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Cover Page Footnote

I would like to thank Dr. Suzanne Meeks for her feedback and guidance on this paper.

Self Determination and Health Behavior Interventions

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ABSTRACT

Physical and mental health contribute to a person's overall sense of well-being. People generally want to live happy and healthy lives, so they make decisions that will increase their well-being. Many factors contribute to our health, but health behavior is something we can modify. Health behavior interventions aim to promote healthy choices and a sense of well-being in patients. Interventions have a theoretical basis that influences the design of the intervention. Public health interventions have used self-determination theory (SDT) and its components to guide interventions that promote health behavior change in various populations. This paper will seek to understand the extent to which health interventions that incorporate SDT are successful in encouraging the behavior change they aim to promote. To situate SDT in a broader context, it will be compared to other behavior change theories. Applications of SDT in health behavior change and health support interventions will also be explored to better understand how SDT and how its components are used. Lastly, the limitations of the theory and its effectiveness will be discussed, in addition to the implications of the findings.

KEYWORDS: self-determination theory, SDT, health behavior, health interventions, health psychology

Many factors contribute to a person's health outcomes. In the context of public health and healthcare, health promotion strategies are widely used because they help improve the health of a population, oftentimes targeting a specific health behavior. Many of these interventions rely on a person's ability to adhere to the intervention to ensure maximum effectiveness. Self-determination theory (SDT) is a psychological theory that can serve as the foundational framework for health behavior interventions and support behavior adherence. SDT explains the conditions necessary to promote well-being and motivation, making it a useful tool in guiding interventions that drive change.

SDT, proposed by Ryan and Deci (2000), is a metatheory of human motivation and personality. The theory assumes people have innate growth tendencies and three inherent psycho-

logical needs: competence, autonomy, and relatedness. Competence is feeling like we have done a good job at what we set out to do. Autonomy is feeling like we had a choice and drove the desired behavior or action. Relatedness is having meaningful relationships and interactions with other people. When these needs are met, they help foster our innate growth tendencies, social development, and well-being (Ryan & Deci, 2000).

SDT also includes the concepts of extrinsic and intrinsic motivation. Extrinsic motivation refers to performing an activity to achieve a separable outcome (Ryan & Deci, 2000). Intrinsic motivation refers to doing an activity for the inherent satisfaction of the activity itself (Ryan & Deci, 2000). In other words, extrinsically motivated behaviors are performed due to external pressure or reward, whereas an intrinsically motivated behaviors are

performed for something internal to the activity, such as the fun or challenge of it. The type of motivation affects the likelihood of a behavior becoming internalized and integrated. Behaviors that are internally regulated are more likely to be internalized and consequently maintained compared to externally regulated behaviors.

A person's environment also affects the likelihood a behavior becoming internalized or integrated. Environments that promote a person's feelings of competence, autonomy, and relatedness foster internalization of a behavior. These feelings are promoted or hindered in the context of a built and social environment. In the context of promoting health behaviors, the built environment and social environment play a large role in a person's ability to be healthy. Built environments provide infrastructure for the fulfillment or hindrance of these needs, such as

housing, hospitals, schools, grocery stores, or transportation. Social environments include the culture, people, and institutions where people interact. Social environments promote or inhibit a person's ability to be healthy due to policies, discrimination, or acceptance of various values. An of an environment where a person may be more likely to adopt a behavior could include having a strong support system of family members and healthcare providers, who listen to the patient, and allow them to make decisions for themselves. An example of an environment where a person may be less likely to adopt a behavior would be one where a person had no support or was forced to undergo treatment that they did not choose.

Factors that contribute to a person's health outcomes can be categorized as nonmodifiable or modifiable. Non-modifiable risk factors are not under someone's control and include factors such as age or genetics. Modifiable risk factors can be changed and include health behaviors. Health behaviors are various actions that impact health outcomes, and they can positively or negatively impact health. Examples of health behaviors include engaging in physical activity, smoking, or adherence to prescribed medications. Health behavior interventions target modifiable risk factors, often-times trying to promote behaviors that will positively contribute to someone's health or stop behaviors that will negatively impact someone's health.

