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Belief in free will: Integration into social cognition models to promote health behavior

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ABSTRACT

The question of whether free will exists has been debated extensively for centuries. Instead of debating this complex issue, recent work in psychology has sought to understand the consequences of beliefs in free will. That is, how are people's behaviors influenced when they either believe or do not believe in free will? Amongst many outcomes, research has identified free will beliefs to influence achievement, perseverance, and aggressiveness. We believe that beliefs in free will could also exert influence on health behaviors. Health promotion from a psychological perspective has typically adopted social cognitive models to understand and predict health behaviors. We contend that free will beliefs could be included in these models to understand and change health behavior. We provide examples of how a popular social cognition theory, the theory of planned behavior, could be aligned with beliefs in free will. We suggest that the relationship between free will beliefs and theory constructs (attitude, subjective norm, perceived behavioral control, intention) could be positive in health enhancing behaviors and negative in health risk behaviors. Experimentally testing these relationships is needed in future research. This may provide further insights into the consequences of free will and contribute to the explanation of health behavior.

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Introduction

Interest in free will and its existence has been debated for centuries (Baer et al., 2008; Dennett, 1991). In a broad sense, behavior can be considered either a consequence of willful action whereby individuals are able to choose between alternative behaviors in any given situation or a consequence of determinism whereby individuals can only behave in one possible way, namely the one that is determined by the antecedent situation (Kane, 2002). Moving beyond a philosophical debate, albeit an interesting one, research in psychology has focused recently on the

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consequences of these beliefs. That is, how do people behave when they either believe their behavior is a consequence of free will or determinism? Notwithstanding issues of replicability, studies addressing this question have found interesting results. Specifically, both positive and negative outcomes have been demonstrated by free will believers and nonbelievers. The influence of free will beliefs has been suggested to operate through different mechanisms. However, as far as we are aware, no link has been made to the potential relationship between free will beliefs and psychological social cognitive models. These models have proved popular when attempting to understand and change health behaviors (Hagger et al., 2020). The main purpose of this paper is to illustrate how beliefs in free will can be integrated with models of social cognition. To do this, we firstly introduce the main positions relating to free will and then provide definitions from the layperson. Following this, we outline and discuss research examining the consequences of free will beliefs. We then suggest how theories of social cognition can be integrated into the free will debate to potentially understand and intervene on health-related behaviors. We use a popular theory, the theory of planned behavior (Ajzen, 1991), to illustrate these relationships. We then conclude by recommending future directions for work in this area.

Positions on free will

The concept of free will is complex and often difficult to define. Definitions have been provided from different perspectives which often contrast (Lavazza, 2019). Moreover, laypersons' understanding of free will substantially differ to that of philosophers. Free will has been defined by whether an individual has the ability to do otherwise, whether an individual has control over choices, and whether an individual is responsiveness to reasons (Walter, 2001). Baumeister (2017) described free will as "the capability to act in different ways, subject to the person's own control and serving the person's reasons, goals, wishes, and choices" (p. 68). Beyond definitional issues, positions vary about the extent to which actions are made freely. At the most extreme are libertarians who believe people are freely able to make choices and enact behavior. Some libertarians are incompatibilists and regard free will as being incompatible with determinism. That is, a world with free will cannot coexist in a world with determinism. A softer position is taken by compatibilists who believe determinism does not undermine free will. According to this position, free will can exist even if determinism is true, with external factors not entirely responsible for action. In this way, consciousnesses need not be the sole nor original cause of behavior (Baumeister & Bargh, 2014). For example, dualism, which asserts an ontological difference between mind and matter, suggests the latter may be

caused by physical properties in the brain but the former is a separate, nonphysical entity (Mele, 2014).

