Unpredictable Needs are Associated with Lower Expectations of Repayment

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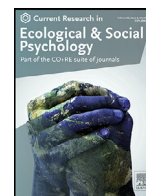
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Unpredictable needs are associated with lower expectations of repayment

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ABSTRACT

Sometimes people help one another expecting to be repaid, while at other times people help without an expectation of repayment. What might underlie this difference in expectations of repayment? We investigate this question in a nationally representative sample of US adults ($N = 915$), and find that people are more likely to expect repayment when needs are perceived to be more predictable. We then replicate these findings in a new sample of US adults ($N = 417$), and show that people have higher expectations of repayment when needs are perceived to be more predictable because people assign greater responsibility to others for experiencing such predictable needs (e.g., needing money for utilities). This is consistent with previous work based on smaller-scale societies, which shows that the predictability of needs influences expectations of repayment. Our results also add to this previous work by (1) showing that the positive relationship between predictability of needs and expectations of repayment previously found in smaller-scale communities is generalizable to the US population, and (2) showing that attributions of responsibility partially mediate this relationship. This work shows that the predictability of needs and attributions of responsibility for that need are important factors underlying the psychology of helping in times of need.

1. Introduction

Across all types of subsistence economies, from hunter-gatherers to horticulturalists, pastoralists, and large-scale societies, people engage in a combination of strategies to manage the risks that arise in their everyday lives (Cronk, Berbesque, et al., 2019). Some of these strategies to manage risk need only individual effort, while others are inherently cooperative endeavors. When people cooperate with others to manage risks, they sometimes expect repayment for helping, while at different times, they do not. Previous work has shown that American ranchers are more likely to expect repayment for their help when others' needs arise with predictable timing (e.g., additional labor during branding time or when they bring animals to market), compared to when needs arise with unpredictable timing (e.g., injuries while working with animals or heavy machinery) (Cronk et al., 2021). For example, when ranchers helped another with branding (a predictable need), they expected to receive a similar or some kind of help in return at a later date. In contrast, ranchers were less likely to expect direct repayment (i.e., monetary compensation or the same kind of help) for their help when the reasons for providing help arose from less predictable events such as work-related injuries (Cronk et al., 2021).

Here, we investigate whether this relationship between predictability and expectations of repayment is generalizable to the broader US population. We also investigate whether perceptions of responsibility associated with predictable needs mediate this effect. Across two studies, we show that predictable needs give rise to greater expectations of repayment, in part because people are more likely to assign responsibility to others for experiencing needs when those needs are perceived to arise predictably.

1.1. Helping with and without expectations of repayment

The strategies that people use to manage risk include avoiding potentially costly endeavors altogether, stocking up on resources in order to buffer against the costs of future risks, spreading risk among several endeavors (e.g., diversifying sources of income), and transferring risks or sharing risks among mutual aid partners (Dorfman, 2007). When people transfer risk to mutual aid partners, they often use need-based transfer systems (Cronk et al., 2019).
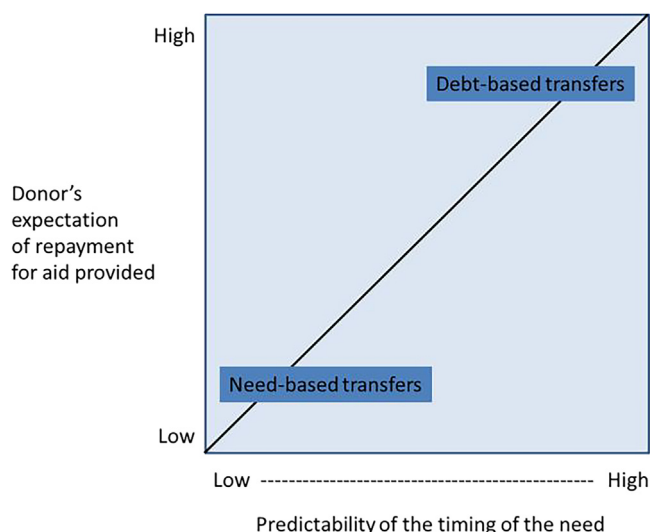

Fig. 1. Relationship between the predictability of needs and expectations of repayment
Note. This figure was reproduced from Cronk et al. (2021) with permission from the publisher.

Need-based transfer systems differ from debt-based systems in that debt-based systems describe instances in which people transfer resources to another and such transfers create debts that must be repaid to the helper in order for the relationship to continue. Aktipis et al. (2011; 2016) refer to these credit-debit transactions as *debt-based transfers*. Need-based transfer systems, on the other hand, describe instances in which people transfer resources to another that do not create debt. For such *need-based transfers*, a similar or some kind of help is expected *only* if the helper experiences the same, or a similarly unpredictable, kind of need at a later time and seeks assistance to manage this risk (Aktipis et al., 2016, 2011) (see Fig. 1). In need-based transfer systems, there is a mutual obligation to help under certain circumstances, but not an obligation to repay debts.

1.1.1. Need-based transfers are a form of social insurance

Need-based transfers are a form of social insurance, and, as with insurance, the point is not to get a return on your investment, but rather to have a safety net in the case of a catastrophe. The kinds of risks for which we buy insurance are harder to predict (i.e., insurance is a type of risk pooling), and the only time you get money from your insurance company (i.e., help from members of your risk pool) is when something bad happens to you. You hope that you never need to file a claim (i.e., request help) because you have been fortunate enough not to experience any losses. This same logic applies to need-based transfer systems; people do not expect or hope to get resources back from partners they have transferred resources to, because that would only occur in the event of a catastrophe.

1.1.2. Rules of need-based transfers

Two simple rules describe how people are expected to behave in need-based transfer relationships: (1) request help from partners only when you are genuinely in need, and (2) help partners if you are asked and able to do so without going below the threshold of your own needs. For example, Maasai and other Maa-speaking peoples of Kenya and Tanzania engage in a special kind of need-based transfer relationship with partners they can turn to for the same or similar types of help during times of unpredictable need, called *osotua*. In such *osotua* (the Maa word for "umbilical cord") partnerships, one only asks for what is needed, partners give what is needed only if they are able to, and these instances of helping do not create debt between partners. Maa-speakers also have a separate system called *esile* that is based on debts that are expected

to be repaid (Cronk, 2018). The use of these two types of helping relationships, alongside other forms of risk management strategies (e.g., avoiding, and hedging risks), allows the Maa-speaking peoples to manage needs that can arise from various sources of risk (Cronk et al., 2019).

1.1.3. Advantages of need-based transfers over debt-based transfers

The ubiquity of need-based transfers across societies and their utility in allowing people to manage unpredictable risks (Cronk and Aktipis, 2021) suggest that the association between the perceived predictability of needs and whether people expect repayment for their help may be part of a broader human psychology that allows people to identify and manage risk. In support of this, agent-based models show that need-based transfers can lead to higher survival than debt-based transfers when shocks occur that lead to losses, creating needs that are hard to predict (Aktipis et al., 2016, 2011; Campennì et al., 2021). The success of need-based transfers is partially due to the fact that need-based transfer relationships, unlike debt-based transfer relationships, do not dissolve when someone does not pay back previous help.

