. The value of exploring self-regulation from a social cognitive perspective as a potential approach to enhance well-being and performance in the medical context is exemplified by not only its explanatory and predictive power, but also its potential to guide interventions (Bandura, 2005). Using both Zimmerman's self-regulation model and the RPM as guiding frameworks added value to the current investigation by complementing

respective conceptual gaps and allowed the researcher to better grasp the reality of self-regulation capacity with this population. While the RPM highlights the importance of identifying personal subjective standards to guide one's proactive and reactive actions to achieve desired felt experiences and overcome barriers, Zimmerman's model offers specific self-regulatory phases and strategies that can be applied prior to, during, and after performance attempts. Given the lack of research on self-regulation in the context of medicine and its potential to lead to optimal functioning, the current study was conducted.

Although some studies found sub-processes of self-regulation (e.g., self-reflection and self-monitoring) to be associated with well-being (Borrell-Carrió & Epstein, 2004; Meldrum, 2010), research systematically examining the relationship between self-regulation and well-being is lacking and warranted. To our knowledge, no studies have evaluated physicians' and medical students' capacity to self-regulate, particularly in relation to their well-being and performance. Furthermore, self-regulation resources and barriers influencing the achievement of well-being and performance goals should be examined as they could provide insight into the development of processes and strategies to develop healthy future physicians.

A common limitation of studies surrounding physician well-being is the absence of guiding theoretical or conceptual frameworks, and as such, recommendations to develop and implement well-being strategies are also limited. Furthermore, there is tremendous value in viewing well-being from a positive psychological perspective, that is, as optimal and positive functioning rather than merely the absence of disease. Utilizing well-developed and valid measures of well-being and self-regulation will strengthen findings and recommendations for change.

Purpose of the study

In light of these gaps in the literature, the purpose of this study was to examine the self-regulation of physicians and medical students in relation to their well-being and performance.

Specifically, this study attempted to answer the following questions:

- 1) What is the relationship between self-regulation and well-being in a physician and medical student population?
 - a. What are the current levels of self-regulation, psychological well-being, psychological stress, and burnout of physicians and medical students and how do these compare?
 - b. Does their self-regulation level predict their level of psychological well-being, psychological stress, and burnout?
- 2) How does self-regulation influence physicians' and medical students' well-being and performance?
 - a. What are physicians and medical students' guiding personal standards in the self-regulation process? Specifically how do they want to feel based on the principles of the RPM?
 - b. What self-regulation strategies facilitate their well-being and performance?
 - c. What self-regulation barriers inhibit their well-being and performance?

Chapter 3 – Results

A mixed methods approach was used in this study and allowed the researcher to expand the understanding of a relatively new area of research (Hanson, Creswell, Plano Clark, Petska, & Creswell, 2005), that is, self-regulation in the context of medicine. Both quantitative and qualitative data were collected and analyzed in two distinct phases through the use of questionnaires and individual interviews, respectively, and findings are presented in two separate articles.

The first article titled “Self-regulation: Can it Predict Well-Being, Stress, and Burnout in Physicians and Medical Students?” will answer the first set of research questions pertaining to the quantitative phase.

Results from the qualitative phase are presented in a second article, titled “Exploring the Self-regulation of Physicians and Medical Students In Relation to Their Well-being and Performance: A Qualitative Inquiry”.

Self-regulation: Can it Predict Well-Being, Stress, and Burnout in
Physicians and Medical Students?

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Abstract

The purpose of this study was to investigate the self-regulation capacity of 37 medical students and 25 physicians involved in medical training at a Canadian university. Seldom empirically examined as a psychosocial construct in the context of medicine, self-regulation is an important skill that allows individuals to effectively plan, generate, and adapt their thoughts, feelings, and actions to meet personal standards and goals within their changing social and physical environment (Zimmerman, 2000). Our aim was to determine the relationship between self-regulation and well-being-related variables including psychological well-being, psychological stress, and burnout. To this end, the 62 participants (31 m, 31 f; age range = 21–70) completed four online questionnaires to measure self-regulation capacity (SSRQ), psychological well-being (SPWB), burnout (MBI) and psychological stress (PSM-9). Results showed that the medical students and physicians had moderately high to high levels of self-regulation and moderate levels of psychological well-being, psychological stress and burnout. Physicians had significantly higher levels of psychological well-being than medical students on the subscales of Autonomy, Personal Growth, Purpose in Life, and Self-Acceptance. Means for self-regulation capacity significantly correlated with all outcome variables and significantly predicted levels of psychological well-being, psychological stress, and burnout. Self-regulation capacity appears to be an important skill that may help both physicians and medical students to meet the demands of the medical profession and maintain an adequate level of well-being. These findings serve as an impetus for additional research in this area and the development of effective interventions to resolve the prevalent societal issue surrounding ill-being among physicians and medical students [Canadian Medical Association (CMA), 2003, 2007].

Self-regulation: Can it Predict Well-Being, Stress, and Burnout in Physicians and Medical Students?

We trust that as health experts, physicians hold the competencies and expertise required to offer us the best treatment possible. The rapid advances in knowledge and technology have positioned physicians as agents of health, increasing opportunities to prolong life and treat what was once considered incurable (Bandura, 2005). However the fast-paced changes and performance expectations in medicine are not without consequences (Puddester, 2001; Wallace, Lemaire & Ghali, 2009). While attempting to meet the demands of their profession, it appears that many physicians have lost sight of their own health and well-being (Shanafelt, Sloan, & Habermann, 2003), shaping the reality of today's "stressed out" (CMA, 2003; Sotile & Sotile, 2001), "burnt out" and/or dissatisfied physicians (Goldman, Myers, & Dickstein, 2000; Tyssen, Hem, Gude, Gronvald, & Ekeberg, 2009).

Practicing medicine entails facing many stressors (e.g., long hours, emotionally charged situations, difficult interactions, excessive cognitive demands, and rapid changes in the profession) that can have serious harmful effects on physicians' mental and physical health, as well as impinge on their social relationships (Wallace et al., 2009). Lee, Stewart, and Brown (2001) found that out of 158 Canadian physicians who completed the Family Physicians Stress Inventory, 43% were highly stressed, 27% were moderately stressed, and 31% had low stress levels. Furthermore, according to the CMA's 2001 Physician Resource Questionnaire, nearly two thirds (64%) of Canada's physicians reported having a workload they considered too heavy and more than half (58%) said their family and personal life had suffered because they chose medicine as a profession (CMA, 2003).

Stress occurs when there is a substantial imbalance between demand and response capability under conditions where failure to meet the demand has important consequences (McGrath, 1970). Psychological stress represents a state of tension, preoccupation, and agitation that emerges from this imbalance. Although some degree of stress is normal in the profession of medicine, not all physicians perceive it as a motivator and not all levels of perceived stress are healthy (Lee & Graham, 2001). Chronic or extreme stress can lead to the development of various physical and mental disorders, such as distress and burnout (Lemyre & Tessier, 2003). Professional burnout is a syndrome indicative of emotional exhaustion, depersonalization, and a sense of low personal accomplishment resulting from chronic and excessive work-related stress (Maslach & Leiter, 2008). Burnout is disconcertingly reported to affect nearly half of Canadian physicians (Boudreau, Grieco, Cahoon, Robertson, & Wedel, 2006; CMA, 2007; Puddeste, 2004). Up to 60% of practicing American physicians have also reported symptoms associated with burnout (Shanafelt et al., 2003). In addition to impacting physicians' health, distress and burnout appear to alter the quality of care physicians provide to their patients (Eckleberry-Hunt et al., 2009; Freeborn, 2001; Shanafelt, 2009; Shanafelt, Bradley, Wipf, & Back, 2002; Shanafelt et al., 2003; Taub, Morin, Goldrich, & Benjamin, 2006). Even for physicians who are not impaired by distress or burnout, excessive psychological stress and fatigue have been found to contribute to patient care errors (Firth-Cozens, 2003; Fletcher et al., 2008; West et al., 2006; West, Tan, Habermann, Sloan, & Shanafelt, 2009). These results have also been found with medical students who reported high levels of stress throughout their training that can impede their performance, professionalism, and overall health (Dyrbye, Thomas, & Shanafelt, 2005; Lee & Graham, 2001). In fact, medical students have higher rates of overall psychological distress, and may also be more vulnerable to health problems than the general public and age-matched

peers (Dyrbye et al., 2005). Failure to effectively cope with stress during medical training could lead to future personal impairment, as well as decreased performance as physicians (Estabrook, 2008).

In light of the growing research exposing the reality of the “unwell” physician and medical student, and the potential negative consequences for patient care (Shanafelt et al., 2003), the CMA (2007) has made the development of sustainable and healthy physicians a priority (Puddester, 2001). As a result, research on the causes, consequences, and solutions to physician burnout and distress has surged in the literature. While researching treatment for physician distress and burnout is crucial, simply focusing on fixing the problem “is certainly settling for less than what can be achieved” (Shanafelt et al., 2003, p. 514). The tendency to focus on a disease model of health (Weiner, Swain, Wolfe, & Gottlieb, 2001), and constantly reacting to obstacles and repairing what is wrong, does not seem to move us closer to the *prevention* of health-related problems. Based on the science of positive psychology, important insights into distress and burnout prevention have emerged from a perspective centered on proactively building strengths (Seligman & Csikszentmihalyi, 2000). Human strengths and positive self-care strategies and skills are believed to act as buffers against the negative effects of stress and allow individuals to thrive and optimize their health and well-being.

Well-being is best understood as a multidimensional concept that represents social, emotional, psychological, and physical aspects of being well that help shape overall positive life functioning (Keyes & Waterman, 2003). According to proponents of positive psychology, well-being is more than the absence of pathology and negative states; it also encompasses positive functioning and striving to enhance and optimize lives (Seligman & Csikszentmihalyi, 2000). According to Diener (2000), well-being is a reflection of one’s life satisfaction and presence of

positive affect over and above the absence of negative affect. Ryff and Keyes (1995) conducted instrumental research in the area of psychological well-being and postulated that other aspects of positive functioning, beyond feeling happy and satisfied, must be considered to obtain a comprehensive view of well-being. They generated a multidimensional model of psychological well-being that includes six distinct components: self-acceptance, personal growth, purpose in life, positive relations with others, environmental mastery, and autonomy. Ryff and Keyes' (1995) multidimensional model of psychological well-being has received wide support in the literature.

Unfortunately, researchers interested in the health and well-being of physicians and medical students have focused their efforts almost exclusively on “impairment” over the course of the last 40 years (Goldman et al., 2000; Yamey & Wilkes, 2001). As a result, they have given comparatively less attention to investigating the promotion and achievement of physician and medical student well-being through positive optimal functioning (Dyrbye et al., 2005; Shanafelt et al., 2003; Wallace & Lemaire, 2007; Weiner et al., 2001). Beyond measures of pathology (e.g., depression, anxiety), little is known about what it means for physicians and medical students “to be well” and as such, their level of well-being measured from a positive psychological perspective remains unexplored (Novack et al., 1999; Shanafelt et al., 2003; Weiner et al., 2001, Yamey & Wilkes, 2001); consequently, more research is warranted.

Studies conducted in other contexts demonstrate the positive effect of well-being on productivity and work performance, socially desirable behaviors, positive mental and physical health, and social relationships (Diener & Biswas-Diener, 2008; Keyes & Waterman, 2003). Individuals with higher levels of well-being tend to adopt more positive self-care behaviours and have fewer maladaptive lifestyle and health problems (Diener & Ryan, 2009; Zimmerman,

2000). It can thus be hypothesized that helping physicians and medical students to achieve and maintain a high level of well-being may lead to improved health, as well as enhanced performance through quality patient care and reduced medical errors (Goldman et al., 2000). More research examining well-being and its relationship to various outcomes is required to confirm this (Gerrity, 2001).

The achievement of well-being and performance goals may be accomplished through a process called self-regulation (Bandura, 1991; Brandtstädter, 2009; Hofer, Busch, & Kartner, 2011; Zimmerman, 2000). From a social-psychological perspective, self-regulation has been defined as the ability to control one's thoughts, feelings and actions in order to meet personal standards and set goals within one's changing environment (Zimmerman, 2000). Although self-regulation models differ in how they define sub-functions of this process, the general consensus is that self-regulation represents one's capacity to plan, generate, and adapt internal states in order to attain desired outcomes, whether these are performance or well-being-related (Bandura, 1991, 2005; Boekaerts & Corno, 2005; Hofer et al., 2011; Zimmerman, 1996).

Self-regulation is dynamic in that its effectiveness and application can change based on one's context, thus it should not be viewed as a singular trait but rather a skill that can be developed and improved with practice (Zimmerman, 2000). This means that depending on personal and external demands, resources, as well as self-efficacy and motivation levels, individuals may be able to effectively self-regulate in one context (e.g., work) but not in another (e.g., home) or they may be able to self-regulate to achieve a work-related performance goal but struggle to attain a personal well-being goal. The self-regulation process entails not only setting standards for desired thoughts, feelings, and actions along with outcome expectations, but also monitoring oneself and comparing outcomes with preferred standards through self-reflection to

note discrepancies and adapt. Zimmerman's (2000) social-cognitive perspective of self-regulation geared toward adopting healthy behaviours and achieving well-being demonstrates the necessity of the bidirectional interaction that exists between one's personal (e.g., cognitive, affective, behavioural) and environmental (e.g., social) processes. An individual must develop and utilize his or her personal resources in order to effectively adapt to continuous changes in the environment (Zimmerman, 2000). Physicians and medical students training to become proficient health experts should therefore be viewed as active agents, managing their thoughts, feelings, and actions in order to adjust to the dynamic nature and taxing demands of their profession.

Self-regulation has been shown to be significantly associated with well-being (Horner et al., 2011; Vohs & Baumeister, 2004), however, this link in the context of medicine has not been examined, thus more research is required. Other evidence suggests that deficiencies in self-regulation explain many performance and health problems people face (Zimmerman, 1996), including difficulties coping with stress and adversity (Elliot, Thrash, & Murayama, 2011). Consequently, it would be valuable to explore this with physicians and medical students who have reported difficulties coping during their training and professional work (Simon & Durand-Bush, 2009; Shanafelt et al., 2003).

Although distinct self-regulatory sub-processes (e.g., self-reflection, Dobie, 2007; Svenberg, Wahlqvist, & Mattsson, 2007; self-monitoring, Epstein, Siegal, & Silberman, 2008, Borrell-Carrió & Epstein, 2004; accepting and regulating personal limitations and standards, Jenson, Trollope-Kumar, & Waters, 2008; Meldrum 2010; self-regulation of attention and mindfulness, Baer, 2003; Rosenzweig, Reibel, Greeson, Brainard, & Hojat, 2003) have been proposed within the medical literature as effective strategies to enhance physician and medical student well-being and performance, overall self-regulation as both a skill and process remains

for the most part unexplored with this population. Furthermore, although research in other contexts has demonstrated a link between self-regulation and positive functioning (Bandura, 2005; Zimmerman, 2000), studies in the context of medicine are needed to examine the relationship between self-regulation and well-being and other health-related variables such as stress and burnout. To our knowledge, no research to date has determined physicians' and medical students' self-regulation capacity and the extent to which it predicts their level of psychological well-being, psychological stress, and burnout. Examining this would allow us to answer the following question: Is self-regulation an approach physicians and medical students could use to not only reduce their level of stress and burnout but also enhance their overall well-being?

Although several self-reported well-being strategies and approaches have been suggested in the literature, research linking sound theory and instruments to potential solutions is required (Patrick & Williams, 2009). Given the CMA's mandate to develop healthy physicians, there is a need and an opportunity to impart to both physicians and medical students who will shape the future of medicine the necessary skills to manage the demands of their career and personal life. One example of the benefits of teaching self-regulation skills to medical students is provided by Simon and Durand-Bush (2009) who conducted an intervention-based study with medical students. Specifically, four female students, two of whom were in their 3rd year of medical school and two were 2nd year residents, took part in a three-phase 17-week intervention study examining the process in which they attempted to learn to develop their self-regulation capacity with the expected outcome of optimizing their performance and well-being. During the intervention phase, the students each engaged in six one-hour sessions facilitated by the researcher every two weeks. These sessions focused on the participants' views and evolving experience of various

self-regulation sub-processes and strategies and their impact on their performance and well-being in their training environment. Results showed that the four female medical students increased their awareness of their actual and desired personal standards of performance and well-being. Furthermore, they identified ways to self-regulate to achieve these standards and they successfully implemented strategies allowing them to enhance their performance and well-being.

Simon and Durand-Bush (2009), who were the first to investigate a self-regulation intervention in the context of medicine, suggested that the development of self-regulation skills and strategies to respond to various performance demands in medicine is an important avenue of research as it is scarce. They recommended that additional research be conducted to examine medical students' self-regulation in relation to their performance and well-being since all four participants reported benefitting from participating in the intervention. Accordingly, researchers should focus on medical students in training in order to find ways to help them learn early on how to deal with inevitable career stressors and thrive as health professionals (Dobie, 2007; Estabrook, 2008; Rakel & Hedgecock, 2008; Simon & Durand-Bush, 2009). If medical students learn at the onset of their training to build a strong foundation of self-management skills and develop and maintain healthy skills and processes, they will likely continue to regulate these throughout their career (Ball & Bax, 2002). Simon and Durand-Bush (2009) also suggested that in order to put forth the most appropriate interventions for skill development, further research exploring self-regulation with both medical students and the physicians who serve as models for them is needed. According to Zimmerman (2000), developing self-regulatory competence remains dependent on the context and requires sustained effort and continuous positive sources of social and personal influences. As such, effective self-regulation skills can be increased through modeling and instruction and should be taught interdependently within an individual's

social and environmental milieu (Zimmerman, 2000). Self-regulation is a life-long learning process and the sooner individuals learn to effectively self-regulate, the sooner they can systematically adapt to their changing personal and contextual conditions (Zimmerman, 2000). Strengthening the self-regulation capacity of medical students could be a promising solution to meet the priority set forth by the CMA to develop healthier future physicians.

Purpose of the Study

In summary, there is currently little evidence that physicians and medical students can effectively self-regulate in order to attain and sustain optimal functioning and well-being (Simon & Durand-Bush, 2009). Accordingly, we need a more realistic view of this population's current capability to self-regulate and the relationship this has on their level of well-being and other relevant variables such as stress and burnout. In light of this, the purpose of the present study was to examine the relationship between the aforementioned variables.

Hypotheses

We first sought to determine and compare the self-regulation capacity, psychological well-being, psychological stress and burnout levels of the participating physicians and medical students. We hypothesized that physicians and medical students would have similar levels of psychological well-being, burnout and psychological stress as studies show that they experience comparable stressors and are exposed to similar well-being resources (Dyrbye, Thomas, & Shanafelt, 2006). Secondly, we investigated whether or not self-regulation capacity scores could predict levels of psychological well-being, psychological stress, and burnout in physicians and medical students. We first hypothesized that self-regulation would be positively associated with psychological well-being and negatively associated with psychological stress and burnout. Then, based on some evidence showing that effective self-regulation leads to optimal functioning and

enhanced coping with stress and adversity (Zimmerman, 2000), we hypothesized that self-regulation capacity scores would predict psychological well-being, psychological stress, and burnout scores and in the expected directions. In other words, those scoring higher on self-regulation capacity would have higher levels of psychological well-being and lower levels of psychological stress and burnout, while those scoring lower on self-regulation capacity would have lower levels of psychological well-being and higher levels of psychological stress and burnout. Finally, we examined if group status (i.e., physician or medical student) moderated the association between self-regulation capacity and the predicted outcome variables. Due to the lack of literature, no hypotheses were formulated for this final test.

Methods

Participants

This study was conducted at a medical university in Canada. Physicians and residents involved in medical training and education, and medical students enrolled in their first, second, third, and fourth year of their program were invited to participate. Using a combination of availability and quota sampling techniques (Garson, 2009), participants were recruited via posters and emails sent by contact individuals from the targeted university's Faculty of Medicine and the participating hospital. Once a few participants were recruited, chain referral sampling was used to reach the desired number of participants within the group of physicians and medical students (Garson, 2009). Procedures received institutional ethics approval. Informed consent was obtained from all participants and confidentiality was assured before completing the surveys. The sample included 37 medical students and 25 physicians occupying educational and/or supervisory roles. From these 62 participants, 10 physicians and 10 medical students agreed to partake in individual interviews as part of a subsequent qualitative study exploring self-

regulation strategies, barriers and needs, of which results are presented in a separate article. Age, gender, and year of enrolment in the medical program were not delimited, although an attempt was made to recruit both men and women (31 m, 31 f; age 21-30 yrs = 69.4%, 31-40 yrs = 12.9%, 41-50 yrs = 11.3%, 51-70 yrs = 6.5%; range = 21-70).