Through the lens of SDT, health interventions that incorporate SDT or its components, would be the most effective. Social environments that foster the three psychological needs are important to increasing the likelihood of a behavior being adopted or an intervention being effective (Ntoumanis et al., 2021). Interventions that help a person develop a sense of autonomy and competence are crucial. Such interventions increase the likelihood

a person undergoes the process of internalization and integration of the health behavior (Ryan et al., 2008). Relatedness is important to incorporate into health interventions because people are more likely to engage in behaviors when someone important to them endorses the behavior (Ryan et al., 2008). Behaviors that significant people in a person's life (e.g., partner, practitioners, family members) perform that support their needs, such as providing positive information and feedback, offering meaningful choices, or acknowledging a patient's perspective, also help foster a sense of relatedness (Ntoumanis et al., 2021). Integrating the psychological needs into an intervention would increase the chances of health behaviors being internalized and therefore better maintained (Ryan et al., 2008). This is important because better maintenance of health behaviors would increase the chances of people staying healthy or decrease the likelihood of people's health conditions worsening.

COMPARING SDT TO OTHER HEALTH BEHAVIOR CHANGE THEORIES

It is important to situate SDT in the broader context of behavior change theories to better understand how its components are useful in encouraging behavior change. Common behavior change models used in health interventions include the Health Belief Model (HBM) and Social Cognitive Theory (SCT). The HBM was proposed in the 1950s, and it is an expectancy-value model. Expectancy-value models assume people's behaviors are determined based on people weighing the risks of engaging in a behavior compared to the benefits. The HBM's constructs consist of perceived threat of disease, perceived susceptibility, and perceived disease severity (Rejeski

& Fanning, 2019). Another part of the theory is the decisional balance, where people must weigh the perceived benefits and barriers of a health behavior (Rejeski & Fanning, 2019). The health behavior is a result of the combined effect of perceived threats and decisional balance. Similarly to SDT, the HBM considers the environment as part of what motivates behavior change. However, HBM differs in its underlying assumptions of the motivation behind behaviors. HBM assumes people make decisions that are solely dependent on external factors, rather than internal states. This could also be a limitation of HBM through the lens of SDT, as behaviors that are externally regulated are less likely to be integrated and internalized.

SCT is another theory frequently used as the basis of health interventions. Like HBM, SCT follows an expectancy value model, but it differs in that it includes personal agency and the importance of context in which a behavior occurs. Another important component of SCT is the concept of self-efficacy, which, within the model, is the perceived ability to bring about a certain action in a specific context (Rejeski & Fanning, 2019). Self-efficacy is dynamic and influenced by constructs downstream in the theory, such as outcome expectations, barriers, social relations, and cultural forces (Rejeski & Fanning, 2019). In other words, self-efficacy can increase when there is success with a behavior, encouragement from others, or when the person performing the behavior observes others with fewer skills achieving the behavior. SCT has constructs that are analogous to SDT's, such as competence and self-efficacy and personal agency with autonomy. The components of SCT and SDT still differ because there is a lack of focus on the internalization of behavior that is

derived from autonomy supports (Nget al., 2012). SCT also differs from SDT in that SCT is more concerned with past experiences and the environment contributing to motivations instead of internal states.

APPLICATIONS OF SDT: BEHAVIOR CHANGE INTERVENTIONS

Many health interventions that incorporate SDT or its components are pre-ventative in nature, meaning they aim to stop a disease before it can occur or mitigate the effects of an ongoing illness. The primary level of prevention refers to efforts that seek to stop a disease or injury before it occurs through addressing hazardous exposures or unhealthy behaviors. Many health behavior change interventions occur at the primary level of prevention. To be more effective at promoting healthy habits and ensuring their maintenance, health behavior change interventions aim to foster a sense of autonomous motivation within a person.