Risk pooling through need-based transfers generally follows a set of principles, including (but not limited to): (1) the same or similar types of helping should be for needs that arise with unpredictable timing. (2) Needs that arise with unpredictable timing do not create debt, and (3) members should reach a consensus regarding what constitutes genuine needs (Cronk and Aktipis 2021). In contrast to unpredictable needs, which follow no known schedule, predictable needs refer to needs that follow a known schedule. For example, the need to pay for one's mortgage, rent, or utilities tends to follow a known schedule (e.g., monthly payments), and is therefore a need that can be prepared for in advance. In contrast, events that lead to needs such as injuries, sickness, or being assaulted do not follow a known schedule, and therefore these needs are harder to predict, and to prepare for in advance. Risks that can generate a need and that follow no known schedule describe unpredictable needs (Cronk et al., 2021). As long as these principles of risk-pooling systems are followed, then partnerships are maintained and individuals can continue to request help when they are in need, even when they have not reciprocated previously provided help.

Looking at need-based transfers through the lens of signal detection theory (Nesse, 2001, 2005; Peterson et al., 1954) and the associated error-management theory (Haselton and Nettle, 2006) makes the social insurance function of need-based transfers even clearer. While the timing of specific needs is often difficult to predict (e.g., experiencing an injury), many people will likely experience serious needs that arise with unpredictable timing. Moreover, the costs associated with experiencing a serious need without having a safety net such as that provided by risk pooling are greater than the costs of engaging in risk pooling by default. Experiencing a serious need without having a safety net is especially costly among individuals living in subsistence economies, or for people whose livelihoods depend on dangerous work (e.g., ranchers are prone to work-related accidents and injuries). Thus, on average, failure to "pay your premiums" in risky environments is a costlier decision than behaving generously towards members of your risk pool so long as behaving generously does not compromise your own wellbeing.

1.2. Predictable needs should give rise to greater attributions of responsibility

Compared to predictable needs, unpredictable needs are more likely to be temporary and less likely to be controllable. Hence, we should expect that people will make lower attributions of responsibility for unpredictable needs compared to more predictable ones.

Attributions of responsibility are the extent to which people believe that others are responsible for the positive as well as negative outcomes they experience (Heider, 1958; Heider and Weiner, 2002). The responsibility assigned to some person is determined by whether the assigner attributes the cause of an outcome to forces within the person or outside the person, the extent to which the assigner believes that the cause of

an outcome is temporary or stable, and the extent to which the assigner believes that the person can control the cause of the outcomes that they experience (Weiner et al., 1979). When people ascribe less responsibility to others' needs, they are more likely to experience empathic concern and a willingness to help the person in need (Decety et al., 2010; Delton et al., 2018; Weiner, 1980), a tendency called the deservingness heuristic (Aarøe and Petersen, 2014; Jensen and Petersen, 2017). Studies have found that both US and Danish adults are more likely to support welfare for "unlucky" individuals (i.e., a recipient who cannot work due to an injury) compared to welfare for "lazy" individuals (i.e., a recipient who has never held a regular job, and is healthy/able to work) (Aarøe and Petersen, 2014).

1.3. The present research

Previous research on American ranchers provided preliminary support for the hypothesis that helping others in need in situations that emerge with unpredictable timing does not give rise to expectations of repayment (i.e., need-based transfers), while helping in situations that emerge with predictable timing do give rise to expectations of repayment (i.e., debt-based transfers) (Cronk et al., 2021). However, this previous work was limited to a small sample of ranchers ($N = 118$) who shared a similar cultural identity and live within a specific geographic area. Further, it considered only risks that are commonly encountered by ranchers. Thus, the relationship between the predictability of needs and expectations of repayment was limited to the specific context of ranching-related needs. Lastly, previous work did not test the psychological mechanisms that might mediate the relationship between the predictability of needs and expectations of repayment.

In light of these limitations, we undertook this study in order to answer two questions: (1) Does the finding that people are less likely to expect repayment when the reason for helping arises with unpredictable timing generalize to the US population? And (2) do attributions of responsibility mediate the relationship between the perceived predictability of needs and expectations of repayment? While previous work has investigated the relationship between attributions of responsibility and prosocial intentions (Decety et al., 2010; Delton et al., 2018; Weiner, 1980), previous research has not investigated specifically whether the predictability of needs is associated with attributions of responsibility and whether attributions of responsibility mediate the association between predictability and expectations of repayment.

We address these questions by asking a large ($N = 915$), and diverse (i.e., nationally representative) online sample of individuals about the predictability of a range of situations in which help is needed and whether helpers expect to be repaid in each of those situations.

In addition to measuring the perceived predictability of needs and expectations of repayment, we also measured and controlled for individuals' own experience with risk. People who experience needs more frequently might come to perceive that needs are more predictable than people who experience needs less frequently. If predictable needs lead to greater expectations of repayment as we have predicted, this could bias participants who experience needs more frequently to overestimate the extent to which people expect repayment when lending a hand.

We also measured and controlled for levels of wealth. Results from studies that assess the influence of income on prosocial behavior have been inconsistent. Some research finds that lower-income individuals are more generous because they are more compassionate and attuned to the experience of hardship (Piff et al., 2010; Stellar et al., 2012), while other studies find no evidence that income affects generosity (Schmukle et al., 2019). Considering that lower-income individuals might be more generous than higher-income individuals, lower-income individuals might be more likely to report lower expectations that people will repay each other. Alternatively, higher-income individuals might be more likely to report lower expectations of repayment than lower-income individuals because higher-income individuals have a greater capacity to help than lower-income individuals (i.e., it is less

costly for high-income individuals to absorb the costs associated with experiencing need and helping).

2. Study 1

2.1. Method

2.1.1. Participants

We recruited a nationally representative sample of US participants in terms of age, sex, and ethnicity (although there was an under-representation of participants who identified as Hispanic/Latino) through Prolific.co, an online recruitment platform. No participants were removed due to failing attention checks ($N = 915$, $M_{age} = 46.19$, $SD_{age} = 15.74$, 51% women; 74.5% White, 12% Black/African American, 6.4% Asian/Pacific Islander, 4.3% Hispanic/Latino, 0.4% Native American, 2.3% "other"). Data for Study 1 comes from a larger longitudinal study about social behavior during the COVID-19 pandemic. Participants for this longitudinal study were asked to participate every 30 days between September 26, 2020, and December 16, 2021. Data for Study 1 is derived from the first period of data collection of the longitudinal study (i.e., September 26, 2020). Any person who was over the age of 18 and was fluent in English was eligible to participate. Study 1 was not preregistered. We ran analyses with the GLIMMIX procedure for SAS V. 9.4. Data and analysis code for the present studies, as well as a list of all the measures that participants completed as part of the longitudinal study, are available here https://osf.io/3egz5?view_only=34bde5d50c854b418c26fe4d3e6b630e.

2.1.2. Procedures and measures

In a within-subjects design, participants reported the perceived predictability of six different needs (e.g., *Not having enough food or water*), how often participants themselves experienced these same six needs over the past year, as well as expectations of repayment for these needs (Table 1). We also asked participants to report their yearly income ($M = 4.82$, $SD = 2.11$), savings ($M = 3.40$, $SD = 2.38$), and assets ($M = 5.64$, $SD = 2.99$) (Table 1), which we averaged to create a composite of wealth ($\alpha = 0.78$). Fig. 2 shows descriptive statistics for the perceived predictability of needs, and repayment expectations.

