The Impact of Payment Frequency on Subjective Wealth Perceptions and Discretionary Spending

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ABSTRACT

An increasingly popular trend is for consumers to get paid more often, resulting in more frequent, yet smaller paychecks. However, surprisingly little is known about whether and how payment frequency impacts consumer behavior. The current work addresses this gap. We find that higher payment frequencies result in increased perceptions of wealth and more discretionary spending relative to lower payment frequencies. We first demonstrate a naturally occurring relationship between higher payment frequencies and increased discretionary spending using natural variation in payment frequency in a dataset of more than 27,000 consumers from a large financial institution. We then demonstrate a causal relationship between payment frequency and discretionary spending in a controlled lab study. We show that higher payment frequencies lead to greater perceptions of subjective wealth, which explains the increase in discretionary spending. Finally, we demonstrate that the introduction of a daily pay option by a large employer led to an increase in discretionary spending among its workers in the months following. Beyond the contributions to the payment frequency literature, this work reveals that the implications of segregated and aggregated gains are broader than previously demonstrated and that the impact of gains to subjective wealth perceptions exhibit diminishing marginal returns.

Keywords: segregated and aggregated gains, payment frequency, discretionary spending, subjective wealth, financial constraints, slack, financial decision making

Payment frequency is an essential feature of getting paid, affecting virtually all consumers. An increase in the number of people who hold multiple jobs, lower payroll processing costs, and advancements in payroll technology, are making it increasingly common for consumers to receive more frequent (albeit smaller) paychecks. While receiving frequent paychecks is not an entirely new phenomenon—over 4.5 million Americans are day laborers or tipped employees (Semuels and Burnley 2019; Valenzuela et al. 2006)—the trend towards higher payment frequency for hourly workers is growing. As an example, in 2017, Walmart instituted daily pay for its workforce (Corkery 2017), enabling its workers to receive up to 31 paychecks per month. However, despite the growing popularity of more frequent payments, and daily payments in particular, it is largely unknown how higher payment frequency will impact consumer behavior.

Proponents of increasing workers' payment frequency, like Automatic Data Processing (the largest payroll company in the US), contend that more frequent payments help consumers match the timing of their income to their expenses, which can enable them to pay their bills on time and avoid costly penalties. In short, proponents suggest that higher payment frequencies like daily pay helps consumers smooth their expenditures throughout the month. However, this argument implicitly assumes that the timing of consumers' purchases is the only consequence of increasing a consumers' payment frequency. In the current work, we examine whether getting paid more frequently impacts consumers in ways that extend beyond merely the timing of their consumption. Although more frequent payments result in reductions to the size of each paycheck, we build on the segregated and aggregated gains literature to posit that more frequent payments increase consumers' subjective wealth perceptions, and result in increased discretionary spending.

The current research uses a combination of real-world spending data and pre-registered, controlled lab studies to examine the impact of getting paid more frequently. First, we analyze banking transactions of more than 27,000 consumers from a large financial institution. Using natural variation in payment frequency, we find that consumers who are paid more frequently have higher discretionary spending than consumers paid less frequently, even when controlling for total income (study 1). Next, we test the causal impact of payment frequency on discretionary spending in the lab using an online life simulation. Consistent with the real-world spending analysis, we demonstrate that smaller, more frequent paychecks lead to more discretionary spending (study 2). We then try to understand the mechanism by which payment frequency impacts discretionary spending. We demonstrate that smaller, more frequent, paychecks (vs. larger, less frequent paychecks) increase consumers' wealth perceptions (studies 3A, 3B, and 3C), which consequently increase discretionary spending (study 4 and 5). Although getting paid more frequently typically leads to earlier access to funds, which can result in higher average daily account balances, we demonstrate that payment frequency's impact on subjective wealth and increased discretionary spending is not entirely explained by differences in account balances. Indeed, the effect occurs even when those paid more frequently have a lower average account balance than those paid less frequently (study 5). Moreover, we do not find evidence that the effect is explained by other plausible explanations such as perceptions of income volatility, decreased propensity to plan, or differences in affect (study 5). Finally, an analysis of real consumer spending data demonstrates that the introduction of daily pay by a large gig economy platform was associated with an increase in the discretionary spending of its employees in the months following (study 6). We conclude with a discussion of the implications of this work for both theory and practice.

THEORETICAL FRAMEWORK

Payment Frequency

According to Parsons and Van Wesep (2013), wages can vary across three dimensions: level (the amount of income earned), structure (the rate of payment per unit of effort), and timing (any variations in the temporal patterns of when pay is disbursed to employees, for a given level and structure). We focus on an essential aspect of payment timing, which is payment frequency. Payment frequency does not refer to the frequency at which wages are earned, but rather the frequency at which wages are received. Traditionally, payment frequency has been described as the recurring cycle by which employers pay their employees (e.g., weekly, bi-weekly, or monthly). In the current research, we define payment frequency from a consumer's perspective, reflecting the number of paychecks a consumer receives within a given time period. This more comprehensive definition allows payment frequency to reflect common pay cycles (e.g., weekly, bi-weekly) when consumers are paid cyclically by one employer, as well as pay cycles that may result from multiple sources of income, irregular work, or inconsistent pay schedules (Golden 2015; Rothwell 2019; U.S. Bureau of Labor Statistics 2019).

Recent technological advances are making the study of payment frequency increasingly important. The choice of payment frequency by employers has historically been dictated by logistical and cost considerations -- it is costly to print and distribute paychecks. However, the ability to transfer funds electronically and automatically has reduced some of these cost and logistical considerations (Stell 2016). Further, an increase in competition has led many payroll providers to decrease their pricing and eliminate the electronic transfer fees associated with making a payroll transfer (Wakefield Research 2019). For example, payroll providers like Patriot

allow employers to “pay their employees as often as you want without being charged extra” (Patriot 2019). Thus, employers are increasingly able to choose a wider variety of payment frequency options for their employees, including more frequent pay cycles like daily pay. As evidence of this greater flexibility in payment frequencies, the prevalence of daily pay increased by 400% from 2016 to 2017 (DailyPay 2019).

Given the greater flexibility of employers to select payment frequencies based on factors other than logistical considerations, a natural question that arises is whether and how payment frequency impacts consumers. The existing literature on payment frequency primarily focuses on how payment frequency impacts the timing of expenditures (e.g., Berniell 2018; Parsons and Van Wesep 2013; Shapiro 2005; Stephens 2003, 2006; Stephens and Unayama 2011). For example, Stephens and Unamaya demonstrated that Japanese retirees exhibited greater consumption smoothing when they received one retirement income paycheck every two months, instead of one paycheck every three months (2011). In other words, consumers spread their expenditures throughout the year more evenly when paid once every two months, instead of every three months.

Although payment frequency is a ubiquitous feature of getting paid, little is known about its effect on consumer behavior outside of consumption smoothing. Moreover, the prevalence of more frequent pay cycles, like daily pay, is a relatively new trend. As such, the existing literature has only compared the impact of much longer payment frequencies, such as monthly or quarterly pay (Stephens 2003; Stephens and Unayama 2011). Additionally, research suggests that the source of consumers' income impacts their spending behavior (Epley, Mak, and Idson 2006; Thaler 1999). Thus, the impact of payment frequency of earned income may differ from the other types of income that have been previously studied like benefit income (Shapiro 2005;

Stephens 2003, 2006) or retirement income (Stephens and Unayama 2011). Thus, existing research is largely silent as to whether consumers' payment frequency impacts perceptions that could influence important consumer behaviors. In this research, we examine the psychological consequences of higher payment frequencies by considering how payment frequency might impact consumers' perceptions of their subjective wealth, and subsequently, their discretionary spending.

Subjective Wealth Perceptions

Consumers' subjective perceptions of their financial resources often differ from their objective amount of financial resources (e.g., Gąsiorowska 2014; Sharma and Alter 2012; Tang et al. 2004; Tully, Hershfield, and Meyvis 2015; Zauberman and Lynch 2005). Thus, consumers with similar financial resources can vary in their perceptions of how adequate these resources feel. Although some research focuses on perceptions of financial adequacy (i.e., financial slack; Berman et al. 2016, Zauberman and Lynch 2005) and other research focuses on perceptions of financial inadequacy (i.e., financial constraints, financial deprivation; Fernbach, Kan, and Lync 2015; Paley et al. 2019; Sharma and Alter 2012; Tully, Hershfield, and Meyvis 2015), in the current work, we refer to both perceptions of financial adequacy and inadequacy as subjective wealth.