Similar to the many positions supporting free will, there have been equally as many rejecting it. Determinism, in the hard sense, concerns the causality of universal laws, conditions and physical properties (Caruso, 2012). That is, outcomes are assumed to be inevitable consequences of the laws of nature. It denies both that humans are the original source of action and that they are able to act otherwise. Determinism is often misaligned with fatalism which is the idea that outcomes would have happened regardless of a person's actions. Determinists take an incompatible view by asserting free will cannot exist in a deterministic universe. Some suggest free will is merely an illusion disguised within phenomenological experience (Bargh, 2008; Libet et al., 1983; Wegner, 2002). In a famous experiment, Libet et al. (1983) found brain activity associated with initiating an action occurred before participants reported deciding to take the relevant action. According to Wegner (2002), the illusionary will is a consequence of experiencing a conscious will before an action that is consistent with the will and exclusive to the will. Therefore, a thought can precede an action, be consistent with the action, but not cause the action. An individual consistently thinking of a falling tree branch and then experiencing the branch falling cannot infer that this action was a consequence of the thought (Wegner, 2002). Bargh (2008) suggests most behavior and mental processes, including the illusion of free will, are a consequence of unconscious, determined influences.

An interesting inclusion to the debate is indeterminism which suggests behavior cannot be predicted a priori. Quantum mechanics has established that all things are probabilistically rather than absolutely determined (Suarez & Adams, 2013). Libertarians argue this refutes determinism; randomness is not determined. Determinists, however, believe this does not support the notion of free will. That is, if behavior is subject to randomness, it is certainly not under control of the will. Moreover, the randomness of quantum mechanics does not mean the randomness is not causal; indeterminism is not an absence of causation but rather reflects the presence of non-deterministic causal processes (Fetzer, 1988). An interesting position thus ensues; indeterminism is incompatible with both free will and determinism, and free will and determinism are incompatible with each other. To circumvent this, hard incompatibilism seeks to include both determinism and indeterminism whilst maintaining an incompatible position against free will (Pereboom, 2006). There are many other positions inscribed in the free will debate we have not introduced. However, the purpose of the above was to outline the main philosophically debated positions.

How do laypeople define free will?

Whether people possess free will has dominated philosophical thought for centuries and the complexity of this debate has not abated with time. However, researchers have recently sought to go beyond rational speculation and instead use empirical methods to establish how laypeople or “the folk” understand free will. When asked to define free will, Monroe and Malle (2010) found laypeople identified three main categories: (1) decision or choice, (2) following one’s desires, and (3) overcoming constraints. The most popular definition related to free will being a decision which suggests participants believed free will to be a question of choice. In a second study, they found nearly half of participants rejected the claim that free will is an illusion, with the majority of those stating the ability to choose supported this position. Stillman et al. (2011) found free will was associated with reaching goals and moral behavior, and Nahmias et al. (2005) found that when presented with deterministic scenarios, participants still maintained free will was present.

Given the above, the intuitive nature of free will, and the belief that individuals agentically organize their world in line with relevant aspirations, expectations, and goals (Bandura, 1977), it may be expected that ordinary people unfamiliar with the debate would assume an incompatibilist position in favor of free will. Indeed, most people do believe that they possess free will (Baumeister et al., 2009; Nadelhoffer et al., 2014; Paulhus & Carey, 2011). However, it appears that folk people can find room for a compatibilist world in which both free will and determinism exist. When measuring lay beliefs, Paulhus and Carey (2011) found scores on a free will subscale were not significantly correlated with scores on a scientific determinism subscale. Similar findings were obtained by Nadelhoffer et al. (2014). Unlike an incompatibilist position, which would necessitate a negative relation, these findings suggest laypeople view free will and determinism as compatible. This has been further supported by research demonstrating a positive correlation between beliefs in free will and determinism (Nahmias et al., 2006; Wisniewski et al., 2019). Taken together, this suggests laypeople can incorporate both free will and determinism into their belief system. Examination of the free will-indeterminism relation has demonstrated similar findings. That is, rather than demonstrating an inverse association, no correlation between indeterminism and free will has been found. This suggests laypeople do not necessarily believe indeterminism is a requirement for belief in free will. Moving from definitional interpretations of free will, research has recently investigated the consequences of such beliefs.