The predictability of needs and expectations of repayment items were first developed for a previous study based on ethnographic work in a community of ranchers (Cronk et al., 2021). Interviews revealed that, given a strong norm of mutual aid shared by most ranchers, people were reluctant to say that they themselves would expect anything in return for lending a hand. However, when asked what others would expect, or what in general is expected in a given situation, people were more likely to report expecting some kind of repayment. We retained the original items of this previous study, as we attempted to replicate and extend these previous findings.

In our item measuring experience with needs, we used the term "challenge" to refer to events that carry a risk (i.e., probability) of generating a need. A need may or may not always arise, and the level of need can vary depending on a person's material, social, and psychological resources, as well as their appraisal of the event. We chose to use "challenges" instead of "needs" to better approximate our definition of risk (i.e., event that carries a probability of generating a need), while avoiding the ambiguities inherent in the term "need" (i.e., level, resources, appraisal).

2.2. Results

We predicted that people would be more likely to expect repayment (i.e., have debt-based transfers expectations) when needs are more predictable. In contrast, when needs are unpredictable, people should be less likely to expect repayment for lending a hand (i.e., have need-based transfer expectations).

Table 1
Measures employed in Studies 1–2.

| Variable	Label	Scoring
Perceived predictability of needs	*Below are some common reasons people need help from each other. Does this reason for helping arise at regular, predictable times, or does it arise at unpredictable times?*	1 = *Very unpredictable* 3 = *Neither predictable nor unpredictable* 5 = *Very predictable*
Expectation of repayment	*When people help each other in these ways or in these circumstances, what, if anything, do they expect in return?*	A = *Monetary compensation* B = *The same or any kind of help at a later time, regardless of whether one needs it* C = *The same or any kind of help at a later time, but only if one really needs it* D = *Nothing is expected in return for this kind of help or help given in this circumstance*
Income	*What was your combined household income in the previous year before taxes?*	1 = *Under $15,000* 5 = *$50,001 - $75,000* 9 = *Over $200,000*
Savings	*Approximately, what is the total amount of money that you have in all of your checking(s) and saving(s) accounts?*	1 = *$0 - $500* 5 = *$45,000 - $70,000* 9 = *Over $200,000*
Assets	*Approximately, what is the total net worth of all of your assets combined (including your primary residence, other real estates, business, vehicles, stocks, trusts, etc.)?*	1 = *$0 - $500* 5 = *$45,000 - $70,000* 9 = *Over $200,000*
Experience with need	*In the past 12 months, how many times did you experience each of the following challenges?*	1 = *0 times* 2 = *1–2 times* 3 = *3–5 times* 4 = *6–10 times* 5 = *More than 10 times*
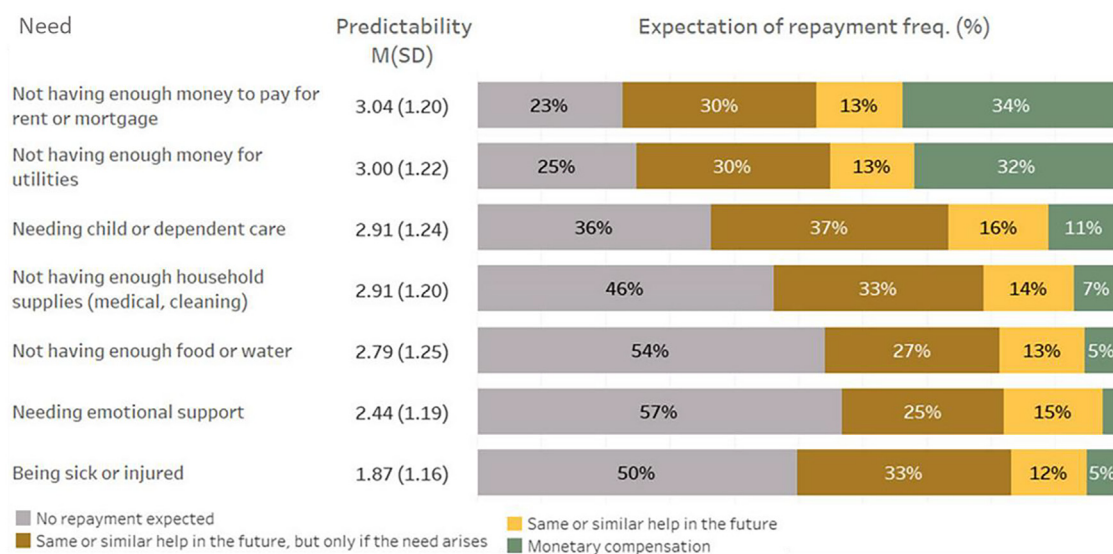
Fig. 2. Descriptive statistics (Study 1).

2.2.1. Analyses

To test our hypothesis, we ran generalized multinomial mixed-effects regressions. This type of analysis allows us to treat expectations of repayment as a categorical variable with multiple response options (i.e., 4), and tests whether predictors are associated with a higher, or lower, probability that participants reported expecting money in return, the same kind of help regardless of need, or the same kind of help at a later time, compared to reporting that nothing was expected in return (i.e., the reference level). This type of analysis also allows us to account for the nested nature of the data (i.e., responses are nested within participants), and investigate the extent to which variance in expectations of repayment is attributable to trait (i.e., between-person) as opposed to within-person variables, while at the same time accounting for any potential between-person variance in the slope of the perceived predictability of needs (i.e., the effect of predictability of needs on expectations of repayment might vary between individuals).

In all of the following models, we nested observations by participant ID, applied an unrestricted covariance structure, using maximum likelihood with Laplace approximation for the estimation method, and a cumulative logit link function. To obtain the between-person (i.e., Level-2) effects, we computed cluster means (i.e., a person's average score on a given variable across observations). To obtain the within-person (i.e., Level-1) effects, we computed cluster-mean centered scores (i.e., a person's reported score on a given variable centered on their respective cluster mean).

2.2.2. Do unpredictable needs lead to lower repayment expectations?

We first ran a model with the perceived predictability of needs as the only predictor of expectations of repayment. We included random effects for the participant ID intercept, the slope of predictability of needs, and their correlation. We found that a one-unit increase in the predictability of needs at the between-person level was associated with
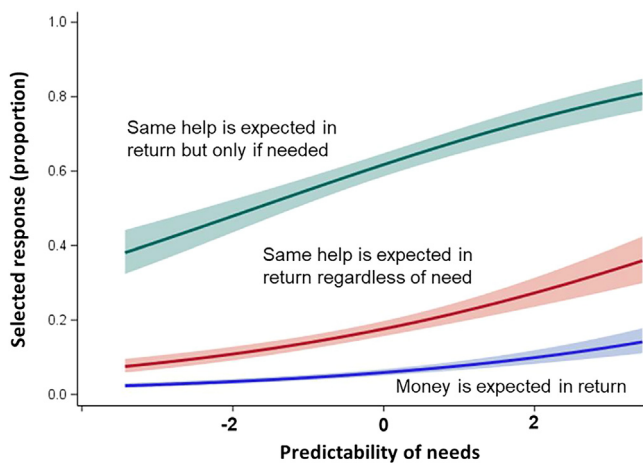
Fig. 3. Within-person effect of predictability of needs on expectations of repayment (Study 1)
Note. The probability that participants reported *The same or any kind of help at a later time, but only if one really needs it* (green line), *The same or any kind of help at a later time, regardless of whether one needs it* (red line), or *Monetary compensation* (blue line) increased when the reason for providing help was perceived to be more predictable. *Nothing is expected in return for this kind of help or help given in this circumstance* was treated as the reference level, and, thus, as the probability that participants reported other response options increased, the probability that participants reported that nothing was expected in return decreased. Lines show the within-person (i.e., Level-1) effect of predictability of needs, and shaded areas show the corresponding 95% confidence limits.

a 33% increase in the probability that participants reported higher expectations of repayment (OR = 1.33, p = 0.003, $CL_{95\%}$ [1.14, 1.56]). At the within-person level, a one-unit increase in the predictability of needs was associated with a 32% increase in the probability that participants reported higher expectations of repayment (OR = 1.32, p < 0.001, $CL_{95\%}$ [1.24, 1.41]) (Fig. 3).

