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Article:

Increasing Environmentally Sustainable Behaviors by Increasing Self-Concordance: Testing an Intervention

Globally, there is a clear need to change our behavior to mitigate climate change. Many people, however, will not find the need for mitigation important enough to make their behavior more environmentally sustainable. Three studies supported the hypothesis that it is possible to overcome this issue by connecting these behaviors to goals that are important to people, even if such goals are unrelated to climate change or the environment in general. Study 1 (N = 305 working adults) showed that stronger self-concordance of behavior related to energy sustainability was related to a greater chance of signing a petition for increasing renewable energy sources. Next, two experimental studies (Study 2: N = 412 working and non-working adults, and Study 3: N = 300 working adults) showed that increasing self-concordance of environmentally sustainable behaviors by asking people to cognitively connect either sustainable energy use (Study 2) or commuting behaviors (Study 3) to their personal goals increased intentions to engage in these behaviors compared to a control condition (Study 2 and Study 3) and compared to persuasion attempts based on climate change mitigation (Study 3). These findings occurred even after controlling for political orientation and environmental concerns. This research has significant practical implications for workplaces, particularly for those in which employees or managers place a low priority on environmental and climate change considerations.

Keywords: self-concordance, sustainability, environmental psychology, pro-environmental behavior, energy use, commuting behavior

Despite protests by some, there is no doubt that the climate of the world is changing (IPCC, 2007; Meteorology, 2013; Peterson, Hoerling, Stott, & Herring, 2013) and that mitigation of this change requires a reduction of carbon dioxide emissions. This necessitates an alteration of carbon emission related behaviors such as switching to alternative, non-fossil-based energy sources, reducing the general demand for energy and switching to public transport rather than own-car usage (Barnett et al., 2011). In line with this, the past decade has seen an increase in organizational research examining how environmental sustainability can best be improved through organizational processes such as corporate social responsibility strategies and human resource procedures (e.g., Aguilera, Rupp, Williams, & Ganapathi, 2007; Aguinis & Glavas, 2012, 2013; Andersson & Bateman, 2000; Andersson, Jackson, & Russell, 2013; Bratton & Bratton, 2015; Davis & Coan, 2015; Delmas & Pekovic, 2013; Jackson, Ones, & Dilchert, 2012; Norton, Zacher, & Ashkanasy, 2012, 2014). Although these macro-level changes are sometimes successful (e.g., Andersson, Shivarajan, & Blau, 2005) their effects are underwhelming (see Young et al., in press). This is likely because their effectiveness largely depends on whether or not employees are willing to change their behavior in line with these organizational-wide systems (Davis, Leach, & Clegg, 2011) and unfortunately, organizational procedures aimed at increasing environmental sustainability are not always followed by employees (Davis & Challenger, 2012, 2015). This lack of employee engagement in environmentally sustainable behaviors could be due to several factors, such as a mismatch with personal values or beliefs (e.g., Stern, 2000), low priority of sustainability within the organization leading to conflicting goals (Unsworth, Dmitrieva, & Adriasola, 2013), or cynicism due to a perceived mismatch between what the organization "says" and what it "does" with regards to sustainability (Aguinis & Glavas, 2013). This has raised the need to increase our understanding of how to overcome these barriers and increase employees' performance of environmentally sustainable behaviors.

The majority of research aimed at increasing individuals' performance of environmentally sustainable behaviors has generally taken one of two approaches (for reviews of workplace interventions see Osbaldiston & Schott, 2012; Unsworth, 2015; Young et al., in press). First, studies based on psychological theories such as Theory of Planned Behavior (e.g., Fielding, McDonald, & Louis, 2008), the Values-Beliefs-Norms model (e.g., Stern, 2000), Self-Determination Theory (e.g., Pelletier, Tuson, Green-Demers, Noels, & Beaton, 1998), or a normative or leadership approach (e.g., Andersson et al., 2005; Cialdini, 2003; Graves, Sarkis, & Zhu, 2013; Kim, Kim, Han, Jackson, & Ployhart, 2014; Walls & Hoffman, 2013) have aimed to motivate people by influencing their environmental and altruistic values, perceived social and personal norms related to environmentally sustainable behaviors, knowledge of climate change, and attitudes towards the environment and climate change (e.g., Bamberg & Moser, 2007; Black, Stern, & Elworth, 1985; Dono, Webb, & Richardson, 2010; Fielding, Terry, Masser, & Hogg, 2008; Han, Nieuwenhijsen, de Vries, Blokhuis, & Schaefer, 2013; Stern, Dietz, & Guagnano, 1995; Sussman, Greeno, Gifford, & Scannell, 2013). What these studies have in common is their focus on explicitly working towards environmental goals, in other words, motivating people to behave in environmentally sustainable ways by convincing them to help the environment (Unsworth, 2015). This, of course, seems like an obvious course of action, particularly as motivation appears to be of great influence on employee green behavior (Norton, Parker, Zacher, & Ashkanasy, 2015). Yet, not everyone is susceptible to techniques focused on environmental goals.

It is human nature to devalue, disregard or even act adversely to information that is not in line with one's own attitudes and goals (e.g., Clark & Evans, 2014; Hart et al., 2009; Strickland, Taber, & Lodge, 2011). Therefore, environmentally-focused techniques will be ineffective for those who refute that climate change is happening, who do not find environmental sustainability particularly important, or whose political identities prime them

for opposing environmental policies and behaviors (see e.g., Unsworth & Fielding, 2014). Importantly, the percentage of people falling in these categories appears to be substantial. For example, a relatively recent study amongst 1001 Americans showed that 28% either did not believe global warming was happening or did not believe humans could reduce it, even if it was happening (Leiserowitz, Maibach, & Roser-Renouf, 2010). Similarly, a large international poll conducted in 2014 showed that 38% of Australians and 36% of Americans agreed with the statement 'I'm tired of the fuss that is being made about the environment' and even larger percentages (55% and 50% respectively) agreed with the statement 'The government is just using environmental issues as an excuse to raise taxes' (Ipsos MORI, 2014). Moreover, even in the absence of conflicting attitudes or beliefs, environmental goals may conflict with the person's privacy goals within the organization (Bolderdijk, Steg, & Postmes, 2013) or the organization's goals, leading to less engagement in organizational interventions with a pro-environmental focus (Unsworth et al., 2013).

The second research approach to influencing behavior comes from an economics, human factors or behavioral finance perspective and often uses rewards or compliance strategies to increase environmentally sustainable behaviors (e.g., Midden, Meter, Weening, & Zieverink, 1983; Slavin, Wodarski, & Blackburn, 1981; Stern, 2011; Thogersen & Moller, 2008). Yet this extrinsic-motivators-based research too has had problems. For one, the effect of rewards does not last a long time (Slavin et al., 1981; Thogersen & Moller, 2008). Furthermore, using compliance strategies can backfire and result in rebound effects (Berkhout, Muskens, & Velthuijsen, 2000; Greening, Greene, & Difiglio, 2000; Schipper & Grubb, 1998). In sum, these two approaches have provided mixed effects at best (see Osbaldiston & Schott, 2012; Young et al., in press).

We propose a third approach to influencing environmentally sustainable behavior, which is based on goal hierarchy (Cropanzano, James, & Citera, 1993; Unsworth, Adriasola,

Johnston-Billings, Dmitrieva, & Hodkiewicz, 2011; Unsworth, Yeo, & Beck, 2014) and goal

systems (Kruglanski et al., 2002) theories. This type of approach was first suggested by

Rupp, Williams, and Aguilera (2011). It allows the individual to choose to engage in the

environmentally sustainable behaviors autonomously (so as to avoid the negative effects of

extrinsic motivation), but is flexible in the goals that are chosen as outcomes of the behaviors

(so as to avoid problems based on having no interest in the suggested goal). More

specifically, we suggest that increasing the degree to which environmentally sustainable

behaviors serve the person's own pre-existing values, identities, and long-term goals, also

referred to as the behaviors' self-concordance (Sheldon & Elliot, 1999), will result in more

widespread engagement in these behaviors, providing organizations with greater means for

adapting to and mitigating against climate change. We propose that this will occur even after

controlling for related factors such as environmental concerns and political ideology. In the

following sections, we will introduce both the theoretical background to our approach, as

well as the empirical findings that served as a basis for the development of our hypotheses

and self-concordance based intervention. Next, we will present a time-lagged correlational

study and two experiments that test this intervention.

Theoretical Underpinnings of Self-Concordance

The premise of self-concordance is based on the notion of a goal hierarchy

(Cropanzano et al., 1993; Unsworth et al., 2011; Unsworth et al., 2014). A goal hierarchy, or

goal system, (see Figure 1) comprises all of a person's values (e.g., power, creativity),

identities (e.g., leader, teacher, researcher), long-term goals (e.g., publishing a paper) and

day-to-day behaviors and tasks (e.g., answering emails); these include both work and home

values, identities, goals and tasks (Austin & Vancouver, 1996; Unsworth et al., 2014).

Moreover, there are connections between these levels that can be facilitative or inhibitive

(Kruglanski et al., 2002; Unsworth et al., 2014). For example, the connection between a

particular behavior and a long-term goal is facilitative if the behavior helps to achieve the goal. As a result of this connection, activation of one (i.e., wanting to achieve either the behavior or goal) will result in activation of the other. Contrarily, the connection between a behavior and a goal is inhibitive if the behavior is perceived as impeding progress towards the goal or vice versa: Where such inhibitive connections exist, activation of one will lead to suppression of the other (Kruglanski et al., 2002; Unsworth et al., 2014).

For example, Figure 1 portrays a section of an academic's goal hierarchy. This academic might see 'working on statistical analyses' as having a facilitative connection to his goal of getting an article published and to his identity as a researcher; thus, this behavior is likely to be activated whenever his publishing goal or researcher identity is activated. On the other hand the academic might view that same behavior as hindering progress towards his teaching goal; the teaching goal is therefore likely to be inhibited (or "forgotten"; Shah, Friedman, & Kruglanski, 2002) whenever the academic is working on statistical analyses. With regard to environmental behavior, this person might perceive the day-to-day task of turning off office lights as connected to his teaching goal because by doing so he teaches his students in that class about pro-environmental workplace behaviors.

