Journal of Experimental Social Psychology 79 (2018) 217–226

Contents lists available at ScienceDirect

Journal of Experimental Social Psychology

journal homepage: www.elsevier.com/locate/jesp

An uncertainty management perspective on long-run impacts of adversity: The influence of childhood socioeconomic status on risk, time, and social preferences

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ARTICLE INFO

Handling editor: Aarti Iyer

Keywords:
Early life environment
Experimental game theory
Socioeconomic status
Economic games
Ultimatum Game
Dictator Game

ABSTRACT

While there has been a recent increase in focus on the role of early life socioeconomic status (SES) on preferences and decision-making, there is still debate surrounding the proper theoretical framework for understanding such effects. Some have argued that early life SES can fundamentally shift time preferences per se, such that those from low SES backgrounds favor current rewards over future rewards. Others have argued that, while early life SES has lasting effects on behavior, such effects are only observable in the presence of salient cues to mortality. Here, we propose an alternative framework that centers on environmental uncertainty. In this *uncertainty management* framework, early life deprivation promotes the development of strategies that minimize the downside costs of uncertainty across domains. We argue that this focus on managing uncertainty results in greater risk-aversion, present-orientation, and prosociality. Furthermore, these effects need not be dependent on salient cues to mortality. Across four large samples of participants (total N = 4714), we find that childhood deprivation uniquely predicts greater risk-aversion (both incentivized and hypothetical) and greater prosociality in economic games. Childhood deprivation also predicts greater present-orientation, but not above-and beyond current SES. We further find that mortality cues are not necessary to elicit these differences. Our results support an uncertainty management perspective on the effects of childhood SES on risk, time, and social preferences.

> "Rich kids make a lot of bad choices.
> They just don't come with the same sort of consequences."
> Sean Reardon, Stanford University

1. Introduction

Converging lines of evidence have demonstrated the influence of early life socioeconomic status (SES) on decision-making and a variety of related psychological mechanisms and behaviors (Amir, Jordan, & Bribiescas, 2016; Griskevicius, Delton, Robertson, & Tybur, 2011; Griskevicius, Tybur, Delton, & Robertson, 2011; Hill, Prokosch, DelPriore, Griskevicius, & Kramer, 2016; Mittal, Griskevicius, Simpson, Sung, & Young, 2015). While multiple accounts have been proposed, no consensus exists regarding what broader theoretical framework explains the relationship between early socioeconomic status and decision-making, in particular how deprivation in early life may shape adult preferences.

One way to approach developing a broader theory is to consider whether these patterns constitute adaptive responses to local environments (Fawcett, McNamara, & Houston, 2012; Hintze, Olson, Adami, & Hertwig, 2015; Kaplan, 1996; Nettle & Bateson, 2015) and to examine which causal pathways may underlie variation in preferences and choice. In line with this perspective, one primary account drawing from life history theory — which we will refer to as the *delay discounting account* — suggests that early life adversity fundamentally shifts time preferences to optimize outcomes given the local environment. For instance, some scholars have argued that early deprivation causes more weight to be placed on present gains over future gains (Dunkel & Kruger, 2015; Frankenhuis, Panchanathan, & Nettle, 2016; Pepper & Nettle, 2017), thereby explaining the patterns of behaviors observed among those from deprived environments, such as higher incidence of

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https://doi.org/10.1016/j.jesp.2018.07.014
Received 10 February 2018; Received in revised form 20 July 2018; Accepted 28 July 2018

smoking and obesity. This account suggest that when environmental harshness or unpredictability is high, such as in low-SES environments, the relatively limited control associated with lower SES curtails the extent to which people can expect to realize deferred rewards (Pepper & Nettle, 2017). That is, to the extent that people believe they occupy an environment with high extrinsic mortality risk, they may be more willing to engage in behaviors that have short-term benefits and long-term costs. If this belief is justified in that the likelihood of actualizing rewards in the future is small, this account argues that the present-orientation seen among low-SES individuals is a contextually appropriate response (Pepper & Nettle, 2017). Additionally, while proponents of this framework acknowledge the potential relationship between time and risk preferences (Pepper & Nettle, 2017), a prominent iteration of the *delay discounting* account does not make specific predictions about risk or social preferences.

A second influential account, also stemming from life history theory — which we will refer to as the *mortality cues* account — suggests that the effects of childhood socioeconomic status are only evoked in the presence of mortality cues (Griskevicius, Tybur, et al., 2011). This paradigm involves priming participants with cues that call attention to extrinsic mortality, after which participants raised with low SES are more likely to take risks and discount the future (Griskevicius, Tybur, et al., 2011), along with exhibiting a preference for more children sooner (Griskevicius, Delton, et al., 2011). The logic of this account borrows from life history theory, highlighting the role of extrinsic mortality in shaping behavior. The authors posit that mortality cues in the environment may push people toward pursuing a faster or slower life history strategy, but that an individual's childhood background will influence which strategy is pursued. That is, those from deprived backgrounds may be impelled to pursue faster life history strategies — preferring risk-taking and immediate payoffs — but only in the presence of salient mortality cues. Consequently, there may not be any observable differences in intertemporal or risky choice between those raised with low childhood SES and those raised with high childhood SES under normal conditions, but such differences will appear when participants are induced to feel that the world is unsafe.

