

## Chapter 7

# Physical Wellness, Health Care, and Personal Autonomy

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In this chapter, we will review the self-determination theory (SDT; Deci & Ryan, 2000) perspective and the current empirical evidence linking personal autonomy with physical wellness within and across cultures. We define physical wellness as indicators of physical health, including health behaviors of tobacco use, nutrition, physical activity, medication adherence, disease risk, and disease status. We will also examine studies that have tested the relations between change in personal autonomy and physical wellness and interventions intended to change personal autonomy and a health outcome. In addition, it is our thesis that a clear understanding of the relation between autonomy and physical well-being is relevant for all cultures. Moreover, respect for patient autonomy is now considered to be an explicit, highest level goal of health care along with patient well-being and social justice (ABIM, 2002; Beauchamp & Childress, 2009). Personal autonomy and values are now recognized as important elements of informed decision making (Braddock, Edwards, Hasenberg, Laidley, & Levinson, 1999; Woolf et al., 2005). Together these changes foretell a potentially rapidly expanding role of personal autonomy in the delivery of health care. Self-determination theory uniquely identifies autonomy as a psychological need and provides for several measures of autonomy that are appropriate for workplace health and medical settings.

SDT posits that all humans are intrinsically oriented toward growth, psychological well-being, and physical well-being. As described in [Chapter 2](#), human's need for autonomy is considered to be universal, although its expression may differ across cultures. The core component of this type of motivation relates to the quality of the psychological energy that energizes the behavior and the direction (or target) of the behavior. The fact that these tenets have been criticized as being Western or American ideals and thus are not generalizable to other cultures has been addressed in other chapters (see [Chapter 3](#) and [4](#)). In this chapter, and we will examine the relation of perceived personal autonomy and physical health within individual and across cultures, as the data allow. Multi-cultural studies (e.g., a study that included

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more than one culture) are expected to be few in number as SDT has only recently been applied into health care outside of the United States and Canada, and only within these countries since around 1990.

Self-determination theory is a general theory of human motivation and behavior which has guided a growing number of studies in health care and health promotion settings. Many health care studies have now tested the link between personal autonomy and health-related behaviors. Specifically, physical health and well-being are predicted to be enhanced by SDT when people’s basic psychological needs of autonomy, perceived competence, and relatedness are satisfied. Further, satisfaction of these needs, and pursuing intrinsically satisfying aspirations, facilitate the internalization autonomous self-regulations for health behaviors and perceived competence for desired healthy behaviors (e.g., not using drugs or tobacco, regular physical activity, healthy nutrition, maintained energy balance, and appropriate use of medications). Figure 7.1 illustrates the self-determination theory Model for Health Behavior. This model of need supportive-based health care delivery, although initially developed in the US (Williams et al., 2006), has been replicated in three other Western countries (Canada, Fortier, Sweet, O’Sullivan, & Williams, 2007, Norway, Munster Halvari & Halvari, 2006, and Portugal Silva et al., 2008). To the extent to which it is generalizable to other cultures, including non-Western societies is discussed below.

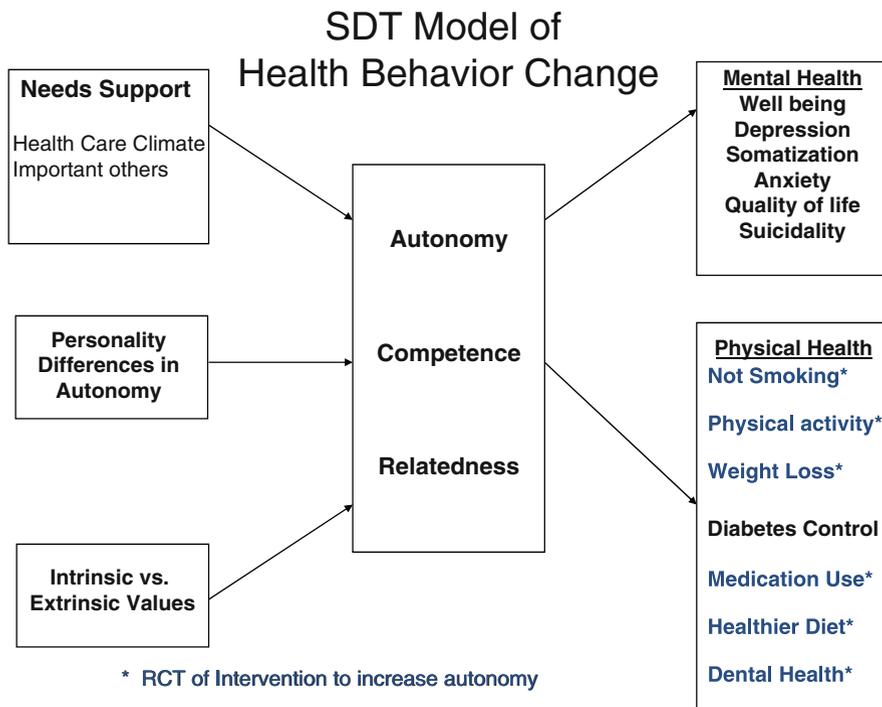


Fig. 7.1 Model SDT health behavior change

Autonomy-related measures, as depicted in SDT, have been assessed with several types of measures. These include: treatment self-regulation questionnaire (TSRQ); general causality orientation scale (GCOS); locus of causality (LOC); intrinsic motivation (IM); and the aspirations index (AI). Some measures are behavior specific, such as the exercise self-regulation questionnaire (SRQ-E), the TSRQ, and the Behavioral Regulation in Exercise Questionnaire (BREQ). Others refer to the perception of need support by participants, or treatment climate measured, for instance by the Health Care Climate Questionnaire (HCCQ). Vitality is a positive form of life energy within the SDT framework.

As we review each study, we will refer to all the various measures of autonomy as “personal autonomy,” and also indicate the specific measure that was used in that study. Treatment self-regulation is the measure of personal autonomy that is most frequently used. It yields up to five subscale scores. Two autonomous levels of self-regulation (1) identified (ID-TSRQ), (2) integrated (IN-TSRQ) and two controlled forms of self-regulation, (3) introject (IJ-TSRQ), and (4) external control (EX-TSRQ). Amotivation is the final category and it will be designated as AM-TSRQ. Amotivation is the lowest form of self-regulation in that it is not volitional and is not directed at achieving an outcome. Internalization is the proactive process of change in personal autonomy and perceived competence within SDT. In the remainder of the chapter, we will outline what is known about how personal autonomy relates to health behaviors and physical well-being, and how interventions to promote personal autonomy may enhance physical well-being.

## **Systematic Search of the Literature**

### ***Inclusion Criteria***

We searched Medline and PsychInfo through October of 2009 for manuscripts that include self-determination theory and autonomy, and health (including physical health, and health behaviors) that allow for cross-cultural comparisons in title, abstract, or key words. We accepted studies that provided quantitative measures of these relations within one culture, or in multiple cultures. We divided the manuscripts according to the health topics that were studied (e.g., tobacco abstinence, nutrition, physical activity, medication taking, physical diseases, or physical wellbeing) and then again within those outcomes by whether they provided data from multiple cultures, single non-US cultures, and single US cultures.

### ***Exclusion Criteria***

We excluded manuscripts that reported only personal autonomy and well being (well being, vitality, or quality of life) that were assessed in non-health care settings (education, home, business) unless a specific health outcome (physical health, functional incapacity, or health behavior) was also reported. We also excluded non-quantitative papers and those studies with measures of autonomy that were not

defined as volition and were inconsistent with self-determination theory. A total of 54 manuscripts were identified, and selected for review in this chapter.

We hypothesized that various forms of personal autonomy would be positively predictive of physical well-being and healthier behaviors and health behavior change and that personal autonomy would be predictive of an increase in perceived competence. Controlled and amotivated self-regulation would be neutral or negatively predictive of physical well-being, healthier behaviors, and health behavior change. We will first turn to the studies that linked autonomous self-regulation to tobacco outcomes, and then other medical outcomes, before reviewing the physical activity, weight loss, and nutrition studies. Most of the tobacco and medical studies were conducted in the US. We now turn to the selected studies of personal autonomy and tobacco dependence treatment, chronic disease management (e.g., diabetes regulation, and medication adherence), dental outcomes, substance abuse, and surgical outcomes.