The influence of free will beliefs

Research examining the consequences of free will beliefs demonstrate that the debate is not just a philosophical concern but, perhaps more importantly,

influences how people think and behave (Baumeister & Brewer, 2012). Replication efforts aside, studies have found a number of outcomes for believing and not believing in free will. In a pioneering paper, Vohs and Schooler (2008) provided participants with an excerpt from Francis Crick's *The Astonishing Hypothesis* which argued free will is an illusion (study 1). In study 2, they adopted the Velten (1968) procedure by asking participants to read 15 statements addressing free will. These statements were in support of free will, against free will, and neutral. They found that the passage provided in study 1 led to increased cheating compared to a control condition. Moreover, participants who read deterministic statements in study 2 engaged in cheating whereas those who read free will statements did not. This suggests that when compared to disbelieving in free will, pro free will beliefs have positive outcomes. From these studies, other researchers have examined the impact of free will, typically using the manipulations adopted by Vohs and Schooler (2008). It has been found that those believing in free will demonstrate better job performance (Stillman et al., 2010), set more meaningful goals (Crescioni et al., 2016), show greater academic achievement (Feldman et al., 2016), persevere more (Li et al., 2018), and are more autonomous (Alquist et al., 2013). Interestingly, Pronin and Kugler (2010) found that participants perceived themselves to personally have greater free will than other people.

Disbelief in free will has been shown to lead to aggression (Baumeister et al., 2009) and to alienate people from their true selves (Seto & Hicks, 2016). Moreover, those with weaker free will beliefs have demonstrated a greater history of addiction (Vonasch et al., 2017) and gambling behavior (St Quinton et al., 2022). Other studies have shown that participants' belief in free will influences how they think about the actions of others. Shariff et al. (2014) examined the consequences of free will beliefs on retributive punishment. They found that when beliefs in free will were reduced, participants shifted toward less retributive punishment. Participants believed that punishments should be more lenient if behavior is not undertaken freely. Similarly, Krueger et al. (2014) demonstrated more punitiveness was given by those believing in free will. It appears that believing people are the driver of behavior provides a moral justification to hold people responsible when bad has happened. Such justifications are not appropriate, however, if free will does not exist (Caruso, 2013). It should be noted that the negative implications of reduced free will has been questioned (Caruso, 2013; Miles, 2013) and study findings have not always replicated (e.g., Buttrick et al., 2020; Crone & Levy, 2019; Embley et al., 2015; Genschow et al., 2021; Harms et al., 2017; Monroe et al., 2016; Nadelhoffer et al., 2020). Indeed, a number of studies have failed to replicate the findings of Vohs and Schooler (e.g., Buttrick et al., 2020; Embley et al., 2015; Monroe et al., 2016; Nadelhoffer et al., 2020). For example, over a series of pre-registered studies, Nadelhoffer et al. (2020) found free manipulations had no relationship with immoral behavior.

Several reasons have been given for the effects of free will beliefs. Disbelieving in free will has been proposed to lead to a subtle reduction in people's willingness to exert control over impulses (Baumeister, 2008). Thus, in the absence of free will people become less motivated to control impulses and subsequently act on urges. Given that a lack of free will may make an individual believe that they could not have acted in any other way, undermining free will could provide people with an excuse to act in undesirable ways (Smilansky, 2000). In contrast, those believing in free will may exert more effort to overcome impulses and act in accordance with moral norms and society standards. Indeed, some findings suggest that belief in free will supports a sense of personal responsibility and accountability (e.g., Clark et al., 2014; Monroe et al., 2014), something which may make people feel that they ought to behave in socially desirable ways. Free will has been suggested to have evolved over time to regulate social behavior and enable humans to locate their place within society (Baumeister, 2005). Free will may also provide motivational properties and the feeling that positive actions can be again repeated in the future (Bargh, 2008).

