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Restricting Our Consumption of Material Goods: An Application of the Theory of Planned Behavior

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Abstract: Despite the increasing number of studies investigating environmentally friendly behavior, relatively little research has examined the attitudes, subjective norms, perceived ability, and intentions of individuals to restrict their consumption. The current study validated a new measure of consumption restriction developed from the Theory of Planned Behavior. A total of 243 college-aged students completed the Consumption Restriction Questionnaire (CRQ), in addition to measures of greed, frugality, materialism, and consumption. Results confirmed the importance of attitudes, subjective norms and perceived control as determinants of both intentions to restrict consumption in addition to actual consumption, and also demonstrated the superiority of attitudes, subjective norms and perceived control in predicting consumption related to individual differences in greed, frugality and materialism. However, intentions to restrict consumption were modest. Results have implications for both our understanding of environmentally friendly behavior, as well as for the targets that interventions designed to restrict our consumption should address.

Keywords: pro-environmental behavior; consumption restriction; theory of planned behavior; greed; frugality

1. Introduction

The typical American household owns some 300,000 items, everything from paper clips and ironing boards, to washing machines and sofas [1]. Estimates suggest that more than \$1.2 trillion is spent annually on non-essential goods and services [2], and personal spending per capita has increased by 33% between 1993 and 2004 [3]. North American and Western European households, although representing just 12% of the world's population, are responsible for 60% of private consumption spending, whereas individuals in South-Asia and sub-Saharan Africa, representing 33.3% of the world population, are responsible for a mere 3.2% of goods and services consumed by households [4].

There is now a consensus among experts that individuals in economically developed nations are overconsuming [5]. The 2016 Assessment Study of the United Nations Environmental Resource Panel estimates that natural resources extracted for human use has tripled in 40 years [6,7]. As a consequence of overconsumption, half a billion people face water scarcity all year round, and half of the world's population faces water shortages at least one month per year [8]. Over 70% of the world's fish species are either fully exploited or depleted [9]. The 2018 Living Planet Report [10] estimates that the population abundance of vertebrate species from around the world declined some 60% between 1970 and 2014. Estimates indicate that the point at which global consumption exceeds the rate at which consumption can be sustained—what has been deemed Earth Overshoot Day—is arriving earlier and earlier each year [11]. In 1970, Earth Overshoot Day was reached on 29 December. Earth overshoot day in 2019 was reached on 29 July, nine days earlier than in 2016.

For advocates of sustainability, restricting the rate at which resources are consumed is an environmental priority [12]. Most economically well-off countries are now investing heavily in both energy conservation and renewable sources of energy [6], as well as in campaigns to reduce and recycle material goods [13]. Germans, for example, only use 54% of the electricity of the typical American [14]. Yet, despite existing efforts and concerns expressed at a societal level, relatively little research has examined individuals' attitudes, beliefs or behaviors around the issue of overconsumption. Although individuals now generally acknowledge the importance of recycling [13], relatively little is known about an individual's willingness to restrict consumption. However, reducing consumption is fundamentally different from consuming products that are produced or raised in an environmentally friendly manner. If overconsumption is the fundamental issue to be addressed, then it will not be sufficient to merely to eat beef that is raised in a sustainable manner, we must also eat less beef. The goal of the current research was to develop and validate a measure of restriction consumption.

1.1. Existing Theory and Research on Overconsumption

The literature on consumer consumption, whether understood as overconsumption [15,16] or sustainable consumption [17,18] has increased dramatically in the past two decades [19], becoming a topic of investigation in a diverse range of disciplines, including ecology [20], economics [21], marketing research [22], sociology [23], and psychology [24–26]. Studies have investigated the association between personality traits (e.g., being frugal, materialistic) and sustainable behavior [23,27], while others have looked at how to enhance sustainability by investigating attitudes and values towards the environment [17,18,26]. Several studies have demonstrated that being aware of the environmental impact of consumption is not enough to predict consumption restriction [17,26]. Despite this growing interest in environmental awareness and consumption, no study has examined the extent to which individuals are (or have the intention of) reducing their consumption.