### *Personal Autonomy and Tobacco Outcomes*

Abstinence from tobacco (e.g., smoking cessation without use of other tobacco products) has been associated with personal autonomy in 7 studies that span 20 years. The initial association using a measure of intrinsic (IM—concerns about health and desire for self-control) relative to extrinsic (EX—immediate reinforcement and social influence) motivation for smoking cessation was tested in two samples ( $n_s = 1217$  and  $151$ ) of smokers requesting smoking cessation materials in the Seattle, Washington area (Curry, Wagner, & Grothaus, 1991). They found that higher relative intrinsic motivation was associated with greater likelihood of abstinence. Further, a randomized trial with the larger sample found that smokers receiving personalized feedback (intrinsic motivation intervention) versus those receiving a monetary reward for completing a smoking cessation workbook (extrinsic motivation intervention), and those receiving both interventions, and those receiving neither intervention had significantly higher abstinence rates at 3 and 12 months (Curry et al., 1991). This was the first study indicating that higher levels of personal autonomy were associated with health behavior change, and it replicated Deci's (1971) findings and a subsequent meta-analysis (Deci, Koestner, & Ryan, 1999) that rewards undermine autonomously motivated behaviors.

In Williams, Cox, Kouides, and Deci (1999) reported that the 2- and 4-month change in personal autonomy (TSRQ) for not smoking was predictive of reduction in smoking for over 150 9–12th graders in upstate New York (Beta = 0.22,  $p < 0.01$ , and Beta = 0.26,  $p < 0.001$ ). These adolescents had been randomized to receive an SDT intervention called "It's your Choice" versus a "Fear and Demand" (terror inducing intervention). Those in the choice intervention perceived greater autonomy support, but were not found to have greater levels of personal autonomy. In this same sample, a second measure of personal autonomy was assessed called relative intrinsic aspirations (IA) along with perceived parental autonomy support (PAS). Both personal autonomy (AI—beta = 0.21,  $p < 0.001$ ) and parental

autonomy support (PAS—beta,  $p < 0.001$ ) predicted lower levels of a composite of health risk behaviors as well as each of the individual risk behaviors making up the composite. The composite included smoking, alcohol use, marijuana use, and early onset intercourse. These adolescents were predominantly white and of mid-level socioeconomic status in a suburban high school. Thus, no racial or ethnic subgroups were analyzed.

In a trial of adult smokers receiving a brief cessation intervention in two styles (Williams, Gagné, Ryan, & Deci, 2002), personal autonomy (ID IN-TSRQ) measured within the week following the intervention predicted 6, 12, and 30 month abstinence and continuous abstinence at all three times (parameter estimates = 0.12–0.14,  $p$ 's  $< 0.001$ ). No racial or ethnic subgroups were analyzed in this study. This study was the first to report that long-term maintenance of abstinence is predicted by personal autonomy following an intervention.

In Williams et al. (2006) reported on a randomized trial of 1,006 adult smokers that demonstrated that an intensive self-determination theory based intervention for tobacco dependence increased 6 and 18 month prolonged abstinence by more than 2.5 times compared to community care. This finding held independent of baseline willingness to quit in the next 30 days. The effect of this intervention was partially mediated by the change (internalization) in personal autonomy (ID IN-TSRQ) and perceived competence during the intervention period. Internalization of autonomy and perceived competence also explained abstinence in the community care group, thus supporting the concept that internalization is an innate potential, independent of intervention. These findings are consistent with a hypothesized causal relationship that changes in personal autonomy (ID IN-TSRQ) and perceived competence play in abstinence from tobacco. There were no differences found between the relation between personal autonomy and abstinence between whites and African Americans in this trial. Thirty-two-month data from this study still showed a between group effect on abstinence from tobacco, and found evidence that the 6-month change in autonomy that occurred within the 6 months of the intervention predicted 7 day point prevalence abstinence measured a full 24 months after the intervention ended. This latter finding suggests that change in personal autonomy may motivate future abstinence attempts (Williams, Niemiec, Patrick, Ryan, & Deci, 2009).

This study also provided initial evidence that the self-determination intervention can enhance personal aspirations for health and that increases in the health intrinsic aspiration (AI) is associated with long-term abstinence from tobacco (Niemiec, Ryan, Deci, & Williams, 2009). Vitality (psychological energy that is not directed at a specific outcome) was also found to increase significantly with personal autonomy (TSRQ—beta = 0.11,  $p < 0.001$ ), and with decreased cigarette use over the time of the intervention (Williams et al., 2009), and the change in personal autonomy (ID IN-TSRQ) during the intervention increased vitality over the next 12 months (Beta = 0.07,  $p < 0.05$ ). While these results represent small effects that need replication, they suggest that as smokers experience higher levels of personal autonomy they are more likely to abstain from tobacco and they experience a greater level of vitality, or well being. Also, this study found no differences for African Americans compared

with whites in the relation of autonomous self-regulation and prolonged abstinence, thus suggesting no cross-cultural differences exist between these two groups.

Finally, a small randomized trial measuring autonomy support (HCCQ) and hypnosis ( $n = 48$ ) conducted in England found that the autonomy support group had significantly higher levels of personal autonomy (ID IN-TSRQ), but no between group difference was found in abstinence from tobacco (Solloway, Joseph, 2006). Autonomous self-regulation accounted for 16% of the variance in smoking abstinence ( $p < 0.01$ ). There were no cross-cultural comparisons made in this study.

Overall, the results of these studies in the US and England consistently reported weak to moderate effects of personal autonomy (ID IN-TSRQ) on tobacco abstinence or reduction in tobacco use, and improved well-being. Randomized controlled trials indicate that internalization of autonomous self-regulation can be facilitated by need supportive interventions, suggesting a causal relationship between autonomous self-regulation and abstinence from tobacco. While not mentioned in this review, the controlled forms of self-regulations (IJ, EX-TSRQ) were not significantly related to tobacco outcomes in several of the tobacco studies (Williams et al., 1999, 2006, 2002, 2009), thus these relations were not reported in the papers or discussed here. Only one study explicitly tested whites versus African Americans and found no difference. Cross-culture tests of SDT-based interventions intended to increase personal autonomy (ID IN-TSRQ or AI) and tobacco abstinence have not been conducted.

### *Diabetes Self-Management*

Diabetes is a common disease that lowers quality and length of life. Almost one-third of Americans will be diagnosed with diabetes that are born after the year 2000 (Narayan, Boyle, Thompson, Sorenson, & Williamson, 2003). Further, it is a disease that can be prevented (DPP, 2002) and if patients manage their glucose control tightly, measured on hemoglobin A1c (HbA1c), they will experience fewer complications (DCCT). Chronic conditions such as diabetes mellitus offer a unique opportunity to examine the process of internalization of personal autonomy (ID IN-TSRQ) and perceptions of competence. Motivation is particularly relevant for people with chronic diseases because humans need energy for the day-to-day effective management of their diseases. Internalization is expected to begin with diagnosis and is expected to differ as a function of the need supportiveness of the health care climate and important others in the diabetics life, as well as personality differences in causality orientation. Autonomous self-regulation is expected to be important in long-term adherence to lifestyle and persistent use of medications. Personal autonomy and perceived competence were predicted to energize diabetes self-management behaviors and reducing disease complications such as blindness, kidney failure, and numbness that affect quality of life. This is somewhat different than motivation to prevent onset of a disease in that symptoms of a disease that has set in are frequently experienced, and the complications can be monitored with feedback for the patient. Several studies of motivation regarding diabetes mellitus have been conducted.