Summary

We have so far introduced free will and associated positions, outlined how laypeople define free will, and demonstrated the influence that belief in free will has on behavior. As we showed, free will beliefs have been associated with both positive and negative behaviors. However, it should be noted that this research examined the *consequences* of believing versus disbelieving in free will and are therefore agnostic as to whether free will actually exists. Nevertheless, people's beliefs about free will appear to have important implications for thought and behavior. We believe that perceptions of free will could also be associated with participation in health behavior. The rest of the paper will outline how free will beliefs could be integrated with popular social cognition theories to understand and intervene on various health behaviors. We first provide a brief introduction to these theories, followed by possible integrations and avenues for future research.

Social cognition and free will

Theories in the social cognitive tradition typically adopt conscious processes to predict and explain human behavior (Conner & Norman, 2015). These theories have been applied to understand and change many health-related behaviors such as physical activity, alcohol consumption, fruit and vegetable intake, and smoking (Hagger et al., 2020). The theory of planned behavior is a prominent model of social cognition that has been widely applied to health behavior (Ajzen & Schmidt, 2020). The

theory asserts that the proximal determinant of behavior is a behavioral intention which represents an individual's decision to exert effort to perform the behavior. Intentions are influenced by three determinants: attitude, subjective norm, and perceived behavioral control (PBC). Attitude relates to the evaluation of a behavior, whether that be positive or negative. Subjective norm refers to the normative influences of significant others (i.e., family, friends, general physicians). PBC shares similarities with self-efficacy and concerns the amount of control an individual perceives themselves to have over a behavior. To the extent that PBC reflects actual control, the construct is suggested to directly influence behavior. Meta-analytic studies have attested to the validity of the theory with constructs predicting intention and behavior across a number of behavioral domains (e.g., Armitage & Conner, 2001; Haus et al., 2013; McEachan et al., 2011).

The theory enables room for additional individual and social influences on behavior, with such influences acting as distal predictors of intention and behavior (Ajzen, 2011). Specifically, the theory suggests any additional effects are mediated through model constructs (e.g., attitude, subjective norm, and PBC). For example, theory constructs have shown to mediate background factors such as personality (Conner & Abraham, 2001; McEachan et al., 2010) and empathy (de Leeuw et al., 2015). Considering theory constructs can usefully outline the paths through which behavior is influenced by distal predictors. These social cognitive constructs could also enable an explanation as to how free will beliefs are associated with health behavior. To support this proposition, Hagger and Hamilton (2022) recently examined the effects of free will beliefs on intention to engage in vaccination boosters. The authors found these effects were fully mediated by social cognition constructs, specifically attitude, subjective norm, and PBC. However, work examining these relations has been limited to date. Nevertheless, there are a number of potential relationships between beliefs in free will, social cognitive constructs, and health behavior. Beliefs in free will, whether strongly or weakly endorsed, could directly influence participation in both health enhancing and health risk behaviors. Moreover, the influence of these beliefs could operate through social cognition constructs. In this sense, free will beliefs in relation to the theory of planned behavior can be considered a background factor. These potential relationships will now be discussed and are shown in [Figure 1](#). We first suggest how beliefs in free will could be associated with health behaviors and then explain how free will beliefs could influence the social cognitive constructs outlined in the theory of planned behavior.