Measures

After giving their informed consent, the participants completed four online questionnaires, which took them approximately 20-30 minutes. To this end, they were emailed a link with their unique ID to access the questionnaires and this allowed the researcher to track their responses. The following questionnaires were administered to measure the participants' self-regulation capacity, psychological well-being, psychological stress, and professional burnout levels.

Self-regulation Capacity. Self-regulation was evaluated using the Short form Self-Regulation Questionnaire (SSRQ), which was developed based on the 63-item Self-Regulation Questionnaire (SRQ, Brown, Miller, & Lawendowski, 1999). These were both designed to measure individuals' general capacity to regulate behaviour so as to achieve desired future outcomes, and there is good support for interpreting the total score of the 31-item single-factor SSRQ as a reflection of self-regulatory capacity (Carey, Neal, & Collins, 2004). The total score on the original SRQ version represents a low, intermediate, or high level of self-regulatory capacity. Cut-off values for these levels were transferred and adapted by the researcher for the short version, with a score of 118 or more reflecting high self-regulation capacity, a score between 105 and 117 reflecting a moderate capacity, and a score of less than or equal to 104 representing low self-regulation capacity. The items on the questionnaire reveal personal (i.e., cognitive and affective states), behavioural, and social/environmental aspects of self-regulation

that are linked to Zimmerman's (2000) social cognitive perspective of self-regulation. The items also measure both reactive (e.g., responses to adversity) and proactive (e.g., planning and adjusting progress goals) processes as proposed by Zimmerman (2000). The SSRQ has been shown to have good psychometric properties in a series of studies on self-regulation and drinking behaviour in college students (Carey, Neal, & Collins, 2004; Hustad, Carey, Carey, & Maisto, 2009; Neal & Carey, 2005).

Psychological Well-being. Well-being was measured using Ryff and Essex's (1992) Scales of Psychological Well-Being (SPWB). This questionnaire presents six 14-item scales constructed to evaluate the following six dimensions of psychological well-being: self-determination (Autonomy), capacity to effectively manage one's life and surrounding world (Environmental Mastery), continued growth and development as a person (Personal Growth), quality relations with others (Positive Relations With Others), belief that one's life is purposeful and meaningful (Purpose in Life), and positive evaluations of oneself and one's past life (Self-Acceptance). This questionnaire was chosen for its multidimensional approach to well-being and for including aspects of positive functioning emphasized in theories of health and well-being (Ryff & Keyes, 1995). There is evidence that this scale is a comprehensive and reliable assessment of well-being (Ryff & Keyes, 1995; Weiner et al., 2001).

Psychological Stress. Stress was evaluated using the Psychological Stress Measure (PSM-9, Lemyre & Tessier, 2003), which was translated and validated in English from the French version (MSP-9, Lemyre & Tessier, 1988; Lemyre, Tessier, & Fillion, 1990). An abridged 9-item version was developed and validated by Lemyre and Tessier in order to meet a variety of research needs and applications. The impact of objective sources of stress (e.g., excessive workload) is therefore measured through the subjective appraisal and multidimensional

experiences of the individual (Lemyre & Tessier, 2003). This psychometrically sound questionnaire measures the degree to which situations in one's life (experienced recently, in the last 4 to 5 days) are appraised as stressful on an 8-point scale (1=not at all, 8=extremely). Higher scores indicate higher psychological stress. Based on norms established in a study conducted with a non-clinical sample of 1520 francophone participants ranging in age, socio-economic status and employment, and representing the Québec population at large, the average stress level is 32, and results usually tend to vary between 21 and 43. A score that exceeds 41 is considered a very high level of psychological stress (Lemyre & Tessier, 2003). The PSM-9 was developed and validated as a measurement instrument for those conducting research on health and well-being in the workplace.

Burnout. Professional burnout, resulting from prolonged chronic work-related stress, was measured with the Maslach Burnout Inventory (MBI, Schaufeli, Leiter, Maslach, & Jackson, 1996). This 22-item standardized instrument was originally designed for use with people working in human services and health care and is currently used to measure professional burnout in all employment occupations (Maslach & Leiter, 2008). The instrument has three subscales to evaluate each of the dimensions of burnout characterized as emotional exhaustion, depersonalization, and a low sense of personal accomplishment. The exhaustion component refers to feelings of being overextended and depleted of one's emotional and physical resources (i.e., feelings of reduced well-being). The depersonalization component, also known as cynicism, refers to negative detachment to various aspects of one's work, including people. Finally, the component of reduced accomplishment or inefficacy refers to feelings of incompetence and a lack of achievement and productivity in one's work (Maslach & Leiter, 2008). Responses permit the compilation of an individual score on each of these three dimensions, identifying a degree of

burnout ranging from low to high. Although no cut-off scores were established, according to convention, a high degree of professional burnout is reflected by a continuum indicating a high score on the depersonalization and the emotional exhaustion subscale, and a low score on personal accomplishment (Dion & Tessier, 1994; Maslach, Jackson, & Leiter, 1996; Maslach & Leiter, 2008).

Data Analysis

Data from the questionnaires were analyzed using the software program SPSS 9.0. Of the 62 participants, 62 completed the SSRQ, 60 completed the SPWB, 59 filled out the PSM-9, and 58 answered the MBI. A mean imputation was used to calculate missing data points for each scale given that these represented less than 5% of the total data points.

Internal consistency coefficients for each of the questionnaires were examined to ensure reliability of the chosen measures. Descriptive statistics were obtained to determine levels of self-regulation capacity (i.e., SSRQ, 1 summative score) well-being (i.e., SPWB, 6 subscale scores: autonomy, environmental mastery, personal growth, positive relationships, purpose in life and self-acceptance), psychological stress (i.e., PSM-9, 1 summative score), and professional burnout (i.e., MBI, 3 subscale scores: emotional exhaustion, depersonalization and personal accomplishment) for all participants, as well as separate scores for the two groups of physicians (MD) and medical students (STUD). Next, independent sample *t*-tests were computed to compare means for students and physicians on each scale/subscale. In addition, to assess the relationship between the study variables (i.e., self-regulation capacity, psychological well-being, psychological stress, and burnout), Pearson product-moment correlations were computed. Multiple regressions were then used to assess trends between self-regulation capacity and the different outcomes, including the amount of variance that self-regulation accounted for in

psychological well-being, psychological stress, and burnout scores. Finally, cross-product terms were added in hierarchical regressions to explore interaction effects when status (STUD versus MD) and self-regulation capacity were both independent variables in order to determine the best model to explain a significant prediction equation.

Results

Internal Consistency of Scales

Cronbach's alpha coefficients were used to assess the reliability of the scales. The coefficients for each scale or subscale can be found in Table 1.

Descriptive Statistics

The means and standard deviations for all 11 study variables are displayed in Table 1. Data were found to be normally distributed for self-regulation capacity. Scores on the SSRQ were evaluated on a total sum score varying from 31 to 155, from low to high self-regulation capacity. Mean scores for self-regulation capacity were 123.15 ($SD=13.49$) for both groups, 124.00 ($SD=16.53$) for physicians and 122.57 ($SD=11.2$) for medical students. High, moderate, and low self-regulators were delimited using the suggested cut-off scores (Brown et al., 1999) and approximately $n=47$ (76%) of the 62 participants were ranked as high self-regulators, $n=8$ (13%) participants had moderate self-regulation capacity while $n=7$ (11%) cases had low capacity.

Mean scores ranging between 14 and 84 were obtained for each of the six dimensions of the SPWB whereby the higher the score, the higher the well-being for that specific dimension. Following Ryff and Singer's (2006) guidelines, high scorers and low scorers on each dimension were delimited based on the middle cut-off score of 49 (out of the range of 14 to 84). Mean scores for autonomy (57.77, $SD=9.26$), environmental mastery (59.18, $SD=9.63$), personal

growth (62.73, $SD=10.54$), positive relationships (60.80, $SD=12.46$), purpose in life (60.13, $SD=14.28$) and self-acceptance (59.88, $SD=13.26$) were all above the score of 35 delimiting high and low scorers, which indicates that well-being levels of physicians and medical students ranged from moderate to moderately high.

Scores on the PSM-9 ranged between 9 and 72 and participants' overall mean score of 31.51 ($SD=12.32$) indicates that their level of psychological stress was moderate based on the Likert scale and cut-off scores suggested by the authors (Lemyre et al., 1990) for this measurement. Mean scores for physicians [31.46 ($SD=14.90$)] and medical students [31.54, ($SD=10.43$)] were similar (see Table 1).

For the MBI questionnaire, emotional exhaustion subscale scores varied between 0 and 64, where higher scores indicated higher levels of emotional exhaustion. Depersonalization subscale scores ranged from 0 to 30, where higher scores indicated higher levels of depersonalization. Finally, personal accomplishment subscale scores varied between 0 and 48, where higher scores represented greater accomplishment. Overall mean scores (see Table 1) for emotional exhaustion (18.72, $SD=11.66$), depersonalization (4.71, $SD=5.75$), and personal accomplishment (39.24, $SD=6.41$) were all considered to be adequate based on their respective subscale cut-offs, as well as comparisons to a study conducted by Dyrbye et al. (2006), in which burnout levels of physicians were measured using the same questionnaire.

T-tests for Group Status

Independent sample *t*-tests were performed to test mean differences between groups, that is, medical students (STUD) and physicians (MD), for the 11 outcomes variables. Significant differences (2 tailed) were found for the four following subscales of the SPWB: (a) autonomy [students ($M = 55.89$, $SD = 8.81$) and physicians ($M = 60.58$, $SD = 9.38$), $t(df) = 58$, $p < .05$]; (b)

personal growth [students ($M = 59.53$, $SD = 9.47$) and physicians ($M = 67.54$, $SD = 10.41$), $t(df) = 58$, $p < .01$]; (c) purpose in life [students ($M = 55.11$, $SD = 12.98$) and physicians ($M = 67.67$, $SD = 14.21$), $t(df) = 58$, $p < .001$]; and (d) self-acceptance [students ($M = 56.64$, $SD = 10.43$) and physicians ($M = 64.75$, $SD = 15.62$), $t(df) = 36.58$, $p < .05$].

No significant differences at $p < .05$ between physicians' and medical students' scores were found for the remaining scales of the SPWB, SSRQ, PSM-9, and the MBI.

Correlations

Pearson product-moment correlations for all study variables are presented in Table 2. Almost all correlations were significant and in the expected direction. Self-regulation capacity was found to significantly correlate with all outcome variables. Emotional exhaustion, depersonalization, and personal accomplishment (i.e., subscales of the MBI) all significantly correlated with psychological stress and in the expected direction. Correlations between the psychological well-being subscales and that of burnout and stress were in the expected direction, that is, they were inversely correlated, however, not all were significant. Autonomy was not significantly correlated with any of the burnout or psychological stress scores. Scores on the MBI subscales significantly correlated with all psychological well-being subscales except for depersonalization which did not correlate with personal growth or purpose in life.

Multiple Regressions

For each dependent variable (i.e., psychological well-being, psychological stress, and burnout), separate multiple regressions were performed to establish the relative predictive importance of the participants' self-regulation capacity (i.e., scores on the SSRQ) on the outcome variables. SSRQ scores explained between 7 and 36% of the variance in the 10 dependent

outcome variables (i.e., 6 SPWB subscales, PSM-9 scale, and 3 MBI subscales. See Table 3 for compared beta weights and adjusted R squares.

We also controlled for the potential impact of group status (physicians versus medical students) and self-regulation capacity by entering them in different steps of the regression analysis. To prepare for hierarchical analyses involving interaction terms (Cohen, Cohen, West, & Aiken, 2003), we first dummy coded the categorical variable of status (MD versus STUD) in order to then create an interaction term between the categorical variable and the continuous variable (self-regulation capacity). We then centered the independent variables of status as a dummy variable and of the total self-regulation capacity score and then created product terms for the potential interactive effects by multiplying these centered variables. Variables were entered into each of the regression models in three steps. At step one, we entered the centered variable representing status. In the second step, we entered the total self-regulation capacity score alongside the centered variable for status. In the third step, we added the interactive product term (i.e., centered status by self-regulation capacity) along with the centered variables for status and self-regulation capacity.

The first step in these regression analyses examined the contribution of group status. Group status was significantly associated with autonomy, personal growth, purpose in life and self-acceptance, with medical students scoring significantly lower than physicians on these outcome variables. In the second step, we tested the significance of the difference between the two R^2 s (group status and self-regulatory capacity) to determine if adding an independent variable to the model significantly increased the explained variance. Together the two predictor variables explained a significant amount of variance in all outcome variables: 22% in autonomy, 36% in environmental mastery, 36% in personal growth, 20% in positive relationships, 44% in

purpose in life, 41% self-acceptance, 18% in emotional exhaustion, 8% in depersonalization, 30% in personal accomplishment and finally 16% of variance in psychological stress. As can be seen from the coefficients in Table 3, the main effect of self-regulation capacity was significant for all outcome variables. As expected, self-regulation capacity was negatively associated with psychological stress, emotional exhaustion, and depersonalization and positively associated with all other outcome variables. The main effect of group status was significant for autonomy, personal growth, purpose in life, and self-acceptance, where physicians reported higher levels for these outcome variables.

In the third step of the hierarchical analysis, cross-product terms were added as independent variables to explore interaction effects. In Table 3, we can see that the interaction between group status and self-regulation capacity significantly explained 42% of variance in environmental mastery, 47% in purpose in life and 46% in self-acceptance. The interaction term was not predictive of the other three psychological well-being subscales, of psychological stress or of the three burnout subscales. See Figures 4 (a), (b) and (c) for a visual depiction of the interaction effects. An inspection of trends suggests that high self-regulation capacity appears to benefit physicians but not medical students when it comes to environmental mastery, purpose in life, and self-acceptance. However, these results must be interpreted with caution given that trends regarding medical students are not clear (e.g., purpose in life and self-acceptance levels do not appear to significantly change between high and low self-regulating students). Future research should further examine such interactions to confirm if there are differential effects of self-regulatory capability on dependent measures for students and physicians.

Discussion

Although self-management skills are deemed essential in the medical profession (Meldrum, 2010; Novack et al., 1999; Sotile & Sotile, 2002), there is currently no evidence that physicians and medical students can effectively self-regulate in order to achieve their goals and sustain adequate well-being levels throughout the course of their career. This study investigated the self-regulation capacity of physicians and medical students, and established if it was associated with lower levels of psychological stress and burnout, and higher levels of psychological well-being. Theoretical, methodological, and practical implications of the findings will be discussed.

What is the Level of Self-regulation, Psychological Well-being, Psychological Stress, and Burnout of Physicians and Medical Students?

The self-regulation capacity of physicians and medical students was elevated. According to the suggested cut-off scores for high, intermediate, and low levels of self-regulation capacity adapted for the SSRQ (Brown, et al., 1999), 76% of the participants had a high level of self-regulation, whereas 8% had a moderate and 7% a low or impaired level of self-regulatory capacity. These percentages were similar between medical students and physicians when comparing groups. Although physicians are typically more skilled and have more experience and practice than students, perhaps they face more personal and professional demands and adversity, which could partly explain why their self-regulation capacity was not significantly higher than the younger and less-experienced medical students. Recent upgrades in well-being resources and curriculum changes specifically (Moss & Smith, 2006; Puddester, 2001, 2004), can possibly explain why the medical students reported a higher self-regulation capacity than expected. More research with a larger sample comparing the self-regulation capacity of different group members

varying in age and medical expertise will clarify this. Nonetheless, since physicians with academic responsibilities play an important role in the training of medical students, it would appear to be an asset for them to not only possess adequate self-regulation skills but also have the ability to teach these skills to medical students at the onset of their education so that they have the opportunity to deliberately practice and internalize them to become self-directed in the process (Zimmerman, 1996).

Participants' level of psychological well-being was also found to be adequate given that they scored between 57.8 and 62.7 out of a possible 84 on each of the six subscales. However, physicians had a higher level of well-being than medical students across all subscales, particularly with respect to having a sense of autonomy, purpose in life, personal growth, and self-acceptance, as significant differences were found for these subscales. Although it may be argued that medical students have some direction in their life as they chose to learn to become physicians, the uncertainty they face with regards to their residency placement and the lack of direct impact they have on patient outcomes could possibly explain why they reported a lower sense of purpose in life than physicians. In terms of personal growth, given that this reflects a feeling of continued development and a sense of realizing one's potential (Ryff & Keyes, 1995) and that physicians in this study had accumulated more experiences and opportunities for development than the students, this could explain why they scored higher on this dimension of well-being than the students. The same argument could be used to explain why the level of self-acceptance of physicians was significantly higher than that of students. Having a positive attitude toward the self, acknowledging and accepting multiple aspects of the self including good and bad qualities, and feeling positive about one's past life (Ryff & Keyes, 1995) are perhaps outcomes

that emerge once one has completed medical school and developed sufficient medical competence. However, more research is required to confirm this.

Physicians' higher level of well-being supports the idea that educators and mentors should serve as primary vehicles to convey effective strategies to medical students so that they too can achieve superior levels of well-being (Zimmerman, 2000). According to Pololi and Knight (2005), mentoring promotes personal growth and development for all parties involved. The authors suggested that establishing effective mentoring programs in medicine may not only promote professional development but also increase career satisfaction and reduce burnout. Being mentored was identified by medical students as an important factor leading to resilience during stressful medical training (Ball & Bax, 2002; Dunn, Iglewicz, & Moutier, 2008). More research should be conducted to examine how medical educators can play a role in the promotion and enhancement of medical students' well-being during their formal training (Simon & Durand-Bush, 2009).

Burnout levels were not indicative of the literature on physician well-being and the current published burnout rates of Canadian physicians (Boudreau et al., 2006, CMA, 2003). Perhaps burnout symptoms are not as prevalent for students who have just begun their medical training and have not been extensively exposed to patients and the stressors of the profession. Given that 76% of the participating medical students were in their first year of medical training, their burnout level may not be representative of the general student body across all years of study. Both groups had moderate to high mean levels of personal accomplishment, which is consistent with other data on the profession of medicine (Dyrbye et al., 2006). In terms of psychological stress, both groups had similar adequate levels (Lemyre & Tessier, 2003), which contradicts studies suggesting that physicians and medical students are highly stressed (CMA,

2007, Lee et al., 2001). Again, the students' lower stress level may be due to the fact that several of them were in their first year of education and they had not been exposed to many stressors inherent in the profession (e.g., long work hours, difficult patients, difficulties balancing personal and professional life). One may think that physicians who are also involved in the formal training of students may experience more stress due to a heavier workload (Pomaki, Supeli, & Verhoeven, 2007), however, this was not the case with this sample. Based on present results, it is possible that their high self-regulation capacity influenced their perceptions of stress and buffered against its potential negative effects (Seligman & Csikszentmihalyi, 2000).

In sum, medical students and physicians had moderately high to high levels of self-regulation and adequate levels of psychological well-being, psychological stress and burnout. This does not support the existing literature on physician well-being (Wallace et al., 2009) but a possible explanation may be their high self-regulation capacity. Other hypotheses that could explain our results include self-report bias, sampling limitations but presumably, it is the nature of the sample that accounts for this divergence from prior studies. The faculty from which the participants were chosen was unique in that it offered resources required to develop self-care skills and achieve well-being goals. The robust and challenging selection process put in place for student admissions into medical programs could also explain the high self-regulation capacity of students. The medical profession is one that demands high performance, and as such, this population could already possess a certain level of self-regulation capacity allowing them to achieve such performance. However, as Zimmerman's model of self-regulation (2000) points out, effective self-regulation in one context such as academia does not automatically imply effectiveness in other contexts.

Furthermore, due to the voluntary nature of the study, those who agreed to participate may have done so because they were already well instead of distraught. More importantly, self-regulation capacity was high for both groups and given that self-regulation was found to significantly predict the participants' psychological well-being, psychological stress and burnout (see below), this may explain why the latter health indicators were adequate. Our results support findings that self-regulation capacity leads to enhanced well-being and reduced stress (Carver & Scheier, 1998, 2008; Elliot, Thrash, & Murayama, 2011).