In a 12-month longitudinal study of 128 patients with diabetes (Williams, Freedman, & Deci, 1998), personal autonomy (ID IN-TSRQ) was significantly correlated with HbA1c at baseline ( $r = -0.40$ ), 4 months ( $r = -0.28$ ) and 12 months ( $r = -0.30$ , all  $p$ 's  $< 0.001$ ). In a second study of 159 patients with diabetes (Williams, McGregor, Zeldman, Freedman, & Deci, 2004), increase in personal autonomy (TSRQ) over the initial 6 months in the study predicted improvement in glycemic control ( $r = -0.24$ ,  $p < 0.01$ ). Life satisfaction was significantly correlated with personal autonomy (ID IN-TSRQ—beta = 0.34) even after controlling for dietary self-efficacy in a study of 638 French Canadian patients with diabetes (Senecal, Nouwen, & White, 2000). Personal autonomy (ID IN-TSRQ) for using medication to control diabetes and cholesterol was positively correlated with quality of life ( $r = 0.19$ ,  $p < 0.01$ ) measured on the Short-Form 12 Health Survey (SF-12v2; Ware, Kosinski, & Keller, 1996) in a study of approximately 2,000 patients with diabetes. In addition, personal autonomy (ID IN-TSRQ) predicted adherence to diabetes and cholesterol medications and diabetes control ( $r = -0.12$ ,  $p < 0.01$ ) and healthier cholesterol ( $r = -0.09$ ,  $p < 0.01$ ). Nearly 40% of this sample was non-white (36.5% African American, and 3.8% other), but when race was controlled for it didn't significantly effect the findings.

In summary, personal autonomy, in the form of autonomous self-regulation (ID IN-TSRQ) for diabetes self-management behaviors, has been consistently associated with improved diabetes control, quality of life, and life satisfaction in Western cultures. Non-white subgroups have participated in these studies and autonomous self-regulation appears to have similar associations with disease outcomes in both groups.

### ***Medication Adherence and Use***

Adherence is defined as the percentage of patient behavior/the “recommended” amount of behavior. The “recommended” amount is usually from treatment guidelines or from health care practitioners, but it could also be based on what patients agree to take. Adherence particularly to long-term regimens is an important outcome because it is a motivated behavior that requires psychological energy to maintain and it has a major effect on health outcomes (Osterberg & Blaschke, 2005). In the clinical world (as opposed to within controlled research studies) as much as a third of prescriptions are never filled and, only about 50% of prescriptions are taken as prescribed once started.

In a US study (Williams, Rodin, Ryan, Grolnick, & Deci, 1998) of 30 different long-term medications (mean time taken = 6.5 years) over a 14-day window of time, personal autonomy (ID IN-TSRQ) accounted for nearly half the variation in medication adherence (parameter estimate = 0.78,  $p < 0.001$ ). A second study examined the relations between personal autonomy (ID IN-TSRQ) for adherence to more complex medication regimens prescribed for 205 HIV positive patients. These patients had been HIV positive for over 7 years on average and needed to take these HIV medications multiple times a day at specific intervals in order to suppress the

virus. Personal autonomy (ID IN-TSRQ) was weakly but significantly correlated with adherence over the 3-day assessment period ( $r = 0.15, p < 0.05$ ).

In summary, both studies of medication adherence were in US samples and no racial or cultural variables were reported. Both studies report moderate to strong positive relations between personal autonomy and adherence.

### *Substance Use and Abuse*

Several studies of substance abuse and its treatment have been conducted. Ryan, Plant, and O'Malley (1995) found that personal autonomy (IJ ID-TSRQ; note that in this study here internalized motivation was the sum of introjected + identified self-regulation), and external motivation (EX-TSRQ; external control and pressure) interacted to predict a composite treatment outcome (completing treatment and number of the 8 planned therapy sessions attended) for alcohol-dependent clients seeking treatment. Racial and cultural demographics were unrelated to personal autonomy and the outcome variables, in this US sample of 100 clients (80% were Caucasian). In another US study, drinking alcohol was predicted by extrinsic reasons (EX IJ-TSRQ; introject + external control) in 78 undergraduates ( $r = 0.42, p < 0.01$ ), and 53 members of college fraternities ( $r = 0.40, p < 0.01$ ; Knee & Neighbors, 2002). While these studies included multiple ethnicities, the sample sizes didn't allow for subgroup analyses. Personal autonomy related to drinking or not drinking was not assessed in this study. Personal autonomy (IJ ID-TSRQ) for treatment in a methadone maintenance program for opioid dependence was reported for 74 clients, 52% of whom were white (Zeldman, Ryan, & Fiscella, 2004). Autonomous self-regulation was significantly correlated with all three treatment outcomes; percent of sessions missed ( $r = -0.28, p < 0.01$ ), percent of positive urine tests ( $r = -0.27, p < 0.05$ ), and number of days between entering treatment and being allowed to receive take-home doses of methadone ( $r = -0.25, p < 0.05$ ). Racial differences were not reported.

Wild, Cunningham, and Ryan (2006) assessed personal autonomy (ID-TSRQ) for 300 addicts in Toronto Canada and found identified regulations predicted reduction in alcohol use (beta = 0.26,  $p < 0.001$ ), alcohol use (beta = -0.28,  $p < 0.05$ ), therapist ratings of client interest in treatment (beta = 0.18,  $p < 0.05$ ), and client perceived benefits of reducing drug use (beta = 0.31,  $p < 0.01$ ). No racial or ethnicity data are reported in this study. Finally, personal autonomy (GCOS autonomy and controlled subscales) predicted average daily alcohol consumption ( $r$  autonomy = -0.14 and  $r$  controlled = -0.10,  $p$ 's < 0.05) in 818 first year college students who reported a heavy drinking episode in the previous month (Chawla, Neighbors, Logan, Lewis, & Fossos, 2009). This sample was collected online a large public US in the northwestern United States, and 65% were white, 24% Asian, and 11% other. Relations between personal autonomy (TSRQ) and drinking behaviors for the different races and ethnicities were not reported in this study.

In summary, studies of substance abuse and its treatment showed weak to moderate strength relations between various measure of autonomy, and control from self-determination theory. Controlled self-regulations (EX IJ-TSRQ; introject is typically unrelated and TSRQ external control is usually somewhat negatively predictive of physical health outcomes) have typically been found to be unrelated to physical health outcomes, or they have been unreported in physical health studies. All these studies were conducted in the US or Canada, and while some samples had diverse racial and ethnic make up, few of these relations were reported.

### *Autonomy and Other Medical, Surgical, and Dental Outcomes*

One 5 country study of nurses offering information to 1,500 surgical patients found that desire for input into decision making regarding their care predicted independence level in daily activities ( $r = 0.24, p < 0.001$ ) and subjective health status ( $r = 0.12, p < 0.01$ ). SDT informed the measurement model that was assessed, but the construct representing autonomy (desire for input into decision making) was based on biomedical ethics definition of autonomous decision making (Beauchamp & Childress, 2009) and was not consistent with the SDT construct of autonomy. The mean levels of the desire for input into decision making were reported for the patients in Finland, Spain, Greece, Germany, and Scotland, and they were significantly different and ranged from 2.2 in Greece to 3.8 in Scotland ( $F = 75.8, df = 4,1, p < 0.005$ ). However, differences in parameter estimates by country are not reported. Further, the IRB did not allow the assessment of race and ethnicity in this study.

Personal autonomy (ID IN-TSRQ) was assessed in 50 residents of a nursing home in upstate New York and found to be predictive of patient vitality ( $r = 0.36, p < 0.05$ ), mortality ( $r = -0.36, p < 0.05$ ) and days lived ( $r = 0.31, p < 0.05$ ) over a 13-month period (Kasser, & Ryan, 1999). No assessment of ethnicity or race was reported for the study participants. This study is notable for many reasons, but in particular, the association found between personal autonomy and mortality (length of life) is striking and calls for replication.

Personal autonomy (IM) related to the intrinsic motivational factors of job creativity, job autonomy, and job complexity were found to be similarly predictive of functional incapacity in a 5 country study (Canada, China, Finland, France, and Sweden) of 13,795 employees of a single global forest industry corporation (Vaananen et al., 2005). Interestingly, the strength of associations between personal autonomy (IM) and functional incapacity were the strongest among the Chinese employees then in the “Western” countries. The authors suggest that “the Chinese, as employees of an economy in transition, may particularly value intrinsic motivational factors of work in their cultural context.” They also note the studies limitation of being cross-sectional, and call for longitudinal cross-national research. This study supports the SDT assumption that autonomous and intrinsic motivations are present in all humans, even those in Eastern cultures. These findings directly contradict the

criticism that autonomy is a westernized concept, and suggests that the link between personal autonomy and functional status and possibly physical health is stronger in Eastern versus Western cultures.