We previously mentioned how people with behavioral addictions have been shown to possess weaker beliefs in free will (St Quinton et al., 2022; Vonasch et al., 2017). Additionally, we outlined how free will beliefs have

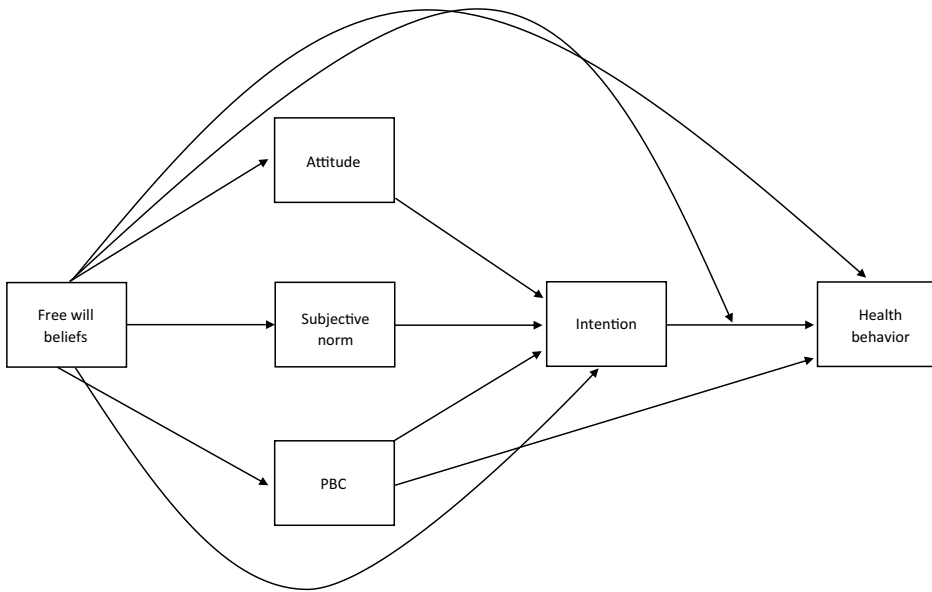


Figure 1. Diagram outlining the proposed relationships between free will beliefs, theory of planned behavior constructs, and health behavior. In accordance with the theory of planned behavior, intention is influenced by attitude, subjective norm, and PBC, and health behavior is directly influenced by intention and perceived behavioral control. Free will beliefs can act as a direct predictor of (a) health behavior, (b) intention, (c) attitude, (d) subjective norm, and (e) PBC. Free will beliefs can also be a distal predictor of (f) intention and (g) health behavior, and (h) a moderator of the intention-health behavior relationship.

been positively associated with perseverance, autonomy, and the goals people set. Such traits are also important for undertaking health behaviors (Bandura, 2004; Deci & Ryan, 1985). For example, it is often the case that successfully adopting a health behavior requires overcoming barriers and persevering in difficult moments (Schwarzer & Luszczynska, 2015). Taken together, we therefore believe free will beliefs could play a role in influencing behaviors associated with health. We specifically suggest that free will beliefs could be positively associated with health enhancing behaviors and negatively associated with health risk behaviors, and these effects could differ depending on whether free will beliefs are weak or strong. For example, people holding stronger free will beliefs could engage in greater health enhancing behaviors (e.g., physical activity, fruit and vegetable consumption) than those possessing weaker beliefs in free will. In contrast, weaker beliefs in free will could lead to greater participation in health risk behaviors (e.g., smoking, alcohol consumption, gambling). That is, health risk behaviors may be a consequence of a disbelief in free will. Rather than directly affecting behavior, which is a possibility, the influence of free will on health behavior could be mediated by specific psychological mechanisms. More specifically, we believe free will beliefs could influence the psychological

constructs outlined in the theory of planned behavior, namely attitude, subjective norm, PBC, and intention. These psychological constructs would then influence health behavior, in accordance with the theory.