What are the Correlations Between Self-Regulation, Psychological Well-Being, Psychological Stress, and Burnout?

Self-regulation capacity correlated significantly with all outcome variables. This indicates that there is a reliable relationship between self-regulation and various positive psychological dimensions of well-being, as well as with psychological stress and burnout. Correlations between scores on the SPWB and those on the PSM-9 and MBI questionnaires were also observed in order to provide data that could give additional insight into the relationship between the well-being and potential impairment of physicians and medical students as a result of stress and burnout (Boisaubin & Levine, 2001; Wallace et al., 2009). Environmental mastery, positive relationships, and self-acceptance scores all correlated significantly with the three indicators of burnout and in the expected direction. These dimensions of psychological well-being may be predictors of burnout if they cannot be achieved or maintained under chronic stress. This is logical given that individuals' relationships and perceived control, self-worth, competence typically decrease when experiencing burnout (Maslach & Leiter, 2008). However, since correlations between psychological well-being and burnout were not all significant, more studies are needed to better understand the relationship between these two variables.

All subscales of the SPWB and MBI correlated significantly and in the expected direction with psychological stress. Higher levels of psychological stress were associated to decreased well-being and increased levels of burnout, which provides additional insight into the participants' global level of well-being and confirms previous findings regarding the relationship between these indicators (Lemyre & Tessier, 2003; Maslach & Leiter, 2008; Ryff & Keyes, 1995; Shanafelt, 2009; Zimmerman, 2000). Given that burnout is the result of chronic and excessive stress (Maslach & Leiter, 2008), it makes sense that such constructs are significantly associated. Results also support the notion that well-being reflects both the presence and absence of positive and negative aspects of functioning (Keyes & Waterman, 2003). Thus, well-being may be achieved not only by reducing and managing one's stress (Seligman & Csikszentmihalyi, 2000) but also by achieving positive functioning by enhancing autonomy, personal growth, positive relationships, self-acceptance, environmental mastery, and purpose in life (Ryff & Keyes 1995).

Perhaps the link between self-regulation, psychological well-being, psychological stress, and burnout is best explained by the fact that although all jobs and training generate stress to some extent, it is the way people manage themselves and cope with stressors that determines how their psychological, physical, and social well-being will be affected (Dunn et al., 2008). Our findings support the transactional model of stress (Lazarus, 1991), which states that the effect of stressors on well-being depends on one's ability to cope with those stressors. It appears that well-developed self-regulatory skills, which involve enabling self-motivational beliefs and effective adaption to one's changing environment, may help individuals to cope with stress while achieving their goals (Carver & Scheier, 2008).

Does Self-Regulation Predict Levels of Psychological Well-being, Psychological Stress, and Burnout Among Physicians and Medical Students?

Results from the multiple regressions indicate a direct significant association between self-regulation and all the outcome variables. Having higher self-regulation capacity was associated with less emotional exhaustion, depersonalization, and psychological stress, and with higher psychological well-being and personal accomplishment. This supports previous research in which effective self-regulation skills were found to be predictive of health, well-being, and performance achievement (Bandura, 2005; Zimmerman, 1996; 2000). Zimmerman (2000) suggested that proactively and regularly generating desired feelings, thoughts, and actions can not only offer protection against recurring stressors but also allow individuals to achieve desired well-being goals and standards. The statistically significant main effects of self-regulation on the outcome variables suggest the predictive power of self-regulation capacity and support the current study's hypothesis that developing effective self-regulation skills may be an effective approach to enhance well-being and reduce stress and burnout levels. More research within the medical context is required to corroborate this promising finding.

Does group status significantly moderate the association between self-regulation capacity and the outcome variables?

As there is evidence that practice and experience contribute to the development of self-regulation skills and strategies, which in turn improve overall self-regulation capacity, and that differences in self-regulation capacity can influence health (Zimmerman, 2000), both group status and self-regulation capacity were investigated in a hierarchical regression analysis. The unique significant variance that group status offered in the predictive equation for subscales referring to environmental mastery, purpose in life and personal growth, suggests that being a

physician versus a medical student, in collaboration with self-regulation, also predicted these particular outcome variables. This finding is particularly relevant to the medical profession as educating physicians have to perform several roles (e.g., administrative, research, teaching, clinical roles) that could put them more at risk of experiencing distress or burnout (Pomaki et al., 2007). Younger physicians (i.e., under 30 years old) have been previously reported to have more emotional exhaustion and higher stress levels than their older counterparts (Campbell, Sonnad, Eckhauser, Campbell, & Greenfield, 2001). It is noteworthy that in the current study, 69% of the participants were 30 years old and younger thus the sample did not include many senior physicians. Given these results, when developing self-regulation interventions specific to the academic medical context, it may be essential to investigate ways to incorporate both physicians with educational roles and medical students.

In terms of interaction effects, status as a moderator significantly impacted the relationship between self-regulation capacity and environmental mastery, purpose in life, and self-acceptance. Upon visual inspection, the interactions appear to suggest that self-regulation capacity may benefit physicians but not necessarily medical students for these outcome variables. In other words, the benefits of self-regulation capacity on environmental mastery, purpose in life, and self-acceptance appear to be more pronounced for physicians than medical students. These results hold important implications for understanding where and how to target future interventions with this population, if self-regulation is used as an approach to enhance well-being. Well-being dimensions of environmental mastery, purpose in life and self-acceptance could be key focus areas to target for physicians when developing self-regulation skills and strategies. However, more research with a larger number of participants is required to confirm these interactions and establish if clear trends exist between physicians and medical students.

Self-Regulation: A Skill that Can be Developed

Compared to other predictors of psychological well-being, psychological stress, and burnout that are more outside of one's control, such as personality traits or imposed work conditions, self-regulation capacity is understood to be a skill under one's control that may be developed to manage one's inner states and responses in order to adapt to the environment (Carver & Scheier, 1998). Research on physician well-being indicates that an important predictor of physician psychological well-being, satisfaction, and professional commitment is a sense of control over the practice environment (Yamey & Wilkes, 2001). Although there is an obvious need for organizational restructuring to reduce the demands placed on physicians and enhance external well-being resources (Dunn, Arnetz, Christensen, & Homer, 2007; Shanafelt et al., 2003), it remains difficult to modify existing medical structures and working environments, or to account for the continuous changes in the health care system (Shanafelt, 2009; Tidd & Friedman, 2002). On the other hand, individuals preside over their own behavior and actions and as such, they are or must be active agents in the development and maintenance of healthy life and work habits. External factors and resources may serve as guides and motivators, but they are unlikely to lead to lasting and effective well-being-promoting skills and strategies unless individuals develop the means to exercise control over their own actions, feelings, and thoughts (Bandura, 2005). Physicians and medical students should therefore learn to manage their inner states and behavioural responses through proactive and context-specific planning, monitoring, and self-reflection (Zimmerman, 2000) in order to adjust to and cope with the dynamic nature of their profession. Strengthening and empowering the individual physician through self-regulation and skill development seems like a plausible and promising approach that should be further investigated.

Limitations, Strengths, and Future Research

This is the first study that has examined the relationship between self-regulation, psychological well-being, psychological stress, and burnout with physicians and medical students, and it is important to address a few limitations. As previously mentioned, response bias remains a possible limitation in that self-regulated medical students and physicians may have been more interested in the topics explored and thus more likely to complete the survey. Conversely, stressed or burnt out potential participants may have been more apathetic and less likely to complete the questionnaires. However, participants' high self-regulation capacity levels may not be indicative of a selection bias; they may be representative of the medical professional population, and as such further research is necessary to confirm these findings. Furthermore, this study relied on cross-sectional data from which no direct causal relationships could be examined thus it is not clear whether or not the outcome variables explored are causally related to self-regulation capacity. Longitudinal studies could determine if self-regulation capacity is an antecedent or a correlate of well-being. It would also be interesting in future studies to investigate long-term moderating effects on the self-regulation capacity and well-being relationship. Adaptability during training and once integrated into the profession varies over time and can also vary depending on attenuating circumstances and life events. Although self-regulation accounted for a good amount of variance in the predictive equation for the chosen well-being outcome variables, not all the variance was explained by the participants' self-regulation capacity. It would be interesting to further investigate what factor variables could be added to the regression equations to explain more variance (e.g., age, specialty, professional experience and position, year of study, time of year). Moreover, the sample was perhaps not fully representative of the general medical population as the majority of participating medical students

were in their first year of study and physicians were below the age of 45. Age and experience could have impacted reported scores on the measured variables. Finally, a limitation of this study includes the setting, a single faculty, and as such, the relationship between self-regulation and various health-related outcome variables should be investigated with a larger sample from various institutions and settings within the medical context in order to be able to generalize results to the broader medical community.

There are also several strengths to this study. To our knowledge, this is the first study to measure self-regulation capacity with physicians and medical students and the only study to explore the impact of self-regulation capacity on psychological well-being, psychological stress, and burnout. Given the lack of sound psychometric tools to measure self-regulation, it was encouraging to see the high reliability coefficient of the SSRQ, which had not been previously used with physicians and medical students. Results of this investigation also provide valuable insight for future research and interventions. The significant relationship between self-regulation and the ten outcome variables is a promising finding that should be further explored given the paucity of data that may be used to enhance the well-being of physicians and medical students and to reduce their stress and burnout levels. Exploring effective self-regulatory strategies and skills used by physicians and medical students is also important in order to develop appropriate interventions. Measures such as the ones used in this study will allow researchers to evaluate if interventions, and more specifically the use of particular strategies, are associated with expected desired outcomes.

Concluding Remarks

Given the promising results of this study and the CMA's mandate to increase physician well-being, empirically investigating self-regulation as a potential empowering approach to

develop effective self-management skills with physicians and medical students is warranted. This study was the first to use established methods to examine self-regulation capacity and determine its link to psychological well-being, psychological stress, and burnout in the context of medicine. Results confirm that physicians' and medical students' capacity to self-regulate significantly predicted their level of psychological well-being, psychological stress, and burnout. High self-regulation capacity was linked to less emotional exhaustion, depersonalization and psychological stress, and higher well-being and personal accomplishment. More research is needed to examine status group (i.e., medical students versus physicians) main and moderating effects on the relationship between self-regulation and the well-being outcomes. It appears that self-regulation may be a valuable approach that physicians and medical students could learn early on in their training or career to manage the adversity they face and maintain an adequate level of well-being and achievement. Given the mentoring role that physicians play in the education of medical students, it may be an asset for physicians to not only possess effective self-regulation skills but also the ability to help students learn and apply such skills at the onset of their training.

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Table 1

Cronbach's Alpha coefficients, means (M) and standard deviations (SD)

Questionnaires				Physicians		Students	
	Cronbach's Alpha	M	SD	M	SD	M	SD
SSRQ	0.92	n=62		n=25		n=37	
		123.15	13.49	124.00	16.53	122.57	11.2
SPWB	0.97	n=60		n=24		n=36	
Autonomy	0.76	57.77	9.26	60.58	9.38	55.89	8.81
Environmental Mastery	0.80	59.18	9.63	60.79	12.55	58.11	7.06
Personal Growth	0.83	62.73	10.54	67.54	10.41	59.53	9.47
Positive Relationships	0.88	60.80	12.46	62.38	14.20	59.75	11.23
Purpose in life	0.89	60.13	14.28	67.67	14.21	55.11	12.98
Self-Acceptance	0.89	59.88	13.26	64.75	15.62	56.64	10.43
MBI		n=58		n=24		n=34	
Emotional Exhaustion	0.92	18.72	11.66	19.29	13.87	18.32	10.02
Depersonalization	0.84	4.71	5.75	5.5	6.47	4.15	5.22
Personal Accomplishment	0.82	39.24	6.41	39.58	7.74	39.0	5.38
PSM-9	0.91	n=59		n=24		n=35	
		31.51	12.32	31.46	14.90	31.54	10.43

Table 2

Correlation coefficients

Scale or subscale	1	2	3	4	5	6	7	8	9	10	1
1. SSRQ_SR Capacity		.44**	.61**	.51**	.47**	.54**	.60**	-.45**	-.30*	.57**	-.44**
2. SPWB_Autonomy	.44**		.59**	.65**	.60**	.63**	.68**	-.19	-.03	.21	-.23
3. SPWB_Environmental Mastery	.61**	.59**		.75**	.76**	.72**	.85**	-.55**	-.36**	.56**	-.61**
4. SPWB_Personal Growth	.51**	.65**	.75**		.77**	.92**	.90**	-.30*	-.12	.30*	-.31*
5. SPWB_Positive Relationships	.47**	.60**	.76**	.77**		.78**	.84**	-.40**	-.34**	.37**	-.41**
6. SPWB_Purpose in Life	.54**	.63**	.72**	.92**	.78**		.90**	-.28*	-.010	.32*	-.34**
7. SPWB_Self-Acceptance	.60**	.68**	.85**	.90**	.84**	.90**		-.45**	-.28*	.49**	-.48**
8. MBI_Emootional Exhaustion	-.45**	-.19	-.55**	-.30*	-.40**	-.28*	-.45**		.65**	-.60**	.88**

Table 2 (cont.)

Correlation coefficients

Scale or subscale	1	2	3	4	5	6	7	8	9	10	1
9. MBI_Depersonalization	-.30 [*]	-.03	-.36 ^{**}	-.12	-.34 ^{**}	-.10	-.28 [*]	.65 ^{**}		-.65 ^{**}	.54 ^{**}
10. MBI_Personal Accomplishment	.57 ^{**}	.21	.56 ^{**}	.30 [*]	.36 ^{**}	.32 [*]	.49 ^{**}	-.60 ^{**}	-.65 ^{**}		-.57 ^{**}
11. PSM_Stress	-.44 ^{**}	-.23	-.61 ^{**}	-.31 [*]	-.41 ^{**}	-.34 ^{**}	-.48 ^{**}	.88 ^{**}	.54 ^{**}	-.57 ^{**}	

Note.

*** Correlation is significant at the 0.001 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 3

Hierarchical multiple regression analyses for status and self-regulation capacity

Variable	Autonomy		Environmental Mastery		Personal Growth	
	ΔR^2	B	ΔR^2	B	ΔR^2	B
Step 1: Status	0.05*		0.002		0.13**	
MD vs STUD		-0.25*		-0.14		-0.38**
Step 2: Main effects	0.22***		0.36***		0.36***	
MD vs STUD		-0.23*		-0.11		-0.35***
SR		0.43***		0.60***		0.49***
Step 3:	0.21		0.42**		0.37	
Interaction term						
Status and SR		-0.05		-0.29**		-0.15

Variable	Positive Relationships		Purpose in Life		Self-Acceptance	
	ΔR^2	B	ΔR^2	B	ΔR^2	B
Step 1: Status	-0.01		0.18***		0.08**	
MD vs STUD		-0.10		-0.43***		-0.30*
Step 2: Main effects	0.20***		0.44***		0.41***	
MD vs STUD		-0.08		-0.41***		-0.27**
SR		0.46***		0.52***		0.58***
Step 3:	0.21		0.47*		0.46**	
Interaction term						
Status and SR		-0.17		-0.22*		-0.25*

Variable	Emotional Exhaustion		Depersonalization		Personal Accomplishment	
	ΔR^2	B	ΔR^2	B	ΔR^2	β
Step 1: Status	-0.02		-0.04		-0.02	
MD vs STUD		-0.04		-0.12		-0.5
Step 2: Main effects	0.18***		0.08*		0.30***	
MD vs STUD		-0.07		-0.14		-0.01
SR		-0.45***		-0.31*		0.57***
Step 3: Interaction term	0.19		0.07		0.29	
Status and SR		0.18		0.13		-0.09

Table 3 (cont.)

Hierarchical multiple regression analyses for status and self-regulation capacity

Variable	Psychological Stress	
	ΔR^2	B
Step 1: Status	-0.02	
MD vs STUD		0.003
Step 2: Main effects	0.16***	
MD vs STUD		-0.02
SR		-0.44***
Step 3: Interaction term	0.18	
Status and SR		0.18

Note. MD group= '1'; STUD group = '2'

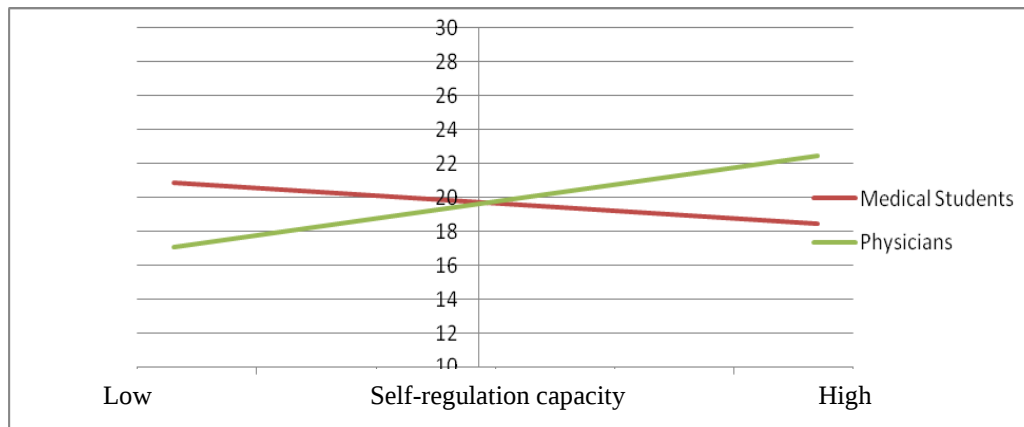
*** Correlation is significant at the 0.001 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

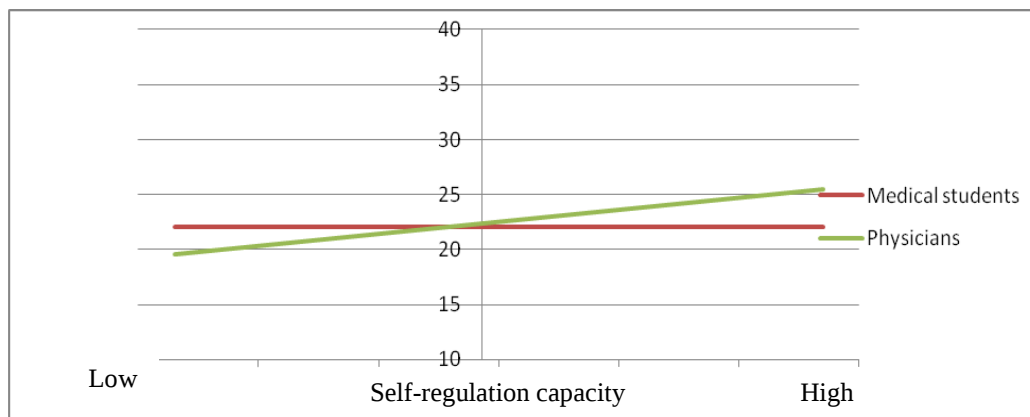
* Correlation is significant at the 0.05 level (2-tailed).