Subjective wealth perceptions are important for researchers to understand as they predict a wide range of consumer behaviors (Ailawadi, Neslin, and Gedenk 2001; Fernbach, Kan, and Lynch 2015; Karlsson et al. 2005; Paley, Tully, and Sharma 2019; Shah, Mullainathan, and Shafir 2012; Sharma and Alter 2012; Tully, Hershfield, and Meyvis 2015). Wealth perceptions impact consumers' attention (Shah, Mullainathan, and Shafir 2012), planning behavior

(Fernbach, Kan, and Lynch 2015), choices (Ailawadi, Neslin, and Gedenk 2001; Sharma and Alter 2012; Tully, Hershfield, and Meyvis 2015), discretionary spending (Karlsson et al. 2005) and post-consumption behaviors like word-of-mouth (Paley, Tully, and Sharma 2019). While extant research focuses on the consequences of subjective wealth perceptions, less is known about what causes subjective wealth perceptions. In this work, we argue that consumers' payment frequency may impact consumers' perceptions of wealth, which may then impact consumers' discretionary spending.

Payment Frequency's Impact on Subjective Wealth and Discretionary Spending

How might payment frequency impact consumers' perceptions of wealth? One possibility is that payment frequency will not have an impact on consumers. Such an outcome is in line with the Permanent Income Hypothesis (Friedman 1957). The Permanent Income Hypothesis suggests that consumers will spend money based on their expected lifetime earning rather than current earnings. Thus, to the extent that consumers can accurately forecast future income, the timing of the receipt of that income is immaterial, aside from liquidity constraints. Thus, if consumers operate under the Permanent Income Hypothesis, as long as payment frequency does not impact consumers' total income, payment frequency will not impact consumers' perceptions of wealth.

Another possibility is that because getting paid more frequently results in receiving smaller amounts of money per paycheck, higher payment frequencies could reduce consumers' wealth perceptions. Research shows that consumers evaluate money and costs on a relative basis (Buechel and Morewedge 2014; Kassam et al. 2011). More specifically, Morewedge, Holtzman, and Epley (2007) showed that consumers spend less when thinking about a small account than a

large account and that purchases made from a small account (e.g., the money in one's wallet) feel more expensive than purchases made from a large account (e.g., the money across one's total assets). Thus, if consumers focus on their average paycheck size, which by definition decreases as one's payment frequency increases, then higher payment frequencies may make costs feel larger and reduce one's sense of subjective wealth. For example, if a consumer earning $100 every weekday (versus $500 a week) compares their expenses to the size of a paycheck, each expense will feel subjectively larger, which could decrease perceptions of wealth.

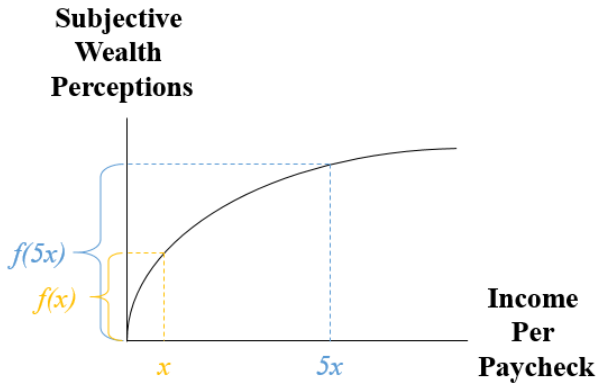
Despite the aforementioned possibilities, in the current work, we argue that higher payment frequencies increase consumers' perceptions of wealth. First, there has been mixed evidence for the Permanent Hypothesis Theory across a range of findings, and the existing research on consumption smoothing suggests that consumers' behavior can indeed be impacted by payment frequency (Shapiro 2005; Stephens 2003, 2006; Stephens and Unayama 2011). Second, although smaller paycheck size is an inherent consequence of getting paid more frequently, we suggest that people are not as likely to focus on the size of a singular paycheck as they are to consider their stream of income in determining their subjective wealth. Thus, we suggest that the effect of payment frequency is more likely to be informed by the research on segregated versus aggregated gains rather than the research on relative account sizes.

Research on segregated gains (smaller gains received over multiple time periods) and aggregated gains (larger gains received at one time) has primarily focused on hedonic (affective) outcomes. This research demonstrates that people have larger hedonic assessments towards segregated gains than aggregated gains (e.g., Thaler 1985; Heath, Chatterjee, and France 1995; Thaler and Johnson 1990; Morewedge et al. 2007). In other words, people are happier with segregated versus aggregated gains. For example, Morewedge et al. (2007) demonstrated that for

non-trivial amounts, consumers' hedonic assessments were higher when they received $5 a day for five days than when they received $25 on the fifth day.[1] The researchers suggest that higher hedonic assessments for segregated (vs. aggregated) gains are explained by diminishing marginal utility of gains (e.g., Thaler 1985).

We suggest that, much like hedonic assessments, subjective wealth perceptions exhibit diminishing marginal returns. In other words, subjective wealth perceptions resulting from a monetary gain follow a concave function, such that the marginal impact of an additional dollar on subjective wealth perceptions decreases as the total dollar amounts increase. As a result, if subjective wealth perceptions follow a concave function for gains ($f''(x)<0,\ x>0$), then receiving five smaller, segregated paychecks should be perceived as a greater increase in subjective wealth than a larger, aggregated paycheck ($5*f(x) > f(5x)$, see Figure 1). Thus, given similar objective amounts, getting paid more frequently should increase consumers' perceptions of subjective wealth relative to getting paid less payment frequently.

Figure 1. Payment Frequency and Subjective Wealth Perceptions



[1] In the case of small gains (e.g., $1 a day for five days vs. $5 a day on the fifth day) the segregations of gains decreased rather than increased hedonic benefits across monetary and non-monetary gains (Morewedge et al. 2007). In this research, we focus on large gains given our focus on consumers' income.

In sum, we argue that the effects of higher payment frequency (vs. lower payment frequency) are more likely to be informed by the research on aggregated versus segregated gains rather than the research on cost perceptions or by the Permanent Income Hypothesis. Thus, building on the literature above, we hypothesize:

H1: Higher payment frequency (e.g., daily pay) will increase consumers' perceptions of their subjective wealth compared to lower payment frequency (e.g., weekly or bi-weekly pay).

If higher payment frequency increases consumers' perceptions of subjective wealth, then higher payment frequency should also lead to more discretionary spending. Discretionary spending has been defined as spending that is not mandatory in nature (e.g., Bowen, Chen, and Eraslan 2014), or spending that is not needed (Danziger 2014; Sarial-Abi et al. 2016). In other words, at its core, discretionary spending relates to spending where consumers have a high level of control over whether, when, and how much to spend. We focus on discretionary spending as discretionary expenditures are more impacted by perceptions of wealth than non-discretionary expenditures. Consumers' subjective wealth perceptions have been shown to predict their discretionary spending decisions (Karlsson et al. 2005). Indeed, this research shows that consumers who perceive themselves to have more financial resources have higher discretionary expenditures, even when controlling for their objective financial situation. Thus, changes to subjective wealth perceptions are likely to influence consumers' discretionary spending. More formally, we hypothesize:

H2: Consumers who receive more frequent paychecks (e.g., daily pay) will spend more on discretionary spending than consumers who receive less frequent paychecks (e.g., weekly or bi-weekly pay).

H3: Consumers' subjective wealth perceptions will mediate the effect of higher payment frequency (vs. lower payment frequency) on discretionary spending.

We test these hypotheses across eight studies. First, we demonstrate a relationship between higher payment frequency and discretionary spending using real-world banking transactions. Next, we establish a causal relationship between higher payment frequency and increased discretionary spending through a controlled laboratory study. We then explore the underlying mechanism for this effect. We demonstrate that higher payment frequency (e.g., daily pay) leads to increased perceptions of subjective wealth relative to lower payment frequency (e.g., weekly pay). We demonstrate that spending differences resulting from higher payment frequency are explained by these differences in subjective wealth, and cannot be similarly explained by differences in affect, perceptions of income volatility, or planning behavior. Finally, we demonstrate that the introduction of a daily pay option by a large gig-economy platform resulted in increased discretionary spending among its employees.