1.2. Developing a New Measure of Consumption Restriction Behavior

Kostadinova [28] has highlighted recent efforts to utilize Ajzen's [29] Theory of Planned Behavior (TPB) to investigate a variety of attitudes and behaviors, including attitudes and intentions to purchase environmentally friendly products [30,31], awareness and interest in recycling [32], sustainable consumption [33–36], and environmental activism [37,38], as well as whether or not sustainable consumption is a behavior that can be learned [21]. Buenstorf and Cordes [21] were among the first to theorize that sustainable consumption could be acquired by individuals, largely as a result of social pressures that would increase conformity among individuals. They presented a theoretical model largely based on evolutionary theory but did not examine the acquisition of sustainable consumption behavior directly. They concluded that voluntary restraint is unlikely but acknowledged that the reduction of individual consumption had yet to be realized [21].

Despite the growing number of studies examining attitudes and intentions towards environmentally friendly products and sustainable consumption, no study to date has examined the importance of individuals' attitudes, expectations and intentions to restrict their consumption, in general, or the factors that may determine whether individuals will reduce their consumption. The recent study conducted by Joanes [34] is one of the few studies to examine the importance of personal norms associated with reducing the consumption of clothing. Although this study found support for the importance of assessing personal norms to intentions to reduce the consumption of clothing (i.e., "I feel obliged to reduce my personal clothing consumption because of my personal values," p. 947), other factors typically examined within the Theory of Planned Behavior (TPB) that are hypothesized to influence intentions were not investigated, including attitudes towards consumption, the importance of perceived control over reducing consumption and in fact actual consumption restriction.

Given the extensive research indicating that individuals are consuming more goods and the pressing need to modify consumption behavior globally, we developed a new measure of consumption behavior, based on Ajzen's [29] Theory of Planned Behavior, designed to evaluate the

factors influencing consumption restriction behavior, namely the individual's attitudes, expectations, and perceived ability and intentions to restrict consumption. This model, depicted in Figure 1, posits that attitudes, expectations, and perceived control over the behavior will directly influence any intentions (i.e., to restrict consumption) and that these three components, namely attitudes, expectations, and perceived control, will be the most immediate and proximal predictors of intentions to restrict consumption than other determinants, such as personality characteristics, including individual disposition towards greed or frugality, and that intentions to restrict consumption will be the most proximal predictor of actual behavior.

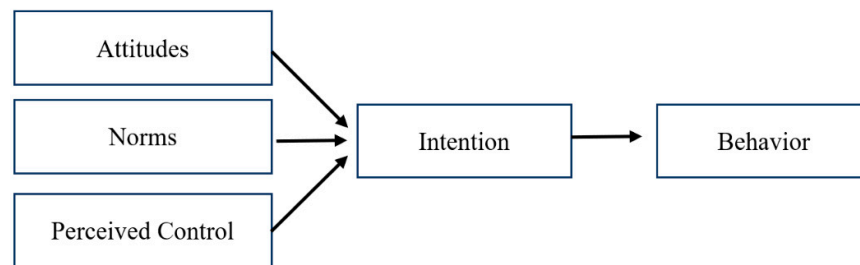


Figure 1. Theory of planned behavior for consumption restriction behavior.

We formally defined consumption restriction as an individual difference variable comprised of a number of related components that include both directly restricting consumption, namely buying less, as well as indirectly reducing consumption, namely buying goods that would last longer. Specifically, consumption restriction was defined as the act of postponing the consumption of goods until needed, reducing the amount consumed (e.g., not buying a second television) and the frequency of consumption (e.g., buying new things all the time), avoiding the consumption of goods that are not necessary (e.g., not buying a large sport utility vehicle when a smaller car will do; not taking a plastic shopping bag), or the consumption of goods that are unlikely to last (e.g., non-durable goods), continuing to use something that is out-of-date, damaged, or old longer than wanted, reusing something that was previously owned, and favoring the consumption of eco-friendly products (i.e., products that are made in a sustainable manner).

According to Ajzen's [29] Theory of Planned Behavior, individuals' intentions to restrict their consumption will be determined by their attitudes towards reducing consumption (e.g., reducing purchases is something that is positively viewed), their subjective expectations and norms (e.g., reducing purchases is something that is expected from them), and their perceived behavioral control (e.g., reducing purchases is something they find difficult). Through pilot testing of questions, we learned that individuals were able to understand the control of consumption better when questions were formulated as a lack of control. Accordingly, we elected to assess the lack of control over consumption rather than the control over restricting consumption.