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Insert Figure 1 about here

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Self-concordance is the motivational propensity that derives from the degree to which a particular behavior is connected in this way to the rest of the person's goal hierarchy. Self-concordance between a behavior and higher-order goals (that is, all goals that are higher in the goal hierarchy than the focal behavior) tends to be calculated as the combination of two factors, namely 1) the degree to which a particular behavior has more positive, facilitative connections and fewer negative, inhibitory connections with a person's higher-order goals

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and 2) the personal importance of these higher-order goals to which the connections are made (Adriasola, Steele, Day, & Unsworth, 2011; Adriasola & Unsworth, 2011; Adriasola, Unsworth, & Day, 2012; Sheldon & Emmons, 1995; Sheldon & Kasser, 1995). Thus, self-concordance does not denote particular higher-order goals as important for everyone, in contrast to, for example, self-determination theory (Deci & Ryan, 1985). Instead, it takes a broader perspective and, rather than a one-size-fits-all approach, it is left to the individual to determine which goals are important to him or her. Self-concordance is theorized to increase the motivation towards the specified behavior based on both a utilitarian approach (the behavior that helps to achieve the highest number of important higher-order goals provides more "bang for the buck" and thus more motivational power) and a self-consistency approach (a behavior that helps to achieve more higher-order goals is more easily regulated and enables personality integration and positive well-being) (Kruglanski et al., 2013; Sheldon & Kasser, 1995).

Importantly, the connections between behaviors and higher-order goals are supposed to be malleable such that they can be activated or deactivated, and strengthened or weakened, depending upon situational circumstances and learning (Hanges, Lord, & Dickson, 2000; Lord & Brown, 2001; Unsworth et al., 2014). For example, in Figure 1 the self-concordance of turning off office lights is weak to moderate because it has a facilitative connection to one goal (i.e., teaching), and no inhibitive connections. However, if the academic realizes that turning off office lights can be used as a behavioral measure for his research into workplace pro-environmental behavior, his previous non-existent relationship between turning off office lights and his research goal might be changed to facilitative and his self-concordance for turning off office lights will, consequently, increase. This is an example of how self-concordance can be theoretically increased using a person's existing goals, without this person needing to have a goal, identity or value focusing on environmental consideration or

climate change. Thus, since self-concordance provides a motivational propensity to act regardless of the specific content of the higher-order goals, the malleability of connections between behaviors and goals could provide a means of increasing the performance of environmentally sustainable behaviors not only in those who hold environmental goals, but also in cases where the goal of "helping the environment" is seen as controversial or workplace-irrelevant.

Empirical Evidence for Effects of Self-Concordance

Empirically, self-concordance has been related to motivation towards and engagement in behaviors in a variety of domains, such as work-related performance (Bono & Judge, 2003; Molina, Unsworth, Hodkiewicz, & Adriasola, 2013), citizenship behaviors (Greguras & Diefendorff, 2010), leader behaviors (Adriasola et al., 2011), freshman adjustment behaviors (Sheldon & Houser-Marko, 2001), and planning for natural hazards (McNeill, Dunlop, Skinner, & Morrison, in press). However, the principle of self-concordance has not yet been empirically tested in relation to environmentally sustainable behaviors, which is distinct from the behaviors tested in previous studies. More specifically, the behaviors in previous studies that have examined the role of self-concordance have all had direct connections with egocentric goals (e.g., work-related performance helps with personal appraisals, the performance of adjustment behaviors helps with personal coping, the performance of planning behaviors helps with personal survival in the face of a hazard). Environmentally sustainable behaviors, on the other hand are generally seen as having consequences for society at large, rather than just the individual. In addition, their consequences tend to have a much longer time-frame relative to the consequences of behaviors that normally occur in an organization (Bansal & Knox-Hayes, 2013). It might be that the distance in goals (personal consequences compared to societal consequences) and time-frame of the consequences alter

the role played by self-concordance. As such, we cannot directly generalize the findings from previous research.

Still, there are some research findings that suggest self-concordance plays a similar role in predicting behavior in the context of environmental sustainability as it does in relation to behaviors that tend to be solely connected to egocentric goals. First, Myers, Nisbet, Maibach, and Leiserowitz (2012) tested the effect of three different message frames on U.S. citizens' emotional reactions to climate change information. These messages framed climate change as a risk to the environment, public health, or national security. They found that the frame that engendered emotions that were most supportive of climate change mitigation across different audiences was around public health. Second, Bain, Hornsey, Bongiorno, and Jeffries (2012) looked specifically at climate change skeptics and attempted to influence their willingness to engage in environmental citizenship behaviors (sustainable behaviors focused specifically on voluntary tasks) by asking them to what extent they thought such behaviors would serve interpersonal warmth, societal development or a reduction of climate change induced hazards. They found that asking skeptics to relate environmental citizenship behaviors to interpersonal warmth or societal development led to greater intentions to engage in the behaviors than asking them to relate these behaviors to a reduction in environmental hazards. We suggest that both sets of findings can be explained by differences in self-concordance. More specifically, most people would hold public health, interpersonal warmth and societal development as higher-order goals; activating the connection between environmental behaviors and these goals is therefore likely to increase the self-concordance of these behaviors for people regardless of their views on climate change. In contrast, activation of the goal of reducing climate change related risks is more likely to have been in conflict with the personal attitudes and goals of the respondents, given that the first study was conducted amongst U.S. citizens, many of whom hold attitudes and goals in conflict with goals related

to climate change (Leiserowitz, 2010; Ipsos MORI, 2014), and the second study was run amongst climate change skeptics, all of whom are likely to hold conflicting attitudes and goals to a certain degree. Given the higher likelihood of goal conflict, the climate change related conditions would not have increased self-concordance in as many cases.

The findings from previous research are thus in line with the idea that self-concordance plays a role in the context of environmentally sustainable behaviors. However, neither of these studies explicitly measured self-concordance of the sustainable behaviors. In addition, no study to date, neither within the domain of environmentally sustainable behaviors nor in relation to other behaviors has explicitly focused on influencing behavior by manipulating self-concordance. Furthermore, the studies that may have influenced intentions or behavior by increasing self-concordance, albeit without measuring it (e.g., Bain et al., 2012), have asked respondents to create a connection between the target behavior and one specific higher order goal. Since the self-concordance of a behavior is based on what each individual considers his or her own important goals, the manipulation of self-concordance should ideally include the possibility of creating connections with a variety of goals that people might find personally important, rather than prescribing a connection to a single goal.

We thus set out to expand on past research in two important ways. First, we wanted to test our theorizing that there is a relationship between the self-concordance of environmentally sustainable behaviors on the one hand and intentions to perform and actual performance of such behaviors on the other. Based on our previous argument we believe this is the case. Therefore, we hypothesized that:

Hypothesis 1: There will be a positive relationship between self-concordance of environmentally sustainable behavior and both intentions to perform and actual performance of environmentally sustainable behavior.

Second, based on our theorizing, we believe that encouraging people to create facilitative connections between environmentally sustainable behavior and the goals that are important to them will increase the self-concordance of these behaviors and, as a result, increase people's intentions to engage in these behaviors. Thus, we hypothesize that:

Hypothesis 2a: Persuading people to create connections between environmentally sustainable behaviors (namely, sustainable energy use and commuting) and their higher-order goals will be associated with an increase in intentions to engage in these sustainable behaviors.

Hypothesis 2b: The relationship between the self-concordance intervention and intentions to perform environmentally sustainable behaviors will be mediated by perceived self-concordance of these behaviors.

We tested these hypotheses in three complementary studies. The first was a temporally lagged study of working adults, which tested the relationship between self-concordance of environmentally sustainable energy behavior and a behavioral measure of increasing environmentally sustainable use of energy by signing a petition. The next two studies were experimental surveys in non-student samples that incorporated our newly developed self-concordance manipulation: One examined the effects of the self-concordance manipulation on intentions to engage in environmentally sustainable energy behaviors compared to a control condition while the other compared the effects of the self-concordance manipulation on intentions to engage in environmentally sustainable ways of commuting to work with both a traditional climate change manipulation and a control condition. These three studies complement each other both theoretically and methodologically. Theoretically, Study One takes a static, individual differences approach while Studies Two and Three examine the dynamic and malleable nature of self-concordance. Methodologically, Studies Two and Three provide causal evidence that builds on the correlational evidence of Study One, while Study

One uses an actual behavioral measure that complements the intentions measures in Studies Two and Three.

Study One

Sample

For the first study, we accessed a sample of Australian working adults from an accredited panel survey organization (Qualtrics). Participants who opted-in to complete the study (and who received a small cash or non-cash payment of approximately AU$6 for each survey (AU$18 per hour) from Qualtrics for doing so) received two surveys spread one month apart to decrease the likelihood of cross-sectional response biases. The first wave of data collection received 528 complete responses (260 males and 266 females; M_{age} = 45.57, SD = 16.13). The second wave of data collection received 305 complete responses (148 males and 157 females, M_{age} = 47.35 years, SD = 15.62 years). Combining all data across both waves of data collection, we were able to match 303 responses across the 2 time periods (57.4% response rate at time two).

Measures and Procedure

Self-Concordance. Self-concordance of environmentally sustainable use of energy was measured in the first wave of data collection. Its measurement was based on Adriasola and colleagues' operationalization (Adriasola et al., 2011; Adriasola & Unsworth, 2011; Adriasola et al., 2012) which, in turn was based on Sheldon and Kasser (1995). Sheldon and Kasser (1995) asked participants to rate how helpful everyday strivings were to six idealized futures, and then summed the resulting scores to get a measure of overarching self-concordance. Adriasola and colleagues modified this by focusing on self-concordance for one striving or behavior (in our case, energy behavior), by increasing the number of potential goals/futures to incorporate all relevant values and goals (see below) and by allowing each participant to indicate how important the idealized futures or values (in our case, goals) were

to them; the helpfulness score was then weighted by the importance score. The importance weights thus allowed the goals that are important to an individual to play a bigger role in determining self-concordance than goals that are seen as irrelevant by the individual. Adding such importance weights is essential from a theoretical point of view since the self-concordance concept is based around a person's individual goals, rather than assuming all people hold the same goals. As the measure is essentially an index, measuring internal reliability is not appropriate (Cronbach and Gleser, 1953; Edwards, 1994). However, Adriasola and colleagues have found this measure, when applied to leadership behavior (Adriasola et al., 2011; Adriasola & Unsworth, 2011) or work task behaviors (Adriasola et al., 2012), to have convergent validity with an older conceptualization of self-concordance and predictive validity with the specific behaviors over time.