Here, we offer a different, broader theoretical framework. We propose that the key link between childhood SES and behaviors in adulthood is an underlying *uncertainty management strategy* in which those who experience deprivation in early life tend to develop preferences aimed at minimizing the downside costs of uncertainty. In simpler words, the heuristic that emerges from this framework is: “avoid uncertainty if you can't afford the bad outcome.” This account is consistent with the *relative state model* of risk-taking, which argues that selection has favored agents who calibrate risk-taking based on implicit computations of conditions and/or competitive (dis)advantages (Barclay, Mishra, & Sparks, 2018). Our framework extends this further, however, by arguing for a privileged role of the early environment in this calibration process. We argue that preferences aimed at managing uncertainties are especially informed by conditions early in life — in part because one's early life environment is often a good predictor of one's adult environment.[2] Successful strategies across domains of uncertainty may be internalized early in life and implemented through preferences which help guide efficient decision-making in adulthood. That is, what people may interpret as an affordable risk is in part determined by their early socioeconomic environment, as those raised in low SES households are much less protected against small unexpected bad outcomes (e.g. an unexpected car problem can mean not having food for every meal or missing a few days from work due to illness might mean having to ask friends to borrow money for bills), the consequences of which may substantively impact one's life. Therefore, managing these uncertainties may be a fundamentally different problem for those in environments of abundance as opposed to those in environments of scarcity (Amir & Jordan, 2017). Here, we define uncertainty in the broader, economic sense, as containing both ambiguous choice (or choice under *Knightian uncertainty* (Knight, 1921), where outcomes are known but probabilities are not) and risky choice (where both outcomes and probabilities are known). We also take care to distinguish between risk preferences in the colloquial sense of risk — as relating to risky behaviors, such as speeding or smoking — and risky choice from an economic perspective — as relating to choices with variable payoffs governed by known probabilities. Our account is only focused on the latter.

Why should people be concerned with managing uncertainty? In addition to arguments for state-dependence as an important factor in risky choice (Barclay et al., 2018; Mishra, 2014; Mishra, Barclay, & Sparks, 2017), there is good reason to believe natural selection favored heightened sensitivity to state and extrinsic uncertainty in humans, more broadly. Given that the emergence of our genus *Homo* — between 2 and 3 million years ago — played out against a backdrop of rapidly shifting environmental conditions (Potts, 2012), it's plausible that humans, in particular, have experienced strong selection for behavioral mechanisms that can effectively minimize the costs of uncertainty. Evolutionarily speaking, extrinsic uncertainty poses an important adaptive problem, such that in stochastic environments, increasing variance detrimentally affect the long-run average rate of increase in fitness. While the specifics of how variance affects fitness are dependent on many factors, such as the frequency and informativeness of cues (Fawcett & Frankenhuis, 2015), where in the life cycle it is experienced, and degree of environmental autocorrelation (Nettle, Frankenhuis, & Rickard, 2013), all things being equal: variance negatively affects fitness (Jones, 2005). Additionally, as uncertainty is a variance multiplier (Weitzman, 1998, 2009), making a decision that is poorly calibrated to the probabilities or magnitude of downside costs can be evolutionarily disastrous. This is further exacerbated when the decision-maker starts life in a compromised state (such as being born into a low-SES environment), as the margins are lower and costs more consequential. As it's rarely the case that choices are made based on explicit calculations of likely fitness outcomes, organisms must make decisions based on proxies to fitness (Mishra et al., 2017). In most Western societies, socioeconomic status is a good predictor of life outcomes, particularly those related to fitness such as all-cause and infant mortality (Lynch et al., 1994). Consequently, cues to socioeconomic status can serve as credible proxies to fitness.

In sum, our *uncertainty management* account suggests that early life deprivation leads to a set of preferences aimed at minimizing the downside costs of uncertainty across a variety of domains. And additionally, because preferences are tuned in early life and persist into adulthood, they ought to be generally present in decision-making and do not need to be elicited by mortality cues. We lay out the converging and diverging predictions of the *mortality cues* account, the *delay discounting* account, and our *uncertainty management* account as they pertain to risk, time, and social preferences below.

2. Competing theories and predictions

While there is some overlap between the *delay discounting* and *mortality cues* account, largely based on their grounding in life history theory, these frameworks do generate different predictions across domains. In the domain of risk preferences – that is, trade-offs between expected value and variance in outcomes (Mishra et al., 2017) – the *delay discounting* account does not make specific predictions (as it focuses on time preferences), while the *mortality cues* account argues that early life deprivation leads to risk-*seeking* behavior in the context of cues to mortality (Griskevicius, Tybur, et al., 2011), perhaps because a low-yield but safe decision results in a payoff that is less favored by an individual in an unsafe environment. Here, our *uncertainty management* view predicts the opposite: low childhood SES should lead to risk

[2] While this may not always hold true in the modern world, it was certainly a reasonable assumption throughout our evolutionary history.