2.2.3. Do wealth and experience with needs confound the effect of predictability of needs on repayment expectations?

We then ran a model in which we controlled for participants' wealth and experience with needs. We included random effects for the participant ID intercept, the slope of predictability of needs, and the slope of experience with needs. At the between-person level, wealth was associated with lower expectations of repayment (OR = 0.80, p = 0.01, $CL_{95\%}$ [0.67, 0.95]), the predictability of needs was associated with greater expectations of repayment (OR = 1.37, p = 0.0004, $CL_{95\%}$ [1.15, 1.64]), and experience with needs was not associated with expectations of repayment (OR = 1.19, p = 0.058, $CL_{95\%}$ [0.99, 1.42]). At the within-person level, experience with needs was associated with lower expectations of repayment (OR = 0.88, p = 0.0005, $CL_{95\%}$ [0.82, 0.95]), and the predictability of needs was associated with greater expectations of repayment (OR = 1.33, p < 0.001, $CL_{95\%}$ [1.25, 1.43]). This model, shown in Table 2, improved fit relative to an intercepts-only model ($-2LL$, $\chi^2(7) = 2681.27$, p < 0.001), explaining 22.45% of the within-person (i.e., level-1) variance, but none of the between-person (i.e., level-2) variance.

2.3. Discussion

Study 1 provided support for the prediction that people are more likely to expect repayment (i.e., have debt-based transfer expectations) when the need or reason for providing help is perceived to arise with predictable timing. In contrast, when the reason for providing help is perceived to arise with unpredictable timing, people are less likely to

expect repayment for lending a hand (i.e., they instead have need-based transfer expectations).

In addition to our primary analyses, we also considered, and ruled out, the possibility that participants clustered the response options of the dependent variable in different ways, and whether this might have influenced the effect of predictability of needs on expectations of repayment. Rather than representing four response options, participants might have clustered expectations of repayment as a binary outcome that reflected either need-based transfer expectations or debt-based transfer expectations. Alternatively, participants might have clustered the same help is expected in return regardless of need, and the same help is expected in return but only if needed responses together, such that the dependent variable represented a three-response multinomial outcome. In supplemental analyses (SI S2.1.2) we show that these alternative ways of clustering the dependent variable lead to similar results as our primary analyses (Table S3-S4).

3. Study 2

In Study 2, we included a broader range of reasons for providing help to see how generalizable the positive relationship between the predictability of needs and expectations of repayment is across different types of needs. In addition, we tested the hypothesis that greater attributions of responsibility would mediate the positive relationship between the predictability of needs and expectations of repayment. Sample size considerations, hypotheses, and analysis plan for Study 2 were preregistered. This preregistration is available here: https://osf.io/pzs2m?view_only=72ce0e89553942d58a9fef5123698e9e.

3.1. Method

3.1.1. Participants

Given the multilevel nature of our data, we employed generalized mixed-effects models in a previous study to test our predictions, and we found that the effect of predictability on expectations of repayment was β = 0.34. Based on simulation studies from Lyles et al. (2007) on power for generalized mixed-effects models, we determined that a sample of 400 participants should yield a power greater than 80% to detect the effect of a single predictor variable (i.e., predictability) on our dependent variable (i.e., expectations of repayment) when α = 0.05, and β = 0.34. We recruited a new sample of 418 US participants from Prolific.co. We removed one participant for missing attention checks (M_{age} = 34.74, SD_{age} = 13.54, 49.9% men; 69.5% White, 6.5% Black/African American, 13.7% Asian/Pacific Islander, 6.2% Hispanic/Latino, 0.5% Native American, 2.9% "other"). Any participant who was over the age of 18 and fluent in English was eligible to participate.

3.1.2. Procedures and measures

In a within-subjects design, participants reported the perceived predictability of needs, their expectations of repayment, how often they experienced needs over the past year, and their wealth (M = 4.09, SD = 2.05; α = 0.76) using the same measures shown in Study 1 (see Table 1). In addition to the six needs included in Study 1, participants reported the perceived predictability, experience with needs, and expectations of repayment for an additional 19 reasons for providing help (e.g., *getting evicted from home, falling into debt*). Table S1 shows the full list of needs and descriptive statistics. Some of the needs were derived from anthropological research: needing food, water, injuries, sickness, childcare, loss of a romantic partner, loss of a close friend, death of a family member, and natural disasters, are recurrent needs faced by people across societies (Cronk et al., 2019; Cronk and Aktipis, 2021). The remaining set of needs was developed by the authors of the current manuscript during a brainstorming session.

Participants also answered these two questions for each of the 25 reasons for providing help (1 = *not at all, 7 = completely*): *When faced with the following challenges, to what extent are people at fault/responsible*

Table 2
Multinomial mixed-effects model predicting expectations of repayment (Study 1).

Obs. = 5277	b	SE	t	p	95% CL	
Intercept (Money)	−3.94	0.29	−13.57	<0.0001	−4.51	−3.37
Intercept (Same help)	−2.71	0.29	−9.45	<0.0001	−3.27	−2.15
Intercept (Same help if needed)	−0.67	0.28	−2.37	0.02	−1.23	−0.12
Level-2						
Wealth	−0.23	0.09	−2.49	0.013	−0.40	−0.05
Experience with needs	0.17	0.09	1.90	0.06	−0.01	0.35
Predictability	0.32	0.09	3.53	0.0004	0.14	0.50
Level-1						
Experience with needs	−0.12	0.04	−3.52	0.0005	−0.19	−0.05
Predictability	0.29	0.04	8.20	<0.0001	0.22	0.36

Note. $N = 757$, ICC = 0.47, $\tau_{intercept} = 3.25$ ($z = 12.67^{***}$), $\tau_{predictability} = 0.17$ ($z = 3.85^*$), $\tau_{needs} = 0.05$ ($z = 1.53$), $\sigma^2 = 9555.43$.

for experiencing these challenges?*; and *When faced with the following challenges, to what extent are people able to prepare ahead of time in order to prevent the situation or try to minimize its negative consequences?* We developed these items to tap into the perceived locus of control and perceived controllability of needs (Weiner et al., 1979). We operationalized attributions of responsibility as the average composite of these two measures for each need.

As in Study 1, we ran additional analyses to rule out the possibility that the effect of predictability of needs was influenced by the way participants clustered the dependent variable (i.e., a binary or three-response multinomial outcome). In supplemental analyses (SI S2.2.2) we show that these alternative ways of clustering expectations of repayment lead to similar results as the primary analyses in which we treat expectations of repayment as a four-response multinomial outcome (Table S6-S7).