Thus, we first asked participants to rate how important 12 different goals were to them on a 5-point scale (from 1 "Not at all important" to 5 "Very important"). These goals were based on the full set of egoistic, altruistic, and biospheric values (Schwartz, 1992; Schwartz, 1994; Stern, 2000; Stern & Dietz, 1994) as well as additional pro-environmental behavior motives (De Young, 2000); they were financial goals, frugality, not standing out from the crowd, being helpful to others, protecting the environment, participating in changing the world, social justice, fulfilling requirements and obligations, being a good citizen/neighbor, looking after our children's future, having a relatively easy or convenient life, and reducing the effects of climate change. Next, to determine the strength and valence of the connections between environmentally sustainable energy behavior and their higher-order goals we obtained ratings for how much participants believed that environmentally sustainable energy use would help them to achieve each of the 12 goals. The responses were rated on a 7-point scale (from 1 "Very unhelpful (detrimental)" to 7 "Very helpful"). We calculated weighted self-concordance scores for environmentally sustainable use of energy by creating a weighted

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helpfulness score (i.e., helpfulness in achieving goal A * importance of goal A + helpfulness in achieving goal B * importance of goal B... and so on). Self-concordance scores were thus able to range from 12 to 420. As shown in Table 1, and consistent with Adriasola and colleagues' research, in our study energy self-concordance was significantly correlated with climate change beliefs (r = .22) and environmental identity (r = .49), indicating convergent validity; but was not correlated with broader attitudes such as political orientation (r = .02), indicating divergent validity.

Support for sustainable energy. To capture a behavioral measure related to environmentally sustainable use of energy we told participants at the end of wave two that they could be involved in signing petitions that we were sending to the Federal Government Minister (see e.g., Margetts, John, Escher, & Reissfelder, 2011; Schumann & Klein, 2015). We made a clear separation between the survey questions and the petitions to decrease survey biases.

Participants were offered the opportunity to sign two petitions, each representing different sides of the environmental debate to decrease social desirability biases. The first petition served as our measure related to environmentally sustainable use of energy. This was a petition in support of transitioning Australia to 100% renewable energy. The second petition served the purpose of decreasing social desirability to sign the sustainable energy petition and was a petition in support of scrapping the carbon tax. The carbon tax was a controversial policy that had been implemented by the government at the time to aid in the reduction of carbon pollution. While generally supported by those holding pro-environmental values, it was strongly contested by the opposition. Signing the second petition, scrapping the carbon tax, could be interpreted as anti-environmental behavior. However, since the tax was based on carbon pollution, which stems not only from energy use, but also from other factors such as manufacturing processes, this petition lacked a particular focus on sustainable use of

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energy. Participants were free to sign either petition or to refrain from signing either or both petitions. Both petitions were created using the rhetoric and wording identified in websites aimed at each viewpoint. For each petition, participants were told, "You can decide how much your level of involvement is by: a) not signing the petition; b) signing the petition and having the standard text provided; c) signing the petition and altering the text to make the message more personal to you; or d) signing the petition and writing your own personal message attached to your petition."

Of the 305 respondents in the second wave, 181 answered the petition question that was our dependent variable construct (i.e., environmentally sustainable use of energy; 59.3%). Of these, 29.3% of those respondents responded that they were not interested in signing the renewable energy petition, 65.7% signed using the standard text, 2.8% signed and modified the text, while 2.2% signed and created new text. Due to the skewedness in the responses, we combined the latter three responses to represent signing the renewable energy petition as our main variable; thus, the measure split the sample into those who signed the renewable energy pro-environmental petition ('2') and those who indicated they were not interested in signing the petition ('1'). As expected, signing versus not signing this petition was unrelated to whether or not participants signed the second petition (r = -.06, p = .77).

Control variables. It is important to note that demographics and environmental goals at a range of levels of abstraction have been related to engagement in environmentally sustainable behavior in the past: This includes free-market ideology at the broadest level of abstraction (e.g., Heath & Gifford, 2006; Lewandowsky, Gignac, & Vaughan, 2013), environmental identity at a medium level (e.g., Fielding, McDonald, et al., 2008; Fielding, Terry, et al., 2008; Sparks & Shepherd, 1992) and beliefs in anthropogenic climate change at the most specific level of abstraction (e.g., Bord, O'Connor, & Fisher, 2000; Gifford, 2011; Leviston & Walker, 2012). Since the self-concordance of sustainable behaviors is partially

based on the relationships these behaviors may have with environmental goals, we wanted to rule out the possibility that it is these relationships with environmental goals that are driving the behaviors, rather than the overall self-concordance, and thus we need to control for these variables.

To capture free-market ideology, we included the measure by Heath and Gifford (2006), which asks participants to indicate the extent to which they agree with five statements (e.g., "The preservation of the free market system is more important than localized environmental concerns") on a 5-point scale ranging from strongly disagree to strongly agree ($\alpha = .75$). This measure was included in wave two. We captured the strength of a participant's environmental identity in the first wave of data-collection with the three item measure by Fielding, McDonald, et al. (2008) (e.g., "I think of myself as an environmentally-conscious person"). The items were measured on a 9-point scale ranging from 'Very Strongly Disagree' to 'Very Strongly Agree'. Cronbach's alpha for this sample was .94, indicating strong internal reliability. Finally, to control for climate change beliefs, we included the one-item measure developed by the Australian Commonwealth Scientific and Industrial Research Organization (CSIRO) (Leviston & Walker, 2011) in the first wave survey. The question has been shown by Greenhill, Leviston, Leonard, and Walker (2014) to be the most valid of the current measures of climate change beliefs; it asks participants to choose the statement that best describes their general attitude towards climate change. The statements range from lack of belief in climate change (I do not believe in climate change, scored as 1), through lack of knowledge (I do not know whether climate change is happening or not, scored as 2) through to belief in non-anthropogenic climate change (I believe that climate change is happening but it's just a natural fluctuation in Earth's temperatures, scored as 3) to belief in anthropogenic climate change (I believe that climate change is happening and humans are contributing to it, scored as 4).

We also measured age, gender and political orientation in the first wave, since previous research has found that they affect the performance of environmentally sustainable behaviors with younger, female and more left-wing-oriented people engaging in a greater number of environmentally sustainable behaviors (e.g., Yue, Long, & Chen, 2013). Political orientation was dichotomized into "left-wing-oriented" (Labor Party, Greens Party) and "right-wing-oriented" (Liberal Party, Nationals Party). For international reference, at the time the study was conducted, the Australian Labor Party was most similar in orientation to the UK Labor Party and the US Democrats, the Greens Party was most similar to the UK Greens Party, and the Liberal and Nationals Parties were most similar to the US mainstream Conservatives. Those who aligned with Independents were not included in the analysis as they supported single-issue candidates rather than being ideologically driven.

Results

Table 1 outlines the means, standard deviations and correlations between the variables. We first ran a logistic regression analysis with signing behavior related to the pro-environmental petition on renewable energy as the dependent variable. This analysis, shown in Table 2, showed that the total model was significantly related to renewable energy petition signing behavior ($\chi^2 = 40.03$, df = 7, p <.001; Cox & Snell $R^2 = .24$). Most importantly, self-concordance of environmentally sustainable energy use was significantly positively associated with the likelihood of signing the renewable energy petition (B = .012, SE = .005, Wald statistic = 7.22, p = .007); the odds ratio was 1.012 (95% CI = 1.003-1.12). As expected, political orientation had a significant relationship with petition behavior (B = 1.11, SE = .48, Wald statistic = 5.41, p = .020), however neither gender nor age was significantly related to it (B = -.16, SE = .48, Wald statistic = 0.11, p = .74; B = .01, SE = .02, Wald statistic = 0.53, p = .47; respectively). Interestingly, the relationships of pro-environmental petition signing behavior with the environmentally-related variables, namely climate change

beliefs, environmental identity and free-market ideology were also non-significant (B = .21, SE = .25, Wald statistic = 0.71, p = .40; B = .24, SE = .16, Wald statistic = 2.26, p = .13; B = -.72, SE = .37, Wald statistic = 3.67, p = .055; respectively); it is likely that, with the exception of free-market ideology, this is due to their overlap with self-concordance (r = .22, p < .001; r = .49, p < .001; r = -.06, p = .36; respectively) indicating the more proximal effect of self-concordance.

The 124 respondents who did not answer the pro-environmental petition question could be labeled as being unwilling to sign the petition. To investigate this possibility we first conducted a t-test between respondents and non-respondents: There were no significant differences in their level of self-concordance of environmentally sustainable energy use (t = .13, df = 476, p = .72). Next, to ensure that the findings of the logistic regression analysis reported above were robust, we reran the logistic regression, but included non-respondents as 'non-petition-signers'. Again, the total model was significantly related to renewable energy petition behavior (χ^2 = 41.34, df = 7, p < .001; Cox & Snell R^2 = .17) and self-concordance of sustainable energy use was significantly positively associated with the likelihood of signing the petition on renewable energy (B = .01, SE = .003, Wald statistic = 7.05, p = .008); the odds ratio was 1.01 (95% CI = 1.002-1.14).

Next, we ran the four additional regression models, namely with or without non-responders, and either without any controls or with only the demographic control variables. In all four logistic regressions, self-concordance of environmentally sustainable energy use was significantly positively associated with the likelihood of signing the renewable energy petition (B = .011, SE = .003, Wald statistic = 11.48, p = .001; B = .005, SE = .002, Wald statistic = 9.95, p = .002; B = .01, SE = .003, Wald statistic = 10.48, p = .001; B = .005, SE = .002, Wald statistic = 7.24, p = .007; respectively). Thus, the results of this first study were robust and supported Hypothesis 1.

Study Two

The first study showed a relationship over time between the self-concordance of environmentally sustainable use of energy and the behavioral measure of signing a petition for renewable energy. The next study tested for causality within the relationship between self-concordance of environmentally sustainable use of energy and the intention to engage in environmentally sustainable energy behaviors (Hypothesis 2). In this study, we randomly assigned participants to an experimental and control group, increased self-concordance of the environmentally sustainable use of energy in the experimental group and then tested for differences in the intention to engage in environmentally sustainable energy behaviors.

Sample

A sample of Australian adults from an accredited panel organization (Qualtrics) was used to test our experimental hypothesis. Five hundred and seven participants opted-in and completed the survey for a small payment of approximately AU$6 (AU$24 per hour) or its equivalent in non-cash payment made by Qualtrics; none of these participants had participated in Study One. Approximately half the participants (51.5%) were female and they came from a range of educational backgrounds (32.1% junior or high school; 36.7% had a technical qualification; 22.3% had a Bachelors degree; and 8.9% had a Masters or PhD), and political orientations (34.0% aligned with centre-left Labor Party; 37.9% with conservative Liberal Party; 4.9% with the conservative Nationals Party; 7.7% with the left-wing Greens Party; and 15.6% with Independents).

Measures and Procedure

Manipulation.