Figure 1. Significant interactions between group status, self-regulation capacity, and subscales of psychological well-being (i.e., environmental mastery, purpose in life, and self-acceptance)

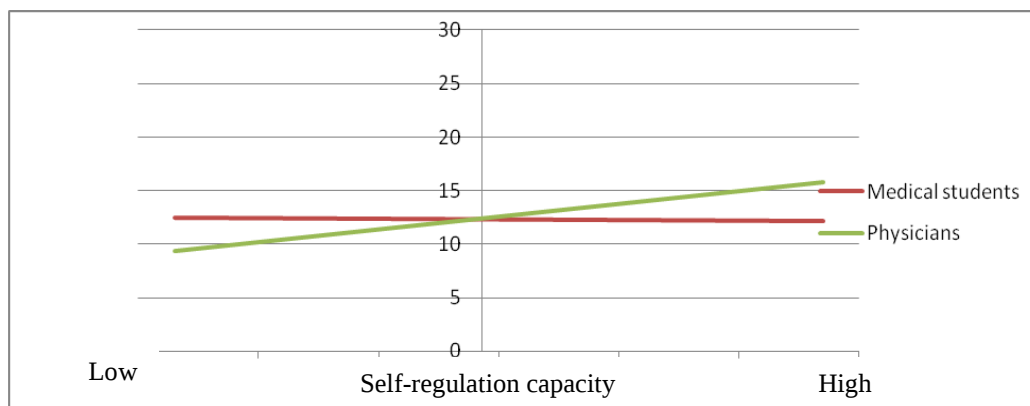
A. Environmental Mastery



B. Purpose in Life



C. Self-Acceptance



Exploring the Self-regulation of Physicians and Medical Students
In Relation to Their Well-being and Performance: A Qualitative Inquiry

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Abstract

The purpose of this study was to explore the self-regulation of 10 physicians and 10 medical students in relation to their well-being and performance using a qualitative, multiple case study approach. Self-regulation is a self-directed process in which individuals strategically plan, control, and adapt thoughts, feelings, and actions based on personal standards and goals within their changing environment (Zimmerman, 2000). The self-regulation process helps to explain not only how individuals cope with adversity but also how they actively strive for optimal functioning. Recent research suggests that several physicians and medical students fail to effectively adjust to the demands and stressors in their environment (Estabrook, 2008; Rakel & Hedgecock, 2008). As such, semi-structured, in-depth, individual interviews were conducted with 20 participants to examine their perceived self-regulation strategies and barriers influencing their well-being and performance. An exhaustive deductive and inductive content analysis was performed and various self-regulation strategies were identified and categorized based on Zimmerman's (2000) three phases of self-regulation: forethought, performance or volitional control, and self-reflection. Examples of strategies included establishing desired standards, setting well-being and performance goals, planning, engaging in self-observation, using self-control performance techniques such as focusing and self-talk, and reflecting on oneself to assess outcomes and satisfaction. Both internal and external types of self-regulation barriers were reported. Implications for future research and interventions are discussed.

Exploring the Self-regulation of Physicians and Medical Students

In Relation to Their Well-being and Performance: A Qualitative Inquiry

While students enter medical school with the hope to heal and become professional promoters of health, they are exposed to an extensive training process that may contribute to the prioritization of knowledge and productivity above their own well-being (Dobie, 2007; Lee & Graham, 2001). The goal of medical education is undoubtedly to graduate competent and successful professionals (Dyrbye, Thomas, Shanafelt, 2005) but the process in which students engage to attain this goal could be unintentionally hindering them (Ball & Bax, 2002; Dabrow, Russell, Ackley, Anderson & Fabri, 2006; Dunn, Iglewicz, Moutier, 2008; Dyrbye et al., 2005). In fact, studies have shown that students' mental health worsens during medical school (Ball & Bax, 2002; Puddester, 2001). They also have higher rates of overall psychological distress and may be more vulnerable to health problems than both the general public and age-matched peers (Dyrbye et al., 2005).

It is believed that the idea of sacrificing one's own well-being to meet expectations is produced by the medical culture itself, as students learn through modeling to prioritize performance over personal care (Rakel & Hedgecock, 2008). They also adopt maladaptive behaviours similar to those practiced by their preceptors (Wallace, Lemaire, & Ghali, 2009). It is therefore important to provide students with models who value their own personal well-being and can balance their professional career with their personal life, instead of models who promote performance at all costs (Lee & Graham, 2001). As such, it is argued that physicians must shift their attitude and practices in order to carry out what they preach and be ambassadors of good health not only for themselves but also for the students they educate (Estabrook, 2008).

Unfortunately, it is not clear to this day how this shift will and can occur thus more research is warranted to guide this process.

Achieving Well-being

Due to an overemphasis on physician *impairment* in past research (Goldman, Myers, & Dickstein, 2000; Weiner, Swain, & Gottlieb, 1998), there has been a call to focus investigations on physician and medical student *well-being* (Wallace et al., 2009; Weiner et al., 1998; Yamey & Wilkes, 2001). This is due to the fact that little is known about what it means for physicians “to be well” (Novack, Epstein, & Paulsen, 1999; Weiner, Swain, Wolfe, & Gottlieb, 2001) beyond treatment of ill health (Arnetz, 2001; Shanafelt et al., 2005). The tendency to use a disease model of human functioning, which typically focuses on repairing what is wrong, has led to a distorted view of what human experience is and should be like (Seligman & Csikszentmihalyi, 2000). Consequently, this focus on pathology has left physicians with little practical information on what constitutes positive functioning in a demanding and stressful environment (Novack et al., 1999; Weiner et al., 2001; Yamey & Wilkes, 2001).

Currently, there is no clear evidence to suggest that physicians and medical students are equipped with requisite self-care skills to achieve and sustain optimal levels of well-being throughout the course of their training and subsequent career (Simon & Durand-Bush, 2009; Sotile & Sotile, 2002). Given the gap in the medical literature that prohibits us from having a comprehensive view of well-being (Compton, 2005), and the apparent lack of concrete and plausible solutions to sustain physician and medical student well-being (Shanafelt et al., 2003; Shanafelt, 2009; Wallace et al. 2009; Weiner et al., 2001; Yamey & Wilkes, 2001), more research is needed to help advance knowledge and effective interventions with this population.

There is also a need to link well-being dimensions and strategies to sound theoretical frameworks (Patrick & Williams, 2009).

Well-being has been studied extensively by social psychologists (Diener, Suh, Lucas, & Smith, 1999; Ryan & Deci 2001; Ryff & Keyes, 1995). While the distinct dimensions of well-being have been debated, the consensus has been that well-being refers to optimal functioning and experience. Diener and Ryan (2009) found that high positive and low negative affect and satisfaction with one's life are indicators of well-being. However, other dimensions must also be considered to obtain a comprehensive view of well-being (Ryff & Keyes, 1995). Ryff and Keyes proposed a multidimensional model of psychological well-being comprising the following six dimensions: Autonomy, Environmental Mastery, Positive Relationships with Others, Personal Growth, Purpose in Life, and Self-Acceptance. Adopting a positive perspective of well-being (Seligman & Csikzentmihalyi, 2000) was a unique feature of this investigation as it allowed us to frame well-being as *more* than the presence or absence of negative states, and examine individuals' capacity to achieve positive, valued experiences related to optimal functioning (Shanafelt et al., 2005; Snyder & Lopez, 2007; Weiner et al., 1998).

Researchers recognizing the importance of building and strengthening individuals in order to optimize well-being and performance in the context of medicine proposed that targeting medical students at the onset of their training is a promising solution to shape healthier and more competent future physicians (Ball & Bax, 2002; Dunn et al., 2008; Dyrbye et al., 2005; Esterbrook, 2008; Hassed, de Lisle, Sullivan, & Pier, 2009; Moss & Patrick, 2007). Shanafelt (2008) stated that health professionals must each determine their own formula to reach optimal balance between their career and personal life. This approach is empowering and places the locus of control for change on the individual. While there is an obvious need for organizational

restructuring within the health care system to reduce the demands placed on physicians, and a necessity for curricular changes to better develop and protect medical student well-being (Dunn, Arnetz, Christensen, & Homer, 2007), it was noted that fundamentally, individuals govern their own behavior and actions and as such, they are active agents in the development and maintenance of healthy life and work habits (Bandura, 2005). External factors and resources may serve as important guides and sources of motivation, however, both medical students and the physicians from whom they learn are unlikely to adopt effective and lasting well-being-promoting skills and strategies unless they develop and internalize the means to exercise control over their own actions, feelings, and thoughts within their environment (Bandura, 2005).

Self-Regulation: A Potential Approach to Enhance Well-being?

Self-regulation is an empowering process guiding individuals to exert greater control over themselves within their evolving and often challenging environment (Vohs & Baumeister, 2004). Self-regulation allows people to not only effectively react and adapt to their work environment, but to also proactively strive for standards and goals related to positive functioning and experiences (Zimmerman, 2000). Self-regulation is a fundamental quality of humans, and as such, every individual has the capability to self-regulate to optimize personal functioning (Seligman & Csikszentmihalyi, 2000). What distinguishes effective from ineffective forms of self-regulation is not whether or not one possesses such capabilities but rather “the quality and quantity of one’s self-regulatory processes” (Zimmerman, 2000, p. 15). Zimmerman views self-regulation as a triadic interaction between personal, behavioral, and environmental factors that are cyclically observed and adjusted using three self-oriented feedback loops. More specifically, covert self-regulation involves monitoring and adjusting both cognitive and affective states through skills such as imagery and relaxation, while behavioral self-regulation pertains to

“observing and strategically adjusting performance processes” (Zimmerman, 2000, p. 14).

Finally, environmental regulation involves “observing and adjusting one’s environmental conditions and outcomes” (Zimmerman, 2000, p.14). These interrelated self-regulatory processes, that allow individuals to plan and adjust their thoughts, feelings, and actions in order to attain personal goals are present in the following three cyclical sub-regulatory phases: (a) Forethought, (b) Performance or Volitional Control, and (c) Self-reflection (see Figure 1).

Insert Figure 1 here

The *forethought phase* (e.g., planning to perform tasks within one’s medical context) consists of examining key motivational beliefs, analyzing tasks to be performed, identifying learning or performance outcomes, and setting personal standards or goals in order to complete the tasks to the best of one’s ability. The *performance or volitional control phase* (i.e., performing and monitoring tasks) involves self-control, self-observation, and self-recording processes. While self-control refers to one’s ability to maintain focus on current tasks and to optimize efforts toward goal attainment, self-observation consists of observing and tracking specific aspects of one’s performance and environment during task completion, and subsequent efforts produced in response to such data. Self-recording (e.g., journaling) increases the effectiveness and accuracy of feedback and leads to self-awareness by providing relevant personal and environmental data that can be synthesized into future adapted strategies. The *self-reflection phase* (i.e., reflecting and learning from performing tasks) consists of comparing self-monitored data with a standard or goal (i.e., determining where one is in relation to where one wants to be), and assigning attributions or causal significance to the results. Self-satisfaction regarding one’s task-related performance and adaptive inferences made to improve future regulatory attempts are also part of this process (Zimmerman, 2000).

Self-regulation is thus a highly cyclical process because feedback information from previous experiences is used to make adjustments during current and future efforts of regulation (Zimmerman, 2000). A key contribution of Zimmerman's social cognitive perspective of self-regulation is its emphasis on learning as well as on socializing agents (e.g., preceptors, students, patients) and the reciprocal effect they have on one's actions and development of self-regulation. According to Schunk and Zimmerman (2003), "self-regulation does not develop automatically with maturation, nor is it acquired passively from the environment. Systematic interventions assist the development and acquisition of self-regulatory skills" (p. 72). This is important since it suggests that medical students and physicians may need assistance in developing sound self-regulation skills. Furthermore, as an extension of Bandura's (1991) social-cognitive theory of self-regulation, Zimmerman's model focuses on both proactive and reactive elements of self-regulation, indicating that individuals can proactively strive for optimal experiences and functioning.

Self-regulation was deemed beneficial to improve diverse aspects of functioning such as motivation, physical and mental health, the acquisition of physical skills (e.g., strength, motor skills), complex decision-making, and academic success (Bandura, 2005; Zimmerman, 1990; 2000). As such, it would be interesting to examine if self-regulation skills and strategies could help physicians and medical students to effectively respond to their continually changing and demanding environment and achieve their performance and well-being goals. Given that self-regulation has seldom been examined as an adaptive skill and process related to well-being and performance within the context of medicine, it was the aim of the current study. Exploring the self-regulation capacity of physicians and medical students could help us obtain a more exhaustive view of strategies that may enhance their well-being and personal accomplishments

(Jensen, Trollope-Kumar, Waters, & Everson, 2008; Wallace & Lemaire, 2007; Weiner et al., 2001).

Feel and the Process of Resonance

As previously mentioned, one important dimension of well-being pertains to affect (Diener, 2000). While affect and its related constructs (i.e., emotions, feelings, and mood) have been addressed to some extent in several self-regulation theories and models, it is not sufficiently clear how the regulation of affect plays a role in the overall self-regulation process (Vohs & Baumeister, 2004). One group of researchers has attempted to shed more light on this by studying the concept of feel using the Resonance Performance Model (RPM, Simon & Durand-Bush, 2009, see Figure 2).

Insert Figure 2 here

Resonance, as depicted in the RPM, is a self-regulatory process that allows individuals to control their felt experiences by identifying and proactively striving to feel the way they want, and also by reactively reducing discrepancies when not feeling a desired way (Simon & Durand-Bush, 2009). In this context, feel is defined as a subjective, multidimensional, and dynamic experience that is mediated by one's ability to perceive, to be aware of, or to be conscious of one's inner self and external environment. As such, it is a broader concept that can be differentiated from emotions and feelings (Hanin, 2007; Vallerand & Blanchard, 2000). While one's felt experiences incorporate an emotional dimension (e.g., I feel happy), they can include physical (e.g., I feel strong), cognitive (e.g., I feel confident), social (e.g., I feel connected to the group), and spiritual (e.g., I feel at peace) dimensions as well (Callary & Durand-Bush, 2008).

Similarly to the cyclical phases in Zimmerman's (2000) social-cognitive model of self-regulation, the RPM includes dynamic, cyclical components that facilitate achieving a desired

experience. Resonance as a process allows individuals to (a) identify how they want to feel in different situations and aspects of their life (i.e., desired standard), (b) prepare to feel the way they want, (c) identify obstacles that prevent them from feeling the way they want, and (d) reconnect with the way they want to feel when necessary (Callary & Durand-Bush, 2008).

Through sub-regulatory processes such as planning, self-monitoring, and self-reflection, individuals who develop the skill to manage the way they feel and experience harmony between their inner self and external environment on a daily basis are more likely to experience optimal levels of performance and well-being (Arcand, Durand-Bush & Miall, 2007; Callary & Durand-Bush; Doell, Durand-Bush, & Newburg, 2006; Guérin, Arcand, & Durand-Bush, 2010; Lussier-Ley & Durand-Bush, 2009; Simon & Durand-Bush, 2009). As such, it is crucial to help individuals establish desired standards to guide their self-regulatory efforts, as well as strategies to achieve and adapt them based on evolving well-being and performance needs and goals.

While most studies on resonance have been conducted in different sport contexts, Simon and Durand-Bush (2009) examined the implementation of a resonance intervention in the context of medicine, and found that it enhanced the well-being and performance of four female medical students. Specifically, the purpose of this multiple case study was to explore the process in which four female medical students learned to regulate how they felt by participating in a feel-based, person-centered intervention. The extensive qualitative results, synthesized through an analysis of narratives, showed how their felt experiences were multidimensional, self-defined, and varied over time. Through the intervention, each student was able to “identify how they wanted to feel based on different dimensions, observe how these mediated each other, and learn how to regulate their felt experiences to optimize performance and well-being” (Simon & Durand-Bush, 2009, p. 228).

Like Zimmerman's (2000) social-cognitive approach to self-regulation, the RPM views the social and physical environment as a resource and individuals as proactive agents in constant exchange with this resource. Individuals who create and live in an environment that continually nurtures their desired feel, can better enjoy quality performance and everyday living because it gives them the motivation and energy necessary to sustain their endeavours over time and attain their goals (Newburg, Kimiecik, Durand-Bush, & Doell, 2002). The medical profession is one environment in which people are in constant interaction and must form relationships (e.g., with patients, students, preceptors, physicians, administrators). Although these relationships can cause stress and lead to excessive demands (Wallace & Lemaire, 2007), connections with patients and with co-workers can also be a source of satisfaction and energy (Dunn et al., 2007). In Simon and Durand-Bush's (2009) study, the participants discovered the importance of establishing and maintaining positive connections with their peers, preceptors, and patients in their quest to attain optimal performance. As such, they became increasingly aware of and put in place strategies to be able to regulate this social dimension of their felt experiences.

According to Dobie (2007), relationships with patients provide physicians with many opportunities to learn about themselves and increase their self-awareness. Self-awareness is at the forefront of the resonance approach and allows individuals to be conscious of their inner self and their surrounding environment (Callary & Durand-Bush, 2008). In the study by Simon and Durand-Bush (2009), the resonance intervention allowed the four participating students to learn to recognize, monitor, and adapt their inner states (i.e., how they felt and what they thought) and behaviours in relation to their preferred standards and changing environment. Physicians may be taught to focus on the needs of their patients and to put their own desires, emotions, and needs aside in order to remain professional and competent (Dobie, 2007). However, Dobie (2007)

states that “they can do this best when they know themselves, when they are truly present in the encounter and when they are attentive to the collaboration between the patient and themselves” (p.423). Physicians who are attuned to their own selves and can self-adapt will be better able to support their patients’ needs (Patrick & Williams, 2009) and optimally perform as medical performance has traditionally been conceptualized through quality of patient care (Estabrook, 2008; Firth-Cozens, 2001; Wallace et al., 2009). Gerrity (2001) reiterated that physicians’ actions or behaviours in the caring process (e.g., ability to communicate, show empathy, focus on relevant information, etc.) affect patients and as such, their well-being remains crucial to their professional performance. Of importance, when physicians are unwell, their performance and that of more general health-care systems are suboptimal (Wallace et al., 2009).

There is currently little evidence that physicians and medical students can effectively self-regulate in order to achieve and sustain optimal performance and well-being throughout the course of their career (Simon & Durand-Bush, 2009). Accordingly, we need a more realistic picture of this population’s current ability to self-regulate and the actual strategies they employ to do so. The premise for studying self-regulation with medical students and physicians lies in the implications that it may have on their well-being and performance, two concepts at the forefront of today’s medical literature. Achieving and managing desired felt experiences, thoughts, and behaviours may foster well-being through increases in optimal functioning, life and job satisfaction, positive relations with others, environmental mastery, and autonomy (Ryff & Keyes, 1995). In order to address our society’s expressed need for increased physician well-being and performance, research is warranted.

Purpose of the Study

Accordingly, the purpose of this study was to explore the self-regulation of physicians and medical students in relation to optimal functioning, performance, and well-being using a qualitative, multiple case study approach. The following research questions guided the study:

- a. What are physicians' and medical students' guiding personal standards in the self-regulation process? Specifically how do they want to feel based on the principles of the RPM?
- b. What self-regulation strategies facilitate their well-being and performance?
- c. What self-regulation barriers inhibit their well-being and performance?

Methodology

A multiple case study approach was used to carry out this research as it allowed the researcher to explore and document the various common and different experiences and strategies of numerous participants (Yin, 2003). A case study is "an empirical inquiry that...investigates a contemporary phenomenon within its real-life context, especially when...the boundaries between phenomenon and context are not clearly evident" (Yin, 2003, p. 13). Given that self-regulation and well-being have seldom been empirically examined from a qualitative and positive psychology viewpoint in the context of medicine, the case study approach was useful to capture not only individual experiences with particular events, but also the conditions in which they occurred (Yin, 2003).

Participants

Using a combination of convenience and purposive sampling techniques (Marshall, 1996), 20 participants were recruited via posters and emails sent by contact individuals from the Faculty of Medicine at a Canadian university and an affiliated teaching hospital. The latter were

targeted due to their convenient location and accessibility. In order to ensure a variety of perspectives and experiences, the participants included 10 medical students in their 1st (n=5), 2nd (n=3), 3rd (n=1), and 4th (n=1) year of training, as well as 10 physicians (including 2 residents) occupying an educational or supervising role within the selected Faculty of Medicine. Age and gender were not delimited, although an attempt was made to recruit both men and women, which resulted in 8 women and 12 men.

Data Collection Procedures

After giving their informed consent, the participants individually engaged in a semi-structured, face-to-face interview with the researcher in a private consultation room at the selected university. The interviews were audio-recorded and lasted approximately 90 minutes. An interview guide provided structure to explore the research questions in-depth but the process was flexible enough to allow the discussion of relevant themes and inductive knowledge to emerge (Hsieh & Shannon, 2005). This approach was ideal for examining key constructs such as self-regulation, well-being and performance, which are still not completely understood from a positive psychological perspective in the context of medicine (Meyer, 2001). Probes and follow-up questions were used when needed to deepen the level of responses and to increase the richness of the data.

Data Analysis Procedures

The digitally recorded interviews were transcribed verbatim and a directed content analysis of the transcripts was performed (Hsieh & Shannon, 2005). This allowed the researcher to systematically classify the data based on the conceptual frameworks guiding the investigation (i.e., Social-cognitive model of self-regulation, Zimmerman, 2000 and the RPM, Simon & Durand-Bush, 2009) and existing relevant research findings (Hsieh & Shannon, 2005). This

directed approach to content analysis is most suitable for studying unexplored phenomena or processes that are presented through certain theoretical lenses that “could benefit from further description” (Hseih & Shannon, 2005, p. 1281).