3.2. Results

3.2.1. Do unpredictable needs lead to lower expectations of repayment?

We followed the same analytical strategy as in Study 1. We first ran a model in which the perceived predictability of needs was the only predictor and found that a one-unit increase in the predictability of needs at the between-person level was associated with a 32% increase in the probability that participants reported greater expectations of repayment (OR = 1.32, $p = 0.01$, CL$_{95\%}$ [1.05, 1.67]). At the within-person level, a one-unit increase in the predictability of need was associated with a 60% increase in the probability that participants reported greater expectations of repayment (OR = 1.60, $p < 0.001$, CL$_{95\%}$ [1.52, 1.69]) (Fig. 4).

3.2.2. Do greater attributions of responsibility lead to greater expectations of repayment?

In the following model (Table 3), we included attributions of responsibility and controlled for participants' wealth and experience with needs over the past year. Relative to an intercepts-only model, this model improved fit (−2LL, $\chi^2(12) = 1733.13$, $p < 0.001$), explaining 10% of the within-person variance, but none of the between-person variance. At the between-person level, greater attributions of responsibility (OR = 1.21, $p = 0.047$, CL$_{95\%}$ [1.003, 1.47]), but not predictability of needs (OR = 1.19, $p = 0.19$, CL$_{95\%}$ [0.91, 1.56]), was associated with greater expectations of repayment. At the within-person level, both the predictability of needs (OR = 1.22, $p < 0.001$, CL$_{95\%}$ [1.16, 1.29]), and attributions of responsibility (OR = 1.48, $p < 0.001$, CL$_{95\%}$ [1.42, 1.56]; Fig. 5) were associated with greater expectations of repayment.

3.2.3. Do attributions of responsibility mediate the relationship between perceived predictability of needs and expectations of repayment?

To estimate the effect of predictability of needs on expectations of repayment (i.e., c' path in Fig. 5) while controlling for the effect of attributions of responsibility on expectations of repayment (i.e., b path),
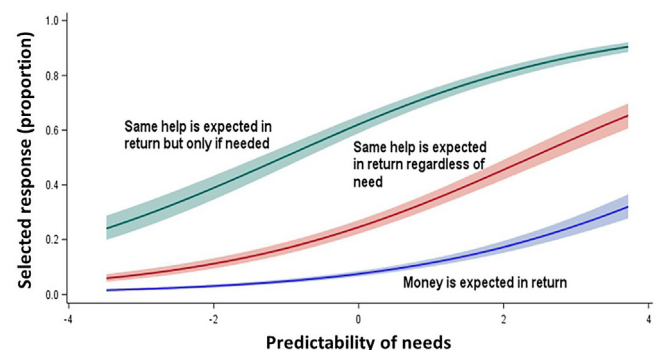

Fig. 4. Within-person effect of predictability of needs on expectations of repayment (Study 2)
Note. The probability that participants reported *The same or any kind of help at a later time, but only if one really needs it* (green line), *The same or any kind of help at a later time, regardless of whether one needs it* (red line), or *Monetary compensation* (blue line) increased when the reason for providing help was perceived to be more predictable. *Nothing is expected in return for this kind of help or help given in this circumstance* was treated as the reference level, and, thus, as the probability that participants reported other response options increased, the probability that participants reported that nothing was expected in return decreased. Lines show the within-person (i.e., Level-1) effect of predictability of needs, and shaded areas show the corresponding 95% confidence limits.

we standardized the predictability of needs and attributions of responsibility and ran a multinomial mixed-effects regression applying the same specifications as previous analyses. At the between-person level, neither the predictability of needs ($b = 0.13$, SE = 0.08, $p = 0.09$, CL$_{95\%}$ [−0.02, 0.29]) nor attributions of responsibility ($b = 0.13$, SE = 0.08, $p = 0.10$, CL$_{95\%}$ [−0.02, 0.28]) were associated with expectations of repayment, indicating no possible mediated effect at Level-2. However, at the within-person level, both the predictability of needs ($b = 0.22$, SE = 0.03, $p < 0.001$, CL$_{95\%}$ [0.17, 0.28]), and attributions of responsibility ($b = 0.52$, SE = 0.03, $p < 0.001$, CL$_{95\%}$ [0.45, 0.58]) were positively associated with expectations of repayment.

To estimate the effect of predictability of needs on attributions of responsibility (i.e., *a* path in Fig. 5) we ran an additional multinomial mixed-effects regression with the perceived predictability of needs (standardized) predicting attributions of responsibility. The predictability of needs was associated with greater attributions of responsibility at both the between- ($b = 0.70$, SE = 0.06, $p < 0.001$, CL$_{95\%}$ [0.57, 0.82]) and within-person level ($b = 1.34$, SE = 0.04, $p < 0.001$, CL$_{95\%}$ [1.23, 1.42]). Finally, based on the Level-1 estimates shown above, we tested an indirect effect of predictability of needs on expectations of repayment via attributions of responsibility using the *RMediation* program (Tofighi and MacKinnon, 2011). As predicted, we found a strong indirect effect = 0.70 (SE = 0.04, CL$_{95\%}$ [0.65, 0.79]), indicating that

Table 3

Multinomial mixed-effects model predicting expectations of repayment (Study 2).

Obs. = 10,068	b	SE	t	p	95% CL	
Intercept (Money)	−3.59	0.45	−8.05	<0.0001	−4.47	−2.72
Intercept (Same help)	−2.16	0.44	−4.86	<0.0001	−3.04	−1.29
Intercept (Same help if needed)	−0.48	0.44	−1.07	0.28	−1.35	0.40
Level-2						
Wealth	−0.09	0.03	−2.75	0.01	−0.16	−0.03
Experience with needs	0.29	0.23	1.29	0.20	−0.15	0.74
Predictability	0.18	0.14	1.30	0.19	−0.09	0.44
Attributions of responsibility	0.19	0.10	1.99	0.04	0.002	0.39
Level-1						
Experience with needs	0.06	0.03	2.08	0.04	0.003	0.11
Predictability	0.20	0.03	7.41	<0.0001	0.15	0.26
Attributions of responsibility	0.40	0.02	16.5	<0.0001	0.35	0.44

Note. $N = 408$, ICC = 0.31, $\tau_{intercept} = 1.74$ ($z = 11.43^{***}$), $\tau_{predictability} = 0.06$ ($z = 3.09^{**}$), $\tau_{attributions} = 0.06$ ($z = 4.45^{***}$), $\tau_{intercept.predictability} = -0.14$ ($z = -1.02$), $\tau_{intercept.attributions} = -0.41$ ($z = -3.68^{***}$), $\tau_{predictability.attributions} = 0.17$ ($z = 0.75$), $\sigma^2 = 21,186.65$.

Fig. 5. Within-person effect of attributions of responsibility on expectations of repayment (Study 2)

Note. The probability that participants reported *The same or any kind of help at a later time, but only if one really needs it* (green line), *The same or any kind of help at a later time, regardless of whether one needs it* (red line), or *Monetary compensation* (blue line) increased when people assigned greater responsibility within others for experiencing a need. *Nothing is expected in return for this kind of help or help given in this circumstance* was treated as the reference level, and thus, as the probability that participants reported other response options increased, the probability that participants reported that nothing was expected in return decreased. Lines show the within-person (i.e., Level-1) effect of attributions of responsibility, and shaded areas show the corresponding 95% confidence limits.

greater attributions of responsibility partially mediated the relationship between predictability of needs and expectations of repayment (Fig. 6).