Chatzisarantis et al. (2012) tested a physical activity (PA) intervention program with three different conditions based on varying levels of autonomy support: autonomy support, forced-choice, and rationale-only. Participants (N = 152) were sedentary undergraduate students and were randomized into one of the three conditions gym access for two weeks. The goal of the study was communicated to participants, where they were encouraged to go to the gym at least eight times before the study ended. The autonomy support condition acknowledged difficulties and provided participants with a choice regarding if they would like to exercise. In the forced choice condition, participants were shown a compulsory message they needed to exercise as part of the

study. In the rationale-only condition, participants only read the initial messages. Gym attendance was used as a proxy variable for PA, and other variables measured included past physical activity behavior, perceived autonomy support, and perceived competence. Chatzisarantis et al. (2012) found significant positive relationships between PA participation and perceived competence and perceived autonomy. In addition, perceptions of competence were higher in those who were in the autonomy supportive condition compared to those in the forced choice or rationale only condition, implying the potential impact of different components of SDT on one another. Lastly, participants who were in the autonomy support condition were more likely to participate in and endorse the intervention than those in the other conditions.

Chatzisarantis et al. (2012) addressed limitations including the generalizability of the findings and the use of a proxy variable. The study was conducted on a college campus, where participants were recruited through advertisements that offered them free access to a fitness center. There is potentially something systematically different about people who would respond compared to those who would not. In addition, the proxy variable for PA was gym attendance, however, the variable did not measure the duration, type, or intensity of the PA occurring.

Silva et al. (2009) explored a weight control intervention based on SDT by implementing a weight management program for a year. Participants (N = 239) were women between the ages of 25 and 50 years who were premenopausal, not pregnant, and having a BMI between 25 and 40 kg/m². Participants were randomized into one of two conditions: one condition promoted autonomous forms of exercise and intrinsic motivation, while the control group received general health education. In the intervention group,

30 sessions were conducted over the course of the study period covering PA, diet, body image, and other cognitive and behavioral content, where the intervention team aimed to promote a sense of autonomy. In the control group, there were 29 sessions conducted over the study period, where participants received various courses on healthy/preventive nutrition, stress management, self-care, and effective communication skills. Silva et al. (2009) measured body weight and body composition, self-reported physical activity, and general and exercise SDT-relevant psychological variables. They found the intervention group showed increased weight loss and higher levels of physical activity/exercise compared to controls. Intervention targets, such as more autonomous self-regulation and more perceived autonomy support in treatment had large effect sizes, which supported the intervention (Silva et al., 2009). Limitations discussed by Silva et al. (2009) included the lack of a baseline assessment for the various outcomes and sample. While Silva et al. (2009) determined there were not differences regarding the demographics or general SDT variables, it cannot be ruled out that the groups were different at baseline. The sample was entirely composed of females, aged 25 to 50 years, who were not pregnant or taking any medications (such as antidepressants) that would impact their weight regulation. The exclusion criteria for participants calls into question the external validity of the study since many of the findings are not generalizable to the broader population.

APPLICATIONS OF SDT: HEALTH SUPPORT INTER- VENTIONS

In addition to health behavior change, many SDT interventions are focused on health support. These are designed to help support treatment for people with an ongoing, chronic condition, which is also a form of prevention. The tertiary level of prevention aims to reduce the severity of a disease and any further

associated effects using treatment or therapies. SDT health support interventions are also focused primarily on autonomy supports to help facilitate a sense of choice within patients during their treatment. Many SDT interventions have focused on managing diabetes or heart conditions.

Yun et al. (2020) aimed to assess the impact of a social support intervention or autonomy support intervention for people with type 2 diabetes in achieving glycemic control and maintaining it for an extended period. Eighteen community healthcare stations were randomized into one of three groups: the usual care group (UCG), social support group (SSG), and autonomy support group (ASG), while participants ($N = 364$) were enrolled one of the three treatment conditions (Yun et al., 2020). Participants were from a previous cross-sectional study that served as a pilot study for the current study. The UCG served as the control group and were provided with diabetes self-management (DSM) education from community doctor every three months. The SSG received the control intervention with the addition of support from doctors, peer leaders, and family. A handbook was also given to family members to offer support for patients with diabetes. In the ASG, participants received the social support intervention, but education was pre-sented through the framework of the psychological needs from SDT, with each being integrated into treatment. Yun et al. (2020) measured blood sugar levels and DSM behaviors, and they found patients in the ASG had more reduction at the end of intervention than those in the UCG. Participants in the SSG did not experience significant change compared to the UCG. Patients in the ASG and SSG also had improvement in DSM behaviors, but it was maintained for longer in the ASG group. Limitations addressed by

Yun et al. (2020) include the location of where the study was conducted and the age of the sample. The study was conducted in urban Chinese communities that had high economic statuses, which meant doctors had higher professional competence to conduct interventions. It was also found the in-tervention was better suited for older individuals because they are not em-ployed as often, meaning they would not be lost to follow-up.