Perceptions of whether or not free will exists could have an impact on certain attitudes toward health behaviors. Greater belief in free will has generally been associated with more prosocial and less antisocial behavior (e.g., Baumeister et al., 2009; Stillman et al., 2010). It may also be the case that free will beliefs are positively associated with attitudes towards health enhancing behaviors and negatively associated with attitudes towards health risk behaviors. That is because the extent to which a person assumes behavior is driven freely could lead to the development of either a positive or negative general outlook about health behaviors. For example, holding the belief that one has control over choices and is able to generate personally salient wishes and desires may lead to more positive attitudes towards physical activity. In contrast, a person not holding such views and therefore believing less strongly in free will could hold more negative evaluations about the behavior. Considering past findings on the relationship between free will belief and prosocial behavior, as well as between free will belief and punitiveness (Krueger et al., 2014; Shariff et al., 2014), stronger beliefs in free will could lead to negative attitudes towards detrimental health behaviors traditionally known as “vices” (e.g., smoking, drinking, and drug use). Conversely, those believing less strongly in free will may have less negative attitudes towards health risk behaviors such as substance use.

Beliefs in free will could impact how much control a person perceives to have over health behavior. It is important to note the difference between PBC and free will. PBC concerns a person's perception about the easiness or difficulty to carry out a behavior. Free will, however, relates to a broader concept of choice and freedom. Therefore, a person could believe strongly in free will, but they may not believe they have the skill to successfully execute a behavior. Conversely, they could lack belief in free will, but believe they can execute the task. Of course, a person could believe strongly in free will and have high PBC, or they could hold weak free will beliefs and have low PBC. But these concepts are distinct and need not align. Similar distinctions have been made between free will beliefs and other constructs pertaining to control. For example, despite observed correlations (Paulhus & Carey, 2011), belief in free will is not synonymous with locus of control, which refers to the degree to which a person perceives behavior is internally or externally controlled (Rotter, 1966).

Whilst identifying differences between free will beliefs and other concepts related to the self, Feldman (2017) suggested free will beliefs are associated with self-efficacy perceptions. Crescioni et al. (2016) found a positive relationship between beliefs in free will and self-efficacy. That is, those with higher belief in free will had stronger perceptions of self-efficacy. These

findings could also relate to many health behaviors; if people believe more strongly in free will, they may also perceive themselves to possess the ability to undertake health enhancing behaviors. Suppose that, although he knows broccoli is a healthy food, John's automatic reaction to vegetable is "yuck." If John believes that he ultimately determines his own actions, he might be motivated to overcome that reflexive disgust and eat the broccoli. If, however, he believes that his actions are the result of freedom of choice, he may resign himself to a broccoli-free existence. Such individuals may also believe in their ability to control health risk behaviors. Conversely, if people do not believe their decisions are made freely, they could be less likely to believe in their ability to perform health enhancing behaviors and to control their participation in risky health behaviors. For example, perceptions of whether or not an individual has the ability to engage in physical activity and refrain from consuming alcohol could be dependent on the extent to which the individual believes they are freely making these decisions. Believing that you are making such decisions could lead to greater control over performing physical activity and refraining from alcohol consumption.

The influence that significant others have on a person's decision to engage in health behavior could be influenced by beliefs in free will. It was earlier outlined that people perceive themselves to possess greater free will than others (Pronin & Kugler, 2010). It was also shown that those believing in free will exert greater autonomy over their behavior and are more likely to resist pressure to conform (Alquist et al., 2013). Taken together, free will beliefs could play an important role in how others are perceived in reference to health behaviors. People may refrain from behaviors approved and undertaken by significant others, especially if they are detrimental to health. For example, if close friends are smokers and would approve of a person smoking themselves, believing in free will could render these influences trivial, thereby demonstrating a negative association. In contrast, those with weaker beliefs in free will could simply conform to the expectations and pressures of others to perform the behavior. The impact of significant referents on health risk behaviors may therefore depend in part on whether people believe they are in control of their decision-making. This effect might be a double-edged sword however, as a reduced tendency to conform might also serve to insulate individuals from the positive influences of those in their life.