Evaluating the extent to which attitudes, expectations, and beliefs about the controllability of consumption restriction, alongside more dispositions such as greed, materialism, and frugality is important for a number of reasons. First, although several studies have investigated attitudes towards consuming eco-friendly products [17,18,24], no studies to our knowledge have investigated beliefs and attitudes towards restricting one's consumption, in general, and second, no studies have examined consumption restriction, within a formal model of behavior change, such as the theory of planned behavior. Although the previous study conducted by Joanes [34] did focus on the association of personal norms to reducing consumption, questions focused on reducing consumption of clothing. In contrast, the goal of the current study was to focus on consumption restriction *in general* and not on a single, specific domain of consumption, for which there will be many. Whether a more focused, specific approach to investigating reducing consumption is more efficacious is an important research question, which will require at a minimum the development of both general and specific measures.

Understanding the determinants of consumption restriction, namely our attitudes, expectations, perceived control, and intentions towards reducing our consumption, is an important step in evaluating the success of any intervention that will ultimately be required to lower our desire to consume to a level that is more sustainable. The importance of models, such as Ajzen's [29] Theory of Planned Behavior, cannot, in our view, be understated. The theory of planned behavior is first and foremost a psychological model that seeks to understand the factors that influence an individual's actions and choices. Arguably, progress on addressing the impact of human activity on climate will depend on changing (or limiting) human behavior, which must include restricting consumption. In a context of consumption restriction, Ajzen's model of behavior change seeks to identify the extent to which individuals feel they should and can exert control over their consumption in general. Even if societies determine that restrictions on consumption need to be imposed, individual attitudes and beliefs about restricting consumption will be important to achieving long term reductions. Finally, it remains an untested question as to whether modifiable factors, such as attitudes, expectations, perceived control, and intentions towards reducing our consumption are more influential predictors of consumption behavior, relative to more stable personality factors, such as greed and frugality.

1.3. Overview and Hypotheses

Existing research has demonstrated that there are a variety of factors that will be expected to influence consumption, including the amount of disposable income a person currently possesses or the level of consumer debt they currently carry, but also personal dispositions, such as being greedy [15], frugal [32], or materialistic [16]. In the current study, we also evaluated the relative importance of attitudes, expectations, and perceived control for predicting consumption restriction behavior relative to other constructs such as frugality, greed, and materialism. The theory of planned behavior [29] does not state that intentions towards any behavior will not be influenced by other variables, only that attitudes, expectations and perceived control will be the most proximal and therefore strongest predictors of intention. In addition, we examined the extent to which intentions to restrict behavior mediate the association between attitudes, expectations and perceived control and consumption behavior, as implied by the model depicted in Figure 1. The following hypotheses were tested:

Hypothesis 1 (H1). *Consistent with the Theory of Planned Behavior [29], it was hypothesized that attitudes, subjective norms, and perceived control can be measured reliably and distinctly and that all elements of the theory will predict intentions to restrict consumption, which in turn is expected to predict consumption behavior.*

Hypothesis 2 (H2). *Previous research has shown that constructs, such as frugality, greed, and materialism, are likely to be related to spending behaviors [15,16,32]. Ajzen's [29]. However, the Theory of Planned Behavior [29] predicts that attitudes, beliefs about the expectations of others, and perceived control are the most proximal predictors of any behavioral intention. Accordingly, it was hypothesized that attitudes, beliefs about the expectations of others, and perceived control would be better predictors of intentions to consume than measures of greed, frugality, and materialism.*

Hypothesis 3 (H3). *Consistent with the model depicted in Figure 1, it was hypothesized that intentions mediate the influence of measures of attitudes, subjective norms, and perceived control on measures of recent consumption behavior. Given that the primary goal of the study was to develop and validate a new measure of consumption restriction, we measured recent consumption, in the past month, as a measure of behavior.*

Hypothesis 4 (H4). *The Theory of Planned Behavior [29] does not predict any differences among different genders, different age groups, or ethnicities. The model predicts that any differences among these kinds of groups should be accounted for by differences in the three antecedent constructs themselves (i.e., attitudes, norms, and perceived control) in individuals in those groups. Accordingly, it was hypothesized that no differences would be found among individuals who designate themselves as male or female, age groups (e.g., 18–21 years old and 26–30 years old), ethnic groups (e.g., Caucasians and Asians), or living situations (e.g., living at home vs living alone).*

2. Materials and Methods

2.1. Participants

Two hundred and forty-three participants (79.84% female) were recruited from the University of Ottawa through on-campus flyers and the Integrated System of Research Participation (ISPR) and were awarded one ISPR point upon completion of the online study. The majority of participants were in their first year of University (63.5%) and reported being Caucasian (53.7%). Most participants either lived at home (47.3%) or alone (44.8%), had less than \$400 available per month to spend on clothes, food, and activities (87.2%) and declared having a job as their primary source of income (54.2%).