STUDY 1: PAYMENT FREQUENCY AND REAL-WORLD DISCRETIONARY SPENDING

In study 1, we sought to explore the relationship between natural variation in consumers' payment frequency and their discretionary spending. To do so, we procured a large dataset from

a US financial institution, which included consumers' income and expenditure data. We hypothesized that consumers paid more frequently would spend more on discretionary purchases than those paid less frequently.

Data

We received data from a large financial institution that gathered consumers' income and expense transactions across their debit and credit cards for 2014. As the data set did not provide enough information to convert foreign exchange transaction amounts to USD, we excluded consumers with foreign exchange transactions. To ensure the data reflected accounts that were currently active, we excluded monthly transactions for which a consumer had no income or expenditure data. This resulted in a final dataset of 27,011 consumers, accounting for over 4.3 million transactions.

Each of the transactions detailed a transaction date, amount, and category (e.g., "Rent" or "Entertainment"). To identify discretionary spending, we recruited seventy-three Prolific Academic workers (M_{age} = 36.56, 37% female) to rate each of the 57 unique transaction categories as a discretionary expenditure category or not. We defined discretionary expenditures as expenditures where consumers have control over whether, when, and how much to spend. For each category, we examined the proportion of participants who deemed the category as discretionary. If significantly more than 50% of raters deemed it as discretionary expenditure, as determined by a chi-square test, then the category was deemed discretionary. This process resulted in 12 categories being rated as discretionary spending. Examples of these categories include "Entertainment," "Hobbies," "Gifts," "Personal Care," and "Electronics." These

discretionary spending categories accounted for 46.1% of total spending transactions in the dataset and 20.0% of the total expenditures. The full list of categories and their categorization can be found in web appendix A.

Results

Discretionary Spending. We first analyzed the number of consumers' discretionary expenditures as a function of their payment frequency and income. To do so, we regressed the number of discretionary expenditures consumers made each month on their payment frequency, measured as the number of deposits received in each month, using the following model specifications:

(1) $\text{Number of Discretionary Expenditures}_{it} = \beta * \text{Payment Frequency}_{it} + \alpha_i + \epsilon_{it}$

(2) $\text{Number of Discretionary Expenditures}_{it} = \beta * \text{Payment Frequency}_{it} + \text{Log(Income)}_{it}\ \alpha_i + \epsilon_{it}$

(3) $\text{Number of Discretionary Expenditures}_{it} = \beta * \text{Payment Frequency}_{it} + \text{Log(Income)}_{it} + \text{Month}_i + \alpha_i + \epsilon_{it}$

Across all models, we included consumer-level random effects, identified as α_i, to account for individual heterogeneity. Model 2 includes total income (log-transformed) since payment frequency was positively correlated with income in this dataset ($r = .55$, $p < .001$). Model 3 includes month fixed effects to account for differences in total spending throughout the year. As hypothesized, model 1 found that consumers' payment frequency significantly predicted the number of discretionary expenditures consumers made, such that higher payment frequency

was associated with more discretionary expenditures (β = 1.35, $p < .001$). This relationship was robust across all models (see Table 1).

We then performed the same analysis replacing the number of unique expenditures with consumers' total discretionary spending during the month as our dependent variable (log-transformed). Again, consistent with our hypothesis, we found that higher payment frequency was positively associated with higher discretionary spending (β = 0.04, $p < .001$) and was robust to the inclusion of different controls (see Table 1).

Table 1. The effect of payment frequency on discretionary spending (study 1).

	Dependent variable:					
	Number of Discretionary Expenditures			Log(Discretionary Spending)		
	(1)	(2)	(3)	(4)	(5)	(6)
Payment Frequency	1.354***	1.017***	1.001***	0.044***	0.011***	0.011***
	(0.017)	(0.018)	(0.018)	(0.001)	(0.001)	(0.001)
Log(Income)		4.846***	4.821***		0.449***	0.449***
		(0.114)	(0.113)		(0.005)	(0.005)
Month Fixed Effects	No	No	Yes	No	No	Yes
Observations	42,919	42,919	42,919	42,919	42,919	42,919
Note:			+ p<0.1; * p<0.05; ** p<0.01; *** p<0.001			

Though the number of deposits a consumer receives in a month is arguably the most straightforward means of identifying payment frequency, we performed a series of robustness checks operationalizing payment frequency in different ways. The first robustness check operationalized payment frequency as the number of distinct days on which a consumer received a deposit in the month. The second robustness check operationalized payment frequency as the average number of days in between paychecks within the month. The third robustness check

used a person-level rather than a month-level payment frequency. Thus, we identified consumers who were in the dataset for a minimum of at least three consecutive months and calculated the average number of deposits a consumer received per month to serve as their payment frequency. Across all three of these measures, payment frequency significantly predicted both the number of discretionary purchases and the amount of discretionary spending (log-transformed). These relationships remained significant after controlling for consumers' income within the month (log-transformed) and calendar month (see web appendix B for more details).

This study provides initial evidence that getting paid more frequently increases discretionary spending. The relationship between payment frequency and discretionary spending was robust to the inclusion of multiple controls, as well as various operationalizations of payment frequency. Of course, as with any correlational data, it is not possible to establish causality. Thus, our next study uses a more controlled lab environment to examine the causal link between payment frequency and discretionary spending.

STUDY 2: PAYMENT FREQUENCY'S IMPACT ON SPENDING

Building on the findings from study 1, study 2 examines the causal impact of payment frequency on discretionary spending decisions. To do so, we created a life-simulation where participants earned income, incurred expenses, and made a series of binary discretionary spending decisions. We held constant the total income participants received but varied the frequency with which participants got paid such that some participants were paid weekly, whereas others were paid daily. We expected that higher payment frequency (daily pay) would result in more discretionary spending than lower payment frequency (weekly pay).

Method

This study was pre-registered on AsPredicted.org (http://aspredicted.org/blind.php?x=he9nu6). One hundred and forty-nine participants completed the study on Prolific Academic in exchange for monetary compensation. Participants were informed that they would play a life simulator game in which they would work, incur expenses, and make spending decisions just as they would in real life. All participants were given the same starting balance in their checking account ($850). Participants did not have liquidity constraints but were told that if their balance ever went negative, that amount would be deducted from their next paycheck. Participants were asked to make decisions as they would in their everyday life.

All participants received the same total amount of income during the five weeks ($2,800)—however, the disbursement of these funds varied by condition. Participants in the higher payment frequency condition received $140 per day, every Monday through Friday, whereas those in the lower payment frequency condition received $700 per week, every Friday. Throughout the life-simulation, participants incurred fixed expenses that they were required to pay (e.g., rent, phone bill, utilities). In addition to these expenses, participants were asked to make fourteen binary discretionary spending decisions throughout the life simulation (see web appendix C for a complete list of decisions). For each decision, there was a higher-cost option and a lower-cost option. To add realism and variety to the life simulation, we varied the decisions such that in some of the decisions, the lower-cost option was free (e.g., not buying anything) whereas, for others, the lower-cost option was simply less costly than the higher-cost option. Our main dependent variable was the total of times participants chose the higher-cost option rather than the lower-cost option (e.g., going to the concert instead of staying home,

buying the expensive sneakers instead of cheap sneakers) across the fourteen decisions. At every point in the game, participants had access to their checking account balance information. If at any point participants' checking account went negative, the negative balance was deducted from their next paycheck.

After participants finished the life-simulation, they were asked to write down any reflections they had regarding their experience. Participants were then given a list of three decisions, where two were decisions they made during the game, and one was not. They were asked to select which of the three decisions listed was not a decision they had to make during the life simulation. This measure served as an attention check to filter out participants who had not paid attention throughout the game. Participants then indicated to what extent they made decisions as they would have in real life on a 7-point scale (1= not at all, 7 = very much). Finally, participants reported their demographic information.