The data analysis procedures were specifically as follows: The researcher thoroughly read the transcripts (approximately 15 typed single-spaced pages for each interview) and then highlighted and identified categories based on first impressions (Hseih & Shannon, 2005). Using the software program NVivo 9 to analyze qualitative data, the researcher then sorted each piece of text that could stand alone into similar categories. Different levels of categories (i.e., categories, sub-categories, and codes) were created to provide more depth to the analysis using a deductive approach, that is, key concepts from the literature (Potter & Levine-Donnerstein, 1999) on self-regulation (Simon & Durand-Bush, 2009; Zimmerman, 2000). An inductive approach allowed for the emergence of new categories and sub-categories, as well as specific codes that did not fit based on the deductive process. Constant comparisons and revisions led to the establishment of general categories, sub-categories, and codes (Piktala & Mantyranta, 2004).

Trustworthiness was assured by means of researcher preparation, an audit trail, member checking, as well as ongoing peer and expert debriefing to remain as transparent and accurate as possible throughout the data collection and analysis phases (Creswell & Plano Clark, 2007). Furthermore, a pilot study was conducted beforehand in order to tailor the interview guide and verify the deductive analysis procedures guided by the chosen self-regulation models.

Results

Three main general categories were identified based on the research questions and data analysis: (a) Standards of self-regulation, (b) Self-regulation strategies, and (c) Self-regulation barriers. These general categories with associated sub-categories and codes are presented in

Tables 1 to 3, respectively. Key citations were identified and included to complement the findings (Rubin & Rubin, 2005).

Standards of Self-Regulation

Participants were asked how they would like to feel on a daily basis, where “feel” was described by the researcher as a central multidimensional desired standard to guide the self-regulation process in order to achieve well-being and performance goals. Participants for the most part described both how they wanted to feel and how they did not want to feel in order to best articulate their desired and undesired standards. The different dimensions of feel, as reiterated in the RPM, were reflected in the participants’ responses. Although desired standards are known to vary over time and from individual to individual (Simon & Durand-Bush, 2009), the participants shared common responses when describing how they wanted to feel, allowing us to categorize these standards, first through the five dimensions of feel (i.e., cognitive, physical, emotional, social, spiritual), followed by a sub-categorization based on the specificity of their responses (See Table 1).

Insert Table 1 here

The cognitive category offered 10 sub-categories representing ways the physicians and medical students wanted to feel in their personal and professional life. Participants wanted to feel satisfied, accomplished, balanced, in control, competent, calm, peaceful, free, confident, focused, and motivated. Feeling satisfied, accomplished, and balanced were the most common psychological desired standards reported by the physicians and medical students. There were 4 sub-categories within the physical category. The participants wanted to feel rested and energetic, healthy and fit, comfortable in their own skin, and finally they did not want to feel sick or tired, which we categorized as free from ill-being. The emotional category comprised two sub-

categories as the participants expressed wanting to feel happy and positive, and free from feeling stressed and negative emotions. The preferred self-regulation standard of feeling happy was mentioned by 10 participants making it the most cited desired standard. Within the social category, two sub-categories were identified to reflect the participants' desire to feel connected to others and purposeful in society. Finally, the spiritual category, comprising two sub-categories, was addressed by three participants who reported wanting to feel at peace with themselves and "zen" like.

Self-Regulation Strategies

Self-regulation strategies were first deductively organized into three general categories in light of the three phases of the self-regulation process as depicted by Zimmerman (2000): forethought, performance or volition control, and self-reflection. Following the exhaustive content analysis of strategies / practices that were perceived to facilitate the achievement of desired standards as well as well-being and performance goals, each phase of the self-regulation process was subdivided into sub-categories and then into specific action-oriented codes.

The first general category entitled "forethought" was divided into three sub-categories: (a) self-motivational beliefs, (b) task analysis, and (c) an inductively assigned category, "self-analysis". In line with the guiding self-regulation model (Zimmerman, 2000), self-motivational beliefs represented personal beliefs and values regarding the establishment and achievement of desired standards as well as well-being and performance goals, which were reflected in the following specific self-regulation strategies: i) demonstrating interest toward the task: "*I manage my performance well and it's because I really like what I'm doing...I want to be able to manage my life in a way to have more activities that I enjoy.*", ii) determining appropriate outcome expectations, and iii) orienting goals toward the process. A fourth emerging strategy that was

mentioned by most participants implied adopting a balanced life approach or belief: *“It’s about being able to do something else than just studying... I want to do other activities, accomplish myself in other ways.”*

The second sub-category within “forethought” was task analysis, which pertained to goal setting and strategic planning. This sub-category was further divided to account for the following self-regulation strategies: i) setting specific well-being and performance goals, which was mentioned by all 10 physicians and 7 medical students. In particular, almost all of the participants (i.e., physicians and medical students) mentioned that they wrote down their short-term performance goals while only a few said that they took the time to write down their well-being goals. No one mentioned writing down their long-term goals, however, some reported visualizing them from time to time; and ii) developing a strategic plan, which involved creating a schedule, managing one’s time, prioritizing tasks, compartmentalizing tasks, and balancing professional and personal activities: *“Because it is impossible to learn all the material, it’s important to know what to study and what to put an emphasis on.” I make a “to do” list and a schedule and I reflect over my schedule. I have a lot going on, and so I have to be organized with my time.”*

Self-analysis, the third sub-category within the general category of forethought, was regularly practiced by only two physicians and pertained to the following self-regulation strategies: i) identifying one’s current self, including recurring thoughts, feelings, actions, and ii) identifying one’s preferred self, including desired personal standards (i.e., how one wants to feel, think, and behave in different situations): *“I like to feel as though I am making a difference, that I am helping others, that I have a role in life.”* Identifying how they wanted to feel from a multidimensional perspective was not a common practice for the physicians and medical

students, although they were able to articulate this following the researcher's questions and probes. However, establishing appropriate and realistic task-related standards was mentioned by most of the participants, as was the importance of choosing appropriate expectations for performance and well-being goals.

Within the general category "performance or volitional control", two sub-categories were created based on Zimmerman's self-regulation model: (a) self-observation, and (b) self-control. In terms of self-observation, the following self-regulation strategies were identified: i) observing and monitoring internal states (i.e., covert thoughts and feelings) and overt behaviours / actions during task execution (e.g., studying, writing an exam, interviewing a patient, undergoing a physical exam) to recognize discrepancies between their current and desired standards and properly adjust, and ii) mentally tracking performance progress. Interestingly, monitoring one's own well-being was determined as important by most of the participants in order to achieve performance goals: *"If I get tired, I take a break to go exercise, and when I come back I am more productive, I feel better and more comfortable in my skin and I have more energy to perform"*. Self-recording and self-experimentation, which are sub-regulatory processes contributing to self-monitoring and goal attainment in Zimmerman's (2000) self-regulation model, were not reported as strategies by the participants. In fact, very few participants actually monitored their goal progress or kept track of them in a systematic way.

With regards to the second sub-category within the category of performance or volitional control (i.e., "self-control"), various self-regulation strategies were reported: i) applying task strategies, which was achieved by utilizing external resources such as social support, tools, tutors, workshops, electives, study partners, mentors, and feedback from others. Mentoring was in fact identified as a strategy for both those offering it and receiving it. Other task-related

strategies pertained to using learning and studying techniques; ii) instructing oneself, a strategy that was often referred to by the participants as self-talk, also contributed to the participants' self-control; iii) focusing attention by minimizing distractions and utilizing focus enhancement strategies such as music and breaks were identified as extremely important strategies to ensure sustainability of performance, task execution, and motivation; iv) managing one's physical self involved exercising, eating healthy foods, and relaxing: *"Being healthy is high on my priority list, and so far it has helped me perform... Being healthy is elementary to being a good physician."* Interestingly, exercise was mentioned by 9 of the 10 medical students as a self-regulatory strategy allowing them to take a break from studying and return more energized and focused and ultimately helping them to attain their well-being goals: *"I need to be able to think of something else besides school and studying...other activities such as exercise allow me a well needed mental break."* All physicians also identified physical activity as an essential strategy to manage stress and proactively protect their well-being.

The third general category of self-reflection was the least discussed by the physicians and medical students. However, two sub-categories were created based on Zimmerman's (2000) model: (a) self-judgment, and (b) self-reaction. In terms of self-regulatory strategies identified for self-judgment, all physicians mentioned the importance of i) self-evaluating and doing routine checks to reflect on the outcomes of task execution, make comparisons to preferred standards and set goals, and adapt goals as needed. They reported that as clinicians with their patients or as educators with their students, self-reflection was essential to allow them to evaluate performance and fulfill their roles. The medical students addressed self-judgment by reporting the important self-regulatory strategy of ii) reflecting on feedback and evaluations provided by others (e.g., preceptors) in order to improve their subsequent performance.

The second sub-category within “self-reflection” pertained to self-reaction, which was discussed through the two following self-regulation strategies to manage reactions: i) determining their level of self-satisfaction by evaluating their performance based on both objective and subjective desired standards, such as how it made them feel; and ii) accepting oneself regardless of the outcome was deemed important by some of the participants as this strategy allowed them to move forward and learn from their experiences. Furthermore, positive connections with patients, preceptors, and colleagues were also essential when determining self-satisfaction with regards to performance-related goals. With respect to well-being goals, both physicians and medical students reported that their reactions were obvious when they were not meeting them as they did not feel well or they were overly stressed: *“It’s all about how you feel after an exam. If I felt absolutely awful, then I know I wasn’t prepared enough for it. But I am much less concerned about marks than I was before.”*

Self-Regulation Barriers

Barriers to effective self-regulation expressed by the participants were perceived as impacting their everyday functioning and ultimately inhibiting the achievement of their performance and well-being goals. Two general categories were identified by the participants, that is, external and internal barriers, which were divided into sub-categories and codes (see Table 3).

Insert Table 3 here

External barriers emerged from the participants’ physical or social environment and included: (a) lack of social support, which pertained to i) poor or lack of social interactions and relationships with family and friends, ii) little to no opportunity to share with a counsellor or mentor, and iii) inappropriate or lack of feedback from preceptors. Three out of the 10 students

expressed that there seemed to be a lack of human resources, such as consistent and reliable mentors who would follow them from the beginning and someone to whom they could openly talk about anything: *“The main resource I feel we are lacking in the Faculty is someone with whom I can sit down and talk like this, with whom I can really share so that when I get home to my girlfriend, I don’t feel as though I need to talk about the stuff that didn’t go well because I have done it already. That way you feel more balanced”*.

A second sub-category of external barrier was a lack of applicable tools, which was further depicted as irrelevant or a lack of applicable stress management techniques and useful strategies to enhance well-being and performance, adapted to the demands of the environment and taught and practiced within the curriculum. This was mentioned by both medical students and physicians: *“In terms of stress management and well-being, through the curriculum they haven’t taught me anything or how to manage. It’s one thing to tell us to manage our stress, we are all aware that we need to do this. They want to make us more balanced but it’s a little difficult to do if they don’t give us the time to balance other activities or teach us the tools to achieve this either.”*

A third sub-category of external barrier that was perceived by the participants to affect their capacity to self-regulate and achieve optimal well-being and performance was termed “multiple life demands”. These demands pertained to: i) unplanned stressful life events, ii) an inability to perform multiple tasks due to inadequate time and resources, and iii) distractions such as the use of computers during class, which can prohibit active listening and the retention of information.

Demands of the medical profession itself were identified as a fourth external barrier leading physicians and some 3rd and 4th year medical students who were more advanced in their

training, to feel stressed and overwhelmed, and feel as if they could not effectively self-regulate. These included i) little to no time to meet all demands of the profession, ii) conflicting roles and responsibilities, iii) having to deal with demanding and difficult patients, and iv) high expectations established by the medical culture.

The last sub-category of external barriers corresponds to the medical training process, that is, the demands of the medical program, which can be divided into i) the abundance of material to be learned within a certain time frame, ii) stressful and non-representative objective evaluations (i.e., multiple choice exams), iii) the uncertainty of specialty placements, iv) excessive financial demands associated with completing a medical program in Canada and having to manage an accumulated debt, which was highlighted by most medical students, and finally, v) the uncertainty of the future, which is partly influenced by students' lack of control over placements.

Internal self-regulation barriers perceived to inhibit well-being and performance pertained to the self and included ineffective self-management skills and maladaptive thoughts, feelings and actions that could be experienced at any point in the cyclical process. Barriers were sub-categorized using Zimmerman's (2000) self-regulation process and included: (a) ineffective or underdeveloped forethought, organizational skills, and inappropriate standards, which were mentioned by all participants as the most common internal barrier that prevented them from achieving their well-being and performance goals: *"Most physicians and medical students unfortunately have standards that are inappropriate. Their standards are too high and they ask too much of themselves. It's all or nothing, rather than seeing it as a process to grow and develop as a human.* This sub-category included i) unrealistic or maladaptive standards of performance and well-being, ii) unrealistic or inappropriate goals, iii) prioritization of

performance over well-being, iv) lack of balance between personal and professional activities, v) ineffective time management and, vi) lack of self-efficacy. The participants also mentioned the frustration and sense of dissatisfaction that can occur when standards are purely established based on external references and how this can lead them to feeling overwhelmed and not in control of their own life.

A second sub-category of internal barrier was termed “ineffective or underdeveloped performance control techniques” which included i) poor mental, technical, or tactical choices, ii) an inability to obtain or utilize feedback, iii) a lack of self-observation and/or self-monitoring, and iv) maladaptive or unhealthy behaviours. Overall, a lack of self-control and awareness was perceived to be a source of stress that could lead to negative health and performance consequences if sustained for too long. Furthermore, most internal barriers led to the adoption of overt maladaptive behaviours such as a lack of exercise, sleep, proper nutrition, and alcohol consumption.

Finally, “ineffective or underdeveloped self-reflection skills and strategies” constituted the third sub-category of internal barriers. It included the following codes: i) lack of self-evaluation skills, such as comparing a performance outcome to a previously determined criteria, ii) evaluation based on external standards rather than or at the expense of personal standards, and iii) lack of reflection on self and goal attainment. Inadequate self-evaluation mainly based on objective measures, external sources, and comparisons to others were perceived by the majority of medical students, as a source of stress, which they linked back to their maladaptive standards, leading them to unsatisfactorily evaluate themselves based on unrealistic standards and goals. While they highlighted the importance of taking the time to reflect on their learning experiences

to better integrate knowledge and revisit their well-being needs, they often did not have the time or the proper skill-set that would enable them to do so.

Although several external and internal barriers were identified, the most frequently cited one, perceived by most of the participants, was not being able to achieve a sense of balance between their personal and professional life. Although many physicians and medical students understood the need to protect and nurture their own well-being, they did not feel that they always could so due to external and internal shortcomings: *“To achieve well-being in medicine can be hard, given the hours and the commitment to it, so I think that well-being will always be the battle that you face as a student and as a resident, and maybe even as a physician, where some fields might be better than others for that.”*

Discussion

This research aimed to examine the perceived relationship between self-regulation, well-being and performance in the context of medicine. The self-regulation standards, strategies, and barriers of 10 medical students and 10 physicians occupying educating or supervising roles provide insight into skills and resources that can either facilitate or inhibit the achievement of well-being and performance goals. While findings will be linked to the existing literature, recommendations for future research and practical implications will be provided.

Self-Regulation Standards

When the participants were asked about their desired standards, and in particular how they wanted to feel on a daily basis, many of them had to take a moment to ponder this. Similar to what was found in previous research on self-regulation (Callary & Durand-Bush, 2008; Collins & Durand-Bush, 2010; Simon & Durand-Bush, 2009), several physicians and students admitted to not reflecting very often on how they *wanted* to feel and reported that how they did

not want to feel was more apparent to them. This also supports recent findings that many medical students and physicians lack reflection on emotional experiences (Dobie, 2007). The accelerated and emotionally charged nature of the medical profession can pose a risk if both intellectual and emotional experiences are not well integrated (Patrick & Williams, 2009). The priority and focus of medical training remains on knowledge acquisition, and as such, students often believe they must distance themselves from emotional experiences in order to deliver more professional patient care (Dobie, 2007). However, Simon and Durand-Bush (2009) found in their study on self-regulation that in order for medical students to optimally perform in the context of medicine, they should be aware of, reflect on, and effectively manage how they feel.

The participants' responses to desired self-regulation standards corresponded with not only the multidimensional dimensions of feel proposed by Simon and Durand-Bush (2009), but also various dimensions of well-being. While the desire to feel satisfied and happy (i.e., cognitive and emotional dimensions of felt experiences, Simon & Durand-Bush, 2009) corresponds to Diener's (2000) definition of subjective well-being, the need to feel socially connected to others (i.e., social dimension of feel, Simon & Durand-Bush, 2009), and to feel confident and in control (i.e., cognitive dimension of feel, Simon & Durand-Bush, 2009) can be linked to Ryff and Keyes's (1995) model of psychological well-being. Achieving and nurturing preferred felt experiences may foster well-being through increases in life and job satisfaction, and the enhancement of other important psychological aspects of the self including positive relations with others, autonomy, environmental mastery, personal growth, purpose in life, and self-acceptance (Ryff & Keyes, 1995). Well-being also comprises a physical dimension deemed important in one's overall health (Buchman, Sallis, Criqui, Dimsdale, & Kaplan, 1991; Yiu, 2005). This was apparent in the current study as both physicians and medical students reported a

physical dimension to their preferred standards. Their desire to feel rested, energetic, healthy and fit speaks to this physical aspect of well-being and should be further investigated as it may be an important component of well-being promotion practices to address in the future.

Although it may be difficult to accomplish due to a variety of internal and external self-regulation barriers, reflecting on and identifying desired standards is a fundamental step that could provide physicians and medical students with tangible reference points from which to guide their self-regulation process (Zimmerman, 2000). This is also important from a well-being perspective in order to establish not only internal congruence between feelings, thoughts, and actions, but also harmony between one's internal states and external environment (Newburg et al., 2002; Simon & Durand-Bush, 2009).

Although goals are often referred to as the essence of performance efforts and human functioning (Zimmerman, 2000), it is essential to align personal standards with goals and to adapt both when necessary in order to experience resonance, rather than dissonance (Newburg et al., 2002; Simon & Durand-Bush, 2009). This is relevant in the medical context in which goals are often socially shaped and culturally determined and can therefore have significant repercussions on the well-being of individuals who do not necessarily share the values and goals of their social and cultural network. Given the sensitivity of goal selection and achievement, self-regulation should be an individualized process in which people are empowered to design and control what allows them to perform with the utmost satisfaction and to feel the way they want not only in their specific domain but also in their life in general (Bandura, 2005; Newburg et al., 2002; Shanafelt et al., 2005).

Self-regulation Strategies Facilitating Well-Being and Performance

In terms of self-regulation strategies that facilitate the achievement of well-being and performance goals, the participants expressed similar strategies for both types of goals, and they also reported that achieving one goal helps to achieve the other. This makes sense seeing as how attributes of general positive functioning have been identified as predictors of well-being (Ryff, 2008; Weiner et al, 1998). Shanafelt, Sloan and Haberman (2003) defined physician well-being as being more than the absence of distress, stating that it is also a reflection of being challenged, thriving, and achieving success in various aspects of one's personal and professional life. All participants discussed a bi-directional link between nurturing their well-being and effectively self-regulating, and acknowledged the impact that feeling healthy and happy has on their subsequent performance.

The reported strategies can be linked to the theoretical frameworks guiding this study. Both reactive (e.g., using feedback from preceptor to assess one's performance) and proactive (e.g., prioritizing tasks) types of strategies were highlighted by the participants and categorized within the three phases of Zimmerman's (2000) self-regulation model. For example, with regards to the *forethought* phase, viewing medical training as a learning process rather than a series of outcome-oriented goals that must be achieved shaped the medical students' self-motivational beliefs and helped them to manage the stress associated with the exhaustive material covered and objective evaluations. Results also confirmed that establishing goals and a plan to reach them is important in order to provide direction and ensure adequate efforts in the self-regulation process (Zimmerman, 2000).