2.2. Measures

2.2.1. Consumption Restriction

The Consumption Restriction Questionnaire (CRQ) is comprised of 45 items designed to operationalize various elements of consumption restriction behavior, including an individual's attitudes, expectations, and perceived ability, as well as intentions to restrict consumption and actual consumption behavior. Items were developed and pilot-tested previously on a group of undergraduate students to determine their suitability. A final set of items were selected and utilized in the current study. Individuals indicated the extent to which they agreed or disagreed on a seven-point scale ranging from (1) very strongly agree to (7) very strongly disagree on items assessing attitudes towards consumption restriction (e.g., "It is important that people learn to restrict how much they purchase and learn to live with less."); normative expectations of others to restrict consumption (e.g., "My family, friends and coworkers expect me to cut down, restrict or minimize what I spend money on."); perceived lack of control over consumption (e.g., "It is difficult putting off a purchase that I really, really wanted."), intentions to restrict consumption (e.g., "I put off buying things until I really need them; I keep shopping to a minimum; I repaired something so that I can use it a bit longer, rather than discarding it and buying a new one"). The questionnaire can be obtained directly from the authors.

Although some of these constructs, such as frugality [32], are likely to overlap with the current construct of consumption restriction in some manner, consumption restriction differs conceptually from frugality. Consumption restriction is defined as a specific behavior, whereas a construct, such as frugality, is better conceptualized as personality disposition. Still, individuals who are extremely frugal should be expected to purchase less. However, being frugal does not necessarily imply that one will restrict consumption, merely just spend wisely. Indeed, closer examination of existing measures of frugality [32], dispositional greed [15] and materialism [16], reveals that the majority of items focus on general attitudes and that relatively few assess explicit behaviors, expectations, or the degree of perceived control over such behavior.

2.2.2. Criterion Measures of Consumption

We also included single-item measures of consumption, expressed in dollar amounts (e.g., the overall amount of money spent each month on clothes, food, going out, and buying new things, i.e., less than \$200, \$200 to \$400; \$400 to \$600; \$600 to \$800; \$800 to \$1000), as well as a single item measuring the frequency of buying something (i.e., almost never, once a month, twice a month, once a week, twice a week, more than twice a week).

2.2.3. The Frugality Scale

The Frugality Scale is an 8-item scale [32] used to evaluate a lifestyle trait by which individuals are both restrictive in their acquisitions and resourceful in their way of using their products. The scale mainly assesses attitudes (e.g., "I believe in being careful in how I spend my money") and the ability to self-control (e.g., "I discipline myself to get the most from my money"), on a six-point scale ranging

from (1) strongly agree to (6) strongly disagree. A low score means a frugal lifestyle. Cronbach's alpha in the present study was adequate ($\alpha = 0.86$).

2.2.4. The Dispositional Greed Scale

The Dispositional Greed Scale is a 7-item scale [15] measuring greed as a personality trait (e.g., "Actually, I'm kind of greedy") on a five-point Likert scale from (1) strongly agree to (5) strongly disagree. A lower score is equivalent to higher dispositional greed. Cronbach's alpha in the current study was adequate ($\alpha = 0.87$).

2.2.5. The Material Values Scale

The Material Values Scale is an 18-item scale [16] assessing materialism and is comprised of three related subscales, namely success, which is defining success with regards to possessions (e.g., "I like to own things that impress people"), centrality, which is placing possessions at the center of life (e.g., "I like a lot of luxury in my life"), and acquisition as an aspect of happiness (e.g., "I'd be happier if I could afford to buy more things"). Items from all subscales are combined to produce a single overall score. Cronbach's alpha in the current study was adequate ($\alpha = 0.82$).

3. Results

Statistical analyses were conducted using SAS (version 9.4) and Mplus (version 7.0) software. Results of exploratory principal components analysis and univariate and bivariate statistics for the newly created measures of consumption restriction behavior are presented first, followed by the results of regression and structural equation modelling.