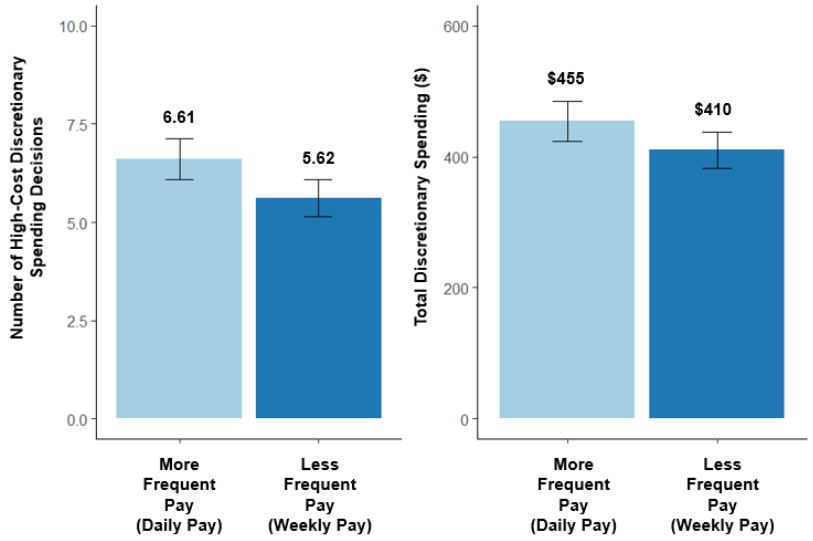
Results

Three participants failed the attention check and, as pre-registered, were excluded from all analyses, leaving a final sample of 146 participants (M_{age} = 33.88, 47% female). Overall, participants reported making decisions as they would in real-life, with the median response rating being a 7 out of 7 (M = 6.65, SD = 0.69).

Our primary dependent measure was the number of times participants selected the higher-cost option across the fourteen decisions (possible range of 0 to 14). Consistent with our hypothesis, participants in the higher payment frequency condition selected the higher-cost option significantly more often than those in the lower payment frequency condition, (M_{higher}

payment frequency = 6.61, *SD* = 2.26 vs. $M_{lower\ payment\ frequency}$ = 5.62, *SD* = 2.08), *t*(144) = 2.76, *p* = .007. Moreover, as a secondary dependent measure, we examined whether participants in the higher payment frequency condition spent more money than those in the lower payment frequency condition across the fourteen discretionary decisions. Indeed, participants paid more frequently spent more money on discretionary purchases compared to those paid less frequently ($M_{higher\ payment\ frequency}$ = $454.58, *SD* = $132.33 vs. $M_{lower\ payment\ frequency}$ = $410.00, *SD* = $119.07), *t*(144) = 2.14, *p* = .034. Study 2 replicates the findings of study 1, providing causal evidence that participants paid more frequently make more discretionary purchases and spend more money on discretionary purchases compared to those paid less frequently.

Figure 2. The impact of payment frequency on discretionary spending (study 2)



STUDY 3A: PAYMENT FREQUENCY AND SUBJECTIVE WEALTH PERCEPTIONS

Study 3A was designed to test whether payment frequency impacts consumers' perceptions of subjective wealth. We varied participants' payment frequency (daily vs. weekly

pay) and measured subjective wealth perceptions by asking participants to draw circles representing the perceived impact of each paycheck. Thus, those in the higher payment frequency condition drew five circles (one for each paycheck) while those in the lower payment frequency condition drew one circle. We hypothesized that the total area of the circles in the higher payment frequency condition would be greater than the total area of the circle in the lower payment frequency condition. In other words, higher (vs. lower) payment frequency should lead to higher wealth perceptions.

Method

Eighty-three participants who were on their way to attend a basketball game at a large West Coast university were recruited to participate in the study in exchange for a Lindt chocolate truffle. Participants were randomly assigned to one of two conditions: higher payment frequency or lower payment frequency. Participants in the higher payment frequency condition were asked to imagine they started a new job where they earned $140 every weekday, Monday through Friday. They then read that they worked a full day and earned $140. Participants were shown a small circle representing the impact of earning $1 and were then asked to draw a circle representing how impactful it would be for them to earn $140 that day. Participants were told that larger circles represented a larger impact, and smaller circles represented a smaller impact (see web appendix D for exact wording). Participants did the same procedure for the next four "days," drawing five circles in total (one for each paycheck). Participants in the lower payment frequency condition followed a similar procedure. However, they were asked to imagine that their new job paid them $700 every week, on Fridays. Thus, the total amount of money earned through the week was the same across conditions, but it was paid all at once on Friday for the

lower payment frequency condition. For the first four "days," they were told that they worked a full day but received no other instructions. On the fifth day, participants read that they worked a full day and earned $700 this week. Like those in the higher payment frequency condition, participants were shown a small circle representing the impact of earning $1 and were then asked to draw a circle representing how impactful it would be for them to earn $700 that week. Participants then shared their demographic information (gender, age, and income).

Results

Seven participants were excluded from the analysis for either not completing the survey or not following the study instructions (i.e., not drawing a circle), leaving a final sample of 76 participants (M_{age} = 38.36, 38% female). Two independent coders, who were blind to the study purpose and hypothesis, calculated the area of each circle using the area calculator software SketchandCalc. SketchandCalc allows users to calculate the area of any closed shape from an image. The two independent coders had very high intercoder reliability (r = *.99).* As a result, the coders' calculated areas for each circle were averaged together. For participants in the higher payment frequency, the area of each of the five circles was added together to calculate a single measure of total area. We removed two outliers that fell outside 1.5x the interquartile range (IQR) for their condition (Tukey 1977). Consistent with our hypothesis, participants in the higher payment frequency condition perceived that their pay increased their subjective wealth to a greater extent compared to those in the lower payment frequency condition, as evidenced by

having drawn circles with a larger total area ($M_{\text{higher payment frequency}}$ = 30.96, SD = 36.99 vs. $M_{\text{lower payment frequency}}$ = 5.50, SD = 5.17), $t(72) = 4.03$, $p < .001$.[2]

This study provides initial evidence that smaller more frequent paychecks lead to greater perceptions of wealth relative to larger less frequent paychecks. A direct replication of this study was conducted on a larger sample size (n = 125, M_{age} = 25.27, 62% female) among behavioral lab participants with similar results ($M_{\text{higher payment frequency}}$ = 38.84, SD = 39.96 vs. $M_{\text{lower payment frequency}}$ = 12.57, SD = 7.96), $t(123) = 4.53$, $p < .001$.

STUDY 3B: PAYMENT FREQUENCY AND WEALTH PERCEPTIONS

Study 3B was designed as a pre-registered conceptual replication of study 3A. However, in this study, perceived impact was more explicitly related to perceptions of one's financial resources in case participants in the last study were thinking about other potential resources (e.g., emotional resources). Moreover, we considered the possibility that the responses in study 3A were influenced by or limited by the size of the paper. Although we did not find evidence to this effect[3], to mitigate this possibility entirely, study 3B measured the perceived size of the financial impact of the paychecks using a method with no upper bound constraint.

Method

[2] The significance of these results remains unchanged if we include all participants.
[3] In study 3A participants were informed that they could always ask for more paper, though no one did. Additionally, the average area of the circles in the weekly condition was just 6.88 inches^2, significantly smaller than the total drawing area provided 93.5 inches^2.

This study was pre-registered on AsPredicted.org (https://aspredicted.org/blind.php?x=sv85fk). One hundred and thirty-five participants at a large West Coast university completed this study in exchange for monetary compensation. To ensure that participants in the study would be able to hear an auditory prompt, participants were asked to listen to a word and correctly identify the word they heard at the beginning of the survey out of four different words. This question served as an attention check.

As in study 3A, participants were assigned to either a higher payment frequency ($140 per weekday) or a lower payment frequency ($700 a week) condition and asked to demonstrate the financial impact of each paycheck. To do so, participants listened to a bell ding and were told to assume that the length of the ding represented the financial impact of earning $1. After listening to this sound, participants were instructed to hold the spacebar for as long as they needed to, to represent the financial impact of earning their paycheck, with longer lengths representing larger financial impact and shorter lengths representing less financial impact (see web appendix E for exact prompt). As in study 3A, participants in the higher payment frequency condition completed this task five times (for each of their five $140 paychecks), whereas participants in the lower payment frequency condition completed this task once (for their $700 paycheck). Finally, participants reported whether or not they had any trouble hearing the sounds and their demographic information.