3.2.4. Does experience with needs influence the relationship between the predictability of needs and expectations of repayment?

The within-person effect of predictability of needs on expectations of repayment was nearly twice as strong in Study 2 (OR = 1.60) compared to Study 1 (OR = 1.33). Why might this be? To answer this question, we merged data from Studies 1–2, looking only at the needs that were included in both cohorts (i.e., not having enough money for rent/utilities, not having enough food/water, not having enough household supplies, needing help with child or dependent care, needing emotional support, and being sick/injured). Study 1 was based on a nationally representative sample of US adults ($N = 915$, $M_{age} = 46.19$, $SD_{age} = 15.74$, 51% women; 74.5% White, 12% Black/African American, 6.4% Asian/Pacific Islander, 4.3% Hispanic/Latino, 0.4% Native American, 2.3% "other"), collected in September 26, 2020 as part of a larger longitudinal study

on COVID and social behavior. Study 2 was based on a sample of US adults ($N = 417$, $M_{age} = 34.74$, $SD_{age} = 13.54$, 49.9% men; 69.5% White, 6.5% Black/African American, 13.7% Asian/Pacific Islander, 6.2% Hispanic/Latino, 0.5% Native American, 2.9% "other").

Exploratory analyses (see SI S2.3) revealed that the positive effect of predictability of needs on expectations of repayment was stronger in Study 2 than in Study 1 for the following reasons. In Study 2, but not Study 1, the positive effect of predictability of needs on expectations of repayment was weaker for people who had themselves experienced more (+1SD) needs overall (OR = 1.46, $CL_{95\%}$ [1.26, 1.69]) compared to people who had experienced fewer (−1SD) needs overall (OR = 1.98, $CL_{95\%}$ [1.73, 2.25]) (Table S9). In addition, in both studies, people who had experienced more needs overall were more likely to have expectations of repayment ($b = 0.16$, SE = 0.05, $CL_{95\%}$ [0.05, 0.27]) (Table S9). These results indicate that greater overall experience with needs attenuated the positive effect of predictability of needs on expectations of repayment for Study 2 participants because people who experienced more needs overall (compared to those who experienced fewer needs overall) had higher expectations of repayment to begin with (Fig. 7).

4. Discussion

We investigated why people sometimes help without an expectation of repayment, but other times expect to be paid back for help. We also tested the hypothesis that, when people perceive needs to be predictable, they are more likely to assign responsibility to others for experiencing a need, in turn leading people to have higher expectations of repayment.

4.1. Unpredictable needs led to lower expectations of repayment

One of the motivating questions for this research was to assess the generalizability of the relationship between the perceived predictability of needs and ensuing expectations of repayment previously observed among American ranchers (Cronk et al., 2019). Among people in a nationally representative US sample evaluating 6 types of needs (Study 1) and in another sample considering a range of 25 types of needs (Study 2), we found clear support for the prediction that needs perceived to arise with predictable timing gave rise to greater expectations of repayment, while needs perceived to arise with unpredictable timing gave rise to lower expectations of repayment. Our results are in line with those previously reported among American ranchers (Cronk et al., 2019), indicating that the psychology governing expectations of repayment is generalizable to the US population.

These results are also consistent with ethnographic work that shows that people are more likely to engage in need-based transfers when the reason for providing help arises with unpredictable timing (Cronk et al.,
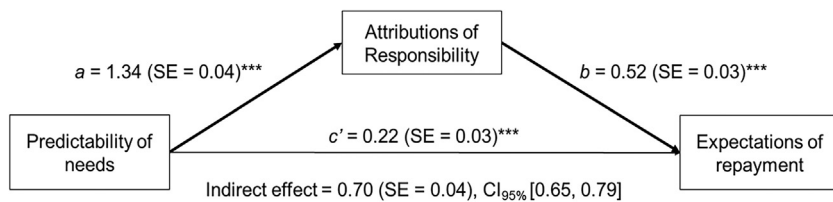
Fig. 6. Within-person (i.e., Level-1) indirect effect of predictability of needs on repayment via attributions of responsibility

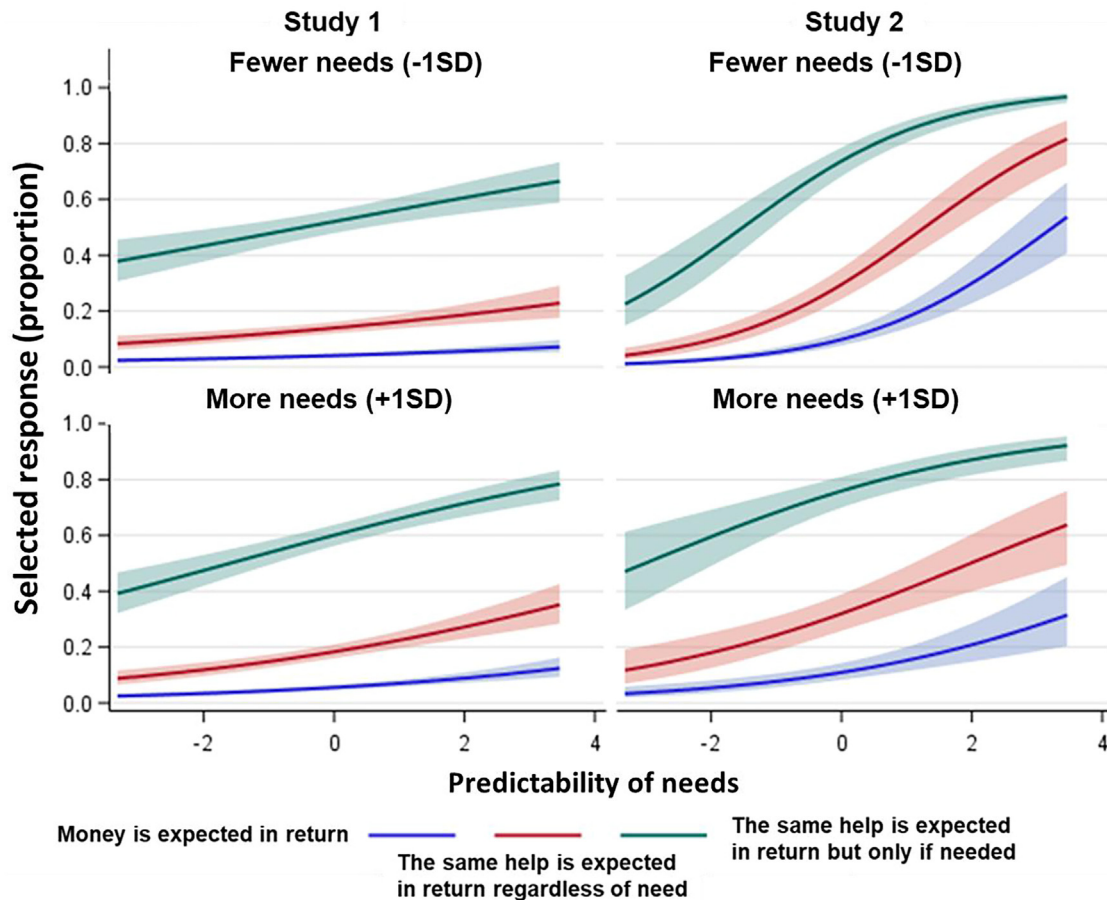Note. Observations = 10,317, N = 417, *** = p < 0.001.