*Personal Autonomy and Testing for Coronary Artery Disease.* Change in personal autonomy (ID IN-TSRQ) for 252 patients being evaluated for coronary disease predicted healthier diet ( $r = 0.19, p < 0.01$ ) and physical activity ( $r = 0.15, p < 0.05$ ) over a 3-year period of time (Williams, Gagne, Mushlin, & Deci, 2005). Three quarters of this cohort were white and the study was conducted in upstate New York. No racial or ethnicity data were analyzed in this study.

*Personal Autonomy and Dental Health Behaviors.* A randomized trial in Norway with 86 social science and school of medicine students demonstrated a large between group effect of an SDT intervention increasing autonomous self-regulation for flossing and brushing which mediated the effect of the intervention on the reduction in gingivitis and dental plaque over 7 months (Munster Halvari & Halvari, 2006). The change in personal autonomy (ID IN-TSRQ) on improving self-reported dental behaviors after controlling for change in perceived competence was significant (parameter estimate = 0.20,  $p < 0.05$ ), and personal autonomy (ID IN-TSRQ) at 7-month follow-up was strongly correlated with lower levels of plaque ( $r = -0.38, p < 0.001$ ). No racial or ethnicity data were analyzed in this trial. This trial provides strong evidence that change in autonomous self-regulation is associated with positive dental outcomes in a westernized culture.

In summary, medical studies outside of tobacco and diabetes, a surgical and a dental study have demonstrated consistent positive relationships between personal autonomy and physical health. However, only one study related to job autonomy assessed the strength of this relation in multiple cultures. This one study found that job autonomy and intrinsic motivations were stronger negative predictors of functional incapacity in Chinese workers than in four Western countries. We now turn to studies of within and cross-cultural associations between personal autonomy, physical activity, and physical well-being.

### ***Personal Autonomy and Physical Activity/Exercise***<sup>1</sup>

The relationship between perceptions of personal autonomy and exercise behaviors (e.g., intentions to exercise, exercise stages of change, minutes of moderate and vigorous physical activity, etc.) has been reported in several studies (e.g., Ryan, Williams, Patrick, & Deci, 2009). To empirically test SDT's tenets when applied to exercise promotion several questions have been addressed by previous studies, which can typically be included into one (or several) of the following categories:

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<sup>1</sup>Although not strictly the same ("exercise" is typically considered a *structured* form of voluntary "physical activity"), we will use the terms "exercise" and "physical activity" indiscriminately in this text. In most studies we reviewed, subjects were measured as to their level of leisure time activity, often to improve health or fitness, or to control body weight (thus predominantly "exercise").

(i) testing whether different behavioral regulations (or *regulatory motives*) distinctly predict exercise behaviors; for instance, if autonomous regulations are stronger predictors than controlled motivations; (ii) evaluating whether reasons for exercising (or *participatory motives*), namely more “intrinsic” (e.g. challenge, health) vs. more “extrinsic” reasons/goals (e.g. social recognition), make a difference in the perceived locus of causality of exercise behaviors; (iii) testing the extent to which basic psychological needs are satisfied in exercise contexts and how that relates to the development of exercise motivation; and (iv) testing if interventions are successful in promoting personal autonomy by providing need-supportive contexts.

We identified 39 studies published since 1993 that address autonomy and exercise behaviors, varying substantially in design (largely observational but also including some experimental research), sample characteristics (healthy or presenting a clinical condition), and measures used to assess exercise/PA. Because there are many more studies in this area, it allows for more fine grained examination of the relations between the various types of personal autonomy and exercise behaviors outlined above. We will now briefly review those findings, drawing also on previous reviews on this topic (Chatzisarantis, Hagger, Biddle, Smith, & Wang, 2003; Hagger & Chatzisarantis, 2007; Wilson, Mack, & Grattan, 2008).

Overwhelmingly, evidence confirms that more self-determined regulations, namely identified, integrated, and intrinsic forms of motivation are significantly associated with increased physical activity adherence and related measures, such as intentions or stages of change (Brickell, Chatzisarantis, & Pretty, 2006; Chatzisarantis & Biddle, 1998; Daley & Duda, 2006; Edmunds, Ntoumanis, & Duda, 2006a; Edmunds, Ntoumanis, & Duda, 2008; Edmunds, Ntoumanis, & Duda, 2006b; Hagger, Chatzisarantis, Culverhouse, & Biddle, 2003; Hagger, Chatzisarantis, & Harris, 2006; Ingledew, Markland, & Ferguson, 2009; Landry & Solmon, 2004; Markland, 2009; Matsumoto & Takenaka, 2004; McNeill, Wyrwick, Brownson, Clark, & Kreuter, 2006; Milne, Wallman, Guilfoyle, Gordon, & Corneya, 2008; Mullan & Markland, 1997; Peddle, Plotnikoff, Wild, Au, & Courneya, 2008; Rose, Parfitt, & Williams, 2005; Sebire, Standage, & Vansteenkiste, 2009; Thøgersen-Ntoumani & Ntoumanis, 2006; Wilson, Blanchard, Nehl, & Baker, 2006; Wilson & Rodgers, 2004; Wilson, Rodgers, Blanchard, & Gessell, 2003; Wilson, Rodgers, & Fraser, 2002; Wilson, Rodgers, Fraser, & Murray, 2004; Wilson, Rodgers, Loitz, & Scime, 2006; Wininger, 2007). It is presently unclear precisely which specific type(s) of self-determined regulations is/are more closely associated with behavior outcomes. While many studies have not included a measure of integrated motivation, most have shown slightly higher association scores for identified motivation (for exercise) compared to intrinsic motivation (e.g., Edmunds et al., 2006a; Ingledew et al., 2009; Standage, Sebire, & Loney, 2008; Wilson & Rodgers, 2004). Although theoretically they are clearly separable, in the exercise context identified and intrinsic measures have tended to be collinear when tested in multivariate models (e.g., Standage et al., 2008). The same point has been made about integrated and intrinsic regulations (Ingledew et al., 2009). For this reason, some studies have chosen to use an autonomous scale instead of separate scales for identified and intrinsic regulations (Ingledew & Markland,

2007; Silva et al., 2010; Standage et al., 2008). In fact, some instruments do not assess integrated regulations (e.g., BREQ-2, D. Markland & Tobin, 2004). In real life, it is likely that people who have successfully integrated the regulation of exercise behaviors (e.g., who have come to see physical activities as contributing to highly valued outcomes or perceive a physically active lifestyle as an integral part of their sense of self) also find the experience of exercise interesting and enjoyable for its own sake. Likewise, individuals who have always enjoyed sports and exercise (e.g., based on positive experiences as a physically active teenager) are very likely to also identify with activity behaviors and/or value it highly during adulthood.

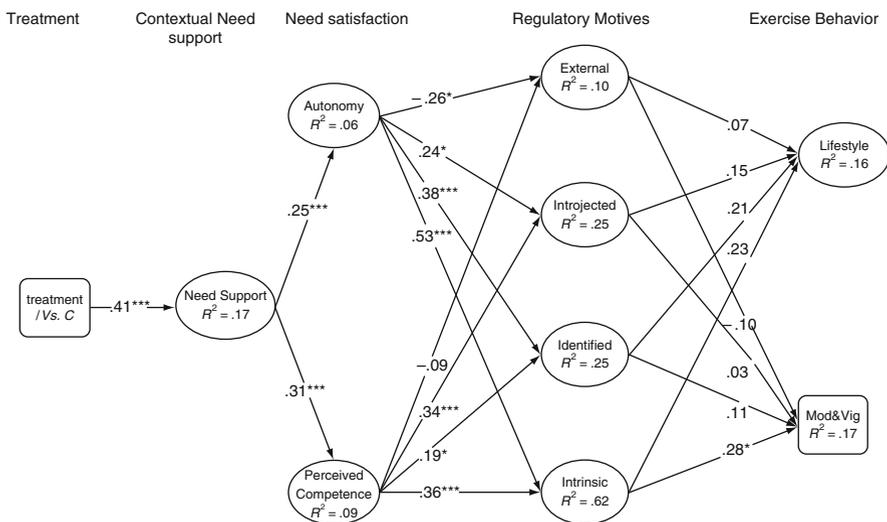
Regarding controlled motivations, while measures of external regulation are clearly not associated, or are negatively associated with initial or continued exercise participation (e.g., Ingledew & Markland, 2007), introjected regulations are sometimes positively related to exercise/PA outcomes (e.g., Edmunds et al., 2006a; Thøgersen-Ntoumani & Ntoumanis, 2006; Wilson et al., 2003), although to a lesser extent than autonomous regulations. One recent study using objective measures of physical activity (accelerometry) showed no association between introjected motivation and behavior (Standage et al., 2008) supporting other studies with self-report measures (e.g., Ingledew & Markland, 2007; Ingledew et al., 2009). Since many reports have been cross-sectional and short-term, and have generally used simple self-reported measures to assess behavior, future studies, especially longitudinal, should clarify the role of introjected motivation in short-term and especially sustained exercise adherence. For instance, in a sport setting, introjected regulation predicted short-term but not long-term behavioral persistence (Pelletier, Fortier, Vallerand, & Brière, 2001). It should be noted that different regulations (more and less autonomous) can and most likely do co-exist for any given behavior, especially those involving complex tasks such as engaging in a regular exercise routine, which can include multiple behaviors and be subject to various influences (e.g. time- and job-related, access to facilities and other aspects of the built environment, weather, social influences, etc.). Indeed, it is the relative preponderance of each form of regulation that should, in the end, determine behavioral outcomes such as persistence vs. dropout. For instance, it is possible that some degree of introjection (e.g., feeling internal pressure every time several days without exercise go by) may not be detrimental to long-term adherence when in the presence of strong and concurrent regulations of a more autonomous nature, whether extrinsic (e.g., valuing the opportunity for meaningful social interaction) or intrinsic.