Results

Seventeen participants failed the attention check, and eight participants reported not being able to hear the sounds, leaving a final sample of 112 participants (M_{age} = 24.82, 69%

female). The total perceived financial impact was measured as the total number of spaces entered by each of the participants. As pre-registered and consistent with study 3A, we removed fourteen outliers that fell outside 1.5x the interquartile range (IQR) for their condition (Tukey 1977). In line with our hypothesis, participants in the higher payment frequency condition entered more spaces than participants in the lower payment frequency condition ($M_{\text{higher payment frequency}}$= 1113.76, SD = 1165.38 vs. $M_{\text{lower payment frequency}}$ = 234.55, SD = 225.12), $t(96) = 5.19$, $p < .001$. This study replicates the results of study 3A and provides further evidence that higher payment frequencies result in greater subjective wealth perceptions than lower payment frequencies.

STUDY 3C: PAYMENT FREQUENCY'S IMPACT ON SELF-REPORTED WEALTH PERCEPTIONS

Study 3C was designed to test whether payment frequency impacts consumers' wealth perceptions, building on the results of studies 3A and 3B in three important ways. First, earlier studies did not highlight consumer's expenditures. Thus, it is possible that participants were not thinking about costs, or if they were, participants in the higher payment frequency condition could have been thinking about fewer or less expensive expenditures than those in the lower payment frequency condition. To keep thoughts about costs similar across conditions, participants in this study were given both income and daily expenditure information. Secondly, in studies 3A and 3B, participants in the higher payment frequency completed the subjective wealth perception measure five times (e.g., drew five circles), whereas participants in the lower payment frequency condition completed the subjective wealth perception measure once (e.g., drew one circle). To ensure that differences in involvement or learning did not impact our results, all participants were prompted for their subjective wealth perceptions five times. Lastly,

in study 3C, in addition to assessing perceptions of subjective wealth indirectly by aggregating their assessments of the financial impact of each paycheck, we directly ask participants to self-report to what extent their income felt like a lot of money.

Method

This study was pre-registered on AsPredicted.org (https://aspredicted.org/blind.php?x=b3eh2i). Two hundred and three Amazon Mechanical Turk Prime participants completed this study in exchange for monetary compensation. As in study 3B, participants were first asked to listen to a word and correctly write the word they heard at the beginning of the survey as an attention check.

As in studies 3A and 3B, participants were assigned to either a higher payment frequency ($140 per weekday) or lower payment frequency ($700 a week) condition. Then for five days, participants were told about a discretionary expenditure they made (e.g., $60 on new jeans, $25 on eating out; see web appendix F for full list) and any paycheck received (when relevant, depending on condition). After each day, participants were asked whether or not their checking account balance increased or decreased. Then, participants were asked to indicate the perceived size of their checking account balance's change. To do so, participants listened to a bell ding and were told to assume that the length of the ding represented the size of the financial impact of their checking account increasing by $1. After listening to this sound, participants were instructed to hold the spacebar for as long as they needed to, in order to represent the size of the day's financial impact on their checking account balance increase (or decrease). Longer lengths

represented larger financial impact, and shorter lengths represented less financial impact (see web appendix F for exact prompt). All participants completed this task for each of the five days.

Then, participants were asked directly about their subjective feelings of wealth by indicating to what extent their income felt like a lot of money throughout the week (1=not at all, 7=very much). Next, participants reported whether or not they had any trouble hearing the sounds and their demographic information. Participants were then asked two more attention check questions, where they had to report how frequently they were paid in the study, and how much they were paid per paycheck. Finally, participants shared their demographic information (gender, age, and income).

Results

As pre-registered, we removed nineteen participants for failing the attention check questions, five participants for reporting not being able to hear the sounds, and eighteen participants for failing to follow instructions (i.e., participants who entered something other than a space character), leaving a final sample of 161 participants (M_{age} = 36.71, 37% female).

First, we calculated the total number of spaces entered by each participant on each day. For the days in which the participant reported an increase in the checking account balance, the total number of spaces entered for that day was added to the total. In contrast, for the days in which the participant reported a decrease in their checking account balance, the total number of spaces entered for that day was subtracted from the total. As pre-registered, we removed thirty-three outliers that fell outside 1.5x the interquartile range (IQR) for their condition (Tukey 1977). Consistent with our hypothesis, participants in the higher payment frequency condition perceived

their checking account balance increased more so than participants in the lower payment frequency condition ($M_{\text{higher payment frequency}}$ = 54.14, SD = 161.27 vs. $M_{\text{lower payment frequency}}$= -35.80, SD = 88.02), $t(126) = 3.82$, $p < .001$. Next, we examined the direct measure assessing feelings of subjective wealth. As predicted, participants who were paid more frequently indicated that they felt like they had a lot of money, more so than participants who were paid less frequently ($M_{\text{higher payment frequency}}$ = 5.19, SD = 1.35 vs. $M_{\text{lower payment frequency}}$= 4.22, SD = 1.51), $t(126) = 3.83$, $p < .001$.

This study provides further evidence that higher payment frequency leads to greater perceptions of subjective wealth compared to lower payment frequency. Not only did we replicate the results of subjective wealth using the indirect measure of number of spaces entered, but we also found differences in subjective wealth using direct measures of how much money people felt like they had. Moreover, since we provided daily expenditures to all participants in this study, these results suggest that differences in subjective wealth perceptions were not due to differences in cost-related thoughts.

Though we provided costs to participants in this study, it is still possible that lower payment frequency naturally increases the number of expenses one considers needing to spend on relative to higher payment frequency, which could impact subjective wealth perceptions. To further consider the possibility that payment frequency impacts expense related thoughts, we ran a study in which we manipulated payment frequency and asked participants how they would spend their money. Participants were told to list any expenses that came to mind. Participants across the higher and lower payment frequency conditions thought about the same number of expenses, $t(98) = .62$, $p = .535$ (see web appendix G for full details). These results provide further evidence that subjective wealth differences are the result of subjective assessments of the receipt of paycheck(s) rather than thoughts about how the paycheck(s) will be spent.

STUDY 4: SPENDING DIFFERENCES AS A FUNCTION OF SUBJECTIVE WEALTH

Studies 3 A-C show that getting smaller, but more frequent paychecks results in greater feelings of subjective wealth relative to getting a larger, less frequent paycheck. In study 4, we return to the life simulation paradigm used in study 2 to understand whether spending differences are explained by the increased feelings of subjective wealth that result from getting paid more frequently. Additionally, one of the benefits marketed by companies offering daily payment cycles is the ability to help consumers avoid overdraft fees. Thus, in study 4, we included a $35 overdraft fee (the most common amount charged for overdrafting; see Bankrate 2018) to examine whether daily pay could increase discretionary spending over and beyond any potential savings of reduced overdraft fees.

Method

This study was pre-registered on AsPredicted.org (https://aspredicted.org/blind.php?x=ge5nx7). Four hundred and five participants completed the study on Prolific Academic in exchange for monetary compensation. Participants in this study played the same life simulation used in study 2 with the following exceptions: First, participants were informed that they would incur a $35 fee every time their account went negative. Second, we varied the order of the discretionary questions, altered some of the options, and added an additional discretionary decision for a total of fifteen decisions (see web appendix H for a complete list of decisions).

After participants finished the life-simulation, they were asked to write down any reflections they had regarding their experience. Next, participants answered four questions assessing their feelings of subjective wealth throughout the game: Based on your experience in the life simulation, how often did you… (1) feel like you had excess money?, (2) feel like you had more than enough money?, (3) feel like you had a low checking account balance?, and (4) make a decision you did not want to make because you had a low checking account balance? (all 7-point scales, 1 = Never, 7 = Always). Finally, participants answered the same attention check question as they did in study 2, and reported to what extent they made decisions as they would have made in real life on a 7-point scale (1= not at all, 7 = very much), and shared their demographic information.

Results

Four participants failed the attention check and were excluded from all analyses, leaving a final sample of 401 participants (M_{age} = 32.07, 48% female). Overall, participants reported making decisions as they would in real-life, with the median response rating being a 7 out of 7. (*M*=6.63, *SD*=0.70).