Fig. 7. Expectations of repayment by predictability of needs and experience with needs

Note. The probability that participants reported *The same or any kind of help at a later time, but only if one really needs it* (green line), *The same or any kind of help at a later time, regardless of whether one needs it* (red line), or *Monetary compensation* (blue line) increased when the reason for providing help was perceived to be more predictable. In Study 1, this effect was similar for people who had experienced more needs overall (bottom left) and fewer needs overall (top left). However, in Study 2, the positive effect of predictability of needs on expectations of repayment was weaker for participants who had experienced more needs overall (bottom right), compared to people who had experienced fewer needs overall (top right). Lines show the within-person (i.e., Level-1) effect of predictability of needs, and shaded areas show the corresponding 95% confidence limits (Table S9).

2019; Cronk et al., 2021; Cronk and Aktipis, 2021). In addition, agent-based models have shown that need-based transfers are a more viable strategy than debt-based transfers when individuals encounter unpredictable shocks that lead to needing help (Aktipis et al., 2016, 2011; Campennì et al., 2021).

On the other hand, when the causes of needs are predictable, people are more likely to expect repayment for help given in response to those needs. This is because people are more likely to engage in balanced resource transfers (e.g., tit-for-tat) when needs are easier to predict. According to game theoretic models, when people engage in balanced resource transfers, failure to reciprocate help leads to defection in future interactions (Axelrod and Hamilton, 1981; Trivers, 1971), retaliation (Gächter et al., 2008; Henrich et al., 2006), or partnership dissolution (Aktipis, 2004, 2011; Noë and Hammerstein, 1994, 1995). This happens because defection, retaliation, and partnership dissolution allow

people to manage the costs of interacting with free-riders and avoid being exploited when opportunities for cooperation (or defection) follow a balanced (e.g., tit-for-tat) schedule.

4.2. Attribution of responsibility mediates the predictability-repayment relationship

The second aim of this research was to test whether attributions of responsibility mediated the relationship between predictable needs and greater expectations of repayment. When the cause of an event is intrinsic, stable, and controllable, people are more likely to assign responsibility to forces within the person experiencing an event (Weiner et al., 1979). Needs that arise with predictable timing are more likely to meet these criteria. Take, for example, the need that participants perceived to be most predictable: not having enough money for rent/mortgage pay-

ments, or utilities. These types of needs tend to follow a schedule (e.g., monthly payments) and are thus predictable sources of need. All else being equal, people have a greater capacity to prepare for and mitigate the negative consequences of experiencing predictable needs than unpredictable needs. For example, the needs that participants rated as most unpredictable were those arising from being the victim of an assault, which is an event that is typically unexpected, is beyond the control of an individual, and is hard to prepare for.

As predicted, we found that people were more likely to assign responsibility to others when experiencing specific needs judged to be predictable. And, people who assigned responsibility to others for experiencing a need were more likely to make greater expectations of repayment. We should note, however, that this indirect effect of predictability of needs on repayment expectations via attributions of responsibility was only observed at the within-person but not the between-person level. These observations indicate that results cannot be attributed to trait-level differences, such as a tendency to see needs as generally more or less predictable, or a tendency to make higher or lower attributions of responsibility. Rather, results indicate that only specific needs judged to be predictable give rise to attributions of responsibility, and thereby elicit greater repayment expectations for those same needs judged to be predictable.

The deservingness heuristic predicts that people are less willing to help when they assign responsibility to the person experiencing a need (Aarøe and Petersen, 2014; Jensen and Petersen, 2017). While expecting reciprocity for helping is not the same outcome as being unwilling to help, we can infer that people made the attribution that someone who is responsible for experiencing a need is not deserving of *un*reciprocated help. These findings suggest that the perceived predictability of needs could be a key antecedent to the deservingness heuristic, something to be tested in future research.

4.3. Risk pooling allows people to manage unpredictable needs

Risk pooling through need-based transfers creates a form of social insurance that protects people against unexpected losses (Cronk and Aktipis 2021). Such systems are ubiquitous across cultures because they are thought to originate from humans' unique evolutionary trajectory as obligate collaborative foragers. According to the interdependence hypothesis (Tomasello et al., 2012), the need to secure calories incentivized individuals to engage in cooperative foraging, distribute the spoils of foraging fairly, and coordinate efforts to deter free-riders, forging positive interdependence among members of social groups who pooled their risks together in order to buffer against the possibility of not securing sufficient calories (Cronk et al., 2019; Cronk and Aktipis, 2021; Smith et al., 2019).

Among subsistence groups, central place food sharing protects people against the day-to-day risk of being unsuccessful foragers (Isaac, 1978; Marlowe, 2010). Such pooling of calories reduces the variance in daily food consumption that can result from variability in an individual's ability to acquire food (Hill & Hurtado, 2009) and from unforeseen needs (e.g., injuries and illness) that can prevent people from foraging (Sugiyama, 2004; Sugiyama & Chacon, 2017).

The need to secure calories is not the only risk that ancestral humans had to manage. Other sources of risks, such as the loss of valuable partners or objects, interpersonal conflicts (Gurven et al., 2012), droughts, hurricanes, and labor shortages, can also favor the emergence of risk pooling systems and, as a result, need-based transfers (Cronk and Aktipis, 2021). Even though need-based transfers can emerge across a variety of risks, the common underlying factor that facilitates need-based transfers appears to be the variability, and hence the lower predictability, of these needs.

When people encounter highly variable resources, they are more likely to share these resources compared to low variance/highly predictable resources. What's more, people engage in risk pooling systems when they encounter highly variable resources even without any direct

guidance, suggesting that humans are psychologically equipped with the ability to form risk pools when presented with highly variable resources (Cronk et al., 2019; Cronk and Atkipis, 2019; Kaplan et al., 2012). Our results further indicate that people readily engage, and expect others to engage, in need-based transfers when they encounter needs that arise from unpredictable events. However, more research is needed to assess whether the psychology governing the predictability of needs and repayment expectations is generalizable across cultures, and to determine at what point during development people learn to engage in need-based transfers when presented with highly variable (as opposed to low variance) resources.

4.4. What mechanisms influence the perceived predictability of needs?

4.4.1. Experience with needs might influence the predictability of needs

We saw that there was substantial variation in the perceived predictability of needs both between different types of risks (e.g., needing money for rent/utilities vs. needing emotional support), and when considering the same type of need (see Fig. 2 and Table S1). What could account for this variability in the perceived predictability of needs? One possibility could be that people perceive needs to be more predictable when they have personally experienced those needs. However, evidence for this link was both small and mixed ($r_{Study\ 1} = -0.04$, $p < 0.01$, $r_{Study\ 2} = 0.09$, $p < 0.001$) (Table S2; Table S5), suggesting that experiencing needs may not be particularly important in explaining the perceived predictability of needs.

Although experience with needs was only weakly correlated with the perceived predictability of needs, exploratory analyses showed that high overall experience with needs was positively associated with expectations of repayment, and attenuated the positive effect of predictability of needs on expectations of repayment. These findings suggest that greater experience with needs might push some people to default to having higher debt-based transfer expectations. However, this attenuation effect was only present in Study 2, but not in Study 1. More research is needed to determine for whom or under what circumstances greater experience with needs might lead people to default to having greater debt-based transfer expectations.