3.1. Principal Components Analysis of Primary Scales

Results of a principal components analysis of items assessing attitudes, norms, perceived control and intentions are represented in Table 1. Results show that items assessing attitudes, norms, perceived control concerning consumption restriction were loaded on distinct factors, but that intentions to restrict were less well-differentiated, which is not unexpected, given that intentions are predicted to be related to each of the components of the model, namely attitudes, norms and intentions.

Table 1. Principal components analysis of primary scales.

Scale	Item	F1	F2	F3	F4	M	SD
Attitude	Buying durable products that last longer is important even though they may cost 25% to 50% more.	0.41	.	.	0.58	3.93	0.81
Attitude	Eating a modestly sized portion at mealtimes (e.g., regular sizes, fewer pieces, fewer drinks) is important to me.	0.50	.	0.15	.	3.37	1.18
Attitude	Even when something is heavily discounted (i.e., on sale), one should not buy it, if it is not needed.	0.37	−0.28	0.22	0.18	3.71	1.02
Attitude	If something is a bit damaged, it is desirable to make do with it as long as possible or have it repaired rather than just buying a new one immediately.	0.55	.	.	.	3.87	0.93
Attitude	It is important to try to repair something that is a bit damaged instead of replacing it.	0.56	−0.15	.	.	3.98	0.91
Attitude	I don't like buying a lot of things at once (e.g., clothes, electronics, cosmetics).	0.35	−0.44	.	−0.16	3.62	1.13
Attitude	If you see something you really, really want, it is okay to buy it even if you do not need it.	0.21	−0.47	0.26	.	3.00	1.13
Attitude	It is important that people learn to restrict how much they purchase and learn to live with less.	0.46	.	.	0.32	4.16	0.87
Norms	People important to me (i.e., friends and family) tend to buy just what they need.	.	.	0.76	.	3.07	1.03
Norms	People important to me (i.e., friends and family) tend to put off buying things until it is really needed.	.	.	0.77	.	3.23	1.03

Norms	People important to me don't tend to buy the newest things, right away.	0.19	.	0.62	.	3.31	1.07
Norms	People important to me don't buy more than they need.	.	−0.20	0.78	.	2.81	1.04
Norms	Restricting how much I buy and spend money on would be respected by the people important to me.	.	.	0.43	0.28	3.49	0.87
Norms	People important to me expect me to cut down and minimize what I spend money on.	.	0.34	0.44	.	3.04	1.17
Control	It is difficult for me to buy only those things that I really need.	.	0.77	.	.	2.94	1.26
Control	It is hard for me to resist buying things that are on sale.	.	0.79	.	.	3.02	1.26
Control	It is difficult putting off a purchase that I really, really want.	.	0.67	.	0.15	3.24	1.20
Control	If someone important to me has something that I don't have, it is difficult for me to wait to have it.	.	0.64	.	0.19	2.45	1.02
Control	I have no difficulty waiting until next month to buy something that I want.	.	0.49	.	.	2.77	1.18
Control	It would be hard for me to purchase the smaller size or portion at a restaurant, or to eat smaller portions or drink fewer drinks at home.	−0.41	0.24	.	.	2.62	1.19
Control	It would be easy for me to buy the product that may cost a little be less, may not be the newest version, or may not be as fancy as the newest model, version or type.	−0.35	0.21	.	.	2.55	1.04
Intent	In the next month, I intend to put off buying things (e.g., clothes, electronics, cosmetics, etc.) until I really need them.	0.33	−0.57	.	0.31	3.37	1.05
Intent	In the next month, I intend on buying a smaller number of things (e.g., clothes, electronics, cosmetics, etc.) than I usually buy.	0.65	0.20	.	.	3.85	0.97
Intent	In the next month, I intend on buying more durable products (i.e., that will last longer) even if it means spending more money.	.	.	.	0.82	3.58	0.97
Intent	In the next month, I intend on eating modest portions at mealtimes (e.g., regular sizes, fewer pieces, in a restaurant) rather than going for larger sizes.	0.60	.	.	.	3.67	1.08
Intent	In the next month, If I see something that I really want, I intend on postponing that purchase until I have time to really think it through.	0.65	.	.	0.22	3.85	0.82
Intent	In the next month, I will repair something or live with it being a bit damaged rather than getting a new one right away.	0.67	.	.	.	3.84	0.93
Intent	In the next month, I will put off buying the newest gadget, fashion or item, even though I really want it now.	0.32	−0.44	.	0.22	3.69	1.01
Intent	In the next month, I will avoid buying things that I do not need.	0.19	−0.46	.	0.28	3.36	1.07