Finally, belief in free will could also relate to intention toward health behavior. Specifically, belief in free will could be positively associated with intentions to perform health promoting behaviors and negatively associated with intentions to refrain from health risk behaviors. Crescioni et al. (2016) found that participants who believed more strongly in free will also set more meaningful life goals, and Li et al. (2018) found that greater belief in free will was associated with greater perseverance. There is also evidence from

domains outside of health (Feldman et al., 2016; Stillman et al., 2010) that greater belief in free will is associated with greater life success. As such, greater belief in free will might increase the likelihood that a participant would set and adhere to positive health goals. Conversely, weaker beliefs in free will could lead to weaker intentions to perform health enhancing behaviors and to refrain from health risk behaviors. For example, those believing in free will may have stronger intentions towards healthy eating compared to those with weaker free will beliefs. Moreover, people possessing weaker beliefs in free will may have stronger intentions towards gambling.

It should be noted that the theory of planned behavior specifies intention to be determined by the three determinants outlined above. Therefore, whether a person develops an intention to perform these health behaviors may not be directly affected by free will beliefs but could rather be dependent on the weight of these constructs. In addition to these effects on intention, it may also be that free will beliefs moderate the intention-behavior relationship. That is, whether an intention leads to behavior could be dependent in part on the extent to which one believes in free will. The intention-behavior relationship may be strengthened when people hold (a) stronger free will beliefs toward health promoting behaviors or (b) weaker free will beliefs towards health risk behaviors. That is, a person is more likely to enact an intention towards a positive health behavior when beliefs in free will are high than when they are low, and they may be more likely to enact an intention towards a negative health behavior when beliefs in free will are low than when they are high. The opposite may also be true; people may be less likely to implement an intention towards a positive health behavior when beliefs in free will are low than when they are high, and they may be less likely to implement an intention towards a negative health behavior when beliefs in free will are high than when they are low.

The examples provided above align free will beliefs to the psychological mechanisms specified in the theory of planned behavior. However, these are only illustrative examples and the impact of free will could also operate through psychological mechanisms outlined in other models of social cognition. For example, intrinsic motivation, which features prominently in Self-Determination Theory (Deci & Ryan, 1985), could also be associated with free will beliefs. Intrinsic motivation refers to doing something because it is inherently pleasurable, and it could be that those endorsing free will also hold greater intrinsic motivation to perform health behaviors. Free will has been found to lead to perseverance (Li et al., 2018) and so it would be unsurprising if coping self-efficacy, which represents the beliefs about a person's ability to cope with barriers and setbacks (Schwarzer, 2008), is also related to free will beliefs. Again, these are only illustrative examples, and the influence of free will is likely to be associated with other

psychological mechanisms. There are also additional health behaviors that could be influenced by beliefs in free will, in addition to the examples provided (e.g., sedentary behavior, limiting sugar intake, condom use).

Future recommendations

We have suggested that beliefs in free will could be associated with health behavior and social cognitive constructs. Research is needed to establish whether health behavior is influenced by possessing such beliefs. Future research should specifically investigate the impact of free will beliefs on the psychological constructs discussed and the resulting impact on health behavior. Direct effects of free will beliefs on health behavior would provide evidence for the impact of free will on behavior. Indirect effects of free will beliefs on health behavior through social cognitive constructs would provide evidence of mediation. In accordance with the theory of planned behavior, free will beliefs would impact attitude, subjective norm, and/or PBC, and these effects would then influence behavior through intention. As an example and in relation to health promoting behaviors, free will beliefs would be expected to exert a positive effect on attitude, intention, and behavior. Mediation analyses would then establish that the effect of free will beliefs on behavior exerted through these constructs, with attitude influencing intention, and intention influencing behavior. An opposite effect would be expected in relation to health risk behaviors; free will beliefs would be expected to negatively predict attitude, intention, and behavior, and the path from attitude to behavior would be mediated by intention.