Other emerging strategies were similar to those presented in the literature on physician well-being, such as adopting a positive approach to life and balancing one's professional and

personal activities. For instance, Weiner and colleagues (2001) found that physicians adopting well-being-promoting practices had developed ways to generate positive thoughts, focus on success, and maintain balance in life. The most cited self-regulation strategy to achieve optimal well-being and performance reported by physicians and medical students in this study was balancing professional and personal activities. Interestingly, it was also identified as the biggest barrier given the demands of the profession and of the medical program in which they were involved. This notion of balance was not addressed in Ryff and Keyes' (1995) multidimensional model of psychological well-being, however, it should be further investigated given its importance in this study and past research.

With regards to Zimmerman's (2000) *performance or volitional control* phase, the participants identified self-control and self-observation strategies, for example, paying attention to how they are feeling and taking breaks in order to come back to studying or working feeling rested, refreshed and motivated to meet their personal standards. Managing one's physical self through exercise, healthy eating, and rest and recovery was a commonly reported strategy that significantly impacted their well-being and performance. Such self-care practices have been recurrently identified in the medical literature on physician and medical student well-being (Meldrum, 2010; Pomaki, Supeli, & Verhoeven, 2007; Quill & Williamson, 1990; Shanafelt et al., 2003; Shanafelt, Bradley, Wipf, & Back, 2002; Sotile & Sotile, 2002; Weiner et al., 2001). Given that most of the participants emphasized exercise and proper nutrition to stay focused, motivated, and to reconnect with how they want to feel when things are not going well, it would be worthy to further investigate these self-regulation strategies in future interventions and studies.

According to Zimmerman (2000) and Simon and Durand-Bush (2009), self-monitoring is an important self-regulatory process because it allows you to track how you feel, think, and behave and remain aware of yourself and your environment on a daily basis to recognize trends, successes, obstacles, and setbacks. Although noting and tracking self-regulatory attempts and their impact on goal progress was not a strategy mentioned by the participants, it would be worthy to examine if and how various self-monitoring means could help medical students and physicians to maintain self-awareness and proactively adapt to the demands of their environment. Given that self-reflective processes are closely associated to self-observation in Zimmerman's self-regulation model, perhaps the lack of self-recording on the part of the participants could also explain the low or ineffective use of self-reflection strategies. Moreover, self-evaluation refers to comparing self-monitored information with a standard or a goal, which often requires tracking outcomes or processes, especially when tasks are complex or multiple (Zimmerman, 2000).

Self-regulation strategies pertaining to the *self-reflection* phase (Zimmerman, 2000) were reported by many physicians, however, they were the least reported by medical students. This supports Piktala and Mantyranta's (2003) finding that little support is offered to encourage reflective thinking during medical students' training process. Yet studies within the medical literature have shown that self-reflection is essential to deepen understanding, promote learning, and increase performance (Patrick & Williams, 2009; Piktala & Mantyranta, 2003; Simon & Durand-Bush, 2009). As suggested by Simon and Durand-Bush (2009), perhaps students and physicians would benefit from learning more specific strategies (i.e., self-recording, self-monitoring, journaling) allowing them to then subjectively evaluate their performance and well-

being as this is crucial to be able to adequately adapt personal standards and goals and sustain a high level of satisfaction and positive affect.

Self-Regulation Barriers Inhibiting Well-Being and Performance

Every individual has the capacity to self-regulate to optimize personal functioning (Seligman & Csikszentmihalyi, 2000; Zimmerman, 2000), however, one's capacity can vary depending on the effective or ineffective use of self-regulated strategies, which can also fluctuate depending on the context and tasks to perform (Bandura, 1991, 2005; Vohs & Baumeister, 2004). In light of depicting medical students' and physicians' self-regulatory processes and skills, it is also important to explore internal and external barriers that prevent them from effectively self-regulating and achieving optimal well-being and performance.

It is believed that many of our dysfunctions and distress can be attributed to low self-regulatory skills (Zimmerman, 2000). These problems are mainly due to internal barriers such as ineffective or maladaptive forethought (e.g., goal setting, strategic planning, and motivational beliefs) and performance control techniques (e.g., self-observation, self-instruction, focusing). Instead of using proactive methods, such as establishing a schedule to exercise, sleep, and eat well, and recording the frequency and quality of these activities to evaluate their effect on well-being and performance, ineffective self-regulators rely on reactive methods, such as skipping a meal or reducing sleep to manage negative outcomes once a discrepancy between their current and desired self is noted (Vohs & Baumeister, 2004; Zimmerman, 2000). The participants in this study identified many internal barriers linked to Zimmerman's (2000) self-regulation phases that perhaps could be prevented or reduced if they more proactively and strategically organized their time and set appropriate goals and standards for themselves. A key indicator of effective self-regulation is the capacity to adapt thus when individuals face setbacks or less than optimal

experiences, they must self-evaluate and adjust what is within their control to reduce any discrepancies or dissonance (Simon & Durand-Bush, 2009).

The participants also discussed several external self-regulation barriers that were perceived to be less in their control. For example, the very nature of the medical profession with its inherent demands, expectations, and culture was perceived to hinder the physicians' and medical students' capacity to effectively manage themselves to maintain an adequate level of well-being and performance. A lack of social support and useful applicable tools to cope with adversity and their multiple life demands compounded the issue. However, proactively adapting to difficulties, challenges, and change in one's life is an individual skill that requires commitment, practice, and learning from all types of experiences and performance outcomes including both successes and failures (Collins & Durand-Bush, 2010; Simon & Durand-Bush, 2009). Therefore, beyond effective forethought and performance control, the adaptive qualities of a person's thoughts, feelings and actions depend on self-reflective processes such as appraisals, judgments, and consequent reactions to situations, which can impact subjective well-being (Zimmerman, 2000). Results of this study suggest that a barrier and weakness in the self-regulation process of physicians and medical students was self-reflection. Levine and colleagues (2005) found that this is in part due to fatigue, lack of personal time, and overwhelming work, which impede physician well-being.

Research indicates that helping physicians to achieve and maintain adequate levels of health and well-being will likely increase effective patient care practices (Goldman et al., 2000). In a medical education context, however, where learning to perform is the primary objective, prioritizing performance goals over and above the well-being of students could possibly be creating a vicious cycle of endless dissatisfaction and decreased productivity. Perhaps one of the

biggest challenges and barriers for physicians and medical students is achieving a sense of balance in their life and prioritizing their well-being over more performance-oriented goals. The participants in this study reiterated how both well-being and performance directly influenced one another. Furthermore, research has shown that it is difficult to perform and to provide quality patient care when physicians are unwell (Borrell-Carrió & Epstein, 2004; Firth-Cozens, 2001; West et al., 2006; West, Tan, Habermann, Sloan, & Shanafelt, 2009). This highlights the importance for individuals to constantly pay attention to both of these variables in their daily life.

While there is an apparent need for medical students to take responsibility for their own self-care needs, it seems that external resources such as credible and adapted means of education, as well as individual consulting services, could be better utilized to address some of the barriers they face and to promote and enhance their well-being and performance. Although many of the external barriers they identified (e.g., excessive demands of training program and profession) are for the most part out of their control, there are certain barriers such as lack of social support and applicable tools that could be more readily addressed within their program. Of importance to note, developing self-regulatory competence remains dependent on the context and requires not only sustained effort but also sources of social influences and support (Zimmerman, 2000).

Limitations and Future Research

Although it was not the inherent goal of this study to generalize the findings to other medical students and physicians, the process of medical training is a shared experience thus the standards, strategies, and barriers offered by these participants may be relevant to others. Future research in which multiple interviews are conducted with various medical students within the same academic year and school is needed in order to depict trends within a specific context. Interviews with medical students and educating physicians from various schools across Canada would also

enrich the findings by offering a variety of perspectives and interpretations, and lead to a more accurate and complete representation of self-regulation strategies and barriers that impact their well-being and performance.

What participants say they do may differ from what they actually practice (Weiner et al., 2001). Participants' self-reports must therefore be interpreted with caution. Triangulation of multiple sources of data (e.g., observations, academic scores, focus groups, individual interviews, questionnaires) could strengthen results in future research (Creswell, 2003). It is believed that a regular iterative process of inquiry and feedback from physicians and medical students may lead to the identification of effective self-regulation strategies to enhance and maintain well-being and performance, which could then be translated to others through knowledge dissemination, applied workshops and interventions, or possibly but less likely, curriculum and organizational changes. Consistent and thorough assessments of self-regulation, well-being, and performance are also needed to evaluate the effectiveness and outcomes of this knowledge dissemination and application.

Conclusion

Teaching and providing physicians and medical students with the resources, time, and skills necessary to effectively self-regulate and achieve optimal well-being and performance may be one plausible solution that could contribute to the CMA's mandate to develop healthier physicians. Helping students to build a strong foundation of self-management skills (e.g., planning, self-monitoring, self-reflection) at the onset of their training may better prepare them to effectively respond to the needs of their profession and offer quality patient care as future physicians. In line with a positive perspective of well-being, medical students need to not only learn and practice to efficiently cope with adversity but also thrive, despite the stressors and

demands of their academic environment (Weiner et al., 2001). Exploring self-regulation with medical students and physicians is a first step in bringing attention to the current strategies they use as well as the barriers they face that impact their well-being and performance. It is hoped that the findings of this study will serve as an impetus to conduct more research and develop future interventions.

In summary, some of the most important practical implications of this study that may be of relevance to physicians occupying an educational or mentoring role and for medical students are as follows:

- Given that performance standards were perceived to be indicators of well-being, and given that well-being strategies were reported to facilitate performance, well-being should be a priority for medical students from the onset of their training to optimize performance and allow them to remain healthy, happy, satisfied, and motivated throughout their learning process.
- Balancing life and work activities was mentioned as both a strategy to facilitate and a barrier to inhibit well-being when it could not be achieved. It is important to encourage and provide opportunities for physicians and medical students to maintain a balanced life by pursuing personal and social activities outside of the medical context.
- Learning and applying effective self-regulatory strategies through the establishment of desired standards guided by multidimensional felt experiences, goal-setting, strategic planning, self-observation, self-control performance techniques, and self-evaluation and reflection will help facilitate the achievement of well-being and performance goals.

- In order to address the barriers and build on the self-regulation strategies reported in this study, it is important to develop credible and applicable means to educate students on self-regulation, well-being, and performance enhancement.
- Given that a lack of external resources was perceived to inhibit performance and well-being, physicians should attend to not only their own self-regulation skills to nurture their well-being and performance but also that of the students they educate and mentor.
- External social support provided through regular personalized individual or small group interventions is an avenue to explore to help students proactively cope with demands and regulate their performance and well-being more effectively.

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Figure 1. Social-Cognitive Model of Self-Regulation (adapted from Zimmerman, 2000, 2008).

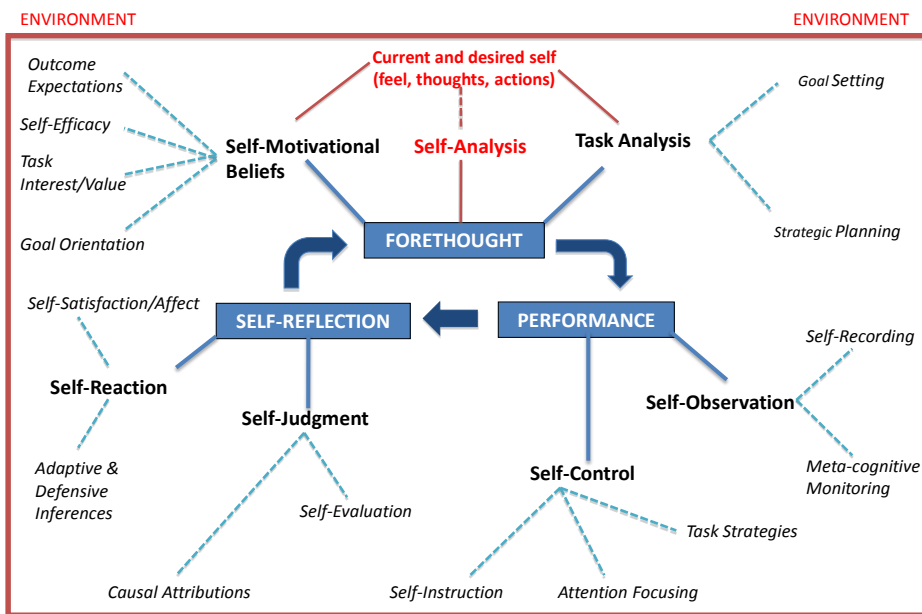


Figure 2. The Resonance Performance Model (Simon & Durand-Bush, 2009).

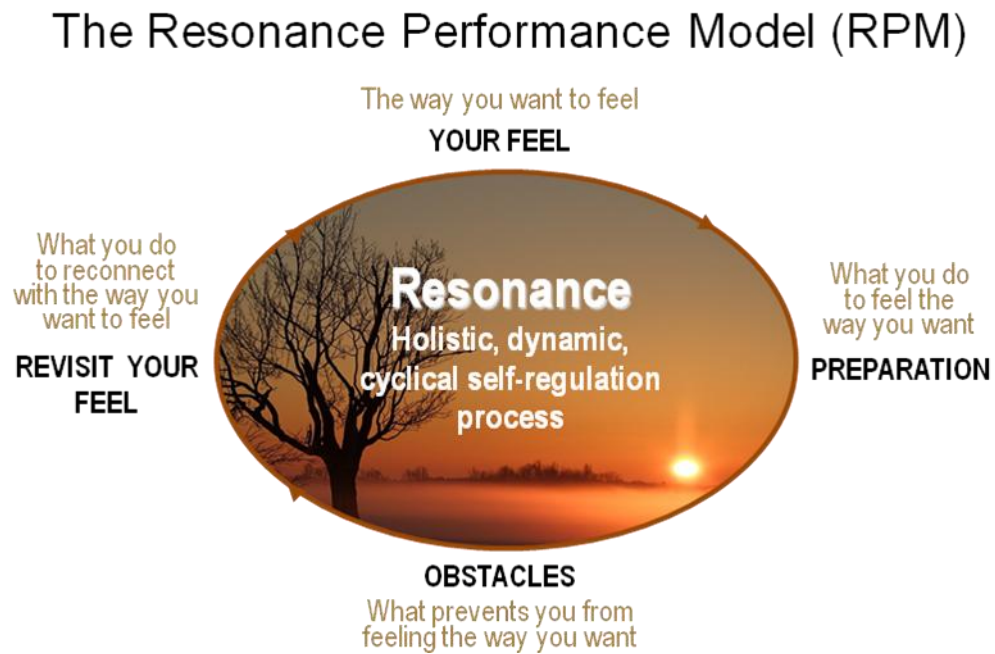


Table 1

Standards of Self-Regulation

Category / sub-category	Rate of Participant Response		
	Physicians	Students	Total
Cognitive			
Satisfied	3	3	6
Accomplished	2	3	5
Balanced	2	3	5
In Control	2	1	3
Competent	1	2	3
Calm / peaceful	1		1
Free	1	1	2
Confident	1		1
Focused		1	1
Motivated		1	1
Physical			
Rested / energetic	3	4	7
Healthy and in shape	1	5	6
Comfortable in skin	4	1	5
Free from ill-being	3		3
Emotional			
Happy / positive	5	5	10
Free from stress / negative emotions	4	4	8
Social			
Connected to others (positive relationships)	4	3	7
Purposeful in society	2	1	3
Spiritual			
At peace with oneself	2		2
Zen		1	1

Table 2.

Self-Regulatory (SR) Strategies Facilitating Well-being and Performance

SR Phase	SR Sub-Process	SR Strategy
Forethought	(a) Self-motivational Beliefs	i) Demonstrate interest toward task ii) Determine outcome expectations iii) Orient goals toward process iv) Adopt balanced life approach
	(b) Task Analysis	i) Set specific performance and well-being goals ii) Develop strategic plan 1. Manage time / create schedule 2. Prioritize tasks 3. Compartmentalize tasks 4. Balance professional and personal activities
	(c) Self-Analysis	i) Identify current self (thoughts, feelings, behaviours) ii) Identify preferred self 1. Establish personal standards
Performance or Volitional Control	(a) Self-Observation	i) Observe and monitor self 1. Covert self (thoughts, feelings) 2. Overt behaviours / actions ii) Track performance and progress
	(b) Self-Control	i) Apply task strategies 1. Use external resources (social support, tools, tutors, workshops, electives, study partner, mentorship, mentoring, feedback from others) 2. Use learning and study strategies ii) Self-instruct (self-talk) iii) Focus attention 1. Minimize distractions 2. Enhance focus (breaks, music) iv) Manage self 1. Exercise / make healthy choices 2. Relax
Self-Reflection	(a) Self-Judgment	i) Self-evaluate (compare to standards and goals) ii) Reflect on feedback from others
	(b) Self-Reaction	i) Determine level of self-satisfaction ii) Accept self regardless of outcome

Table 3. *Self-Regulation (SR) Barriers Inhibiting Well-being and Performance*

Type	Sub-category	Code
External	(a) Lack of social support	i) Poor or lack of social interactions and relationships with family, friends ii) Inability to share with counsellor, mentor iii) Inappropriate or lack of feedback from preceptors
	(b) Lack of applicable tools	i) Irrelevant or lack of applicable strategies to manage stress and enhance well-being
	(c) Multiple life demands	i) Unplanned stressful life events ii) Inability to perform multiple tasks due to inadequate resources iii) Distractions (e.g., computer use in class)
	(d) Demands of the medical profession	i) Lack of time to meet all demands ii) Conflicting roles iii) Demanding or difficult patients iv) High expectations associated with medical culture
	(e) Demands of the medical program	i) Abundance of material to be learned ii) Stressful and non-representative objective evaluations iii) Uncertainty of specialty placement iv) Steep financial debt v) Uncertainty of future
Internal	(a) Ineffective or underdeveloped forethought, organizational skills, and inappropriate standards	i) Unrealistic or maladaptive standards of performance and well-being ii) Unrealistic or inappropriate goals iii) Prioritization of performance over well-being iv) Lack of balance between personal and professional activities v) Ineffective time management vi) Lack of self-efficacy
	(b) Ineffective or underdeveloped performance control techniques	i) Poor mental, technical and tactical choices ii) Inability to obtain or utilize feedback iii) Lack of self-observation and/or monitoring iv) Maladaptive/unhealthy behaviours
	(c) Ineffective or underdeveloped self-reflection skills and strategies	i) Lack of self-evaluation ii) Evaluation based on external standards rather than or at the expense of personal standards iii) Lack of reflection on self and goal attainment

Chapter 4 - General Discussion

In this chapter, the findings are discussed in light of the overall purpose of the study, and results from both quantitative and qualitative phases are integrated to provide an exhaustive account of self-regulation as a potential approach to enhance physicians' and medical students' well-being and performance.

Quantitative Phase: Relationship between Self-Regulation and Well-Being Variables

Current levels of self-regulation, psychological well-being, psychological stress, and burnout of physicians and medical students were first examined. Means for medical students and physicians demonstrated moderately high to high levels of self-regulation, adequate levels of well-being, and normal levels of stress and burnout. Although their stress and burnout levels did not support existing literature on physician well-being (Boudreau et al., 2006; Dyrbye et al., 2006; Wallace et al., 2009), a review of individual cases indicated that 23% of the participants had high levels of psychological stress and 27% reported symptoms of burnout. This suggests that it is important to stay attuned to physicians' and medical students' individual levels of stress and burnout in the future.

A possible explanation for the overall means not reflecting expected well-being, stress, and burnout levels may be the participants' high self-regulation capacity. In fact, their capacity to self-regulate significantly predicted their levels of psychological well-being, psychological stress, and burnout. In other words, high self-regulation capacity was linked with less emotional exhaustion, depersonalization and psychological stress, and higher well-being levels on all subscales, as well as higher levels of personal accomplishment. Based on our results, and in line with previous research (Bandura, 2005; Zimmerman, 2000), it appears that self-regulation capacity does influence well-being, stress, and burnout, at least with this sample of physicians

and medical students. This is a promising finding that warrants more investigation given the CMA's (2007) call to find ways to help physicians sustain personal health and productivity.

Qualitative Phase: The Self-Regulation Process of Medical Students and Physicians

The self-regulation process, as depicted in Bandura's (2005) and Zimmerman's (2000) research, lends itself well to not only evaluate and predict well-being outcomes, but also examine strategies that foster optimal functioning. The extensive qualitative data collected in the qualitative phase of this study provide insight into *how* individuals self-regulate and what specific strategies and barriers influence physicians' and medical students' well-being and performance.