4.4.2. Shared knowledge might influence the predictability of needs

Whether it is from shared subsistence activities or from shared cultural norms, we expect that a greater degree of shared knowledge should lead to a greater agreement (i.e., smaller variance) regarding the perceived predictability of needs. When people are in greater agreement about which types of needs are unpredictable or predictable they could more easily reach a consensus regarding when or which types of help should create debt and which types of help do not. In previous work in which American ranchers were interviewed about the reasons why ranchers help their neighbors during times of unpredictable need without keeping track of help given and received, one rancher replied: "If somebody needs help, you just help them. My family's never worked that way [keeping track] and we never will. We've been here since 1918. It all comes out in the wash" (Cronk et al., 2021). This suggests that mutual aid norms can transmit from one generation to the next, contributing to a shared understanding that some types of help do not create a debt to be directly repaid, while others do. Future studies could investigate the role of shared knowledge in allowing people to more clearly differentiate debt-based helping from need-based helping and how this might influence cooperation.

4.5. Social distance and predictability of needs contribute to expectations of repayment

Anthropologist Marshall (Sahlins, 1965) argued that social distance was the main determinant of whether people engage in what he called "generalized" reciprocity versus what he called "balanced" reciprocity. Because generalized reciprocity involves no expectations of repayment,

it is roughly the same as what we refer to as need-based transfers. Because balanced reciprocity does involve expectations of repayment, it is roughly the same as what we refer to as debt-based transfers. Biologist Richard Alexander brought Sahlins' framework within the evolutionary approach to human behavior by pointing out that social distance often corresponds to genetic relatedness (Alexander, 1979). We have proposed that another driver of the difference between need-based and debt-based transfers is the predictability of the timing of the need in question. These two approaches are complementary. For example, our insight into predictability helps explain situations that do not fit within Sahlins' framework, such as when people who are socially close engage in debt-based transfers (e.g., loans among siblings when the need for help arises at predictable times) and when people who are socially distant engage in need-based transfers (e.g., help given by unrelated ranchers in response to needs that arise unpredictably).

4.6. Limitations and future directions

4.6.1. How do people integrate conflicting information of predictability and responsibility?

One limitation of this research is that the needs we included in the survey were often judged to be unpredictable by respondents, including needs we anticipated would be perceived to be more predictable. One plausible reason for this pattern of responses is that some participants attributed the cause of predictable events (e.g., needing money for rent) to other (likely) less predictable needs (e.g., sickness, injury). This interpretation would be in line with attribution theory (Weiner et al., 1979), and could explain why some participants reported lower repayment expectations even for more predictable needs. In the present studies, we did not provide further details about the cause of predictable needs in order to avoid confounding the effects of predictability and responsibility on repayment expectations. Future studies could test whether people attribute the cause of more predictable events to other less predictable causes.

The issue above raises additional interesting questions, such as (1) how do dispositional biases moderate the association between predictability of needs and attributions of responsibility, and (2) how do people integrate potentially conflicting information about the predictability of a need and the responsibility of the target when determining whether help should be repaid? The correspondence bias describes people's tendency to make internal over external attributions to explain the cause of others' outcomes, but to make external over internal attributions to explain the cause of one's own outcomes. As with other dispositional traits, some people show greater susceptibility to the correspondence bias than others (Gilbert and Malone, 1995). People high on dispositional correspondence bias should be more likely to attribute responsibility to others' needs, and hence this bias might attenuate the positive effect of the predictability of needs on attributions of responsibility. In contrast, perspective taking (i.e., simulating the cognitive and affective states of another person in a given situation) is associated with lower correspondence bias (Hooper et al., 2015). People high on trait (or instructed to engage in) perspective taking should be more likely to make external over internal attributions, and hence less likely to attribute responsibility to others' needs.

Future studies could test whether conflicting information (i.e., a predictable need arising from an unpredictable event) attenuates or overrides the positive effect of predictability on repayment expectations; and how dispositional measures such as correspondence bias and perspective taking shape spontaneous attributions of others' needs. In addition, future studies will benefit from including more events judged to be predictable and for which there is greater agreement about their predictability (e.g., by sampling from communities who engage in shared subsistence activities or encounter similar types and rates of needs). However, that most events were rated to be unpredictable could indicate that most needs are in fact hard to predict, hence providing more

opportunities for people to rely on need-based transfers to manage such unpredictable needs.

4.6.2. Future studies can manipulate the predictability of needs to assess causality

A second constraint of this research is that we relied on a cross-sectional design, neither the predictability of needs nor attribution of responsibility were manipulated between-subjects, limiting our ability to make causal claims about the associations among predictability, responsibility, and expectations of repayment. Future studies could manipulate the schedule at which people experience risks (e.g., in economic games; Claessens et al., 2020; Kaplan et al., 2012), or the type of risks that are presented to participants, to assess whether the perceived predictability of needs causally increases attributions of responsibility and expectations of repayment.

4.6.3. Does interdependence moderate the predictability-repayment association?

A third limitation of the present studies is that the target of the need was not specified. People are more likely to help, and in more costly ways, highly valued targets who share a stake in each other's well-being (e.g., kin, friends) (Delton and Robertson, 2016). Similarly, people are more willing to help in the absence of reciprocity (akin to low repayment expectations) when they perceive high shared fate in their relationships (Ayers et al., 2022). Thus, it is unclear whether people had interdependent targets in mind when reporting on their expectations of repayment, and whether interdependence accounts for some of the variance in participants' lower repayment expectations. Future studies could include multiple targets that vary in level of interdependence (e.g., stranger, cousin, friend, sibling) to test the hypothesis that interdependence overrides or attenuates the positive effect of predictability of needs on repayment expectations because people are more willing to help interdependent targets.

5. Conclusion

Need-based transfer relationships are valuable sources of support that can help people manage risk during times of need. Without the safety net provided by need-based transfer relationships, individuals might be unable to overcome needs posed by unpredictable events. However, engaging only in need-based transfers could compromise the helper's own wellbeing, and make them susceptible to being exploited by free-riders. But there are also costs to engaging only in debt-based transfers: If people always expected to be repaid for their help, many relationships would be strained whenever a partner was unable to reciprocate. The best strategy therefore could be to engage in a combination of need-based and debt-based transfers, depending on the context of the need and how it arose.

Our results support the hypothesis that attending to the predictability of needs allows people to discern when help should be repaid, and when help should be given freely. Discerning predictable from unpredictable needs might allow people to both invest in 'social insurance' in the form of need-based relationships while also benefiting from the balanced exchange of goods and services in the context of debt-based relationships

Our results raise important questions for future research on the psychology of helping and cooperation, such as whether shared knowledge in a group promotes consensus about the predictability of needs. Research into how people come to understand and make attributions regarding the perceived predictability of needs, and what types of inputs people attend to and remember when making these probabilistic inferences, could help to clarify the underlying mechanisms that facilitate or hinder the development, maintenance, and scaling up of successful risk-pooling networks.

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Declaration of Competing Interest

We have no conflicts of interest to disclose.

Data Availability

Data and analysis code have been made available via the Open Science Framework.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.cresp.2023.100095.

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