Other variables which have been used in exercise studies include participatory motives (or goal contents) in exercise (Ingledew & Markland, 2007; Ingledew et al., 2009; Markland & Tobin, 2010; Sebire et al., 2009; Segar, Eccles, & Richardson, 2008; Vansteenkiste, Simons, Soenens, & Lens, 2004). Collectively, results appear to concur with the tenets of self-determination, showing that more “intrinsic” goals (e.g., health, affiliation, challenge, and social engagement) are associated with more autonomous exercise self-regulation and/or with higher exercise adoption, when compared with “extrinsic” goals (e.g. appearance/attractiveness, social recognition). Two recent studies by Ingledew and Markland (2007, 2009) used mediation analysis to show that nominally intrinsic goals predicted exercise participation indirectly

through autonomous forms of self-regulation; health/fitness and stress management goals predicted identified regulation whereas affiliation and challenge goals predicted intrinsic motivation. Contrarily, as expected from theory, controlled participatory motives (social recognition, appearance/weight) predicted external and/or introjected regulations.

According to SDT, there is a link between endorsing more intrinsic goals and the development of autonomous motivation through basic psychologic needs (Kasser & Ryan, 1996). Studies have also investigated perceived need satisfaction in exercise settings and the extent to which it contributed to motivation and behavioral outcomes (Edmunds et al., 2006a; Hagger et al., 2006; Markland, 1999; Markland & Hardy, 1997; Markland & Tobin, 2010; Wilson et al., 2003). For example, Markland and Tobin showed different pathways linking perceived need support (including autonomy, structure, and involvement), need satisfaction (autonomy, competence and relatedness) and behavioral regulations, in exercise-referral participants. Confirming previous studies (See Edmunds, Ntoumanis, & Duda, 2007b for a review), results supported SDT propositions for the mediating role of need satisfaction, in particular of autonomy, for the development of self-determined motivation.

Recently, in Portuguese women, perceived need support during an SDT-based intervention was associated not only with more autonomous exercise self-regulation but also with the development of introjected regulations (Silva, et al., 2010; See Fig. 7.2 below). The authors commented on this unexpected finding by suggesting that a cultural background where external approval is learned to be contingent on



Values in the Paths represent the standardized bootstrap estimate, \*p<.05, \*\*p<.01, \*\*\*p<.001.

**Fig. 7.2** Causal pathways linking an autonomy-promoting intervention with exercise behaviors in 239 overweight and obesity women (from Silva et al., 2009)

compliance and conformity (e.g. to God or expert opinion) could partially explain how an autonomy-promoting treatment climate also led to increased introjected regulations. Willing compliance could in fact be a common form of behavioral regulation in the Portuguese culture, strongly influenced by Catholic ethics and ideal. Interestingly, there were significant associations between introjected and both identified and intrinsic motivations (IM), but no association between introjected and external regulations. Additionally, in a subsequent analysis, we found no association between controlled exercise regulations (external and introjected scales together) and reduced psychological well-being in the same sample (Vieira, et al., in press), suggesting that the intervention effects on introjected regulation were perhaps not perceived as externally controlling and also not detrimental to well-being. This notwithstanding, the positive association between need satisfaction and introjection was not interpreted as supportive of using guilt or promoting contingent self-worth to motivate Portuguese weight loss program participants. In fact, the same study showed that introjected regulations failed to predict physical activity behaviors across multiple time points (Silva et al., 2010; Silva, et al., in press).

To date, only a few interventions have been designed to specifically increase personal autonomy in the form of autonomous self-regulation for exercise in adults (Edmunds et al., 2008; Fortier et al., 2007; Jolly et al., 2009; Silva et al., 2008). Some of these studies are still ongoing and all have been conducted in Western cultures. Fortier et al. (2007) tested an autonomy-promoting counseling protocol for promoting physical activity in sedentary primary care patients, for 13 weeks. Results showed that the intervention was successful in changing autonomous self-regulation to reach activity goals (vs. a brief counseling protocol) and that higher autonomous regulation for exercise mid-intervention predicted higher levels of physical activity at the end of the intervention, in the intervention group. In an exercise on prescription program, Edmunds et al. (2007a) showed increases in introjected and decreases in autonomous motivation during the course of the 3 month study. In spite of this fact, which authors attributed to the relative lack of contact with exercise specialists and low provision of structure during the program, relatedness need satisfaction predict higher levels of exercise autonomous self-regulation and higher attendance, while autonomous self-regulation predicted improved psychological well-being and positive affect; conversely, introjected exercise regulations predicted less subject vitality. At each time point, identified exercise regulation was associated with higher adherence whereas introjected regulations predicted less participation.

The longest RCT to date that evaluated autonomy support and physical activity behaviors was implemented in 239 overweight women, through 30 weekly group sessions for about 1 year (Silva et al., 2008). Strategies used to promote personal autonomy and the development of intrinsic motivation for exercise in this intervention are described in detail elsewhere (Silva et al., 2008, 2009). Results showed that the intervention was successful in changing exercise participatory motives, exercise autonomous self-regulation and exercise behavior (Silva et al., 2009). Additionally, it also indicated that the motivational sequence proposed by SDT (i.e., need-supportive health care climate need satisfaction for autonomy and competence autonomous exercise regulation exercise behaviors) was empirically

supported using structural equation modeling (Silva et al., 2009). Figure 7.2 shows a Partial Least Squares model (and standardized coefficients) for predicting two different forms of exercise at intervention's end. The role of the intervention through perceived autonomy and competence support was particularly effective in increasing intrinsic motivation (IM), which in turn significantly predicted minutes of moderate and vigorous physical activity.

Collectively, available evidence supports the positive role of personal autonomy in adopting and maintaining physical activity and exercise behaviors. Furthermore, it appears that perceptions of autonomy need-support on the part of study participants significantly predict more autonomous self-regulation and improved behavioral outcomes. However, because most studies have been cross-sectional, more experimental data is needed to assess how manipulating social conditions (e.g., health care environments) can induce increases in personal autonomy and how, in turn, this leads to short- and long-term behavior change. Virtually all studies in this domain have been conducted in Western societies (mostly USA, UK, and Canada, but also Greece (Mildestvedt, Meland, & Eide, 2008), Australia (Vlachopoulos, Karageorghis, & Terry, 2000), Norway (Milne et al., 2008), and Portugal (e.g. (Silva et al., 2008)) with one exception from Japan (Matsumoto & Takenaka, 2004), a cross-sectional study of 486 men and women, where more advances stages of changes were predicted by intrinsic (IM), identified (ID-TSRQ) and introjected exercise regulation (IJ-TSRQ). Although no indication in the exercise domain exists that would suggest that the relations between personal autonomy and behavioral outcomes differs across cultures, the available evidence is clearly lacking in cultural diversity for firmer conclusions to be drawn.