Dunbar et al. (2013) sought to study the impact of an intervention involving family partnership and education for people with heart failure (HF). Participants and family dyads ($N = 117$) were recruited from three large university outpatient HF clinics. Participants and family dyads were randomized into one of three conditions: usual care (UC), patient-family member education (PFE), or a family partnership intervention (FPI). The UC group received an informational brochure, patient education, and usual care from providers. Patients in the PFE group received an education session, and reinforcement after two months, four months, and five months. In the FPI group, participants received the same intervention as the PFE group at the two month mark, with the addition of two small group sessions that discussed reinforcing dietary and medication education with patient and family members. In addition, there was follow up at the four and five month mark, with families also receiving tips about autonomous communication. Dunbar et al. (2013) measured MA and dietary sodium (Na) intake, and it was found that dietary Na intake was improved by PFE and FPI compared with UC. Dunbar et al. (2013) also found the

UC was less likely to be adherent with dietary Na than the intervention groups. Limitations addressed by Dunbar et al. (2013) include patient attrition, families not being blind-

ed to their condition, and imprecise dietary Na measures. Dunbar et al. (2013) stated patients with HF have frequent hospitalizations and severe symptoms, making it difficult for them to attend an outpatient intervention at times. As a result, there was missing data for some patients. Since patients and their families were not blinded to their condition, it is possible bias was introduced when patients learned about an outcome related to the study specific to themselves. This introduced the possibility that participants could manipulate their results based on the education they received in their intervention. However, Dunbar et al. (2013) says it is highly unlikely measurements could be manipulated based solely on the education patients received. Dietary Na was a self-re-port measure and could be inaccurate due to incomplete self-report or other medications. Dunbar et al. (2013) stated other studies have not found an objective measure for dietary Na, making it difficult to standardize

THE LIMITATIONS OF SDT

While SDT is useful in health interventions as an underlying theory, it still has limitations regarding the degree to which people will change their behaviors. Multiple meta-analyses have addressed the effectiveness of interventions based on SDT, the effect sizes, and the relationship between various SDT constructs and health outcomes. A meta-analysis conducted by Ng et al. (2012) examined literature testing SDT used in healthcare and health promotion settings. They intended to examine the effect sizes of the associations between the SDT constructs and indicators of mental and physical well-being. One hundred eighty-four studies were cited, and effect sizes were found to be moderate for needs satisfaction. SDT constructs

were found to also predict higher levels of patient welfare, such as better mental health or higher levels of health behaviors linked to longer length of life. Ng et al. (2012) discussed the general limitations they found from their meta-analysis, stating many studies were correlational in nature, so causality could not be determined. When using cross-sectional studies, Ng et al. (2012) also stated the direction of the relationship between autonomous regulation in a patient and the provision of autonomy support from a provider could be bi-directional, making it unclear if it is interventions that help patients or if it is a disposition a patient already possesses. Additionally, more studies are needed that address longitudinal data to examine the extent to which behaviors are internalized. This would better explain the impact of SDT, since there is a focus on the internalization, integration, and maintenance of a behavior.

Another meta-analysis conducted by Sheeran et al. (2020) analyzed randomized control trials that promoted health behavior change based on SDT. They aimed to quantify the impact of SDT on health behaviors, test mediation by specific variables (autonomous regulation and perceived competence) and identify moderators of intervention effectiveness. Fifty-six articles were identified and reviewed, with statistical analysis performed to determine the effect sizes and mediating factors. It was found the effect sizes were moderate, but were significant for physical activity, sedentary behavior, diet, alcohol consumption, and smoking. Autonomous motivation and perceived competence were also found to mediate intervention effects on behavior.