Standards of well-being and performance. From a social-cognitive perspective, self-regulation is a process in which individuals invest effort into managing their thoughts, feelings, and actions so as to remain congruent with their desired personal standards and achieve their goals in their dynamic environment (Zimmerman, 2000). Guiding the process of self-regulation are preferred standards: how one wants to feel, think, and act. How we feel is a central component of our daily experiences (Davidson & Cacioppo, 1992; Fredrickson, 2001), and in line with the Resonance Performance Model (Simon & Durand-Bush, 2009), desired felt experiences can help guide an individual to attain well-being and performance goals, as well as cope with adversity (Newburg et al., 2002).

Interestingly, when the participants in this study shared their desired felt experiences in relation to their performance and well-being goals, their responses were the same for both types of goals. In fact, the most commonly cited preferred standard was to feel happy as this allowed physicians and medical students to remain satisfied and motivated in their work. This suggests that paying attention to one's emotional experience on a daily basis may be more important than

previously advocated in the literature and medical profession. For example, some studies show that students are encouraged to distance themselves from their emotions in order to be more professional in their work (Dobie, 2007; Dyrbye et al., 2005; Lee & Graham, 2001; Shanafelt et al, 2005). However, if personal standards are central to the self-regulation process, it would be important for physicians and medical students to not only identify how they want to feel, think, and behave but also keep these standards at the forefront to be able to note any discrepancies and adapt when necessary.

Another interesting finding is the participants' perception that their personal standards influenced the achievement of both their well-being and performance goals. This confirms Simon and Durand-Bush's (2009) findings and highlights the importance of considering each individual's subjective standards in their self-regulation process. Evidently more research is needed to compare the use of subjective and objective standards and goals, and this could have an impact on the medical field, which has traditionally gravitated towards more objective views of performance (e.g., quantifiable patient outcomes and academic performance scores) (Gerrity, 2001; Wallace et al., 2009).

Self-regulation strategies. The participants in this study identified common self-regulation strategies for both the attainment of well-being and performance goals, which were supported by Zimmerman's self-regulation model (2000). These strategies were categorized within the three phases (i.e., forethought, performance or volitional control, and self-reflection) of the self-regulation process, which also allowed the researcher to identify areas where strategies appeared underdeveloped or even lacking (i.e., self-monitoring and self-reflection). In line with the proactive and reactive stance of the self-regulation model, the strategies mentioned appeared to not only allow participants to cope with excessive demands and stress (Meldrum,

2010) but also enhance well-being and performance, and prevent burnout (Zimmerman, 2000). This highlights the advantages of viewing well-being from a positive perspective and account for the presence and absence of both negative states and positive functioning (Ryff & Keyes, 1995; Seligman & Csikszentmihalyi, 2001).

In support of the literature on self-regulation (Zimmerman, 1996, 2000), the participants viewed medical training as a learning process that should allow them to develop and refine self-regulation strategies in order to achieve both process and outcome-oriented goals, as well as personally and externally-set goals. All of the participants reported that they felt they could improve their self-regulation and benefit from external resources to learn and put into practice effective self-regulatory strategies.

Although many strategies were shared by the participants in the current study, it is not clear if physicians and medical students consistently use them in all aspects of their life. Learning to reliably use various self-regulation strategies in one's daily work and life and converting them into personal habits is an important step in ensuring positive change and sustainability (Yiu, 2005). Consequently, opportunities should be provided for physicians and medical students to learn and integrate self-regulatory strategies into their context, based on both strengths and weaknesses.

Self-regulation barriers. Results of this study also show that the participants experienced several self-regulation barriers that inhibited the achievement of their well-being and performance goals. Of interest, the most significant barrier appeared to be an inability to effectively balance their personal and professional activities. In a medical context where performance is a primary objective (Sotile & Sotile, 2002), prioritizing performance goals over and above well-being could possibly be creating a vicious cycle of dissatisfaction, increased

stress and burnout, and decreased productivity (Wallace et al., 2009). In light of the importance of setting appropriate goals and realistic standards (Zimmerman, 2000), it is crucial to reach medical students as early as in their first year of training to guide them to realistically and adequately set personal standards, outcome expectations, and goals in a way that will allow them to effectively self-regulate to achieve optimal levels of performance and well-being. Focusing on one's own personal self-regulation process can lead to not only more meaningful goals, but also engagement and satisfaction, in spite of external demands and barriers (Newburg et al., 2002).

Self-Regulation as an Approach: Needs for the Future

Presuming that there is a significant positive association between self-regulation, well-being, and performance and that the self-regulation strategies to achieve well-being and performance goals that emerged from this study are effective, it would be important to understand how medical students can be encouraged and supported to incorporate such types of self-care practices into their life. Through their discussion of both self-regulation strategies and barriers, the participants offered some insightful ideas as to how to improve self-regulation capacity within their medical training context. Although some well-being resources and tools are available to them, the participants expressed that these are not always adapted to the needs of the individual, nor do they have sufficient time to practice and apply them. The participants suggested that small groups to learn, refine, and apply concrete self-regulatory strategies and skills (e.g., goal-setting, time management, self-monitoring, self-reflection), and curriculum based individual consulting to enhance well-being and performance could be potential approaches to bridge existing gaps. These suggestions lend themselves well to the existing literature on coping skills and stress management techniques for this population, such as talking with peers (Lee & Graham, 2001), seeking social support (Wallace et al., 2007), and taking part

in discussion groups, which all provide participants with an opportunity to establish collegiality, validate their experiences (Lee & Graham, 2001), and learn new strategies (Simon & Durand-Bush, 2009).

Similarly, mentorship and support groups have been shown to have positive buffering effects on stressors encountered in medical school (Ball & Bax; Dunn et al., 2008; Pololi & Knight, 2001). Medical students suggested that by observing successful physician-mentors effectively balance their life and discussing with them strategies that allow them to do so, they would feel encouraged and supported to do the same. However, as research indicates that physicians need help in protecting and enhancing their own well-being (Shanafelt et al., 2003; Wallace et al., 2009; Weiner et al., 2003), it may also be important to impart to physicians the necessary skills needed to manage the demands of their professional career and balance these demands with their personal life (Sotile & Sotile, 2001). As physicians and medical students in this study reported similar levels on most measured variables, there may be room for improvement for both groups. We need to educate supervising physicians on effective self-regulation practices not only for their own sake but also so that they can model such behaviours for medical students (Estabrook, 2008).

When physicians and medical students were asked during their interview if they thought that self-regulation could enhance well-being and performance, all of them said yes. They discussed that by further developing their self-regulation capacity, they could achieve their well-being and performance goals while adapting to adversity and barriers, and reducing stress and burnout. Their perceptions on the relationship between self-regulation and the well-being outcomes measured in this study are in line with the results obtained in the quantitative phase. Although their levels of self-regulation were high, the questionnaire used to measure this

variable (SSRQ, Brown et al., 1999) did not differentiate between their capacity to self-regulate to achieve performance goals and their capacity to self-regulate to achieve well-being goals. Given the great deal of work, motivation, and effort required to be accepted into medicine, complete the grueling training, and continually perform up to standards within the profession, it is to be expected that the population studied engages in self-regulation in order to be successful within their working milieu. However, their high levels of self-regulation may not necessarily reflect their capacity to effectively self-regulate in all areas of their life and at all times throughout a given year (Zimmerman, 2000). Consequently, longitudinal studies would be beneficial in the future. This study constitutes only the tip of the iceberg. Given the current research on physician impairment and well-being (Shanafelt et al, 2003; Wallace et al, 2009) and the promising results of this study, more research is required to examine self-regulation as an approach to enhance well-being and performance within the medical context.

Chapter 5 - Conclusion

This study sought to depict both quantitative and qualitative attributes of self-regulation to determine if it could be an effective, practical, and measurable approach to enhance physician and medical student well-being and performance. Results from the analysis of the questionnaire data and multiple in-depth interviews indicate that there is a significant positive link between self-regulation and well-being. Quantitative results showed that the physicians and medical students had moderately high to high levels of self-regulation and well-being, and normal levels of stress and burnout. Most scores were similar between both groups, however, physicians had significantly higher levels of psychological well-being than medical students on the subscales of Autonomy, Personal Growth, Purpose in Life, and Self-Acceptance. Means for self-regulation capacity significantly correlated with all outcome variables and significantly predicted levels of psychological well-being, psychological stress, and burnout.

Moreover, findings from the qualitative phase offered examples of self-regulatory strategies to achieve well-being and performance goals, including establishing desired standards, setting well-being and performance goals, planning, engaging in self-observation, using self-control performance techniques such as focusing and self-talk, and reflecting on oneself to assess outcomes and satisfaction. Both internal and external types of self-regulation barriers were reported with the biggest and most commonly cited one being balancing professional and personal activities.

This study coincided with a long-term objective identified in a report by the Canadian Medical Association to improve the mental and physical health of Canadian physicians (Puddester, 2001). Results of this investigation shed light on current self-regulatory levels, strategies, and barriers of medical students and physicians occupying educational and

supervising roles at a Canadian university. More importantly, this study is a first important step in demonstrating that self-regulation is a potential approach to enhance their well-being and performance and also to reduce their levels of stress and burnout. From a practical perspective, this study generated findings that could be used to propose future interventions to address the needs of this population and help fulfill CMA's objective to ensure that our current and future generations of physicians are healthy.

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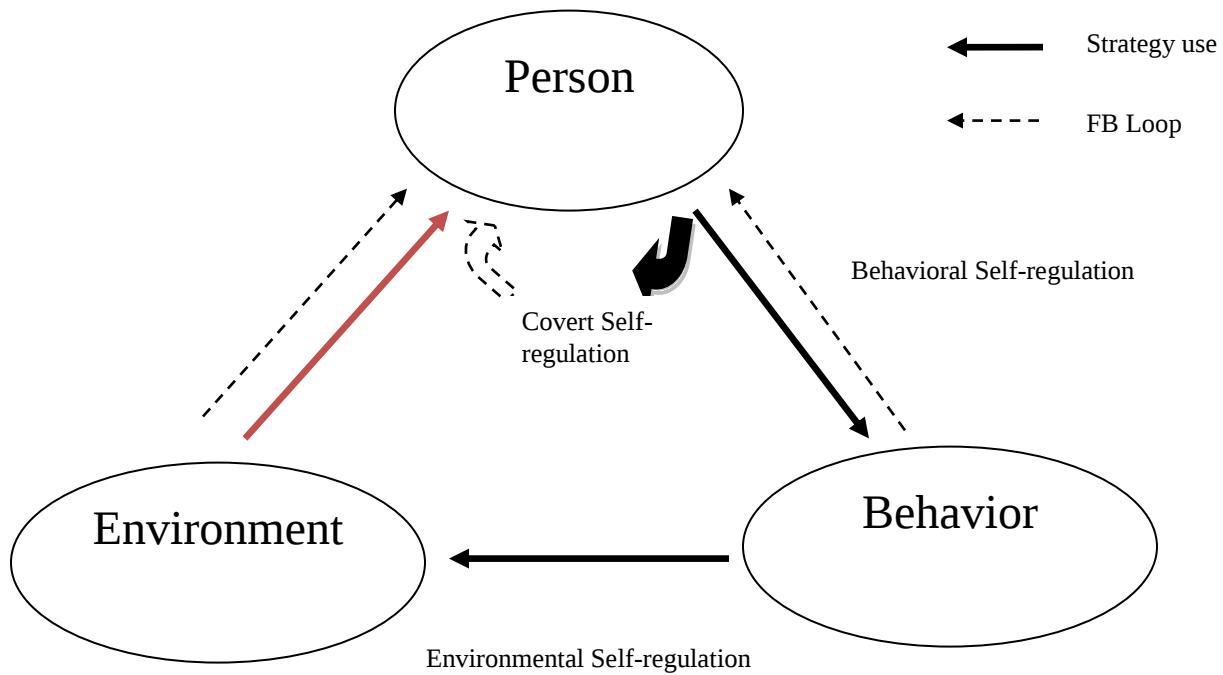
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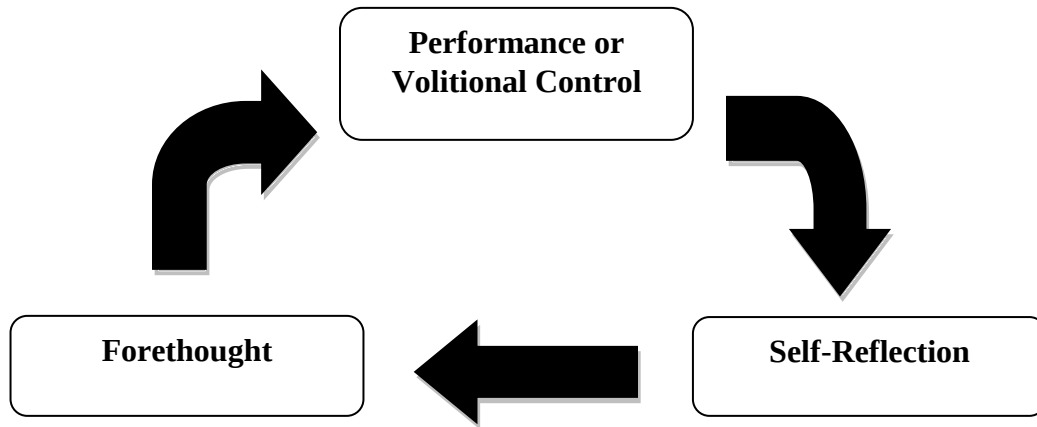
Appendix A

Figure 1. Triadic interaction between personal, behavioural, and environmental factors (Zimmerman, 2000).



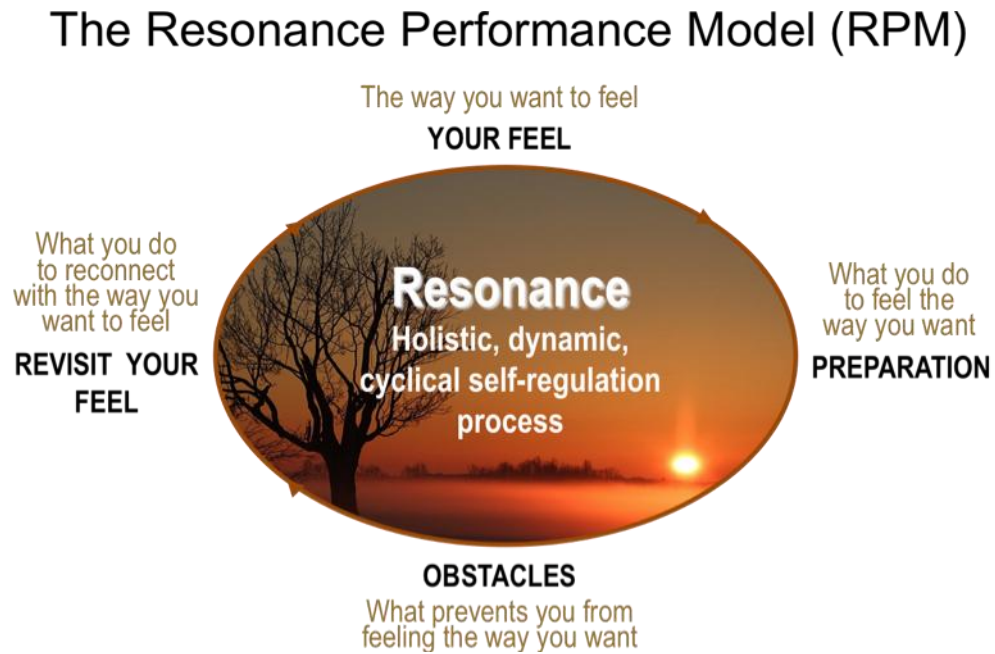
Appendix B

Figure 2. Cyclical phases of self-regulation (Zimmerman, 2000).



Appendix C

Figure 3. The Resonance Performance Model (Simon & Durand-Bush, 2009).



Appendix D

Consent Form

Thank you for agreeing to participate in this study conducted by Marie-Claude Gagnon, M.A. (cand) and Natalie Durand-Bush, Ph.D., from the University of [city] and funded by the Consortium National de Formation en Santé (CNFS).

Purpose

The purpose of this study is to examine self-regulation with medical students and supervising physicians as a potential approach to enhance well-being and performance, and to reduce stress and burnout.

Benefits

By participating in this study, you will be contributing to the mandate set forth by the Canadian Medical Association to develop and promote means that will help physicians protect their health. You can make a difference and also personally benefit from participating in this study by identifying self-regulation skills and gaining insight into your own well-being and performance and what enhances and inhibits it.

PART 1

The first part consisted of completing 5 questionnaires via the secure website “Survey Monkey”:

- Demographic information
- Your capacity to self-regulate
- Your well-being
- Your perceptions of stressful situations in your profession

PART 2

The second part will be conducted today and consists of a discussion group on self-regulation, well-being and performance in the context of medicine. The interview will last approximately 90-120 minutes and will be audio-recorded in order to transcribe the information shared.

Ethics

This study has been approved by the Research Ethics Board of the University of [city]. Your participation is completely voluntary, and you may withdraw from the study at any time and/or refuse to answer questions without any negative consequence. Your responses will remain anonymous and confidential, and no information that could reveal your identity will be used.

Potential risks involved: There is very minimal risk involved in this study. You are asked to participate for two parts of the study however you are free to withdraw from this study at any point without consequence. A potential risk from this study is that you may experience discomfort when discussing how you feel and want to feel with others, however, the information that you choose to share is entirely up to you, and no one will encourage you to discuss anything with which you are uncomfortable. Should you feel at any point that additional support would be beneficial or required, an appropriate referral will be made. Please do not hesitate to contact the researcher to address any other concerns.

By agreeing to participate in this study, I, _____, understand that my involvement will consist of sharing personal information about my experiences and that the research will not pose any serious risk. The purpose of this study is not to evaluate my abilities but to gain information on self-regulation and how it could improve well-being and performance of medical students and physicians. I am also aware that the results of this study, including some direct citations, will be presented at conferences and/or published in professional journals but that my name will not be mentioned at any time.

I understand that I am free to withdraw from the project at any time, including before or during the interviews and intervention sessions. I can also refuse to participate in any aspects of the study, withdraw shared information from the interviews, and refuse to answer questions without any consequences or prejudice. My signature is given with the understanding that I do not have to give up any rights, that I have been informed of the requirements of the

research, and that I agree to take part in this proposed research project.

Please check one of the following options:

- ☐ I agree to be quoted but all personally identifying information shall be removed or altered and contents of the quote shall not be revelatory of my identity
- ☐ I do not wish to be quoted at all

Any information requests or complaints about the ethical conduct of the project may be addressed to the Protocol Officer for Ethics in Research of the University of [city].

Researcher/consultant's signature: _____ Date: _____

Participant's signature: _____ Date: _____

Formulaire de consentement

Titre de l'étude: L'auto-régulation d'étudiants en médecine et de médecins francophones : Une aptitude pour améliorer le bien-être et la performance?

Chercheur: Marie-Claude Gagnon, M.A. (cand.) et Natalie Durand-Bush, Ph.D., École des sciences de l'activité physique, Faculté des sciences de la santé, Université de [ville].

Invitation. Je suis invité(e) à participer à la recherche nommée ci haut qui est menée par Marie-Claude Gagnon et Natalie Durand-Bush dans le cadre d'une thèse de maîtrise s'inscrivant dans un projet de recherche subventionné par le Consortium National de Formation en Santé (CNFS).

But de l'étude. Le but de l'étude est d'examiner les aptitudes d'auto-régulation de médecins et d'étudiant-es en médecine francophones en fonction de leur bien-être et de leur performance.

Participation. Ma participation à cette étude consistera à compléter une courte fiche de données personnelles et quatre questionnaires par l'entremise d'un site web sécuritaire intitulé « Survey Monkey ». J'aurai l'occasion de compléter les questionnaires électroniquement à partir du travail ou à domicile avec un code d'utilisateur et un mot de passe personnels que je vais garder confidentiel. Il me faudra environ 20 à 30 minutes pour compléter les quatre questionnaires. Cependant, j'aurai l'opportunité de répondre à un ou quelques questionnaires à la fois lors de plusieurs courtes sessions si cela me convient mieux. Ensuite, en personne dans une salle privée à l'Hôpital ou à l'Université de [ville], je participerai à une entrevue individuelle qui durera environ 60-90 minutes qui sera enregistrée sur bande audio. Pendant cette entrevue je vais discuter de différents thèmes reliés à l'auto-régulation, le bien-être et la performance dans un contexte de médecine.