### ***Autonomy and Weight Regulation***

Only a few studies have tested personal autonomy or related constructs as predictors of outcomes in obesity studies. Williams, Grow, Freedman, Ryan, and Deci (1996) studied severely obese patients in the context of a 6-month medically supervised very-low-calorie diet, where participants also received weekly group counseling, of a general nature, intended to provide peer support, facilitate discussion, promote self-monitoring, etc. Perceived autonomy support and treatment self-regulation were assessed immediately after the intervention. Perceived need support predicted autonomous reasons to continue to participate in treatment, which in turn predicted higher attendance and improved weight loss. Path analysis supported these same mediation paths for outcomes at treatment's end. Autonomous regulations at 6 months also correlated with self-reported exercise and weight loss at a 20-month follow-up (Williams et al., 1996). No cross-cultural analyses were reported in this study.

Between 2005 and 2007, a randomized controlled trial based on self-determination theory was implemented to identify mediating factors for long-term weight control, in premenopausal overweight and mildly obese women (Silva et al., 2008). Results thus far (Silva et al., 2009; Silva et al., 2010; Silva et al., (in press))

support a mediation effect of need support and need satisfaction (of autonomy and competence needs) for developing identified regulations and intrinsic motivation for exercise, which in turn were found to predict 3-year weight control.

Within the same trial—the PESO study—an empirical test of a more diverse set of psychological and behavioral variables showed that change in exercise motivation variables during the 12-month program (self-efficacy, perceived barriers, and intrinsic motivation) were significant predictors of 2-year weight change. Self-efficacy and flexible dietary restraint were found to partially mediate treatment effects on 2-year weight outcomes (Teixeira et al., 2009). A similar study had been conducted in US women who participated in a 4-month behavior weight control trial (Teixeira et al., 2006). In this analysis, changes in intrinsic motivation were found to be the best predictor of 16-month weight changes (no mediation analyses were conducted due to the absence of a control group).

Mata et al. (2009) analyzed whether, in overweight and obese women, treatment and exercise self-regulations predicted successful eating behavior and mediated the association between actual physical activity and eating behavior measures. Results were consistent with the hierarchical model of motivation (Vallerand, 1997), suggesting that the *quality* of motivation may be one mechanism through which successful self-regulation in one area may affect (“spill-over”) into other behavioral domains. If confirmed, this could help explain how autonomously-motivated exercise behavior contributes to improved weight control; not only via the effects of physical activity itself (e.g., Silva et al., 2009) but also positively influencing the regulation of other relevant behaviors such as eating. In fact, the same eating variables studied in the Mata et al. report (flexible restraint, disinhibition, emotional eating, eating self-efficacy) were, in a subsequent analysis from the same trial, shown to predict weight change and partially mediate the effects of some forms of physical activity on weight control (Andrade, et al., in press).

Recently, Gorin and colleagues (2008) explored whether baseline levels of autonomous and controlled self-regulation, and changes in self-regulation over 6 months, were associated with 6-month weight outcomes in overweight women. Higher controlled self-regulation at baseline was associated with worse weight loss results. Conversely, increases in autonomous self-regulation and decreases in controlled self-regulation over the 6-month period predicted improved weight loss (Gorin, et al., 2008). Ongoing work from the same team appears supportive of autonomy support provided by other adults (Important Other Climate Questionnaire) in the home environment leading to more autonomous self-regulation for weight control, in turn predicting weight loss (Patrick, Gorin, & Williams, 2010).

In summary, although based on a somewhat limited set of studies, results to date suggest a positive association between experiences of personal autonomy and improved weight management in the short and long-term. In some studies, analyses have highlighted potential causal mechanisms linking personal autonomy with behavior change for exercise (e.g., Ingledew et al., 2009; (Silva, et al., in press) and eating behavior (e.g., Pelletier & Dion, 2007; Pelletier, Dion, Slovinec-D’Angelo, & Reid, 2004), in some cases leading to improved weight control. At the present time, and notwithstanding the previous point about the impact of an autonomy-promoting

intervention on introjected regulations (in Portuguese women), there is no evidence upon which to discuss culture-specific issues regarding the impact of personal autonomy on obesity-related health behaviors.

### *Personal Autonomy and Dietary Behavior*

The TSRQ has been used in several studies to measure autonomous (ID IN-TSRQ) and controlled self-regulation (EX IJ-TSRQ) of dietary behavior, each of which was conducted with African Americans. In the Healthy Body Healthy Spirit trial (Resnicow et al., 2005, 2002) our team (KR) recruited over 1,000 African American participants from 16 black churches in Atlanta Georgia. Participants completed the TSRQ at baseline and 1-year follow-up. Fruit and vegetable intake was assessed with food frequency questionnaires and serum carotenoids (sum of lutein, cryptoxanthin, carotene, and carotene) were obtained from most participants to supplement self report. Self-efficacy to eat more F & V was assessed at baseline and 1-year follow-up.

As shown in Table 7.1, autonomous regulation was moderately correlated with F & V intake at baseline and posttest,  $r = 0.35$  and  $r = 0.14$ , respectively. Interestingly, controlled regulations (EX IJ TSRQ) was also significantly correlated with F & V intake at baseline and posttest though the magnitude of the association was weaker,  $r = 0.15$  and  $r = 0.11$  respectively. This pattern is consistent with other studies in health care settings using the TSRQ, where some of the controlled regulations (namely IJ-TSRQ) have been found to relate positively to health outcomes. In other domains (e.g. education, parenting) external and introjected self-regulations (EX IJ-TSRQ) typically relate negatively to outcomes in those domains. It is not yet known how to intervene to change controlled levels of personal autonomy. Amotivation (AM-TSRQ) was uncorrelated with intake.

Autonomous regulation (ID IN-TSRQ) was also related to serum carotenoids, an unbiased measure of dietary intake, at baseline,  $r = 0.17$ , but not posttest. Neither controlled regulation (EX IJ-TSRQ) nor amotivation (AM-TSRQ) were related to carotenoid levels at either time point.

**Table 7.1** Correlations of TSRQ scores with fruit and vegetable intake, serum carotenoids, and self-efficacy in the healthy body trial

	Baseline ( $n = 1,021$ )			Post ( $n = 942$ )		
	FV	Carot	SE	FV	Carot	SE
Autonomous intrinsic motivation	0.35*	0.17*	0.29*	0.14*	0.06	0.29*
Controlled extrinsic motivation	0.15*	0.01	0.02	0.11*	0.01	-0.07
Amotivation	-0.06	-0.03	-0.12*	-0.06	-0.04	-0.15*

SE = Self Efficacy; Carot = Sum of total serum carotenoids.

\* $p < 0.01$ .

SDT posits that autonomous regulation will be more strongly associated with self-efficacy than controlled regulation (Markland, Ryan, Tobin, & Rollnick, 2005; Ryan & Deci, 2000; Williams et al., 1998). Individuals who have greater personal autonomy (ID IN-TSRQ, IM) are predicted to, SDT suggests, express greater persistence in their behavioral effort. Our findings strongly supported this assumption. Autonomous regulation was correlated  $r = 0.29$  with self-efficacy at baseline and also at 1-year follow-up, whereas controlled regulation was uncorrelated with efficacy. Interestingly, amotivation (AM-TSRQ) was significantly inversely associated with efficacy, which also appears consistent with SDT assumptions, as amotivated regulation represents the person feeling dissociated from the outcome, and self-efficacy and perceived competence represent the extent to which the person feels the outcome is achievable.

Another diet-related study that used the TSRQ to measure personal autonomy was Body and Soul (B & S; Campbell, Resnicow, Carr, Wang, & Williams, 2007; Fuemmeler et al., 2006; Resnicow et al., 2004). B & S was a randomized effectiveness trial, testing the impact of a multi-component dietary intervention in 14 black churches recruited through local American Cancer Society (ACS) offices in California and in the Southeast (Georgia, North Carolina, and South Carolina) and Mid-Atlantic (Delaware and Virginia) regions of the US (Fuemmeler et al., 2006). Baseline and 6-month follow-up data were obtained from self-report. Measures of motivation (TSRQ), diet, efficacy, and social support were similar to those used in Healthy Body Health Spirit and prior studies.