3.2. Intercorrelation of Elements of Consumption Restriction

Bivariate and univariate statistics for the newly constructed scales are reported in Table 2. Cronbach's alphas for the newly constructed scales were generally adequate for research purposes with values ranging from 0.71 to 0.82. Consistent with the Theory of Planned Behavior [29], results showed that attitudes, subjective norms, and the perceived lack of control scales were interrelated and were related to intentions to restrict consumption scale, with the exception of norms which was unrelated to a perceived lack of control ($p = 0.03$). As anticipated, intentions to restrict consumption were significantly (positively) correlated with consumption restriction behavior.

Table 2. Correlations among elements of consumption restriction.

	Norms	Lack of Control	Intent	Restriction Behavior	Mean	Std	α
Attitudes	0.29 *** ¹	−0.44 ***	0.59 ***	0.69 ***	32.60	5.04	0.72
Norms		−0.03	0.29 ***	0.24 ***	18.96	4.08	0.77
Lack of control			−0.34 ***	−0.41 ***	19.60	4.97	0.71
Intent				0.58 ***	44.77	6.74	0.82
Restriction Behavior					37.11	6.81	0.71

¹ Note: $p < 0.001$ ***

3.3. Construct Validity and Distinctiveness of Elements of Consumption Restriction

Pearson correlations among elements of consumption restriction and measures of frugality, greed, and materialism are reported in Table 3. Results showed that measures frugality, greed, and materialism are related to elements of consumption restriction in anticipated ways. The measures of greed and materialism were negatively correlated with both the intention to restrict and restriction consumption behavior. The measures of frugality were positively related to all elements of consumption restriction, including attitudes, norms, perceived lack of control, intentions to restrict and restriction consumption.

Table 3. Correlations among elements of consumption restriction and measures of personality characteristics.

	Attitudes	Norms	Lack of Control	Intent	Restriction Behavior	Frugality	Greed	Materialism
Consumption (Buy)	−0.20 ** ¹	0.03	0.26 ***	−0.22 ***	−0.20 **	−0.12	0.20 **	0.17 *
Consumption (\$)	−0.17 *	0.02	0.23 ***	−0.14 *	−0.27 ***	−0.14 *	0.27 ***	0.21 **
Frugality	0.20 **	0.14 *	−0.21 **	0.23 ***	0.20 **		−0.23 ***	−0.27 ***
Greed	−0.37 ***	−0.13 *	0.51 ***	−0.32 ***	−0.33 ***			0.58 ***
Materialism	−0.34 ***	−0.17 *	0.56 ***	−0.28 ***	−0.32 ***			

¹ Note: $p < 0.05$ *, $p < 0.01$ **, $p < 0.001$ ***.

Criterion measures of consumption, namely the frequency of shopping and amounts of money spent on shopping, were also related to all elements of consumption restriction, as hypothesized, with the exception of normative expectations. Attitudes, perceived lack of control, intent to restrict and consumption restriction were all negatively correlated, albeit modestly, to both the self-reported frequency of shopping and the amounts of money spent on shopping monthly.

3.4. Predictive Utility of Attitudes, Expectations and Norms

A simultaneous regression model was conducted to examine the relative predictive value of attitudes, subjective norms, lack of control, relative to the frugality, greed, and material values, with respect to consumption restriction behavior. Results are presented in Table 4.

Table 4. Predictors of Consumption Restriction Behavior.

	t	p
Intentions to restrict consumption	4.4	0.0001
Attitudes	8.28	0.0001
Subjective norms		ns
Perceived lack of control	−2.56	0.001
Frugality		ns
Greed		ns
Materialism		ns

Results showed that the full model could account for 54% of the variance in consumption restriction behavior but that unique contributions were found only for intentions to restrict consumption, attitudes towards consumption restriction, and beliefs concerning a perceived lack of

control to restrict consumption. Results of these analyses also showed individual differences in frugality, greed, and materialism did not account for variance in consumption restriction if individual differences in attitudes, intentions and a lack of control are included in the model.