Of the 507 participants who completed the survey, 256 were randomly allocated to the experimental self-concordance condition and 251 to the control condition. Participants in the control condition were not encouraged to identify connections between environmentally

sustainable energy behaviors and higher-order goals. In the self-concordance condition however, we aimed to increase the perceived connections between energy environmentally sustainable energy behaviors and the person's important goals. Thus, after completing the section containing the control variables and demographics, participants in the experimental condition were told a number of ways in which environmentally sustainable behaviors can help to achieve goals other than environmental ones:

"Sometimes, people think that dealing with climate change means that you have to make sacrifices or that you won't be able to achieve your goals. But, recently, it's been shown that behaviors such as recycling, energy and water efficiency, careful use of transportation and so forth have a number of other benefits. For example, did you know that:

- Turning off lights, changing your air-conditioner settings and other energy efficient behaviors helps you to save money

- Commuting to work can give you time to catch up on your emails or allows you time to read or listen to audio-books

- Being careful with your waste means that less plastic ends up in the oceans and we have cleaner beaches and healthier sea-life and bird-life so that you can enjoy your holidays more

- A number of environmentally-friendly products are also socially responsible, meaning that fewer people in third-world countries are being exploited

- Walking and cycling instead of driving means that there are fewer cars on the road and fewer accidents".

To encourage participants in the experimental condition to identify personal connections between behaviors and their own goals, we then asked them: "What are some ways in which behaviors such as recycling, energy and water efficiency, careful use of transportation and so on could help you to achieve your goals?" Participants responded in a

text box below this question, which served as a manipulation check. Any blank responses or responses such as "You tell me" or "Don't know" were considered to represent people not attending to the manipulation and, as such, were deleted from further analysis. Responses from 53 people in the experimental condition were deleted through these manipulation checks. To further ensure data validity we deleted any participant in either condition who completed the survey in less than 8 minutes (the quickest time that a non-blind research assistant could complete the control condition). Eighteen participants in the experimental condition and 24 participants in the control condition were deemed to have completed the survey so quickly that they could not have participated properly in the study. Thus, 412 participants remained in the study; 240 in the control condition and 172 in the experimental condition.

To check that the people who did not participate were not different to those who did, we ran some checks. Those who completed the manipulation in the experimental condition did not differ from those who did not complete the manipulation in age ($t = .54$, df = 249, $p = .59$) or education level ($t = -.25$, df = 248, $p = .80$). However, there were differences in gender with those completing the manipulation being more likely to be female than male ($t = 2.07$, df = 249, $p = .040$); and differences in environmental values, with those completing the manipulation placing a higher value on the environment than those who did not ($t = 2.69$, df = 249, $p = .002$). However, when comparing those who completed the manipulation in the experimental condition to the participants in the control group, no significant differences were found on either gender ($t = .04$, df = 410, $p = .97$) or environmental values ($t = -1.39$, df = 410, $p = .17$). Thus, these differences are unlikely to have affected the results. Amongst the remaining participants, the vast majority of open-ended responses to the self-concordance intervention were focused on environmentally sustainable energy behaviors therefore we focused on this as the key environmental domain for this study.

Measures.

Sustainable energy use intentions. To measure intentions to engage in sustainable energy behaviors, we created a scale based on four items from a CSIRO measure of pro-environmental behavior (Leviston & Walker, 2011; Leviston, Walker, & Morwinski, 2013). The original scale consists of 11 items covering a wide range of environmentally sustainable behaviors. Participants indicated the extent to which they intend to perform these behaviors in the next few weeks and months and responded on a 5-point scale from 1 (Not at all) to 5 (A great deal). We calculated the mean score across the following four items that focused on sustainable energy behaviors: 1) "Use or switch to appliances that are environmentally-friendly"; 2) "Reduce the amount of gas and/or electricity I use around the house"; 3) "Turn lights off around the house"; and 4) "Continue to have or switch to Green Power Electricity". The internal reliability of the 4-item scale in this sample was adequate ($\square$ = .73).

Self-concordance. Our measure of self-concordance was the same as that for Study One.

Control variables. The demographic characteristics of age, gender, education level, and political orientation were again measured. As in Study One, political orientation was dichotomized into "left-wing-oriented" (Labor Party, Greens Party) and "right-wing-oriented" (Liberal Party, Nationals Party); again Independents were not included in the analysis as they tend to support single-issue candidates rather than being ideologically driven. Also, rather than measuring lower-level environmental goals or specific attitudes, we decided to control for environmental values at its broadest, and thus most widely influential, level; participants therefore rated the importance of "protecting the environment" to them on a scale from 1 "Not at all important" to 5 "Very important". Finally, to control for social desirability we used the self-deception subscale from the Environmental Social Desirability scale (Ewert & Galloway, 2009). This subscale contains 6 items (e.g., "I know what actions I should take

regarding how best to protect the environment") rated on a 4-point scale from 1 "Does not describe me at all" to 4 "Describes me very well". The scale demonstrated a good internal reliability ($\alpha = .74$).

Results

To check that the self-concordance manipulation was affecting a variety of goals, and not simply environmental goals, we examined the data in two ways. First, when looking at the open-ended responses generated by the self-concordance manipulation, we found that the majority of responses were oriented towards financial goals (51 responses), with climate change or environmental goals being the other big set of goals related to energy behavior (37 responses)[1]. Interestingly, although many people discussed financial goals, these were not always strictly egoistic with many people talking about using money for other reasons, e.g., "Saving money so I can spoil my kids". Furthermore, while many participants combined non-environmental goals with environmental goals (e.g., "Saves me money plus doing my bit to protect the environment"), others saw a difference between these (e.g., "I think any of the above methods would be beneficial to you, either health or financial wise, but as to the climate changing factors, I am not convinced that it is a major problem").

Second, we compared the strength of connections between environmentally sustainable energy use and each specific goal across experimental and control groups. As shown in Table 3, the manipulation acted as expected and had broad effects: There were significant differences not only for the connection between sustainable energy use and environmentally-related goals (helping the environment, climate change, looking after our children's future) but also between sustainable energy use and non-environmentally-related goals (financial goals, having an easy life, being a good citizen and activism). Thus, we feel confident that the

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[1] Not everybody referred to their goal in their response and often just discussed what they would do rather than how it would help their goals. On the other hand, some people reported as many as three goals that their actions would help to achieve. As such, the numbers reported here do not add up to the total number of responses and are indicative rather than inferential.

self-concordance manipulation is not simply tapping into the connection between the environmentally sustainable use of energy and participants' environmental goals.

Table 4 outlines the means, standard deviations and correlations between the variables studied. A t-test comparing intentions to engage in environmentally sustainable energy behaviors across the experimental and control conditions was significant (t = 2.32, df = 410, p = .021) with means in the self-concordance condition (M = 3.46, SD = .97) being higher than those in the control condition (M = 3.23, SD = 1.03). Furthermore, a t-test comparing self-concordance across the experimental and control conditions was also significant (t = 2.01, df = 410, p = .045); again, the means were in the expected direction (M_{expt} = 262.34, SD = 72.57; M_{con} = 247.17, SD = 77.84). The effect sizes, as measured by Cohen's d, were d = .23 and .20 respectively, which is similar to Study 1.

We next tested a regression model to examine the unique role that self-concordance of environmentally sustainable use of energy played in accounting for variance in intentions to engage in environmentally sustainable energy behaviors. Even after controlling for age, gender, education level, political orientation, social desirability and environmental values, self-concordance still accounted for a significant amount of variance in intentions to engage in environmentally sustainable energy behaviors (see Table 5). Robustness checks with various combinations of control variables indicated consistent effects for self-concordance (with no control variables, *B* = .01, SE = .001, p < .001; with demographic variables only, *B* = .01, SE = .001, p < .001; with environmental values and social desirability only, *B* = .01, SE = .001, p < .001), thus supporting Hypothesis 2a.

Finally, to test our specific hypothesized mediation from Hypothesis 2b we used the bootstrapping procedures outlined by Preacher and Hayes (2004, 2008). Results of the analysis revealed that the self-concordance manipulation had a significant effect on self-concordance of environmentally sustainable use of energy (B = 15.17, SE = 7.56, p = .046),

which in turn had a significant effect on intentions to engage in environmentally sustainable energy behaviors (B = .01, SE < .01, p < .001). The total effect between the self-concordance manipulation and intentions to engage in environmentally sustainable energy behaviors was significant (B = .23, SE = .10, p = .021) and the model accounted for 37% of the variance in intentions to engage in environmentally sustainable energy behaviors. As expected, and supporting a full mediation hypothesis, the direct effect between the self-concordance manipulation and intentions to engage in environmentally sustainable energy behaviors was non-significant when self-concordance of environmentally sustainable use of energy was taken into account (B = .11, SE = .08, p = .17). Moreover, the bootstrap results for 5000 iterations showed that the 95% bias-corrected confidence intervals excluded zero (.03, .24) indicating that self-concordance of sustainable use of energy mediated the effect of the manipulation on intentions to engage in environmentally sustainable energy behaviors.

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Figure 2 about here

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Study Three

The first two studies showed support for the hypothesis that self-concordance of a particular environmentally sustainable behavior is related to either performance of actions related to that behavior (shown in Study 1) or intentions to engage in that behavior (shown in Study 2). In addition, Study 2 found support for the idea that the connections between behaviors and goals are malleable, and that self-concordance can be increased by asking people to think about new connections. Finally, Study 2 demonstrated that changing self-concordance has a causal effect on behavioral intentions. Nevertheless, these studies did not test whether the self-concordance manipulation performs any better than a traditional climate change manipulation in which people are encouraged to think about how changing their

behavior may help mitigate against climate change. Therefore, in Study 3, we compared a self-concordance manipulation with both a climate change manipulation and a control condition. We also used Study 3 to try and replicate the results of Study 2 in relation to a different environmentally sustainable behavior, namely commuting to work via public transport.

Sample

We used another accredited panel organization, Prolific Academic, to source 300 full-time employed adult participants from the UK and US who opted-in to complete the study for a small payment of GB£7.50 per hour (we prescreened participants to remove any students from the potential sample). Data from seven out of 301 participants were removed from the dataset as these participants reported that they worked from home. Of the remaining 294 responses, 183 reported that they currently drove to work in a car, motorbike or similar (the others walked, cycled, carpooled, or already took public transport). The majority of respondents chose not to report their gender or highest level of education, but of the 47% who did, there were roughly equal numbers of men and women participating (57% men) with a range of educational levels from high school (16%) or vocational qualification (13%) through to a Bachelors (56%), Masters (14%) or PhD (1%) degree.

Method

All participants were shown the following scenario:

"Imagine your company has decided to remove the majority of its car parking spaces to build another building for offices. To ensure you'll still be able to get to work, they will heavily subsidize your costs on public transport."

Participants were then randomly assigned to the self-concordance, the climate change or the control condition. Similar to Study 2, the self-concordance condition first identified a range of potential connections between the target behavior and different goals to give participants

some ideas and then asked them to think about such connections in a personalized manner. In particular, it said:

"The company would like to explain their thinking to you and to understand what is important to you about commuting and public transport. Of course, there are disadvantages to catching the bus or train, but the company believes that commuting to work by public transport has a number of advantages:

- You can save money because you no longer have to pay for as much insurance or car maintenance (and they will be subsidizing the costs of the public transport).

