



Case Report

Out of debt, out of burden: The physical burdens of debt

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ABSTRACT

Proverbs in different cultures describe being indebted as burdensome or a physical strain. To our knowledge, little research has examined the link between debt and burden. In the present work, we conducted five studies to examine the hypothesis that debt would lead to perceptual judgments of the environment as more forbidding and extreme in much the same manner as a physical burden. In Studies 1–3, we found that compared with the control condition, people in the debt condition threw beanbags farther, estimated the distance to be greater, and estimated the hills to be steeper. In study 4 we found that participants with student loan debt rated their subjective weight as heavier than participants without debt. In Study 5, we replicated the results of Study 3, which we pre-registered using the Open Science Framework. These findings provided the first evidence of the association between debt and physical burden and indicated that debts affect people similarly to physical burdens.

1. Introduction

Across many cultures, debt is considered as a burden. Individuals describe being indebted as burdensome or a physical strain.¹ For example, in China one can say “When the debts are paid, the body feels light” (“无债一身轻”). Similarly, in English one can say: “Out of debt, out of burden.” To our knowledge however, little research has examined this intuition. In this article, we therefore tested whether indebtedness would be experienced as a physical burden, influencing how people perceive and act in the world.

Research on the relationship between perceptual judgments and the economy of action suggests that visual perceptual judgments of the physical world are influenced not only by optical and ocular motor information, but also by the costs and benefits of individuals' actions related to their bodily resources and social environments (Proffitt, 2006; Schnall, Harber, Stefanucci, & Proffitt, 2008). Previous studies have shown that perceivers' physical resources and potential for action influence the perceptual judgments of spatial properties, including distance, slant, and size (Proffitt, 2006; Proffitt & Linkenauger, 2013; Witt, 2011). For instance, when physical resources are depleted (due to age, fatigue, wearing a heavy backpack, etc.), hills appear steeper and

distances appear greater (Bhalla & Proffitt, 1999; Proffitt, 2006; Proffitt, Stefanucci, Banton, & Epstein, 2003).

In addition to physical resources, perceivers' psychosocial resources have been shown to moderate visual perceptual judgments of the physical world (Lee & Schnall, 2014; Schnall et al., 2008). A reduction in psychological resources would lead people to judge the environment as more challenging and make more extreme judgments of the environment (e.g., judging hill slant as steeper with fewer perceived resources to scale the hill) (Slepian, Camp, & Masicampo, 2015). For instance, participants who thought of either a neutral person or a disliked person estimated a hill to be steeper than participants who thought of a supportive friend (Schnall et al., 2008). Similarly, participants who were asked to recall preoccupying secrets (i.e., devote personal resources toward those secrets) judged a hill to be steeper than did participants who were asked to recall nonpreoccupying secrets (Slepian et al., 2015; Slepian, Masicampo, Toosi, & Ambady, 2012). Further, participants placed in a powerless condition judged boxes to be heavier than did participants in a powerful condition (Lee & Schnall, 2014). A reduction in psychological resources can affect perceptual judgments of the physical world in much the same manner as a physical burden (Schnall et al., 2008; Slepian et al., 2012; Slepian et al., 2015;

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¹ We conducted an Implicit Association Test to examine the semantic association between debt and burden. Six stimulus phrases referring to debt (e.g. 负债, “be in debt”) and six referring to repaid debt (e.g. 还清, “get the debt paid off”) were included. In addition, there were eight phrases that referred to burden (e.g. 重负, “heavy burden”) and eight that referred to lightness (e.g., 轻盈, “lightness”). Ninety-six participants were recruited for the experiment. We computed the *D* score by dividing the differences in the adapted latency scores between the incompatible and compatible IAT blocks by the standard deviation of all trials in the combined task blocks. We found that the *D* score ($M = 0.65$, $SE = 0.03$; more than 0.64 means strong preference) was significantly greater than zero, $t_{95} = 20.97$, $p < .001$, Cohen's $d = 2.14$, indicating that participants tended to react faster on compatible pairings (i.e., when debt and burden words shared a response key) than incompatible pairings (i.e., debt and burden words did not share a response key). This result suggested that individuals semantically associated debt with burden words.

Zheng, Fehr, Tai, Narayanan, & Gelfand, 2014).

By definition, debt implies the reduction or absence of resources. In our daily life, personal debt can be classified into two categories: one is “the state of owing money,” and the other is “a feeling of gratitude for a service or favor” (Graeber, 2014; Oxford, 2016). Although Watkins, Scheer, Ovnicek, and Kolts (2006) dissociated gratitude and indebtedness and suggested that the debt of gratitude is internally generated and not analogous to an economic form of indebtedness, a number of scholars in the social sciences have equated indebtedness and gratitude (Greenberg, 1980; Greenberg & Westcott, 1983; Komter, 2004). Debt of money has been viewed as “a state of obligation to repay another” (Greenberg, 1980), whereas debt of gratitude “appears to be associated with a desire to recompense the benefactor” (Watkins et al., 2006). Debt of money and debt of gratitude share the common feature of informing the individual whether he or she values being subject to this norm in a given situation and may affect compliance with the norm of reciprocity (Tsang, 2006b). While gratitude has been found to have positive effects (Mathews & Green, 2010; Tsang, 2006a, 2006b; Watkins et al., 2006), it is also closely associated with negative emotions such as feelings of obligation (to repay benefits) (Morgan, Gulliford, & Kristjánsson, 2014). Either debt of money or debt of gratitude would be viewed as a strain on financial resources (Fitch, Chaplin, Trend, & Collard, 2007) or psychological resources (Tay, Batz, Parrigon, & Kuykendall, 2017), thus depleting resources for acting upon the environment. Just as a reduction in psychological resources leads to more extreme judgments of the environment (e.g., Eves, 2014; Proffitt, 2006; Slepian et al., 2015; Witt, Proffitt, & Epstein, 2004), we speculated that debt would lead to judgments of the environment as more forbidding and extreme in much the same manner as a physical burden.