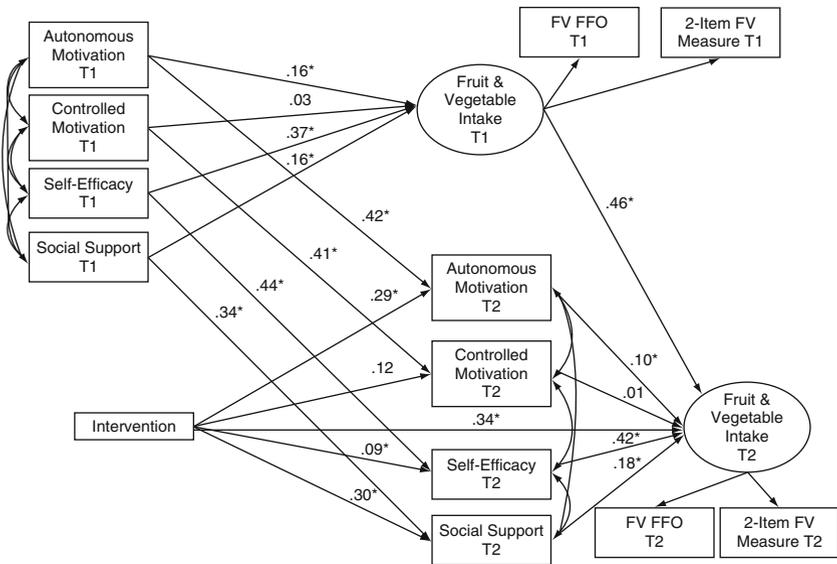
As shown above in Table 7.2, autonomous regulation (ID IN-TSRQ) was significantly correlated with both the 2-item and 19-item F & V measure at baseline and 6-month follow-up. Controlled regulation (EX IJ-TSRQ) was more weakly correlated with intake at baseline and follow-up. Again, as in Healthy Body, autonomous regulation but not controlled regulation was significantly correlated with efficacy at both time points. In addition to cross sectional correlations of TSRQ with efficacy and diet, mediating effects of SDT and other variables were also reported for B & S.

**Table 7.2** Correlations among study variables , reprinted with the permission from American Psychological Association (Fuemmeler et al., 2006)

Variables	1	2	3	4	5	6
1. 2-items measures	–	0.50**	0.23**	0.07*	0.31**	0.21**
2. FV FFQ	0.53**	–	0.20**	0.06	0.28**	0.19**
3. Autonomous motivation	0.25**	0.19**	–	0.25**	0.31**	0.23**
4. Controlled motivation	0.12**	0.09*	0.28**	–	–0.04	0.26**
5. Self-efficiency	0.28**	0.22**	0.33**	0.04	–	0.015**
6. Social support	0.19**	0.09*	0.20**	0.26**	0.16**	–

*Note:* Correlations displayed below the diagonal represent correlations at baseline and correlation above the diagonal represent correlation at follow-up. FV FFQ – 19-items food frequency questionnaire, excluding fried potatoes.

\* $p < 0.05$ .  
 \*\* $p < 0.01$ .



**Fig. 7.3** Association of psychosocial mediators in the Body and Soul trial, reprinted with the permission from American Psychological Association (Fuemmeler et al., 2006)

As shown in the Fig. 7.3 the intervention had an impact on post test psychosocial outcomes (autonomous regulation, efficacy, and social support) as well as F & V intake, both prerequisites for mediation analyses. Moreover, change in autonomous regulation, efficacy and social support were significantly related to change in F & V intake. Not surprising, the intervention pathway was attenuated by the inclusion of these mediating variables in the model (0.47;  $p = 0.01$  without mediators vs. 0.34;  $p < 0.01$ , with mediators). However, since the effect of the intervention on changes in FV intake remained significant, the intervention effect was only partially mediated by these variables.

One final diet study that included the TSRQ was the recently published Eat for Life trial (Resnicow et al., 2008). This study was designed to test whether tailoring a print-based fruit and vegetable (F & V) intervention on constructs from self-determination theory (SDT) and motivational interviewing (MI) increased intervention impact. Another aim was to examine possible user characteristics that may moderate intervention response. The primary user characteristic assessed was preference for an expert recommendation.

For this study, African American adults were recruited from two integrated health care delivery systems, one based in the Detroit Metro area and the other in the Atlanta Metro area, and then randomized to receive three tailored newsletters over 3 months. One set of newsletters was tailored only on demographic and social cognitive variables (control condition) whereas the other (experimental condition) was tailored on SDT and MI principals and strategies. The primary focus of the newsletters and the primary outcome for the study was fruit and vegetable intake, assessed

with two brief self-report food frequency measures (FFQ) measures. Preference for an expert recommendation was assessed at baseline with a single item: “In general, when it comes to my health I would rather an expert just tell me what I should do.” A total of 512 (31%) eligible participants, of 1,650 invited, were enrolled, of which 423 provided complete 3-month follow-up data. Considering the entire sample, there were no significant between-group differences in daily F & V intake at 3-month follow-up. Both groups showed similar increases of around 1 serving per day of F & V on the short form FFQ and half a serving per day on the long form FFQ. There were however, significant interactions of intervention group with preference for a recommendation. Specifically, individuals in the experimental intervention who at baseline preferred an expert recommendation increased their F & V intake by 1.07 servings compared to 0.43 servings among controls. See Fig. 7.4 below.

In this study, the TSRQ was also administered, which allowed us to examine the association between preference for a recommendation and TSRQ values. We split the expert recommendation preference variable above and below 6 (below 6 indicating lower desire for a recommendation, or structure, from the practitioner), and then looked at means of the three TSRQ variables. In this study, we split the controlled regulation scale into its two subscales, i.e., introjected and external control. As shown below, at baseline, individuals who expressed high preference for a recommendation (i.e., they agreed with the “tell me what to do” item), had significantly higher introject and external control scores on the TSRQ than those indicating low preference for an expert recommendation. As would be predicted by SDT, those who suffer with higher levels of guilt and perceptions of being externally controlled around these behaviors may feel uncomfortable in making their own decision. Thus,

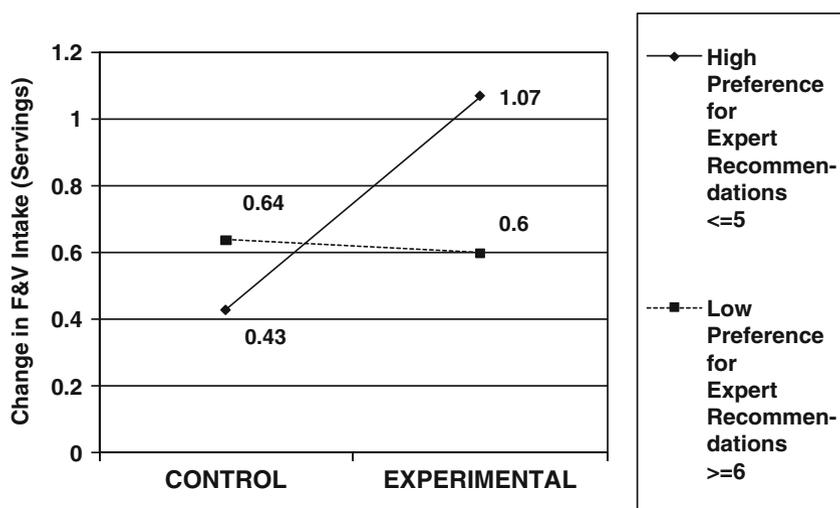


Fig. 7.4 Interaction of F & V change\* with preference for expert recommendation

**Table 7.3** Association of baseline TSRQ values and “preference for an expert recommendation (ER)”: Eat for Life ( $n = 528$ )

	Autonomous	Introjected	External others
Expert $\leq 5$ (high preference for ER)	6.2	3.7	2.5
Expert $> 5$ (low preference for ER)	6.3	4.5*	3.0*

Adjusted for age and gender.

\* $p < 0.01$ .

high levels of introject and perceived external controls are associated with greater dependence on external advice and direction. Variation in level of identified and integrated regulation (autonomy-TSRQ) was unrelated to whether the patient preferred a recommendation to be made. See Table 7.3. This pattern is possible because controlled regulations (EX IJ-TSRQ) are typically orthogonal (largely uncorrelated) with autonomous regulations (ID IN-TSRQ) in the health care domain. The same pattern of findings for the three subscales and preference for a recommendation was evident using posttest TSRQ values as well.