Risques. Je comprends que puisque ma participation à cette recherche implique que je partage de l'information personnelle avec les chercheuses, il est possible que je subisse un inconfort émotionnel, psychologique et/ou social. J'ai reçu l'assurance des chercheuses que tout se fera en vue de minimiser ces risques. Comme de fait, je n'ai pas besoin de répondre aux questions des questionnaires qui me créent de l'inconfort ou un malaise. Lors de l'entrevue, la chercheuse abordera un différent sujet si elle perçoit que je ne me sens pas confortable avec une question ou un thème particulier.

Bienfaits. Ma participation à cette recherche aura pour effet d'augmenter mon niveau de conscience face à mes aptitudes d'auto-régulation et en discutant comment ces aptitudes peuvent être améliorées, je serai plus apte à savoir comment m'auto-réguler afin d'atteindre un niveau optimal de bien-être et de performance. D'un autre point de vue, si je suis capable d'améliorer ou optimiser mon bien-être et ma performance, je pourrai mieux desservir la communauté.

Confidentialité et anonymat. J'ai l'assurance des chercheuses que les informations que je partagerai via les questionnaires et la fiche de données personnelles seront gardées strictement confidentielles. De plus, je m'attends à ce que toutes les données ne soient utilisées que pour examiner comment l'auto-régulation peut influencer le bien-être et la performance des médecins et des étudiant(e)s en médecine.

Aussi, toute information électronique ne sera sauvegardée que sur l'ordinateur personnel de la chercheuse principale, les bandes audio et les documents imprimés seront barrés à clé dans son bureau et seulement la chercheuse aura le code et le mot de passe permettant accès aux données des questionnaires complétés sur le site web « Survey Monkey », un véhicule de gestion sécuritaire. Afin d'assurer que l'identité des participant(e)s demeure anonyme, les codes utilisés ne seront connus que par la chercheuse et ne seront pas révélés aux autres participant(e)s, ni seront-ils publiés. De plus, les informations plus précises telles les noms, les endroits, ou les événements spécifiques discutés lors de l'entrevue qui pourraient compromettre l'anonymat seront masquées. Ainsi, un lecteur potentiel sera incapable d'identifier l'identité des répondant(e)s.

Conservation des données. Les données recueillies à partir de l'entrevue, les résultats d'analyses, ainsi que les bandes audio seront conservées de façon sécuritaire soit sur l'ordinateur personnel de la chercheuse principale ou dans une filière barrée à clé dans son laboratoire de recherche pendant un maximum de cinq ans. Toutes les données seront détruites après cette période de cinq ans. Les données recueillies à partir des questionnaires par l'entremise du

site web sécuritaire Survey Monkey seront conservées indéfiniment dans leur base de données. Toutefois, il est stipulé dans leur politique de confidentialité: "Survey Monkey will not use your data for our own purposes. The data you collect is kept private and confidential" (Survey Monkey n'utilisera pas vos données à ses fins personnelles. Les données recueillies demeurent privées et confidentielles).

Participation volontaire. Ma participation à cette étude est volontaire et je suis libre de me retirer en tout temps, et/ou refuser de répondre à certaines questions, sans subir de conséquences négatives. Si je choisis de me retirer de l'étude, les données recueillies jusqu'à ce moment seront entreposées de façon sécuritaire comme décrit ci-dessus ou détruites si c'est ce que je préfère.

Acceptation. Je, _____, accepte de participer à cette étude menée par Marie-Claude Gagnon et Natalie Durand-Bush, Ph.D. de l'École des sciences de l'activité physique, Faculté des sciences de la santé, Université de [ville]. J'accepte aussi que l'entrevue soit enregistrée sur bande audio et que les données anonymes de l'étude soient publiées dans des revues scientifiques et présentées à des conférences. Je comprends qu'en signant ce formulaire, je n'ai pas à compromettre des droits, j'ai été informé(e) des étapes de l'étude, et j'accepte de participer à ce projet de recherche.

Veillez s.v.p. cocher ☒ une des deux cases suivantes:

1. ☐ J'accepte d'être cité(e) mais toute information personnelle qui pourrait m'identifier devra être supprimée ou modifiée et le contenu des citations ne devra pas révéler mon identité.
2. ☐ Je ne désire pas être cité(e) du tout.

Pour tout renseignement additionnel concernant cette étude, je peux communiquer avec les chercheuses. Pour tout renseignement sur les aspects éthiques de cette étude, je peux m'adresser au Responsable de l'éthique en recherche, de l'Université de [ville].

Signature du participant(e): _____ Date: _____

Signature de la chercheure: _____ Date: _____

Appendix E

Scales of Psychological Well-Being (SPWB) (Ryff & Keyes, 1995)

Presentation Format/Scoring: Items from the separate scales are **mixed** (by taking one item from each scale successively into one continuous self-report instrument). Participants respond using a six-point format: strongly disagree (1), moderately disagree (2), slightly disagree (3), slightly agree (4), moderately agree (5), strongly agree (6). Responses to negatively scored items (-) are reversed in the final scoring procedures so that high scores indicate high self-ratings on the dimension assessed.

AUTONOMY

- (-) 1. Sometimes I change the way I act or think to be more like those around me.
- (+) 7. I am not afraid to voice my opinions, even when they are in opposition to the opinions of most people.
- (+) 13. My decisions are not usually influenced by what everyone else is doing.
- (-) 19. I tend to worry about what other people think of me.
- (+) 25. Being happy with myself is more important to me than having others approve of me.
- (-) 31. I tend to be influenced by people with strong opinions.
- (+) 37. People rarely talk me into doing things I don't want to do.
- (-) 43. It is more important to me to "fit in" with others than to stand alone on my principles.
- (+) 49. I have confidence in my opinions, even if they are contrary to the general consensus.
- (-) 55. It's difficult for me to voice my own opinions on controversial matters.
- (-) 61. I often change my mind about decisions if my friends or family disagree.
- (+) 67. I am not the kind of person who gives in to social pressures to think or act in certain ways.
- (-) 73. I am concerned about how other people evaluate the choices I have made in my life.
- (+) 79. I judge myself by what I think is important, not by the values of what others think is important.

ENVIRONMENTAL MASTERY

- (+) 2. In general, I feel I am in charge of the situation in which I live.
- (-) 8. The demands of everyday life often get me down.
- (-) 14. I do not fit very well with the people and the community around me.
- (+) 20. I am quite good at managing the many responsibilities of my daily life.
- (-) 26. I often feel overwhelmed by my responsibilities.
- (+) 32. If I were unhappy with my living situation, I would take effective steps to change it.
- (+) 38. I generally do a good job of taking care of my personal finances and affairs.
- (-) 44. I find it stressful that I can't keep up with all of the things I have to do each day.
- (+) 50. I am good at juggling my time so that I can fit everything in that needs to get done.
- (+) 56. My daily life is busy, but I derive a sense of satisfaction from keeping up with everything.
- (-) 62. I get frustrated when trying to plan my daily activities because I never accomplish the things I set out to do.
- (+) 68. My efforts to find the kinds of activities and relationships that I need have been quite successful.
- (-) 74. I have difficulty arranging my life in a way that is satisfying to me.
- (+) 80. I have been able to build a home and a lifestyle for myself that is much to my liking.

PERSONAL GROWTH

- (-) 3. I am not interested in activities that will expand my horizons.
- (+) 9. In general, I feel that I continue to learn more about myself as time goes by.
- (+) 15. I am the kind of person who likes to give new things a try.
- (-) 21. I don't want to try new ways of doing things--my life is fine the way it is.
- (+) 27. I think it is important to have new experiences that challenge how you think about yourself and the world.
- (-) 33. When I think about it, I haven't really improved much as a person over the years.

- (+) 39. In my view, people of every age are able to continue growing and developing.
- (+) 45. With time, I have gained a lot of insight about life that has made me a stronger, more capable person.
- (+) 51. I have the sense that I have developed a lot as a person over time.
- (-) 57. I do not enjoy being in new situations that require me to change my old familiar ways of doing things.
- (+) 63. For me, life has been a continuous process of learning, changing, and growth.
- (+) 69. I enjoy seeing how my views have changed and matured over the years.
- (-) 75. I gave up trying to make big improvements or changes in my life a long time ago.
- (-) 81. There is truth to the saying you can't teach an old dog new tricks.

POSITIVE RELATIONS WITH OTHERS

- (+) 4. Most people see me as loving and affectionate.
- (-) 10. ***Maintaining close relationships has been difficult and frustrating for me.***
- (-) 16. I often feel lonely because I have few close friends with whom to share my concerns.
- (+) 22. I enjoy personal and mutual conversations with family members or friends.
- (+) 28. It is important to me to be a good listener when close friends talk to me about their problems.
- (-) 34. I don't have many people who want to listen when I need to talk.
- (+) 40. I feel like I get a lot out of my friendships.
- (-) 46. It seems to me that most other people have more friends than I do.
- (+) 52. ***People would describe me as a giving person, willing to share my time with others.***
- (-) 58. ***I have not experienced many warm and trusting relationships with others.***
- (-) 64. I often feel like I'm on the outside looking in when it comes to friendships.
- (+) 70. I know that I can trust my friends, and they know they can trust me.
- (-) 76. I find it difficult to really open up when I talk with others.
- (+) 82. My friends and I sympathize with each other's problems.

PURPOSE IN LIFE

- (+) 5. I feel good when I think of what I've done in the past and what I hope to do in the future.
- (-) 11. I live life one day at a time and don't really think about the future.
- (-) 17. I tend to focus on the present, because the future nearly always brings me problems.
- (+) 23. I have a sense of direction and purpose in life.
- (-) 29. My daily activities often seem trivial and unimportant to me.
- (-) 35. I don't have a good sense of what it is I'm trying to accomplish in life.
- (-) 41. I used to set goals for myself, but that now seems like a waste of time.
- (+) 47. I enjoy making plans for the future and working to make them a reality.
- (+) 53. I am an active person in carrying out the plans I set for myself.
- (+) 59. Some people wander aimlessly through life, but I am not one of them.
- (-) 65. I sometimes feel as if I've done all there is to do in life.
- (+) 71. My aims in life have been more a source of satisfaction than frustration to me.
- (+) 77. I find it satisfying to think about what I have accomplished in life.
- (-) 83. In the final analysis, I'm not so sure that my life adds up to much.

SELF-ACCEPTANCE

- (+) 6. When I look at the story of my life, I am pleased with how things have turned out.
- (+) 12. In general, I feel confident and positive about myself.
- (-) 18. I feel like many of the people I know have gotten more out of life than I have.
- (-) 24. Given the opportunity, there are many things about myself that I would change.
- (+) 30. I like most aspects of my personality.
- (+) 36. I made some mistakes in the past, but I feel that all in all everything has worked out for the best.
- (-) 42. In many ways, I feel disappointed about my achievements in life.
- (+) 48. For the most part, I am proud of who I am and the life I lead.
- (-) 54. I envy many people for the lives they lead.
- (-) 60. My attitude about myself is probably not as positive as most people feel about themselves.
- (-) 66. Many days I wake up feeling discouraged about how I have lived my life.

- (+) 72. The past had its ups and downs, but in general, I wouldn't want to change it.
 - (+) 78. When I compare myself to friends and acquaintances, it makes me feel good about who I am.
 - (-) 84. Everyone has their weaknesses, but I seem to have more than my share.
-

Appendix F

Short Version of the Self-Regulation Questionnaire

(Carey, Neal, & Collins, 2004; adapted from SQR, Brown, Miller, & Lawendowski, 1999)

Please answer the following questions by circling the response that best describes how you are. If you **STRONGLY DISAGREE** with a statement, circle 1. If you **DISAGREE** circle 2. If you are **UNCERTAIN** or **UNSURE** circle 3. If you **AGREE** circle 4, and if you **STRONGLY AGREE** circle 5. There are no right or wrong answers. Work quickly and don't think too long about your answers.

Strongly Disagree	Disagree	Uncertain Or Unsure	Agree	Strongly Agree
1	2	3	4	5
1. I usually keep track of my progress toward my goals.				1 2 3 4 5
2. I have trouble making up my mind about things.				1 2 3 4 5
3. I get easily distracted from my plans.				1 2 3 4 5
4. I don't notice the effects of my actions until it's too late.				1 2 3 4 5
5. I am able to accomplish goals I set for myself.				1 2 3 4 5
6. I put off making decisions.				1 2 3 4 5
7. It's hard for me to notice when I've "had enough" (alcohol, food, exercise).				1 2 3 4 5
8. If I wanted to change, I am confident that I could do it.				1 2 3 4 5
9. When it comes to deciding about a change, I feel overwhelmed by the choices.				1 2 3 4 5
10. I have trouble following through with things once I've made up my mind to do something.				1 2 3 4 5
11. I don't seem to learn from my mistakes.				1 2 3 4 5
12. I can stick to a plan that's working well.				1 2 3 4 5
13. I usually only have to make a mistake one time in order to learn from it.				1 2 3 4 5
14. I have personal standards, and try to live up to them.				1 2 3 4 5
15. As soon as I see a problem or challenge, I start looking for possible solutions.				1 2 3 4 5
16. I have a hard time setting goals for myself.				1 2 3 4 5
17. I have a lot of willpower.				1 2 3 4 5
18. When I'm trying to change something, I pay a lot of attention to how I'm doing.				1 2 3 4 5
19. I have trouble making plans to help me reach my goals.				1 2 3 4 5
20. I am able to resist temptation.				1 2 3 4 5
21. I set goals for myself and keep track of my progress.				1 2 3 4 5
22. Most of the time I don't pay attention to what I'm doing.				1 2 3 4 5
23. I tend to keep doing the same thing, even when it doesn't work.				1 2 3 4 5
24. I can usually find several different possibilities when I want to change something.				1 2 3 4 5
25. Once I have a goal, I can usually plan how to reach it.				1 2 3 4 5
26. If I make a resolution to change something, I pay a lot of attention to how I'm doing.				1 2 3 4 5
27. Often I don't notice what I'm doing until someone calls it to my attention.				1 2 3 4 5
28. I usually think before I act.				1 2 3 4 5
29. I learn from my mistakes.				1 2 3 4 5
30. I know how I want to be.				1 2 3 4 5
31. I give up quickly.				1 2 3 4 5

Appendix G
Psychological Stress Measure – 9
(Lemyre & Tessier, 1988, 2003)

Mark the number that best indicates the degree to which each statement applies to you recently, that is in the last 4-5 Days

Not at all	Not really	Very little	A bit	Somewhat	Quite a bit	Very much	Extremely
1	2	3	4	5	6	7	8

1. I feel calm.
2. I feel rushed; I do not seem to have enough time.
3. I suffer from physical aches and pains: sore back, headaches, tensed neck, stomach aches.
4. I feel preoccupied, tormented or worried.
5. I feel confused; my thoughts are muddled; I lack concentration and I cannot focus my attention.
6. I feel full of energy and keen.
7. I feel a great weight on my shoulders.
8. I have difficulty controlling my reactions, emotions, moods or gestures.
9. I feel stressed.

Appendix H
The Maslach Burnout Inventory (Maslach et al., 1996)

1.	I feel emotionally drained from my work	1	2	3	4	5	6	7
2.	I feel used up at the end of the working day	1	2	3	4	5	6	7
3.	I feel fatigued when I get up in the morning and have to face another day on the job	1	2	3	4	5	6	7
4.	I can easily understand how my athletes feel about things	1	2	3	4	5	6	7
5.	I feel I treat some of my athletes as if they were impersonal objects	1	2	3	4	5	6	7
6.	I feel my athletes blame me for some of their problems	1	2	3	4	5	6	7
7.	I worry that this job is hardening me emotionally	1	2	3	4	5	6	7
8.	I feel very energetic	1	2	3	4	5	6	7
9.	I feel frustrated with my job	1	2	3	4	5	6	7
10.	I feel I'm working too hard on my job	1	2	3	4	5	6	7
11.	Working with people all day is really a strain for me	1	2	3	4	5	6	7
12.	I deal very effectively with my athletes problems	1	2	3	4	5	6	7
13.	I feel burned out from my job	1	2	3	4	5	6	7
14.	I feel I'm positively influencing other people's lives through my work	1	2	3	4	5	6	7
15.	I've become more callous toward people since I took this job	1	2	3	4	5	6	7
16.	I feel like I'm at the end of my rope	1	2	3	4	5	6	7
17.	I don't really care what happens to some athletes	1	2	3	4	5	6	7
18.	Working directly with my athletes puts too much stress on me	1	2	3	4	5	6	7
19.	I can easily create a relaxed atmosphere with my athletes	1	2	3	4	5	6	7
20.	I feel exhilarated after working closely with my athletes	1	2	3	4	5	6	7
21.	I have accomplished many worthwhile things in this job	1	2	3	4	5	6	7
22.	In my work I deal with emotional problems very calmly	1	2	3	4	5	6	7

Appendix I Interview Guide

A. SELF-REGULATION STANDARDS

1. What goals and preferred standards do you set for yourself in life in general?

PROBES

- How do you want to feel (emotionally, cognitively, physically, socially, spiritually), think, behave?
- Do your goals and preferred standards vary in different contexts?
- Does self-regulation play a role in achieving these goals or standards? If so, how?
 - Self-control and self-observation
 - Self-reflection (self-reactions, evaluations, adaptations)

2. Do you have goals and preferred standards with regards to well-being?

PROBES

- If so, what are they?
- How do you want to feel (emotionally, cognitively, physically, socially, spiritually), think, behave in order to achieve well-being goals?
- Does self-regulation play a role in achieving these well-being goals or standards? If so, how?
 - Self-control and self-observation
 - Self-reflection (self-reactions, evaluations, adaptations)

3. Do you have goals and preferred standards of performance in your profession?

PROBES

- If so, what are they?
- How do you want to feel (emotionally, cognitively, physically, socially, spiritually), think, behave in order to achieve performance goals?
- Does self-regulation play a role in achieving these performance goals or standards? If so, how?
 - Self-control and self-observation
 - Self-reflection (self-reactions, evaluations, adaptations)

B. SELF-REGULATION STRATEGIES

a. Proactive strategies

- What enables you to self-regulate to achieve your goals and preferred standards?

Forethought:

Task Analysis (e.g., setting goals/preferred standards, strategically plan)

Self-Motivational Beliefs (e.g., self-efficacy, outcome expectations, task interest)

Performance:

Self-Control (e.g., task strategies, attention focusing, and self-instruction)

Self-Observation

Self-Recording, meta-Cognitive Monitoring

Self-Reflection:

Self-Judgment (e.g., self-evaluation and causal attributions)

Self-Reaction (e.g., self-satisfaction and adaptive or defensive inferences)

b. Coping/reactive strategies

- How do you respond to obstacles?
- What enables you to reconnect with your preferred goals / standards / desired states after facing an obstacle or setback? (e.g., physical, cognitive, social, emotional, organizational strategies)

C. SELF-REGULATION BARRIERS

- What prevents you from self-regulating to achieve your goals and preferred standards? (e.g., internal and external barriers or obstacles)
 - stress, fatigue, lack of resources, external demands, negative thoughts, low self-efficacy and motivation, illness, lack of time, lack of focus, lack of self-evaluation and reflection, absence of clearly defined goals
- How often do you face barriers?
- How do you respond to barriers or obstacles (i.e., when you do not meet your goals and preferred standards, how do you feel, think, and behave)?
- How do these obstacles and your typical responses affect your well-being and performance? (e.g., motivation, satisfaction, productivity, self-efficacy, relationships with others - peers, supervisors, students, patients)

D. SELF-REGULATION NEEDS

1. Can you improve your self-regulation? If so, how can you realistically do this? If not, what leads you to say you cannot improve?
2. What would you need in order to develop and maintain self-regulatory skills and strategies throughout the course of your education/career/life? (e.g., human resources, physical resources, time for yourself, education, interventions, etc.)
3. Based on everything we have discussed today, would you say that self-regulation affects your well-being and performance?
 - Could a process like self-regulation help you to
 - enhance and optimize your well-being and performance (considering short and long-term influences)?
 - better manage your life in light of the challenges and changes you face in your profession?

E. Summary

1. What have you learned during this interview? (e.g., practical take homes, lessons)
2. Would you like to add anything else before we end?
3. Thank you