- You could use that time for leisure activities such as reading or listening to a book.

- You could use that time to catch up (or get ahead) on work if you wanted to.

- It is better for the environment.

- You will get more exercise and be healthier as you walk to the bus stop.

- You will be reducing the number of cars on the road so you'll be helping others.

- Everybody is the same on the bus or train and there are no status differences so you'll be reducing perceptual inequality.

Of these, which advantages are most relevant to you personally? And are there other reasons why commuting via public transport would be helpful to you? As a reminder, the value that was important to you was [text piped in here responding to their highest ranked value] and the goals that were very important to you were [text piped in here responding to their highest rated goals] so you might want to think about how commuting via public transport affects those goals. In the box below, please write down how coming to work by public transport (e.g., bus, train, tram) will help you to achieve your personal goals and values."

The climate change condition was very similar but focused specifically on how commuting via public transport could help deal with climate change:

"The company would like to explain their thinking to you and to understand what is important to you about commuting and public transport. Of course, there are disadvantages to catching the bus or train, but the company believes that commuting to work by public transport has a number of advantages:

- Cars, trucks and SUVs account for approximately 2/3 of the carbon emissions that come from transportation.

- Using public transport will reduce carbon emissions from 32% (if you use a bus) to 75% (if you use heavy rail such as train or the underground).

- It is better for the environment.

- Greater use of public transport means that further housing and infrastructure development can be more compact, again leading to fewer carbon emissions.

- Public transport providers use energy conservation and technology to ensure operators have lower emissions.

- There will be fewer cars on the road, meaning that there will be fewer traffic jams - traffic jams are one of the largest causes of high rates of emissions.

- It will help mitigate against climate change.

Of these, which do you think are most relevant to dealing with climate change? And are there other reasons why commuting via public transport would help deal with climate change? In the box below, please write down how coming to work by public transport (e.g., bus, train, tram) will help reduce climate change."

Finally, the control condition asked for participants' attitudes towards commuting by public transport:

"The company would like to understand what is important to you about commuting and public transport. In the box below, please write down your thoughts about coming to work by public transport (e.g., bus, train, tram)."

Responses from 19 people were removed as they did not participate in the experimental manipulations (e.g., writing "bus" instead of considering connections with personal goals and values, or writing "sdf" instead of considering connections with climate change mitigation). Of the remaining sample there were 49 people in the self-concordance condition, 60 in the climate change condition, and 65 in the control condition.

Measures

Commuting intentions. We measured commuting intentions by asking participants to what extent they agreed or disagreed with the following four items: "I am likely to take public transport to work"; "I am likely to take the company up on the offer of subsidized transport"; "I will find any other option I can take to avoid taking public transport" (reverse-scored); and "I am likely to start looking for other jobs and leave this company because of this" (reverse-scored). Responses were recorded on a 7-point scale from 1 "Strongly disagree" to 7 "Strongly agree" and internal reliability was high ($\alpha = .84$).

Self-concordance. Our measure of self-concordance was again the same as that for Study 1 except that the target behavior now related to commuting rather than environmentally sustainable use of energy. Participants were asked "How helpful do you think that commuting by public transport is to achieving the following goals?", followed by 13 goals. We included "Being successful" to the other 12 values and goals from the previous studies to more directly capture a work-related goal that might be relevant to the more work-related behavior of commuting.

Control variables. We again controlled for environmental values and this construct was measured in the same way as in Study 2. In addition, given that commuting by public transport will have different levels of inconvenience for participants depending on where they live, and that this is likely to affect their attitudes towards taking public transport, we asked participants "How inconvenient would it be for you to travel to work by public transport (e.g.,

bus, train, tram)?" and they responded on a scale from 1 "Not at all inconvenient" to 6 "Very inconvenient".

Results

Similar to Study 2, we found that the goals that participants in the self-concordance condition connected to the target behavior ranged far beyond climate change and environmental goals. In fact, these goals were only discussed by 7 participants in the self-concordance condition. Again similar to Study 2, the majority of responses referred to financial goals (24 responses). However the commuting behavior was also linked to a number of leisure (having an easy life) goals as well such as relaxing (7 responses), reading (7 responses) and talking to other people (3 responses).

After controlling for environmental values, there were significant differences in the self-concordance of taking public transport across the three conditions ($F(3,170) = 3.31$, $p = .039$; condition $\eta^2 = .03$); importantly self-concordance of taking public transport was significantly higher for those in the self-concordance condition than for those in the climate change condition ($M_{SC} = 202.72$, $SD = 6.95$; $M_{CC} = 182.57$, $SD = 6.29$; contrast = -20.13, SE $= 9.38$, $p = .033$) and also significantly higher than for those in the control condition ($M_{SC} = 202.72$, $SD = 6.95$; $M_{con} = 180.86$, $SD = 6.04$; contrast = -21.86, SE = 9.20, p = .019). Also as hypothesized, there were significant differences in public transport intentions across the three conditions ($F(3,170) = 4.02$, $p = .020$; condition $\eta^2 = .04$). As with self-concordance, the average intention to take public transport was significantly higher in the self-concordance condition ($M_{SC} = 4.49$, $SD = .22$) than in the climate change condition ($M_{CC} = 3.92$, $SD = .20$; contrast = -.58, SE = .30, p = .056) and the control condition ($M_{Con} = 3.67$, $SD = .19$; contrast = -.82, SE = .29, p = .006). To examine the robustness of our analysis, we also ran it without including environmental values as a control variable. We found similar overall results, however the contrasts between the self-concordance and climate change conditions were not

significant for either self-concordance (M_{SC} = 201.55, SD = 8.24; M_{CC} = 186.07, SD = 7.44; contrast = -15.48, SE = 11.10, p = .16) or public transport intentions (M_{SC} = 4.48, SD = .23; M_{CC} = 3.95, SD = .21; contrast = -.53, SE = .31, p = .088). Upon examining this further, we found that the means remained roughly the same but there was an increase in the amount of error variance within the groups thus decreasing the overall significance level. Thus, given the relatively small sample sizes and the theoretical identification of environmental values as an extraneous variable, we do not believe this puts the validity of our results into question.

In sum, the results across the three studies demonstrated support for our hypotheses. A combination of telling and asking people to consider how an environmentally sustainable behavior helped them to achieve their own important goals led to an increase in the behavior's self-concordance, which led to a subsequent increase in intentions to engage in that behavior.

General Discussion

A great deal of research investigating environmentally sustainable behaviors, both inside and outside organizations, has looked at influencing these behaviors by changing people's environmental attitudes, beliefs, identities or values. However, some people are not susceptible to such an approach, especially those who have goals or mental models that do not include or are in conflict with the proposed environmental ones and those who work in organizations which place a low priority on the environment. We therefore set out to test an alternative route to influencing environmentally sustainable behaviors. The results of a temporally-lagged study and two experiments suggest that self-concordance of a sustainable behavior predicts the performance of, or intentions to perform, that behavior over and above higher-order environmental goals such as ideology and environmental values. In addition, results from the two experiments suggest that self-concordance of a behavior can be influenced by asking people to consider how the behavior can help them to achieve their

personal goals. In the case of environmentally sustainable behaviors, this works even if these goals are not related to the environment. This research therefore contributes to our knowledge of self-concordance, as well as producing promising results for the practical application of a new strategy to increase people's intentions to perform environmentally sustainable behaviors, regardless of whether or not they personally hold environmental values and goals.

In the literature to date, self-concordance has already been related to other behaviors. However, the majority of these behaviors had been ones that have clear personal benefits such as work-related performance (e.g., Bono & Judge, 2003; Molina et al., 2013) or preparing and planning for high-risk natural hazards (McNeill et al., in press). Our research shows that self-concordance is still a strong motivational factor even for behaviors that are usually on the periphery of an individual's self-serving goals, such as environmentally sustainable behaviors.

In addition, we have added to the literature on self-concordance by testing both its malleability and the causality of its effects on behavior. To our knowledge, all previous tests of self-concordance have used static, correlational analyses. We used experimental methodology with randomly assigned groups and found that changing the self-concordance of environmentally sustainable behaviors had a greater effect on behavioral intentions than changing people's perceptions of how helpful a behavior is in mitigating climate change. We believe that these results provide strong support for the use of interventions that influence behavior by changing the behavior's self-concordance.

Related to this, our studies provide a theoretical explanation for previous research which has influenced environmentally sustainable behaviors through manipulations, the effectiveness of which could potentially be explained by an increase in self-concordance (Bain et al., 2012; Myers et al., 2012). Importantly though, previous research has often identified specific goals (e.g., public health, environmental sustainability, self-determination

theory-related goals) to connect the target behavior to, which limits the effectiveness of the intervention to those who value those particular goals (e.g., if people do not hold a public health goal then the intervention will be ineffective). Our self-concordance manipulation, on the other hand, shows that self-concordance and behavior can be influenced by letting people weight their own higher-order goals and by letting them choose which ones they link the sustainable behavior to, instead of dictating to them the goals which "should" be relevant to them. This allows for a greater effect across different individuals, since it eliminates the need for them to place value on any particular, culturally determined goal.

Within the environmental sustainability and corporate social responsibility literatures we have thus opened up a new theoretical arena for examining psychosocial determinants. Rather than trying to change people's climate change beliefs or goals about the environment, or trying to convince organizations to make environmentally sustainable behaviors mandatory, our research suggests that more personally-relevant motives can be used. Our research controlled for environmental goals, using both correlational and experimental methods, therefore we are relatively confident that this more individually flexible approach is creating motivation independently of an individual's environmental values.

This research can benefit anyone who is trying to increase environmentally sustainable behaviors, from policy makers to environmental activists to employers trying to increase sustainable behavior within their company. Our results suggest that this may be achieved by developing campaigns that give people examples of how environmentally sustainable energy use or commuting may serve a variety of commonly held non-environmental goals, and by letting people consider ways in which the environmentally sustainable behaviors will benefit their own personal goals. For example, organizations that are trying to motivate their employees to adopt more environmentally sustainable behaviors could do so by letting employees link the target behaviors to common non-environmental workplace goals such as

"being a good employee", "being a good colleague", "getting a promotion", "increasing my skills" and so forth.

Importantly, our research shows that promise for the use of such interventions in organizations that hold mixed motives in relation to the environment. More specifically, the fictional organization we used in Study 3 clearly displayed mixed motives by demolishing the parking lot to make way for new office buildings (which would increase carbon emissions) but providing financial offsets to employees to take public transport (thereby reducing carbon emissions). We believe that such mixed motives in relation to the environment are common in organizations as environmental considerations usually have a lower priority than growth or profit. Using environmental values and goals to motivate employees in these situations is likely to backfire out of perceived incongruence with the organization's actions (cf. Aguinis & Glavas, 2013). We showed in our studies that the self-concordance approach is effective in these situations and might, therefore, be especially fruitful for organizations that are not known to hold strong environmental values, or that are tied to an industry that seemingly contradicts them (e.g., oil companies).