### ***Are There Subgroups Who Express Greater Preference for Expert Recommendations?***

In the EFL sample, there were several demographic characteristics associated with differences in preferences for expert recommendations. Males as well as individuals with income above \$40 k, those under age 40, and those with higher educational attainment all showed a lower preference for expert recommendation in their health decisions. See Table 7.4. This suggests a potential benefit in tailoring the degree of direct recommendations made according to individual or group differences. Perhaps not all individuals want to be fully independent in their health care decision making. Some may in fact respond better when practitioners use a more directive style of communication. This raises some interesting questions about the difference between the two main definitions of autonomy as independence (the non SDT definition of personal autonomy—actions that are done without relation to others) and volition (the SDT definition of personal autonomy—willingness to engage in the behavior for oneself). Thus, the practitioner who provides an expert recommendation would likely be perceived as autonomy supportive if a recommendation is desired by the patient. Conversely, the practitioner would be more likely to be perceived as controlling if he forces the patient to make the choice without him (e.g., independently), if the patient desires practitioners input. When forced to make a decision that the patient may not feel competent to make would be expected to resulting lower energy for maintaining the behavior would be expected to lessen, may raise the patient’s anxiety level and possibly to amotivation. If there is no evidence available on which the practitioner can base make a clear recommendation for treatment, it is the responsibility of the practitioner to inform the patient of that, and then to

**Table 7.4** Preference for recommendation by demographic characteristics in the Eat for Life trial

Prevalence of high preference for expert recommendation ( $n = 562$ )	
Gender	
Male	50%
Female	40%
Income	
<40 k	36%
>40 k	49%
Age	
<40	53%
>40	40%
Education	
<HS	38%
Some college	42%
Complete college	46%

Response 5 or lower on the 7-point item: "In general, when it comes to my health I would rather an expert just tell me what I should do."

work with the patient to decide on the best direction for the patient to go given the lack of evidence (Woolf, 2005), and to provide ongoing care.

Autonomy (e.g., volitionally) supportive practitioners offer a menu of known effective options for treatment, and then provide their recommendation after exploring the patients' wishes about which option to pursue. If the practitioner reflects the patient's perspective back to the patient, and offers a rationale about why to pursue a treatment, if the practitioner wants to check back with her patient to elicit patients' perspective on the advice, it is expected that personal autonomy is increased (e.g., internalized). Thus, providing a menu of effective options for treatment along with an option for not changing is part of the definition of autonomy support.

### ***Summary Personal Autonomy and Dietary Behavior***

Across several studies, most of which were conducted among African Americans, there was considerable consistency in the relationship between dietary behavior and motivation. First, personal autonomy, most commonly measured with the TSRQ (ID IN-TSRQ, and IM), was more strongly related to diet behavior than was controlled regulations and amotivation (AM EX IJ-TSRQ). Second, only autonomous regulation was related to self efficacy. Both of these findings are consistent with suppositions of SDT.

However, although controlled regulation (EX IJ) was more weakly correlated with diet behavior than was autonomous regulation, in several instances the association was nonetheless significant. Given that these studies comprised exclusively African American participants, it is unclear if the moderately strong association

between controlled regulations and diet is unique to this population. This pattern was also found in Portuguese women in the PESO trial (Silva et al., 2009) who are highly Catholic. Previous research has identified associations of religious self-regulations and mental health (Ryan, Rigby, & King, 1993), and perhaps there are common underlying regulations based on religious upbringing that account for these relations. Future cross-cultural studies are needed to explore this issue.

A key issue from an SDT perspective is whether behavior change driven by controlled regulation is less stable than that driven by more autonomous regulation. SDT might, for at least two reasons, posit that changes driven by more controlled regulation would be less enduring than those rooted in more autonomous regulation. First, given that lack of association between controlled regulation and self-efficacy, it is likely that the individual who is externally motivated by exhibit less behavioral persistence in their efforts. Second, because behavior energized by controlled regulations result in poorer well being as shown in many SDT studies described in other chapters in this text, or may be motivated by a form of internal control used by the patient to force himself to behave, or if the individual can learn to manage their negative introjects, through for example a cognitive shift, or an affective shift, or become less susceptible to social pressure, than the behavior from controlled forms of regulation to behave would be attenuated. On the other hand, more autonomously regulated behavior change, particularly when connected to one's deeper values and goals through internalization, would be more enduring. These are important theoretical questions that merit future research.

### *Overall Summary*

Our aim was to review the literature on the relation between personal autonomy and physical well being and the extent to which the association of these constructs generalizes across cultures. The within culture results demonstrate a clear and consistent positive relation between personal autonomy and physical well being in westernized cultures. Four of these studies are randomized clinical trials and provide causal level evidence that interventions intending to facilitate internalization of personal autonomy and did so, and that change in personal autonomy mediated (at least partially) the effect of the intervention on the outcomes of physical activity, abstinence from tobacco, weight loss, dental outcomes and medication use. This pattern is consistent with a causal relation between personal autonomy and health behavior change. Other chapters in this book establish that personal autonomy is associated with psychological well-being. Both improved physical and psychological well-being are important individual outcomes in health care and become combined in important outcomes such as quality adjusted life years used in comparative effectiveness studies that will determine which interventions will be adopted into health care. Thus, not only are interventions intending to increase personal autonomy consistent with biomedical ethics and medical professionalism, evidence reviewed in this book suggests that enhancing personal autonomy will also extend expect life years, and that those life years will be of better quality.

Limitation of our review includes that most of the research reviewed here involved only a single nationality or ethnic group, typically, northern European, and North American whites. A few studies, mostly involving dietary behavior, and one in tobacco dependence treatment, demonstrated this same positive relation in African Americans. Only one true cross cultural study was found linking personal autonomy in the work place with lower levels of functional incapacitation, and this provided evidence that this relation was stronger in China than in the Western countries. Clearly, much more research is needed to confirm that personal autonomy has a stronger relation (or even the same) to physical health in Eastern cultures. This finding is intriguing as it is in the opposite direction than most critics of self-determination theory who consider “autonomy to be a western concept not relevant in collectivist societies.” Perhaps, this stems from SDT’s critics’ confusion over the distinction between volition and independence. In addition, cost-effectiveness of interventions to increase personal autonomy has not been published.

In addition, we noted that introjected self-regulation, which is a less internalized form of personal autonomy, has been found to positively predict greater levels of physical activity and dietary intake, and lower levels of relapse in substance abuse. Why this type of motivation may function differently across health behaviors or cultures merits comments. In Portugal, a culture which is highly shaped by the Catholic Church, introjects may be strong enough to energize some modest amount of long-term health behavior. This pattern was also found in some North American African American church-based samples as well, suggesting that physical health related behaviors maybe weakly motivated by this less internalized form or personal autonomy. We note that in these studies the simplex pattern is still intact, and that only perceived external control is negatively associated with the health outcomes. We do not know how long lasting introjected motivated behavior would be sustained. This is important because SDT predicts that an introject is an impoverished form of energy and isn’t expected to be sustained as long as more autonomous based change. It is likely that some level of introject is internalized while higher levels of self-regulation were internalized in these studies and that it was the autonomous levels of self-regulation (identified, integrated and intrinsic) that sustained the behavior change over time. Further, we would not recommend that clinicians of any type try to motivate others by inducing guilt or shame in their patients as we would expect that it would be associated with poorer emotional well-being as well as less positive long term outcomes. Instead, clinicians are encouraged to facilitate greater levels of autonomous levels self-regulations (identified, integrated, and intrinsic) for their patients. We would also recommend that practitioners elicit patient preferences for treatment, but be willing to provide expert advice in the form of a menu of effective options, when the patient is open to the recommendations.

In conclusion, the evidence in this chapter indicates strong, perhaps causal, evidence that increasing personal autonomy improves physical health. Other chapters indicate that increase in personal autonomy increases psychological well-being. Biomedical ethics has already established that personal autonomy and well-being are the highest level outcomes for health related interventions. Thus, studies that focus on increasing personal autonomy (at the identified, integrated and intrinsic

levels) as the primary outcome are called for and are needed to guide clinical care, medical decision making, and biomedical ethics in all cultures around the world.

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