Discretionary spending. We first examined our primary dependent measure: the number of times participants chose the higher-cost option across the fifteen decisions (possible range of 0 to 15) that participants made throughout the life simulation. Consistent with our hypothesis, participants in the higher payment frequency condition made more high-cost decisions than those in the lower payment frequency condition ($M_{higher\ payment\ frequency}$ = 6.17, *SD* = 2.55 vs. $M_{lower\ payment\ frequency}$ = 5.16, *SD* = 2.09), $t(399) = 4.35$, $p < .001$.

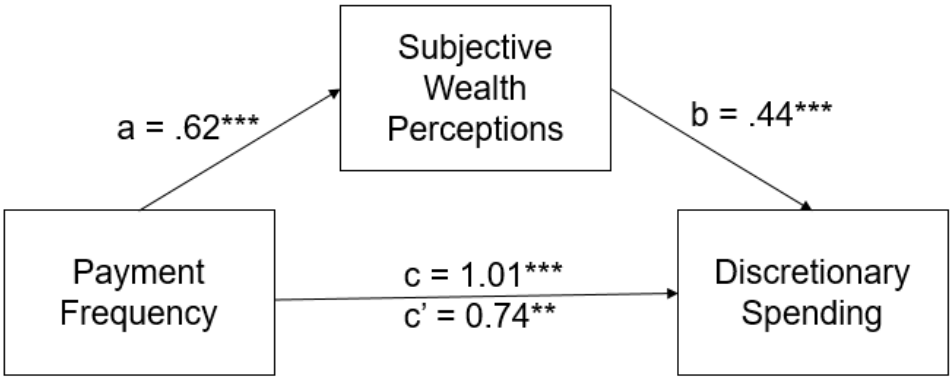
Next, we examined whether those paid more frequently spent more money. Aggregating the amount of money spent across the fifteen decisions, participants in the higher payment frequency condition spent more money than those in the lower payment frequency condition ($M_{\text{higher payment frequency}}$ = \$404.35, *SD* = \$122.26 vs. $M_{\text{lower payment frequency}}$ = \$363.55, *SD* = \$119.07), $t(399) = 3.54$, $p < .001$. Of note, participants in the higher payment frequency overdrafted less than participants in the weekly condition ($M_{\text{higher payment frequency}}$ = 0.31, *SD* = 0.47 vs. $M_{\text{lower payment frequency}}$ = 0.64, *SD* = 1.10), $t(399) = 3.81$, $p < .001$. Thus, we next calculated the amount of money spent by participants including overdraft fees they incurred for having a negative account balance. Even accounting for overdraft fee expenses, participants in the higher payment frequency condition spent more money than those in the lower payment frequency condition, ($M_{\text{higher payment frequency}}$ = \$415.32, *SD* = \$135.12 vs. $M_{\text{lower payment frequency}}$ = \$385.77, *SD* = \$139.82), $t(399) = 2.15$, $p = .032$.

Subjective wealth perceptions. We combined the four questions assessing participants' subjective wealth perceptions into a single index, reverse-coding the last two questions (α = 0.77). Replicating the results of studies 3A-C, participants in the higher payment frequency condition reported greater feelings of subjective wealth relative to those in the lower payment frequency condition ($M_{\text{higher payment frequency}}$ = 2.86, *SD* = 1.22 vs. $M_{\text{lower payment frequency}}$ = 2.24, *SD* = 1.01), $t(399) = 5.53$, $p < .001$. Of note, in this study, participants in the higher frequency condition had spent significantly more money. Thus, even though participants in the higher payment frequency condition ended the life simulation with objectively less money, they *felt* subjectively wealthier.

We then examined whether perceptions of subjective wealth mediated the effect of payment frequency on the number of high-cost decisions. To test this mediation, we utilized the

bootstrapping mediation method outlined in Hayes (2017) (PROCESS, Model 4). In line with our predictions, subjective wealth perceptions significantly mediated the effect of payment frequency on the number of high-cost decisions (ab = 0.27, 95% CI [0.12, 0.46], 10,000 resamples).

Figure 3. Subjective wealth perceptions mediate the impact of payment frequency on discretionary spending (study 4)



This study replicates the results of studies 1 and 2, demonstrating that smaller, more frequent paychecks lead to more discretionary spending than larger, less frequent paychecks. Although daily pay did result in fewer overdraft fees in this study, the increase in spending exceeded the potential benefits of reducing overdraft fees. Moreover, this study found that the effect of payment frequency on discretionary spending was explained by differences in consumers' perceptions of their subjective wealth. Participants paid daily had greater perceptions of subjective wealth than those paid weekly, which increased their propensity to select the higher-cost options.

STUDY 5: OBJECTIVE VERSUS SUBJECTIVE WEALTH

Our research argues that differences in subjective wealth result from diminishing marginal returns. Because of diminishing marginal returns, multiple paychecks increase perceptions of wealth beyond the sum of the paycheck amounts (e.g., $5*f(x) > f(5x)$). An alternative possibility is that differences in perceptions of subjective wealth are simply a function of objective differences in financial resources. That is, when people are paid more frequently, they receive payment more quickly than people who have to wait until the end of a longer payment period to receive their paycheck. For example, all else equal, people paid daily will have more money in their account on an average day than people paid weekly or bi-weekly. Indeed, in the previous studies, while total income and possible expenditures were held constant across conditions, participants in the higher payment frequency condition who were paid more frequently had a higher average daily account balance than participants who were paid less frequently.

While such objective differences are likely to contribute to perceptions of subjective wealth, study 5 was designed to examine whether payment frequency impacts perceptions of subjective wealth—and hence spending—beyond objective differences in the average daily account balance. To do this, in study 5, we compared daily pay (the higher frequency condition) with bi-weekly pay (the lower frequency condition) and set the payment schedule so that participants in the bi-weekly condition received two weeks of pay in their first paycheck. Thus, total pay was held constant, but those paid bi-weekly had a higher average daily balance compared to those paid daily. If perceptions of subjective wealth are solely a function of differences in average daily balance, then those in the bi-weekly pay condition should feel subjectively wealthier and select the higher-cost option more often, compared to those in the

daily pay condition. However, if payment frequency influences perceptions of subjective wealth beyond objective differences in one's average daily account balance, as we suggest it does, those paid daily will select the higher-cost option more often than those paid bi-weekly, despite their lower average daily account balance.

In addition to testing whether payment frequency impacts subjective wealth perceptions and discretionary spending beyond objective differences in financial resources, in this study, we measured other possible contributing mechanisms. One possibility is that since people paid less frequently get larger amounts of money at once, this increases the perception that one's account is volatile. Hence, people paid less frequently will reduce their spending to decrease volatility. To examine this possibility, we measured perceptions of account volatility. Next, we considered the possibility that, because segregated gains have been shown to have a larger effect on positive affect (Morewedge et al. 2007), that spending differences are a function of being in a better mood. Although the compensatory and retail therapy literature would suggest that negative affect increases spending (e.g., Atalay and Meloy 2011), there is some research to support the possibility that positive affect increases spending (e.g., Babin and Darden 1996). Finally, although we found no differences in the number of expenses people spontaneously considered when asked directly (see web appendix G for more details), we considered the possibility that more frequent payments may focus consumers on short-term expenses and reduce their likelihood of planning for longer-term expenses. Less planning could increase spending. Therefore, we measured planning behavior. This study also included a number of individual difference measures that could plausibly relate to some of these other possible contributing mechanisms.

Method

This study was pre-registered on AsPredicted.org (https://aspredicted.org/blind.php?x=ba7rm7). Four hundred and sixty participants completed the study on Prolific Academic in exchange for monetary compensation. Participants played a life simulator game as they did in the last study, with the following changes: First, participants were randomized into either a more frequent (daily) or a less frequent (bi-weekly) pay condition ($140 per day, every Monday through Friday vs. $1400 every two weeks, every other Friday) with those in the bi-weekly condition getting their first paycheck on the first Friday of the game. Second, to ensure that participants across both payment conditions earned the same amount of money ($4,200), participants participated in a six-week simulation (instead of a five-week simulation). Lastly, because of the increased time period, the number of discretionary decisions was increased to nineteen, and the order and wording of some of the previous decisions were varied (see web appendix I for a complete list of decisions).