Limitations and Directions for Future Research

Of course, our research is not without limitations. First, we found relatively small to medium effect sizes. We do not believe that this is a reason to forego research in this area, though. This is because our studies were somewhat conservative in their ability to detect this relationship. To begin, the first study had petition behavior as the behavioral measure of environmentally sustainable use of energy. This behavior may be seen by some as an activist behavior as well as an environmentally sustainable energy behavior; thus, our measure of self-concordance, which focused only on sustainable energy behaviors, might be capturing only part of the person's self-concordance of signing the renewable energy petition, and thus part of the true relationship between self-concordance of the behavior and performance of the

behavior. Similarly, in our second study, we aimed to increase the self-concordance of environmentally sustainable energy behaviors by encouraging participants to increase the self-concordance of a wider range of environmentally sustainable behaviors. The finding that the vast majority of participants focused on environmentally sustainable energy behaviors was thus beneficial, but somewhat unexpected. A possible explanation for this is that many participants might have found it easier to connect environmentally sustainable energy behaviors to a variety of non-environmental goals as compared to other sustainable behaviors. Still, it is possible that a singular focus on environmentally sustainable energy behaviors in the intervention would have resulted in an even stronger self-concordance, and therefore a stronger effect than the broader approach used in our studies. Our focus on commuting in the third study was conservative given that many people deeply dislike or find it inconvenient to use public transport and the fact that we found even small effects is testament to the usefulness of the self-concordance approach.

Second, although manipulating self-concordance should form an effective alternative to the use of environmental-goal-focused techniques when targeting climate change deniers and those who lack environmental goals, our samples were aimed at the general population and did not specifically focus on these subgroups; thus, future research would need to test the effectiveness of this strategy for these groups in particular. However, we did control for environmental goals in our analysis, so the effectiveness of the manipulation is apparent even after the variance attributed to people's environmental goals is accounted for. In addition, results from the third study showed that our self-concordance manipulation was more effective in increasing behavioral intentions than a more traditional climate change related manipulation in a sample containing many people who hold environmental goals. This suggests that manipulating self-concordance should be considered as an alternative to the use

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of environmental-goal-focused techniques even when the target audience does hold environmental goals.

Third, the effects in the experimental studies pertain to intentions to perform environmentally sustainable behaviors rather than the actual performance of sustainable behaviors. Although research has shown a consistent positive relationship between intentions and behaviors even with observed (non self-reported) behavior and experimental studies (Armitage & Conner, 2001; Webb & Sheeran, 2006), this relationship is not perfect, and effects on actual behavior tend to be smaller than on intentions. However, our first temporally lagged study showed a positive relationship between self-concordance and a behavioral measure. In addition, research has identified several strategies that may help close the gap between intentions and behavior, such as the use of action plans, referring to a process in which people think about when and where they will carry out their intended behavior (cf. implementation intentions; Sniehotta et al, 2005; Ziegelmann, Luszczynska, Lippke & Schwarzer, 2007; Gollwitzer & Sheeran, 2006). Future research could thus test whether manipulating self-concordance leads to actual behavioral outcomes, and it could focus on combining an increase in self-concordance with the formation of action plans, in order to more effectively influence behavior.

Fourth, the demands of the experimental and survey setting meant that we needed to pre-determine a range of values and goals from which participants could choose and rate their most important. Moreover, to capture self-concordance, we needed to ask participants to rate the helpfulness against all of these goals. Thus, we were limited in the number of higher-order goals that we could use before inducing fatigue in the participants. To try and capture as many people's possible goals as we could, we used the values from the widely used Schwartz theory (Schwartz, 1992; S. H. Schwartz, 1994) as well as the range of goals highlighted in environmental research (De Young, 2000; Stern & Dietz, 1994). Nonetheless,

it would be good to validate this work with a study that uses an open-ended approach to identifying goals rather than the closed questions we used.

Finally, based on the current findings it remains unclear whether the effect was driven by the formation of new connections between environmentally sustainable behaviors and personal goals, or whether it can be explained by bringing existing connections between the behavior and personal goals into conscious awareness, or a combination of the two. As a result, it is unclear whether the effects would hold over time, without repeatedly asking people to form these connections. However, research from other domains has shown that building connections between a behavioral goal and higher-order goal will have lasting effects on the motivation to perform the behavior, even after the connection between the behavior and higher-order goal no longer exist in reality (Carr & Walton, 2014). This thus shows promise for the idea that the effects of the tested strategy on intentions to perform environmentally sustainable behaviors could hold over time, without the need for repeated reminders.

Conclusions

This research has provided important initial support for a new way to increase sustainable energy behaviors and commuting behaviors that eliminates the need for people to hold pro-environmental goals or attitudes. It suggests that motivation to perform environmentally sustainable behaviors can be increased by letting people connect these behaviors to higher-order goals of their own personal choice.

In sum, we have identified a non-environmental pathway through which we can increase environmentally sustainable behaviors. We are definitely not suggesting that we should give up on environmental values altogether. However we do believe that our self-concordance based approach can provide an effective alternative to increase environmentally sustainable behaviors, and might be an especially useful approach to increase such behaviors

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amongst those who otherwise would not consider it at all. Addressing and adapting to climate change requires that everyone engage in sustainable behaviors in both the home and the workplace. We have shown that linking these behaviors to a person's goals, regardless of whether or not they are environmental goals, will go some way to meeting this challenge.

References

Adriasola, E., Steele, A., Day, D. V., & Unsworth, K. L. (2011). Leader identity: Using goal hierarchy self-concordance to understand leader emergence. Paper presented at the 26th Annual SIOP Conference, Chicago.

Adriasola, E., & Unsworth, K. L. (2011). Leadership's effect on motivation: The effect of self-concordance and goal hierarchy. Paper presented at the Industrial Organisational Psychology Conference, Brisbane.

Adriasola, E., Unsworth, K. L., & Day, D. V. (2012). Goal self-concordance: Understanding its effects through a new conceptualisation and task differentiation. Paper presented at the Academy of Management Conference, Boston, USA.

Aguilera, R. V., Rupp, D. E., Williams, C. A., & Ganapathi, J. (2007). Putting the S back in corporate social responsibility: A multilevel theory of social change in organizations. Academy of Management Review, 32, 836-863.

Aguinis, H., & Glavas, A. (2012). What we know and don't know about corporate social responsibility a review and research agenda. Journal of Management, 38, 932-968.

Aguinis, H., & Glavas, A. (2013). Embedded versus peripheral corporate social responsibility: Psychological foundations. Industrial and Organizational Psychology, 6, 314-332.

Andersson, L., & Bateman, T. (2000). Individual environmental initiative: Championing natural environmental issues in U.S. business organizations. Academy of Management Journal, 43, 548-570.

Andersson, L., Jackson, S. E., & Russell, S. V. (2013). Greening organizational behavior: An introduction to the special issue. Journal of Organizational Behavior, 34, 151-155. doi: 10.1002/job.1854

Andersson, L., Shivarajan, S., & Blau, G. (2005). Enacting ecological sustainability in the
MNC: A test of an adapted value-belief-norm framework. Journal of Business Ethics,
59, 295-305.

Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-
analytic review. British Journal of Social Psychology, 40, 471-499. doi:
10.1348/014466601164939

Austin, J. T., & Vancouver, J. B. (1996). Goal constructs in psychology: Structure, process
and content. Psychological Bulletin, 120, 338-375. doi: 10.1037/0033-2909.120.3.338

Bain, P. G., Hornsey, M. J., Bongiorno, R., & Jeffries, C. (2012). Promoting pro-
environmental action in climate change deniers. Nature: Climate Change, 2, 600-603.
doi: 10.1038/nclimate1532

Bamberg, S., & Moser, G. (2007). Twenty years after Hines, Hungerford and Tomera: A new
meta-analysis of psycho-social determinants of pro-environmental behavior. Journal
of Environmental Psychology, 27, 14-25. doi: 10.1016/j.jenvp.2006.12.002

Barnett, J., Dovers, S., Hatfield-Dodds, S., McDonald, J., Nelson, R., Waller, S., . . . Stock,
D. (2011). National Climate Change Adaptation Research Plan: Social, Economic and
Institutional Dimensions: National Climate Change Adaptation Research Facility.

Berkhout, P. H. G., Muskens, J. C., & Velthuijsen, J. W. (2000). Defining the rebound effect.
Energy Policy, 28, 425-432. doi: 10.1016/S0301-4215(00)00022-7

Black, J. S., Stern, P. C., & Elworth, J. T. (1985). Personal and contextual influences on
household energy adaptations. Journal of Applied Psychology, 70, 3-21. doi:
10.1037/0021-9010.70.1.3

Bolderdijk, J., Steg, L., & Postmes, T. (2013). Fostering support for work floor energy
conservation policies: Accounting for privacy concerns. Journal of Organizational
Behavior, 34, 195-210.

Bono, J. E., & Judge, T. A. (2003). Self-concordance at work: Toward understanding the

motivational effects of transformational leaders. Academy of Management Journal,

46, 554-571. doi: 10.2307/30040649

Bord, R. J., O'Connor, R. E., & Fisher, A. (2000). In what sense does the public need to

understand global climate change? Public Understanding of Science, 9, 205-218. doi:

10.1088/0963-6625/9/3/301

Bratton, A., & Bratton, J. (2015). Green Human-Resource Management. In J. Barling & J. L.

Robertson (Eds.), The Psychology of Green Organizations. Oxford: Oxford

University Press.

Cialdini, R. B. (2003). Crafting normative messages to protect the environment. Current

Directions in Psychological Science, 12, 105-109. doi: 10.1111/1467-8721.01242

Clark, J. K., & Evans, A. T. (2014). Source credibility and persuasion: The role of message

position in self-validation. Personality and Social Psychology Bulletin, 40, 1024-

1036. doi: 10.1177/0146167214534733

Cropanzano, R., James, K., & Citera, M. (1993). A goal hierarchy model of personality,

motivation, and leadership. Research in Organizational Behavior, 15, 267-322.

Davis, M. C., & Challenger, R. (2012). A socio-technical approach to sustainable

intervention design. Paper presented at the Academy of Management Annual

Meeting, Boston, Massachusetts.

Davis, M. C., & Challenger, R. (2015). Environmentally Sustainable Work Behavior Wiley

Encyclopedia of Management (Vol. 11, pp. 1-3).

Davis, M. C., & Coan, P. (2015). Organizational change. In J. Barling & J. L. Robertson

(Eds.), The Psychology of Green Organizations. Oxford: Oxford University Press.