It is highly likely that the influence of free will beliefs, whether that be positive or negative, will be stronger in some health behaviors and weaker in others. Behaviors characterized by agency and choice (e.g., physical activity, alcohol consumption, smoking) are more likely to be associated with free will beliefs than behaviors less reliant on such characterizations (e.g., flossing, sleep). Note that this is also the case for theory of planned behavior constructs; not only are there variations in the contribution of determinants, but some behaviors are not influenced by a determinant at all (Ajzen, 1991). It is also likely that the specific mechanisms through which these effects occur will differ between health behaviors. For example, free will beliefs may influence certain health behaviors through attitude, subjective, PBC, or a combination of these determinants. Future research should therefore establish which health behaviors are influenced by free will beliefs and which specific psychological mechanisms are modified by free will belief manipulations. This would provide important information on whether belief in free will modifies health behavior and, if such changes occur, why this is so.

Research should also examine the effects of free will on theory constructs and behavior across cultures. The generalizability of the theory of planned behavior has been demonstrated in previous work, although there are some

variations in the contribution of theory constructs (e.g., Hagger et al., 2007; Hassan et al., 2016; Shukri et al., 2016). For example, Hagger et al. (2007) applied the theory to understand physical activity across five national groups (Britain, Estonia, Greece, Hungary, Singapore) with different cultures. Although they found attitude predicted intention in all cultures, subjective norm was only a significant predictor in the Hungarian sample. Moreover, PBC was a significant predictor in all but the Hungarian sample. Hassan et al. (2016) found attitude and PBC exerted similar effects on intention, but stronger effects for subjective norm were observed in collectivistic cultures than in individualistic cultures. With regards to free will, Berniūnas et al. (2021) compared whether there were differences in how free will was understood between Western (U.S., Lithuania) and non-Western (Mongolia, India, China) countries. Similarities were found within Western countries but differences between Western and non-Western countries were observed. These different interpretations led to the authors concluding that free will is not universal construct. Furthermore, Genschow et al., 2021 found stronger effects for free will manipulations in US studies than those conducted with European samples. This, again, suggests the influence of free will depends on the sample studied. Although research has primarily concerned Western samples (Berniūnas et al., 2021), future research should replicate these findings and, using other samples, demonstrate whether the understanding and effects of free will on health behavior and social cognitive constructs differ across cultures and populations.

It should be noted that the effects of free will on health behavior may be limited. Experimental work has established that large changes in intention lead to only small changes in health behavior (Webb & Sheeran, 2006). Moreover, such effects on behavior are even smaller for changes at the level of beliefs due to the attenuation by theory constructs (Sniehotta, 2009). As a consequence, manipulations of free will may have limited effects on health behavior. Indeed, a recent meta-analysis conducted by Genschow et al., 2021 examining the effects of free will manipulations found changes in free will had no effect on behavior. Research should establish whether strong free will manipulations influence the antecedents of intention, specifically attitude, subjective norm, and PBC. In accordance with our theorizing, the degree to which a person believes in free will would influence health behavior through these theory constructs. Moreover, as we previously mentioned the influence of free will may fluctuate depending on the health behavior of interest.

Conclusion

The free will debate has dominated philosophical thinking for centuries. Recent research in psychology has examined not only how laypersons define and understand free will, but also the impact these beliefs have on behavior. This

opens up exciting avenues for research targeting health behaviors which have predominantly adopted social cognition theories, such as the theory of planned behavior. We believe that these theories could include free will beliefs to understand and change health behavior. Specifically, we suggest that beliefs in free will could influence health behavior through the psychological mechanisms included in these theories. We outlined how the mechanisms in the theory of planned behavior could be influenced by perceptions of free will. We also suggested that the impact of free will beliefs on health behavior would be dependent on the type of health behavior studied, that is whether the behavior is health promoting or health risk. Future research should seek to examine these relationships by undertaking free will manipulations and assessing the subsequent effects on psychological mechanisms and health behavior. This work would advance our understanding of the importance of believing in free will and, perhaps more importantly, help to bring about positive change in health behaviors.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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