After going through the life simulation, participants completed the subjective wealth measures and attention check questions that followed the life simulation in study 4. However, in addition to these questions, participants in this study answered two questions regarding their perceptions of how their checking account balance changed over the course of the game. First, participants were asked how much they agreed or disagreed with the statement, "*I felt like my checking account was very volatile (increased and decreased a lot"* (1=disagree, 7=agree). Second, participants answered the question, *"On most days, would you say your checking account balance decreased, increased, or remained the same?*" (1=decreased, 4= remained the same, 7=increased). To measure planning behavior, participants indicated their level of

agreement with the following three statements: During the life simulation… (1) I actively tried to plan for large upcoming bills (rent, cellphone, tv and internet, health insurance, gas and electricity, etc.), (2) I actively tried to budget for future expenses, and (3) I consulted my checking account balance to budget how to spend my money for the next few days (all on 7-point scales: 1 = disagree, 7 = agree). To measure mood, participants were asked to think back to their experience in the life simulation and report their mood during the simulation using the 20-item PANAS scale (Watson, Clark, and Tellegen 1988).

Additionally, participants answered a series of validated individual difference scales, including participants' short-run propensity to plan for money (6 items, Lynch et al. 2010), long-run propensity to plan for money (6 items, Lynch et al. 2010), self-control disposition (13 items, Tangney, Baumeister, and Boone 2004), tightwad-spendthrift scale (4 items, Rick, Cryder, and Loewenstein et al., 2008), and financial literacy (3 items, Lusardi and Mitchell 2011). Although we used available filters to ensure that all participants in our study had a unique online participant ID that had not been used in our previous studies, in order to ensure naivety of our sample with regards to the life simulation, we decided to include a question asking participants whether they had taken a similar study before and ensuring them that their responses to this question would not affect their payment for completing the study. Finally, participants reported their demographic information.

Results

Despite the filters used to select unique participants, fifty participants reported previously participating in a similar experiment. An additional seven participants failed the attention check.

As pre-registered, these participants were excluded from all analyses, leaving a final sample of 404 participants (M_{age} = 32.59, 51% female). Overall, participants reported making decisions as they would in real-life, with the median response rating being a 7 out of 7. (*M* = 6.64, *SD* = 0.66).

Discretionary spending. First, we examined the number of times participants selected the higher-cost option across the nineteen decisions. Replicating the results of studies 2 and 4, participants paid more frequently selected the higher-cost option more often than those paid less frequently, ($M_{higher\ payment\ frequency}$ = 8.01, *SD* = 2.70 vs. $M_{lower\ payment\ frequency}$ = 6.94, *SD* = 2.53), $t(402) = 4.10$, $p < .001$. Additionally, participants in the higher payment frequency condition spent more money on their discretionary purchases compared to participants in the lower payment frequency condition ($M_{higher\ payment\ frequency}$= \$552.65, *SD* = \$148.67 vs. $M_{lower\ payment\ frequency}$ = \$499.86, *SD* = \$145.27), $t(402) = 3.61$, $p < .001$.

Perceived subjective wealth. The four questions assessing perceptions of subjective wealth were combined into a single index ($\alpha = 0.72$). Despite the fact that those in the higher payment frequency condition had a lower average daily balance than those in the lower payment frequency pay condition and ended the life simulation with objectively less money (because they had spent more), perceptions of subjective wealth were higher for those in the higher payment frequency condition as opposed to the lower payment frequency condition ($M_{higher\ payment\ frequency}$= 2.82, *SD* = 1.15 vs. $M_{lower\ payment\ frequency}$= 2.38, *SD* = 0.85), $t(402) = 4.30$, $p < .001$.

To examine mediation, we used the same bootstrapping methodology as in study 4. Indeed, perceptions of subjective wealth significantly mediated the effect of payment frequency on the number of high-cost decisions (*ab* = .12, 95% CI [0.01, 0.27], 10,000 resamples), such

that getting paid more frequently led to greater perceptions of subjective wealth, which in turn, led to more high-cost spending decisions.

Alternative processes. Though significant, the two measures assessing volatility were not highly correlated (r=-.14, p=.004), and were thus examined separately. Surprisingly, participants did not perceive their checking accounts to have differing levels of volatility ($M_{\text{higher payment frequency}}$ = 5.80, SD = 1.21 vs. $M_{\text{lower payment frequency}}$= 5.78, SD = 1.40), $t(402) = .13$, p=.894. However, participants did notice how their accounts changed over time. Participants in the higher payment frequency condition were more likely to believe their account balance stayed the same on most days, as their average response rate did not significantly differ from the mid-point of the scale (4 = remained the same) ($M_{\text{higher payment frequency}}$ = 4.04, SD = 1.33), $t(195) = .37$, p = .708. In contrast, those in the lower payment frequency condition were more likely to see their account as decreasing on any given day ($M_{\text{lower payment frequency}}$ = 2.73, SD = 1.23), $t(207) = 14.84$, p < .001. This difference across conditions was significant, $t(402) = 10.22$, $p < .001$). However, this difference did not significantly mediate the effect of payment frequency on the number of high-cost spending decisions (ab = .14, 95% CI [-0.18, 0.47], 10,000 resamples).

The three measures assessing the extent to which participants' planned for the future during the life simulation cohered well and were combined into a single planning index (α = 0.80). Payment frequency did not significantly impact the extent to which participants planned for future expenses ($M_{\text{higher payment frequency}}$ = 5.35, SD = 1.36 vs. $M_{\text{lower payment frequency}}$ = 5.54, SD = 1.37), $t(402) = 1.40$, p = .161.

In terms of participant's self-reported affect, we created a positive affect index by adding the 10 positive affect items together (α = 0.88), as well as a negative affect index by adding the 10 negative affect items together (α = 0.93). Payment frequency did not significantly impact

participants' negative affect ($M_{higher\ payment\ frequency}$ = 18.67, *SD* = 8.47 vs. $M_{lower\ payment\ frequency}$ = 19.66, *SD* = 8.72), *t*(402) = 1.16, *p* = .245. However, in line with research on the hedonic impact of aggregated versus segregated fains, getting paid more frequently marginally increased participants' positive affect ($M_{higher\ payment\ frequency}$ = 30.58, *SD* = 8.28 vs. $M_{lower\ payment\ frequency}$ = 29.20, *SD* = 8.50), *t*(402) = 1.65, *p* = .100. However, marginal changes in positive affect did not mediate the effect of payment frequency on discretionary spending (ab= 0.03, 95% CI[-0.02, 0.11], 10,000 resamples).

Individual differences. None of the individual differences we measured (short-run propensity to plan, long-run propensity to plan, tightwad-spendthrift inclination, self-control, or financial literacy) varied by condition (all $t < .89$, all $p > .415$) or moderated the effect of payment frequency on discretionary spending (all $t < 1.45$, all $p > .15$). See web appendix J for full results.

Study 5 replicates the previous studies by demonstrating that higher payment frequencies increase subjective wealth perceptions, which results in more discretionary spending. This finding is notable, as in this study, those paid daily had a lower average daily account balance than those paid bi-weekly. Thus, even though more frequent payments may lead to higher average daily account balances in the real world, differences in perceptions of subjective wealth as a function of payment frequency cannot be entirely explained by objective differences.

Beyond providing greater evidence for the proposition that effects of payment frequency on spending are explained by differences in perceptions of subjective wealth, this study provided evidence that the effects of payment frequency on spending cannot be explained by a number of alternative explanations. Specifically, perceptions of account volatility, self-reported planning behavior during the life simulation, and differences in mood could not explain the effect.

Moreover, individual differences that could plausibly relate to such factors did not moderate the effect of daily pay on increased discretionary spending.

STUDY 6: REAL WORLD SPENDING

In the last study, we examined the impact that the introduction of a daily pay option had on consumers' discretionary spending. To do so, we procured a dataset from a third-party app that is used by gig-economy workers to track mileage and expenses. We analyzed the discretionary spending behavior of workers of a sizable gig-economy platform three months before and three months after the platform instituted a daily pay option for its employees.