Davis, M. C., Leach, D. J., & Clegg, C. W. (2011). The physical environment of the office:

    Contemporary and emerging issues. International Review of Industrial and

    Organisational Psychology, 193-237.

De Young, R. (2000). Expanding and evaluating motives for environmentally responsible

    behavior. Journal of Social Issues, 56, 509-526. doi: 10.1111/0022-4537.00181

Deci, E. L., & Ryan, R. M. (1985). Intrinsic motivation and self-determination in human

    behavior. New York: Plenum.

Delmas, M. A., & Pekovic, S. (2013). Environmental standards and labor productivity:

    Understanding the mechanisms that sustain sustainability. Journal of Organizational

    Behavior, 34, 230-252. doi: 10.1002/job.1827

Dono, J., Webb, J., & Richardson, B. (2010). The relationship between environmental

    activism, pro-environmental behavior and social identity. Journal of Environmental

    Psychology, 30, 178-186. doi: 10.1016/j.jenvp.2009.11.006

Ewert, A., & Galloway, G. (2009). Socially desirable responding in an environmental

    context: Development of a domain specific scale. Environmental Education Research,

    15, 55-70. doi: 10.1080/13504620802613504

Fielding, K. S., McDonald, R., & Louis, W. R. (2008). Theory of planned behaviour, identity

    and intentions to engage in environmental activism. Journal of Environmental

    Psychology, 28, 318-326. doi: 10.1016/j.jenvp.2008.03.003

Fielding, K. S., Terry, D. J., Masser, B., & Hogg, M. A. (2008). Integrating social identity

    theory and the theory of planned behaviour to explain decisions to engage in

    sustainable agricultural practices. British Journal of Social Psychology, 47, 23-48.

    doi: 10.1348/014466607X206792

Gifford, R. (2011). The dragons of inaction: Psychological barriers that limit climate change

mitigation and adaptation. American Psychologist, 66, 290-302. doi:

10.1037/a0023566

Graves, L. M., Sarkis, J., & Zhu, Q. (2013). How transformational leadership and employee

motivation combine to predict employee proenvironmental behaviors in China.

Journal of Environmental Psychology, 35, 81-91.

Greenhill, M., Leviston, Z., Leonard, R., & Walker, I. (2014). Assessing climate change

beliefs: Response effects of question wording and response alternatives. Public

Understanding of Science, 23, 947-965.

Greening, L. A., Greene, D. L., & Difiglio, C. (2000). Energy efficiency and consumption -

the rebound effect - a survey. Energy Policy, 28, 389-401. doi: 10.1016/S0301-

4215(00)00021-5

Greguras, G. J., & Diefendorff, J. M. (2010). Why does proactive personality predict

employee life satisfaction and work behaviors? A field investigation of the mediating

role of the self-concordance model. Personnel Psychology, 63, 539-560. doi:

10.1111/j.1744-6570.2010.01180.x

Han, Q., Nieuwenhijsen, I., de Vries, B., Blokhuis, E., & Schaefer, W. (2013). Intervention

strategy to stimulate energy-saving behavior of local residents. Energy Policy, 52,

706-715. doi: 10.1016/j.enpol.2012.10.031

Hanges, P. J., Lord, R. G., & Dickson, M. W. (2000). An information-processing perspective

on leadership and culture: A case for connectionist architecture. Applied Psychology:

An International Review, 49, 133-161. doi: 10.1111/1464-0597.00008

Hart, W., Albarracin, D., Eagly, A. H., Brechan, I., Lindberg, M. J., & Merrill, L. (2009).

Feeling validated versus being correct: A meta-analysis of selective exposure to

information. Psychological Bulletin, 135, 555-588. doi: 10.1037/a0015701

Heath, Y., & Gifford, R. (2006). Free-market ideology and environmental degradation: The case of beliefs in global climate change. Environment and Behavior, 38, 48-71. doi: 10.1177/0013916505277998

IPCC. (2007). Fourth Assessment Report: Climate Change 2007.

Jackson, S. E., Ones, D. S., & Dilchert, S. (2012). Managing human resources for environmental sustainability (Vol. 32): John Wiley & Sons.

Kim, A., Kim, Y., Han, K., Jackson, S. E., & Ployhart, R. E. (2014). Multilevel Influences on Voluntary Workplace Green Behavior Individual Differences, Leader Behavior, and Coworker Advocacy. Journal of Management, 0149206314547386.

Kruglanski, A. W., Kopetz, C., Belanger, J. J., Chun, W. Y., Orehek, E., & Fishbach, A. (2013). Features of multifinality. Personality and Social Psychology Review, 17, 22-39. doi: 10.1177/1088868312453087

Kruglanski, A. W., Shah, J. Y., Fishbach, A., Friedman, R., Chun, W. Y., & Sleeth-Keppler, D. (2002). A theory of goal systems. Advances in Experimental Social Psychology, 34, 331-378. doi: 10.1016/S0065-2601(02)80008-9

Leviston, Z., & Walker, I. (2011). Second annual survey of Australian attitudes to climate change: Interim Report Social and Behaviour Sciences Research Group: CSIRO.

Leviston, Z., & Walker, I. (2012). Beliefs and denials about climate change: An Australian perspective. Ecopsychology, 4, 277-285. doi: 10.1089/eco.2012.0051

Leviston, Z., Walker, I., & Morwinski, S. (2013). Your opinion on climate change might not be as common as you think. Nature: Climate Change, 3, 334-337. doi: 10.1038/nclimate1743

Lewandowsky, S., Gignac, G. E., & Vaughan, S. (2013). The pivotal role of perceived scientific consensus in acceptance of science. Nature Climate Change, 3, 399-404. doi: 10.1038/nclimate1720

Lord, R. G., & Brown, D. J. (2001). Leadership, values, and subordinate self-concepts. The Leadership Quarterly, 12, 133-152. doi: 10.1016/S1048-9843(01)00072-8

Margetts, H., John, P., Escher, T., & Reissfelder, S. (2011). Social information and political participation on the internet: an experiment. European Political Science Review, 3, 321-344.

McNeill, I. M., Dunlop, P. D., Skinner, T. C., & Morrison, D. L. (in press). Predicting delay in residents' decision on defending versus evacuating through antecedents of decision avoidance. International Journal of Wildland Fire. doi: 10.1071/WF12213

Meteorology, A. B. o. (2013). Annual Australian Climate Statement 2012. Melbourne, Australia.

Midden, C. J. H., Meter, J. E., Weening, M. H., & Zieverink, H. J. A. (1983). Using feedback, reinforcement and information to reduce energy consumption in households: A field experiment. Journal of Economic Psychology, 3, 65-86. doi: 10.1016/0167-4870(83)90058-2

Molina, R., Unsworth, K. L., Hodkiewicz, M. R., & Adriasola, E. (2013). Are managerial pressure, technological control and intrinsic motivation effective in improving data quality? Reliability Engineering and System Safety, 119, 26-34. doi: 10.1016/j.ress.2013.04.009

Myers, T. A., Nisbet, M. C., Maibach, E. W., & Leiserowitz, A. A. (2012). A public health frame arouses hopeful emotions about climate change. Climatic Change, 113, 1105-1112. doi: 10.1007/s10584-012-0513-6

Norton, T. A., Parker, S. L., Zacher, H., & Ashkanasy, N. M. (2015). Employee Green Behavior A Theoretical Framework, Multilevel Review, and Future Research Agenda. Organization & Environment, 28, 103-125.

Norton, T. A., Zacher, H., & Ashkanasy, N. M. (2012). On the importance of pro-
environmental organizational climate for employee green behavior. Industrial and
Organizational Psychology, 5, 497-500.

Norton, T. A., Zacher, H., & Ashkanasy, N. M. (2014). Organisational sustainability policies
and employee green behaviour: The mediating role of work climate perceptions.
Journal of Environmental Psychology, 38, 49-54.

Osbaldiston, R., & Schott, J. P. (2012). Environmental sustainability and behavioral science:
Meta-analysis of proenvironmental behavior experiments. Environment and Behavior,
44, 257-299. doi: 10.1177/0013916511402673

Pelletier, L. G., Tuson, K. M., Green-Demers, I., Noels, K., & Beaton, A. M. (1998). Why are
you doing things for the environment? The motivation toward the environment scale
(mtes) 1. Journal of Applied Social Psychology, 28, 437-468. doi: 10.1111/j.1559-
1816.1998.tb01714.x

Peterson, T. C., Hoerling, M. P., Stott, P. A., & Herring, S. C. (2013). Explaining extreme
events of 2012 from a climate perspective. Bulletin of the American Meterological
Society, 94, Special Supplement. doi: 10.1175/BAMS-D-13-00085.1

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect
effects in simple mediation models. Behavior Research Methods, Instruments and
Computers, 36, 717-731. doi: 10.3758/BF03206553

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing
and comparing indirect effects in multiple mediator models. Behavior Research
Methods, 40, 879-891. doi: 10.3758/BRM.40.3.879

Schipper, L. J., & Grubb, M. (1998). On the Rebound: using energy indicators to measure the
feedback between energy intensities and energy uses. Paper presented at the 1998
IAEE Quebec City Conference.

Schumann, S., & Klein, O. (2015). Substitute or stepping stone? Assessing the impact of low-threshold online collective actions on offline participation. European Journal of Social Psychology, 45, 308-322.

Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. Advances in Experimental Social Psychology, 25, 1-65.

Schwartz, S. H. (1994). Are there universal aspects in the structure and contents of human values? Journal of Social Issues, 50, 19-45. doi: 10.1111/j.1540-4560.1994.tb01196.x

Shah, J. Y., Friedman, R., & Kruglanski, A. W. (2002). Forgetting all else: On the antecedents and consequences of goal shielding. Journal of Personality and Social Psychology, 83, 1261-1280. doi: 10.1037//0022-3514.83.6.1261

Sheldon, K. M., & Elliot, A. J. (1999). Goal striving, need satisfaction, and longitudinal well-being: The self-concordance model. Journal of Personality and Social Psychology, 76, 482-497. doi: 10.1037/0022-3514.76.3.482

Sheldon, K. M., & Emmons, R. A. (1995). Comparing differentiation and integration within personal goal systems. Personality and Individual Differences, 18, 39-46. doi: 10.1016/0191-8869(94)00131-B

Sheldon, K. M., & Houser-Marko, L. (2001). Self-concordance, goal attainment and the pursuit of happiness: Can there be an upward spiral? Journal of Personality and Social Psychology, 80, 152. doi: 10.1037//0022-3514.80.1.152

Sheldon, K. M., & Kasser, T. (1995). Coherence and congruence: Two aspects of personality integration. Journal of Personality and Social Psychology, 68, 531-543. doi: 10.1037//0022-3514.68.3.531

Slavin, R. E., Wodarski, J. S., & Blackburn, B. L. (1981). A group contingency for electricity

    conservation in master-metered apartments. Journal of Applied Behavior Analysis, 14,

    357-363. doi: 10.1901/jaba.1981.14-357

Sparks, P., & Shepherd, R. (1992). Self-identity and the Theory of Planned Behavior:

    Assesing the role of identification with "Green Consumerism". Social Psychology

    Quarterly, 388-399.