3.5. Mediation

Model testing was conducted using Mplus Version 7 [39]. Results of model testing showed that the full model depicted in Figure 1 obtained superior fit indices than the benchmark model, which did not include intentions as a mediator of attitudes, norms and perceived control on behavior. Fit indices for the model including intentions, $\chi^2 = 85.16$, $p < 0.0001$, CFI = 0.72 and TLI = 0.70, were superior to fit indices for the model not including intentions, $\chi^2 = 134.33$, $p < 0.0001$, CFI = 0.56 and TLI = 0.22. These results indicate that model fit improved substantially with intentions included as a mediator as depicted in Figure 1. An additional model that included an additional direct path from attitudes to behavior was also estimated. Fit indices for this modified model were $\chi^2 = 4.50$, $p = 0.11$, CFI = 0.99 and TLI = 0.97. Including an additional pathway directly from attitudes to behavior was sufficient to achieve an adequate fit. Power calculations for the final model indicated that power for the existing model was 0.84 based on an alpha level of 0.05.

3.6. Group Differences

Independent samples *t*-tests revealed that there were no group differences among those who designate themselves as male or female, as older or younger (e.g., 18–21 years old and 26–30 years old), as belonging to different ethnic groups (e.g., Caucasians and Asians), or who come from different living situations (e.g., living at home vs living alone) for any element of consumption restriction, including attitudes, subjective norms, and perceived control, as well as intentions towards consumption restriction.

4. Discussion

The purpose of this study was to develop and validate a measure of consumption restriction behavior that examines the extent to which consumption restriction is associated with an individual's attitudes, subjective norms, perceived control, and intentions towards consumption restriction. Results of our analyses were generally consistent with study hypotheses and support the importance of understanding consumption behavior within a formal theoretical framework such as the Theory of Planned Behavior. First, bivariate correlations showed that attitudes, subjective norms, and perceived control can be measured distinctly and reliably and that all, except for norms about restricting consumption, were related to intentions to restrict consumption. Second, findings showed that when considered simultaneously, individual differences in greed, frugality and materialism did not predict consumption restriction behavior when individual differences in attitude, perceived lack of control and intentions to restrict consumption were considered. Third, attitudes, intentions to restrict consumption, as well as perceived lack of control, but not norms, were also correlated with criterion measures of consumption, namely frequency of purchasing something and amount of money spent. Finally, results of mediation analyses were generally supportive of the theory of planned behavior model. Although fit indices were superior for the model that included intentions as a mediator as compared to the model that did not. Including a direct path from attention to behavior, while retaining intentions as a mediator, resulted in the best model fit.

Results of the current study have a number of implications for the manner in which we study and understand sustainable consumption. The majority of research conducted to date examining sustainable consumption has focused on environmentally friendly consumption of “green” products. While we recognize the importance of purchasing eco-friendly products that are less harmful to the environment or which are produced in a sustainable manner, environmentally friendly consumption is still consumption. In this regard, studying environmentally friendly consumption is conceptually different from studying consumption restriction. To our knowledge, this is the most extensive model yet to examine determinants of consumption restriction and overconsumption behaviors. As others

have argued [12], it is the overall reduction in consumption that is required, in part, to ease the impact on eco-systems and not merely switch to the consumption of environmentally friendly products.

Previous work has demonstrated that individuals' attitudes and intentions towards environmentally friendly products [26,30] and sustainable consumption (e.g., [21,31,34]) can be effectively modelled from a theory of planned behavior. Results of the current study support the view that individuals' attitudes, expectations and degree of perceived control are an important antecedent of a person's intention to restrict consumption and consumption restriction behavior. Findings from the present study also showed that although individual differences in greed, frugality and materialism were related to behavior, intentions, attitudes, and perceived control were relatively stronger predictors of consumption behavior than greed, frugality and materialism. Greed, frugality and materialism are typically viewed as personality traits, which in contrast to intentions, attitudes, and perceived control, are considered to be stable over long periods of time and largely immutable. Components of the theory of planned behavior, namely intentions, attitudes, expectations and perceived control are viewed as more malleable. Attitudes towards consumption restriction can be change—greed less so.