Data

We collected data from a company that offers an application that is used by many gig-economy workers. On the app, workers connect their bank account to be able to track their income and expenses. We received income and expenditure data for people that identified as working for a large gig-economy platform that introduced a daily pay option and who were active on the platform for the three months before and three months after this time period. This resulted in income and expenditure data for 752 people, accounting for over 427,000 transactions.

Each of the transactions detailed a transaction date, amount, and category (e.g., "Bill Pay" or "Restaurants"). We recruited four-hundred and fifty Prolific Academic workers (M_{age} = 36.10, 51% female) to rate the 528 unique transaction categories as a discretionary expenditure category or not, using the same procedure as in study 1. Given the large number of categories,

participants were randomly assigned to rate 17-22 categories. This resulted in 227 categories being rated as discretionary spending. Examples of these categories include “Coffee Shop,” “Sporting Goods,” “Gift and Novelty,” “Jewelry and Watches,” and “Juice Bar.” These discretionary spending categories accounted for 39.6% of total transactions in the dataset and 15.5% of the total expenditures. The full list of categories and their categorization can be found in web appendix K.

Results

Deposits. We first examined whether the introduction of daily pay increased the number of deposits people received. To do so, we regressed consumers’ total deposits on a dummy-coded variable indicating the three months period before or after the introduction of daily pay (0 = before, 1 = after), using the following model specification:

$$\text{Deposits}_{it} = \beta * \text{Daily Pay Introduction}_{it} + \alpha_i + \epsilon_{it}$$

Access to daily pay increased the number of deposits ($\beta = 5.13$, $p < .001$). These results confirm that the introduction of the daily pay option increased consumers’ payment frequency.

Total Income. To isolate the impact of payment frequency from any potential differences in income, we then examine whether income changed over this time period. To do so, we used the linear mixed-effects model illustrated above, replacing consumers’ total deposits with their income (log-transformed). We found no differences in income, thus the introduction of the daily

pay option increased payment frequency, but did not increase the amount of income earned (β = .03, *p* =.298).

Discretionary Spending. We then analyzed the number of consumers' discretionary expenditures before and after the introduction of daily pay. To do so, we ran the linear mixed-effects model with the number of consumers' discretionary expenditures as the dependent variable. As expected and replicating the effects found in study 1 and the controlled lab studies, people made more discretionary purchases after the introduction of daily pay than they had made before daily pay was introduced (β = 4.95, *p* = .015). Thus, higher payment frequency led to more discretionary purchases. As a secondary analysis, we performed the same analysis for the total amount of consumers' discretionary spending (log-transformed). This analysis demonstrated a marginally significant effect, such that discretionary spending was marginally higher after as compared to before the introduction of daily pay (β = .09, *p*=.055).

Because of the real world nature of the data, one might wonder whether differences in spending are really a function of the introduction of daily pay. Indeed, we find that individuals' increase in the number of deposits after the introduction of the daily pay option predicts both an increased number of discretionary purchases and amount of discretionary spending (log transformed) after the introduction of daily pay, even when controlling for income (both *ps* < .001).

GENERAL DISCUSSION

As higher payment frequencies become more prevalent, understanding the impact of payment frequency on consumer behavior is essential. An examination of real-world spending behavior, a series of laboratory studies, and an analysis of spending before and after an

exogenous payment frequency change, demonstrate that higher payment frequencies increase consumers' discretionary spending (studies 1-2, 4-6), and is explained by changes in subjective wealth perceptions (studies 3A-3C, 4, and 5). This effect occurs over and above any differences in objective wealth that may occur by receiving payments earlier, and is not explained by planning behavior, affect, or account volatility perceptions (study 5).

This research adds to the literature on payment frequency, subjective wealth perceptions, as well as the literature on aggregated versus segregated gains. With respect to the payment frequency literature, the current research is among the first on this topic to study earned income as opposed to fixed benefits. Further, we are the first to examine pay frequency intervals shorter than semi-monthly, even though 76% of the US businesses pay their employees on a more frequent basis than semi-monthly (U.S. Bureau of Labor Statistics 2019). This work extends the research showing that payment frequency can impact *when* consumers spend (e.g., Stephens and Unayama 2011), by demonstrating that it can also impact *how much* consumers spend. These findings suggest the need to understand a broader range of outcomes that may be affected by payment frequencies. For instance, outside of spending decisions, future research could examine the impact of payment frequencies on job performance or retention.

With respect to the subjective wealth literature, most of the existing literature has focused on how subjective wealth is impacted by the overall amount of money one has (e.g., income, Karlsson et al. 2005) or the amount of money relative to one's expenses (e.g., spare money, Zauberman and Lynch 2005). Our research demonstrates that beyond these factors, the structure of the money's receipt can impact subjective wealth. Since subjective wealth is an important input into spending decisions as well as overall well-being, future work could examine other factors that may shape subjective wealth perceptions. For example, it is possible that other

variations in consumers' payment timing (e.g., receiving one's pay in advance vs. in arrears, in the morning vs. the evening, on specific days) impacts consumers' wealth perceptions.

Finally, this work contributes to the literature on aggregated versus segregated gains. The current work finds that the impact of aggregated versus segregated gains goes beyond hedonic outcomes and preferences. In demonstrating that aggregated versus segregated gains impact perceptions of subjective wealth, our research suggests that aggregated and segregated gains are likely to impact a broader range of perceptual assessments of quantity or severity than previously considered. Indeed, these findings may have implications for product packaging, bundling, or subscription services.

In this work, we compared daily pay to both weekly and bi-weekly pay cycles because these pay cycles are the most common, especially among workers who may get access to daily pay in the future. We also found our effect in natural variation in consumers' payment frequencies. However, future research would benefit from a more systemic examination that compares a broader range of pay frequencies to examine whether there are any discontinuities or boundaries of having shorter pay intervals on increased perceptions of wealth. In line with this possibility, the pennies-a-day literature finds that whether segregated costs are more or less attractive than aggregates costs depends on the size of that cost relative to a comparison value (Gourville 1998).

Beyond the theoretical contributions of this research, the current work offers many practical implications. To the extent that managers care about their employees' financial or emotional well-being, this research suggests that they should carefully consider whether or not to introduce more frequent pay cycles like daily pay. Consumers may perceive themselves as happier, wealthier, and/or be more satisfied with their perceived ability to spend money on

discretionary purchases when paid daily. However, for people living paycheck to paycheck, daily pay and the resulting increase in discretionary purchases may reduce their ability to save money or make it harder for these consumers to make ends meet in the long run. Moreover, although daily pay has been offered as a means to help consumers avoid overdraft fees, and such a finding occurred in our lab setting (study 4), this was not the case in either of our real-world datasets. In fact, in study 1, higher payment frequencies were associated with more rather than less bank fees, both in terms of the number of fees ($\beta = .05$, $p<.001$) as well as the amount of money spent on fees (log-transformed) ($\beta = .02$, $p<.001$). Similarly, in study 6, consumers incurred a greater number of bank fees ($\beta = .31$, $p=.003$) and spent more on bank fees (log-transformed) ($\beta = .22$, $p=.003$) after the introduction of daily pay. Such results suggest the need for further research on the long term implications of options such as daily pay on consumer well-being.

These findings also underscore the importance of considering how payment frequency options should be structured or offered to consumers. For instance, how daily pay is implemented can differ across different payroll providers, and these decisions may be costly for consumers. Some payroll providers charge consumers a fee to access daily pay, $2.99 per paycheck, which can add up to sizable amounts. For example, imagine an employee typically gets paid every week on Fridays. They work eight hours per day and earn $120 a day pre-tax (assuming a $15/hour wage) and $102 post-tax (assuming a 15% tax rate). If the employee decides to receive daily pay on a Monday, the $2.99 fee would translate to a 267% APR. Further, if the employee decided to receive daily pay on Monday, Tuesday, Wednesday, and Thursday, their total $11.96 would translate to a 428% APR. These rates are comparable to the average 391% rate for payday loans. This is particularly important, since these new payment structures are more commonly offered to vulnerable low-income workers.

Consumers' payment frequency is a basic aspect of employment, and the current work underscores the need to understand its impact on consumer's decisions and well-being. This work should serve as a call for future research on the long term consequences of the current shift toward more frequent pay cycles.

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