Stern, P. C. (2000). Toward a coherent theory of environmentally significant behavior.

    Journal of Social Issues, 56, 407-424. doi: 10.1111/0022-4537.00175

Stern, P. C. (2011). Contributions of psychology to limiting climate change. American

    Psychologist, 66, 303-314. doi: 10.1037/a0023235

Stern, P. C., & Dietz, T. (1994). The value basis of environmental concern. Journal of Social

    Issues, 50, 65-84. doi: 10.1111/j.1540-4560.1994.tb02420.x

Stern, P. C., Dietz, T., & Guagnano, G. A. (1995). The new ecological paradigm in social

    psychological perspective. Environment and Behavior, 27, 723-745. doi:

    10.1177/0013916595276001

Strickland, A. A., Taber, C. S., & Lodge, M. (2011). Motivated reasoning and public opinion.

    Journal of Health Politics, Policy and Law, 36, 935-944. doi: 10.1215/03616878-

    1460524

Sussman, R., Greeno, M., Gifford, R., & Scannell, L. (2013). The effectiveness of models

    and prompts on waste diversion: A field experiment on composting by cafeteria

    patrons. Journal of Applied Social Psychology, 43, 24-34. doi: 10.1111/j.1559-

    1816.2012.00978.x

Thogersen, J., & Moller, B. (2008). Breaking car use habits: The effectiveness of a free one-

    month travelcard. Transportation, 35, 329-345. doi: 10.1007/s11116-008-9160-1

Unsworth, K. L. (2015). Green me up Scotty: Psychological interventions to increase pro-environmental behaviours. In J. Barling & J. Robertson (Eds.), The Psychology of Green Organizations. New York: Oxford University Press.

Unsworth, K. L., Adriasola, E., Johnston-Billings, A., Dmitrieva, A., & Hodkiewicz, M. R. (2011). Goal hierarchy: Improving asset data quality by improving motivation. Reliability Engineering and System Safety, 96, 1474-1481. doi: 10.1016/j.ress.2011.06.003

Unsworth, K. L., Dmitrieva, A., & Adriasola, E. (2013). Changing behavior: Increasing the effectiveness of workplace interventions in creating pro-environmental behavior change. Journal of Organizational Behavior, 34, 211-229. doi: 10.1002/job.1837

Unsworth, K. L., & Fielding, K. S. (2014). It's political: How the salience of one's political identity changes climate change beliefs and policy support. Global Environmental Change, 27, 131-137. doi: 10.1016/j.gloenvcha.2014.05.002

Unsworth, K. L., Yeo, G., & Beck, J. W. (2014). Multiple goals: A review and derivation of general principles. Journal of Organizational Behavior, 35, 1064-1078.

Walls, J. L., & Hoffman, A. J. (2013). Exceptional boards: Environmental experience and positive deviance from institutional norms. Journal of Organizational Behavior, 34, 253-271. doi: 10.1002/job.1813

Webb, T. L., & Sheeran, P. (2006). Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. Psychological Bulletin, 132, 249-268. doi: 10.1037/0033-2909.132.2.249

Young, W., Davis, M. C., McNeill, I., Malhotra, B., Russell, S. V., Unsworth, K. L., & Clegg, C. W. (in press). Changing behavior: Successful environmental programmes in the workplace. Business Strategy and the Environment. doi: 10.1002/bse.1836

Yue, T., Long, R., & Chen, H. (2013). Factors influencing energy-saving behavior of urban

    households in Jiangsu Province. Energy Policy, 62, 665-675. doi:

    10.1016/j.enpol.2013.07.051

Table 1. Study 1 Correlations, Means and Standard Deviations.

Variable	Mean	SD	1	2	3	4	5	6	7
1. Age	45.44	16.25							
2. Gender	1.50	0.50	-.10						
3. Political orientation[t]	0.58	0.49	-.03	-.01					
4. Climate change beliefs	3.21	0.92	.07	.08	.26***				
5. Environmental identity	6.15	1.63	.12	.11	.10	.36***			
6. Free-market orientation	2.66	0.66	-.12	.05	-.28***	-.32***	-.27***		
7. Self-concordance of energy use	159.79	62.65	.07	.21***	.02	.22***	.49***	-.06	
8. Petition behavior sustainable energy use	1.71	0.46	.06	.03	.33***	.30***	.27***	-.25***	.27***

Note. [t]Political orientation is coded as 0 "Right-wing oriented", 1 "Left-wing oriented"; *p<.05; **p<.01; ***p<.001; N = 167-525 (pairwise deletion)

Table 2. Study 1 Logistic Regression of Renewable Energy Petition Behavior on Higher-Order Environmental Goals and Energy Use Self-Concordance.

	Unstandardized Regression Weight	Standard Error
Age	.01	.02
Gender	-.16	.47
Political orientation	1.11*	.48
Free market ideology	-.72	.37
Environmental identity	.24	.16
Climate change beliefs	.21	.25
Energy use self-concordance	.01**	.005
TOTAL MODEL: $\chi^2 = 40.03$, df = 7, p <.001; Cox & Snell $R^2 = .24$		

Note. * p < .05, ** p < .01; N = 143 (listwise deletion)

Table 3. Breadth of Self-Concordance Manipulation in Study 2

How Helpful Is Reducing Your Energy Use to...	Experimental / Control Group Differences
Environmental Goals	
Protecting the environment	$t = -2.94$, $p = .003$
Frugality	$t = -1.08$, $p = .28$
Looking after our children's future	$t = -3.89$, $p < .001$
Reducing the effects of climate change	$t = -2.52$, $p = .01$
Non-Environmental Goals	
Financial goals	$t = -2.16$, $p = .03$
Participating in changing the world	$t = -2.99$, $p = .003$
Not standing out from the crowd	$t = -.67$, $p = .50$
Being helpful to others	$t = -1.59$, $p = .41$
Having a relatively easy or convenient life	$t = -2.94$, $p = .004$
Fulfilling requirements, obligations or regulations	$t = -1.22$, $p = .22$
Being a good citizen or good neighbour	$t = -2.04$, $p = .04$

Table 4. Study Two Means, Standard Deviations and Correlations

Variable	Mean	SD	1	2	3
1. Sustainable energy behav	13.30	4.03			
2. Self-concordance	253.50	75.96	.61***		
3. Social desirability	2.59	0.76	.15**	.14**	
4. Environmental goal	3.99	0.98	.48***	.68***	.10*

Note. * p < .05, ** p < .01, *** p < .001; N = 412

Table 5. Study Two Regression of Self-Concordance and Control Variables on Sustainable Energy Behavior Intentions

	Step One		Step Two	
	Unstandardized Regression Coefficient	Standard Error	Unstandardized Regression Coefficient	Standard Error
Age	.001	.001	.001	.001
Gender	.16	.10	.07	.09
Education level	-.02	.04	.04	.04
Political orientation	.08	.10	.11	.09
Social desirability	.14*	.07	.07	.06
Environmental goals	.46***	.05	.11	.06
Self-concordance			.01***	.001
	$R^2 = .25$;		$R^2 = .39$;	
	$F(6,335) = 18.54, p < .001$		$F(7,334) = 30.51, p < .001$	

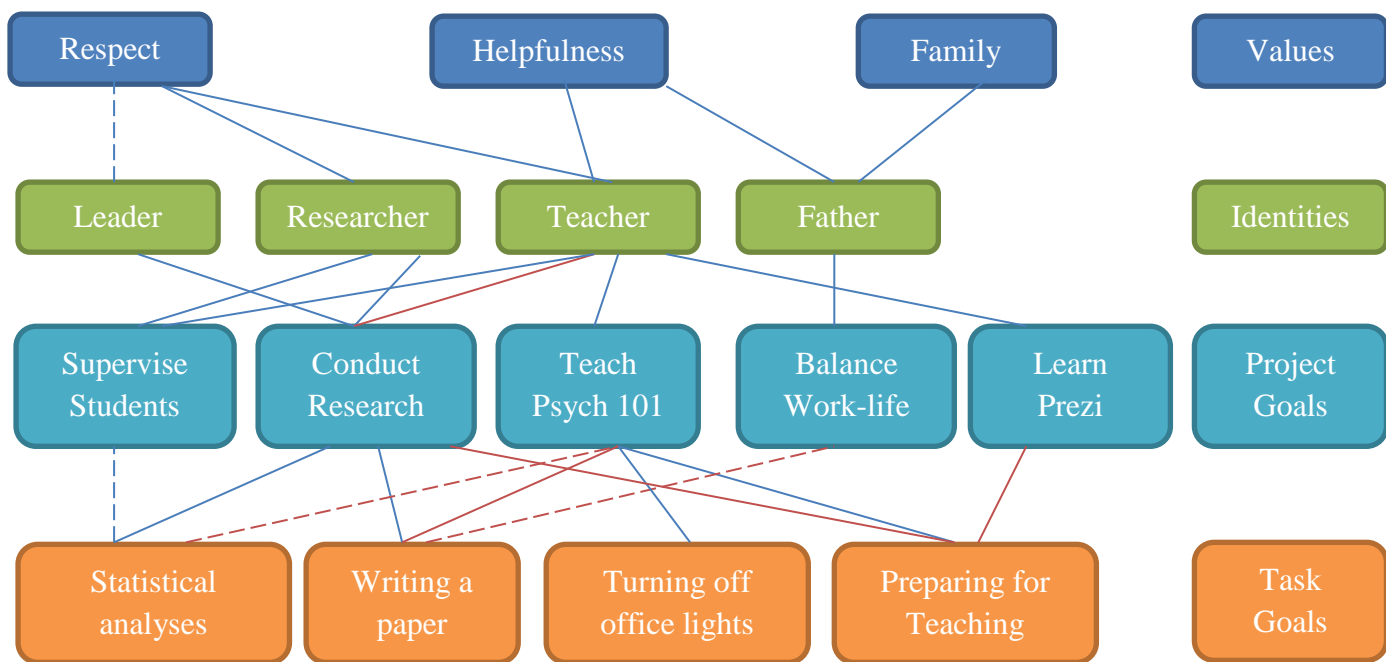Note. * $p < .05$. *** $p < .001$; N = 342

Figure 1. Example of a goal hierarchy (based on Cropanzano, James, & Citera, 1993).