Sheeran et al. (2020) speculated various reasons explaining why effect sizes were small, including the difficulty of implementing autonomy supports if healthcare providers are not used to

doing so. Healthcare providers play an important role in a person's care, and their communication and treatment of a patient impacts the patient's perception of their autonomy, competence, or relatedness as it relates to their care. Without patients feeling like they have autonomy or are perceived as competent by their providers, it could negatively impact if the patient is willing to adhere to treatment. People who are in positions of authority may have a difficult time switching to a needs-based communication style because of personality predispositions, in addition to cultural norms of a hierarchical structure in healthcare. Sheeran et al. also highlighted the tension between public health goals and SDT's emphasis on the individual. Public health utilizes individual level theories for population intervention design, but there are inherent limitations to individual level theories. They often do not consider external influences, such as the environment or the social determinants of health.

Sheeran et al. (2020) also provided recommendations for increasing the change in health behaviors. They addressed the limitations of SDT, including the intention behavior gap, unconscious motivation, and the fact that health behavior does not occur in isolation. The intention behavior gap highlights the issue that not all motivation translates to action. Motivation is a stepping-stone into action, but it does not guarantee that it will occur. Another issue SDT does not address is unconscious motivation, which takes the form of habits or implicit associations. SDT is an individual level theory, and while it does discuss how environments can be used to support the psychological needs, more research needs to be conducted on how structural and societal barriers can hinder and interact with the psychological needs.

The body of literature examined in this paper consisted of studies with different samples. Chatzisarantis et al. (2012) had a sample of young adult college students with a roughly equal number of males and females. Silva et al. (2010) had a sample of adult women, and Yun et al. (2020) had a sample of adults. Dunbar et al. (2013) had a sample with mostly males, predominantly African American, and older age. The studies examined do cover different ages within the population, but they do not cover as much about older adults. In addition, the lack of description of participants demographics from Yun et al. (2020) makes it difficult to determine the generalizability of the findings to the population. While the samples from the various studies did cover a variety of demographics, more studies exploring older adults and non-white people would help the findings be more applicable to the general population.

CONCLUSION

SDT is unique because it focuses on facilitating internal regulation through the interventions designed to support feelings of competence, autonomy, and relatedness. This makes it useful in healthcare interventions that aim to promote behavior change and support ongoing treatment. Many studies focus largely on creating environments that support autonomous motivation, and competence and relatedness are sometimes added to enhance an overall sense of autonomous motivation. In the context of health behavior change interventions, which are more preventative in nature, interventions oftentimes seek to integrate long-lasting behaviors. Treatment support interventions also focus more on social support since many loved ones are potentially involved in the care of the patient of concern.

The literature indicates SDT is a useful theory for health interventions, however, it has its limitations. As an individual level theory, SDT lacks an ability to solely explain the role of the environment on someone's motivation. In addition, the theory only explains motivation, and while interventions and studies did examine behavior change, many did not have a follow-up period to determine the maintenance of behaviors in the long run. As a whole, not many studies regarding SDT and health interventions incorporate a longitudinal design, so an area of future research is looking at whether behaviors are maintained for more than the duration of an intervention. Other future directions for research could be in assessing the role of social and structural factors as they relate to components of SDT. Since health behaviors do not occur in isolation, and individuals are embedded in a society, it is important to understand what is needed within the environment to support an individual's ability to make healthy choices. In doing so, SDT can be combined with other theories of health behavior to ensure people receive interventions that support their internal and external needs.

In summary, SDT is a robust theory, covering human motivation and personality, making it have many applications in a variety of fields. As it relates to the field of healthcare and health promotion, it has been useful in preventative measures and supporting patients with ongoing treatment. Interventions applying components of SDT have been shown to be effective, through demonstrating the importance of autonomy support in healthcare provision. While research still needs to be conducted to better understand the extent to which SDT is effective over time, research has indicated that it is effective in helping patients achieve better health outcomes and well-being.

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