From the perspective of the theory of planned behavior, changing consumption behavior will depend on changing intentions, attitudes, expectations and perceived control, all of which are malleable and can be targeted either individually or a population level. The absence of direct effects for greed, frugality and materialism, once intentions, attitudes, and perceived control suggests that, irrespective of an individual's level of greed or materialism, changes in behavior may be achieved through targeting intentions, attitudes, and perceived control.

Results of the present study are also consistent with the early study conducted by Joanes [34] who examined the relationship between personal norms and intentions to reduce consumption, within a single domain of consumption, namely clothing. Findings from the present study establish the viability of assessing consumption behavior in general, without respect to a specific domain. Evaluating factors influencing consumption behavior, in general, has a number of advantages, both practical and theoretical. Targeting specific domains of consumption will be far more difficult and costly than targeting consumption in general, although it remains an open question which approach general or specific is more effective at changing both intentions and behavior.

Not all elements of the theory of planned behavior were found to be equally important to intentions to restrict consumption, when considered simultaneously. Although measured reliably, questions assessing an individual's normative expectations to restrict consumption were not uniquely related to consumption restriction behavior when the effects of attitudes, intentions and perceived control were simultaneously measured. The implication of this finding, should it be replicated, is that greater change in intention to restrict consumption and actual consumption restriction behavior may be more readily achieved by focusing more on attitudes and perceived control than on the expectations of others. Given that the direct correlations between norms and both intentions and actual behavior were significant (see Table 2), the negative results from both the regression and path analysis suggest that the effect is not strong. Although societal norms to recycle are established in Canadian society the societal expectation to restrict consumption is not. Indeed, the vast majority of initiatives are with respect to recycling and not consumption restriction.

This finding that normative expectations were not uniquely related to behavior is not, however, consistent with the results of the earlier study conducted by Joanes [34], who found that personal norms (e.g., "I feel morally obliged to reduce my personal clothing consumption") was significantly correlated with restricting their consumption (i.e., buy fewer clothing items) of clothing. It is worth noting that items used to measure normative expectations in the present study focus directly on an individual's beliefs about what others expected of them rather than their personal values, which may be arguable closer to the manner in which attitudes were assessed in the present study. Moreover, the study conducted by Joanes [34] only focused on the impact of personal norms on consumption intentions and did not examine either the relative influence of other factors, such as attitudes or perceptions of control, or the impact of norms on actual behavior. Finally, structural equation modelling showed that although intention to restrict does mediate the effect of attitudes, norms and

perceived control on restriction behavior, intention only partially mediates their effect, as the model supported including a direct path from attitudes to behavior.

There are a number of limitations to this study that are important to consider. First, the majority of the participants in this study were female and were first-year university students. Results of this study will require replication in other more diverse samples of individuals and of course may reflect effects that do not generalize from one country to the next. However, the absence of differences among subgroups, defined on the basis of age groups (e.g., 18–21 years old and 26–30 years old), ethnic group (e.g., Caucasians and Asians), and living situations (e.g., living at home vs living alone) suggests the model may generalize well when studied further. Second, although the results of this study are consistent with the theory of planned behavior [29] and with other studies examining the utility of Ajzen’s model in predicting attitudes, expectations, perceived control and intentions concurrently [30,31], the relationship among these elements of the model should be examined prospectively. Third, none of the components of the model were manipulated experimentally. Future research should address the extent to which intentions to restrict consumption can be manipulated and the effect such manipulations produce on subsequent consumption behaviors. Participants in this study were required to recall their consumption behaviors within the past month. Future studies might consider assessing components of this model more regularly over a determined period of time (e.g., once a week, for four consecutive weeks). Finally, although internal consistency for questions assessing the various components of consumption restriction was adequate, the heterogeneity of the construct of consumption, in terms of what is consumed, is likely to be very large. Further scale development should focus on understanding the different domains in which consumption restriction can be targeted and achieved.

5. Conclusions

Despite current knowledge about the negative impact of overconsumption on our planet, relatively little is known about individuals’ willingness to restrict their consumption behavior. Findings from this study provide strong evidence for the importance of the relationship between attitudes, subjective norms, perceived control, intentions to restrict consumption, and consumption behaviors themselves. Progress on addressing the impact of human activity on climate will depend on changing (or limiting) human behavior, which must include restricting consumption. Even if societies determine that restrictions on consumption need to be imposed, individual attitudes and beliefs about restricting consumption will be important to achieving long term reductions.

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