Across five studies, we investigated whether debt would lead to perceptual judgments and actions consistent with those that occur when people carry physical weight. Study 1 examined perceived distance, which is a measure sensitive to physical burden (Proffitt et al., 2003; Slepian et al., 2012), using an action-based measure. Study 2 examined perceived distance directly and added a manipulation check (Slepian, Masicampo, & Ambady, 2014). Study 3 examined the perceived steepness of a hill, which is another measure sensitive to physical burden (Proffitt, 2006; Slepian et al., 2014; Slepian et al., 2015). Study 4 examined subjective judgments of weight by investigating people who had a personal debt (student loan debt). In Study 5, we replicated the results of Study 3, which we pre-registered using the Open Science Framework (see public registration at <https://osf.io/yn7bm/>), and which we conducted after the first round of reviews at this journal. For each of the five studies, we disclose all measures, manipulations, and exclusions, as well as the method of determining the final sample size. Sample sizes were determined prior to any data collection.

2. Unregistered Study 1

In Study 1, we examined whether debts would influence a perceptual measure known to vary with carrying a physical burden: perceived distance (Proffitt et al., 2003; Witt et al., 2004). The rationale is that when a person carries a physical load, the cost of walking across any distance becomes greater, and therefore, distances appear greater (Goncalo, Vincent, & Krause, 2015; Slepian et al., 2012). As actions are globally scaled in terms of effort (Proffitt, 2006); the perceived greater distance would increase individuals' throwing effort, leading to overthrow (Balci et al., 2010; Rieser, Pick, Ashmead, & Garing, 1995). We used an action-based measure of perceived distance. If debts are physically burdensome, then they should cause people to overestimate distance, thereby causing people to overthrow when tossing an object at a target.

2.1. Method

2.1.1. Participants

The participants were 194 undergraduate students (113 female;

$M_{\text{age}} = 21$ years) who were given a small monetary compensation for taking part in the study. A sensitivity analysis showed that the current samples provided 80% power to detect a minimum effect size of Cohen's $d = 0.37$. Additionally, a post hoc power analysis using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) was performed to calculate the number of participants needed to achieve 80% power to detect an effect size of 0.50 (Cohen's d) using a two-tailed t -test. The necessary sample size was $N = 114$, which we exceeded in Studies 1–4.²

2.1.2. Procedure

We distinguished two types of debt: debt of money and debt of gratitude. Participants were randomly assigned into one of three conditions (61 in the debt of money condition, 63 in the debt of gratitude condition, and 70 in the control condition). In the debt of money condition, participants were asked to recall and describe in detail the greatest debt of money they had ever owed. In the debt of gratitude condition, participants were asked to recall and describe in detail the greatest debt of gratitude they had ever owed. In the control condition, participants were asked to recall and describe in detail the biggest plant they had ever seen. After the recalling period, all participants were asked to toss a beanbag at a target 265 cm away (Balci et al., 2010; Goncalo et al., 2015; Rieser et al., 1995; Slepian et al., 2012). The dependent measure was the distance thrown in centimeters.

2.2. Results and discussion

Because the distance data were nonnormal (Shapiro–Wilk's $W = 0.94$, $p < .001$), we corrected for skew by taking the natural logarithm of distance estimates. As no significant difference between the debt of money condition and the debt of gratitude condition was found, the debt of money and debt of gratitude conditions were combined as the debt condition.³ A t -test analysis revealed that participants in the debt condition ($M = 5.55$, $SE = 0.01$) threw the beanbag farther than participants in the control condition ($M = 5.50$, $SE = 0.02$), Cohen's $d = 0.39$, $t_{192} = 2.60$, $p = .010$ (see Fig. 1 for actual distances thrown). The results showed that thinking of debts led participants to overthrow a beanbag at a container more often, suggesting that they perceived a greater distance to the target.

3. Unregistered Study 2

Study 2 improved on Study 1 in three respects. First, a manipulation check was added to ensure that participants in the debt condition really experienced indebtedness. Second, control estimates were introduced to examine whether the effect of debt was specific to the weight-related perceptual judgments. Third, participants' perceived distance was measured directly instead of with the action-based measure of perceived distance.

3.1. Method

3.1.1. Participants

The participants were 153 undergraduate students (91 female; $M_{\text{age}} = 22$ years) who were given a small monetary compensation for taking part in the study. A sensitivity analysis showed that the current samples provided 80% power to detect a minimum effect size of Cohen's $d = 0.44$.

3.1.2. Procedure

As in Study 1, participants were assigned to one of three conditions

² We did a priori power analyses for Studies 1–3 (with a Cohen's f of 0.4) and Study 4 (with a Cohen's d of 0.8), which we acknowledge may be too optimistic.

³ We originally did not plan to combine the two debt conditions. See the Supplemental Material for the results of the comparison between the two debt conditions (Supplemental Material is available at <https://doi.org/10.17632/42dijnzsw8f.2>).

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