# From Cradle to Grave: How Childhood and Current Environments Impact Consumers' Subjective Life Expectancy and Decision-Making

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The age to which people expect to live likely drives many important consumer decisions. Yet we know surprisingly little about the antecedents and consequences of consumers' subjective life expectancies. In the present work, we propose that subjective life expectancy is influenced by the *combination* of people's childhood environment and their current environment. We find that people who grew up in poorer environments expected to have a shorter lifespan compared to people who grew up in richer environments when faced with a current stressor. We document that experiencing a stressor leads people from resource-poor childhoods to believe they will die sooner because they respond to stressors in a more pessimistic way. We further show that subjective life expectancy is an important psychological mechanism that directly contributes to multiple consumer decisions, including desire for long-term care insurance, decisions about retirement savings, and preference for long-term bonds. Overall, the present work opens future research avenues by showing how, why, and when subjective life expectancy influences consumer behavior.

*Keywords*: subjective life expectancy, childhood resources, environmental stressors, long-term decisions, retirement planning

How much money should you save for retirement? Millions of people answer this question with the help of a retirement calculator, a common online tool provided by financial firms. If you use one of these calculators, such as the popular one offered by Merrill Edge (owned jointly by Merrill Lynch and Bank of America), you will need to answer some basic questions about your age, income, and savings. Soon thereafter, however, the financial calculator will pose a deeper question: *How long do you expect to live?*

Subjective perceptions of longevity not only are relevant for retirement planning, but also play a critical role in other domains including health care, insurance, end-of-life decisions, and many consumer choices related to maximizing welfare across one's lifetime (Hamermesh 1985). Past work finds that subjective life expectancy is understandably related to biographical information such as lifestyle,

health, and family history (Hurd and McGarry 2002; van Doorn and Kasl 1998). Yet individual estimates are often inaccurate, whereby even people with similar histories show high variability in their subjective life expectancy (Elder 2007). For instance, one person might expect to live to 91, whereas another person with seemingly similar characteristics might expect to live to 79. While such estimates can be influenced by personality traits such as optimism (Fischhoff et al. 2000; Ludwig and Zimper 2013), recent work shows that subjective life expectancy is partially constructed in the moment and can be affected by situational factors such as the framing of the question (Comerford and Robinson 2017; Payne et al. 2013). In the current research, we examine important and specific factors that influence people's judgments about their own life expectancy.

We propose that people's subjective life expectancy is shaped by the *combination* of their childhood environment and their current environment. Childhood environments are known to influence many outcomes in adulthood, with resource availability in childhood being a central contributor to consumer outcomes later in life (Chaplin and John 2007; Griskevicius et al. 2013; Mittal and Griskevicius 2016; Pampel, Krueger, and Denney 2010; Richins and Chaplin 2015; VanBergen and Laran 2016; Whelan and Hingston 2018). We argue that growing up wealthier is associated with expecting a longer lifespan, whereas growing up poorer is associated with expecting a shorter lifespan. But while childhood is critical, we find that the influence of a person's childhood environment remains invisible without an accompanying consideration of that person's current adult environment. That is, childhood environment does not appear to predict subjective life expectancy at first glance. Instead, we show that childhood environment predicts expected lifespan specifically when the current, adult environment is stressful, such as when adults are currently facing resource scarcity (Mehta and Zhu 2016; Roux, Goldsmith, and Bonezzi 2015; Thompson, Hamilton, and Banerji 2015; Zhu and Ratner 2015).

Overall, we show that subjective life expectancy is influenced by the combination of people's childhood environments and their current environments. Bridging diverse areas of research, this work makes several contributions. First, this research adds to our understanding of how a person's early years affects adult consumer behavior. It suggests that the influences of one's childhood environment may not always be detectable in adult judgment and decision-making. Instead, early-life influences may emerge to drive decision-making specifically when the current adult environment is stressful. Second, our work provides clear evidence that subjective life expectancy is malleable. Building on past work showing that framing affects life expectancy estimates (Comerford and Robinson 2017; Payne et al. 2013), we demonstrate that being in a stressful situation affects people's life expectancy estimates in ways related to their childhood environment. Third, we show that

subjective life expectancy is an important psychological mechanism for understanding several consumer decisions, including desire for long-term care insurance, decisions about retirement savings, and preference for long-term financial bonds. In fact, we find that decisions about all three of these consumer outcomes are mediated by subjective life expectancy. This research not only opens the possibility for novel interventions that could influence retirement savings and other long-term consumer decisions, but also charts the path for future research testing ways in which life expectancy influences consumer behavior and decision-making.

## CONCEPTUAL OVERVIEW

### Subjective Life Expectancy

Anyone who wishes to plan for the long term is wise to consider subjective life expectancy, which is the age to which a person expects to live (Griffin, Hesketh, and Loh 2012). Such estimates are known to play an important role in decisions about work and retirement planning, health behaviors, and insurance (Doerr and Schulte 2012; van Solinge and Henkens 2010; Ziegelman, Lippke, and Schwarzer 2006). More broadly, subjective life expectancy may play a role in any choice related to maximizing expected utility across one's lifetime (Browning and Crossley 2001; Hamermesh 1985). For example, one's projected longevity may affect important choices about how people allocate their resources and make decisions that impact their career, well-being, and the lives of their loved ones.

Economic theories have generally assumed that people's estimates of how long they will live are relatively accurate (Griffin, Loh, and Hesketh 2013; Hurd and McGarry 1995; Perozek 2008). But while life expectancy estimates are fairly accurate at the population level based on actuarial data (Fry and Debats 2006; Siegel, Bradley, and Kasl 2003), individual predictions of life expectancy vary widely, deviating considerably from what would be expected for individuals at the population level (Elder 2007; Hamermesh 1985). For instance, a recent study found that although the mean difference between subjective and actuarial estimates of life expectancies in a population was less than two years, the range of subjective estimates was 59 years around the mean, indicating sizeable variation at the individual level (Rodemann and Arigo 2018). Although examining the accuracy of people's longevity judgments is itself an important question, here we focus on the antecedents and consequences of subjective evaluations of life expectations because individual-level estimates are most likely to drive consumer decisions and behavior (Hamermesh 1985; Hurd and McGarry 2002).

Given that subjective life expectancy is likely important for a variety of consumer decisions, it is surprising how

little we know about the factors that influence people's estimates for how long they might live. We know that autobiographical information, such as one's health and lifestyle, influences subjective longevity predictions (Hurd and McGarry 1995; van Doorn and Kasl 1998). Research also finds that such estimates can be affected by personality traits such as pessimism and optimism, with optimists believing they will live longer than pessimists (Fischhoff et al. 2000; Ludwig and Zimper 2013). More strikingly, however, recent work shows that subjective life expectancy can also be affected by situational factors such as the framing of the question (Comerford and Robinson 2017; Payne et al. 2013). For example, people asked if they would "live to" older ages expected to live seven to nine years longer than those asked the same question framed as a "die by" age (Payne et al. 2013). These findings are noteworthy because they suggest that subjective life expectancy not only is malleable, but also might be substantially influenced by context. The current research proposes that people's sense of their life expectancy is influenced by the combination of their childhood and current environments.

## Childhood Environment and Subjective Life Expectancy

Childhood environment plays a crucial role in many life outcomes, including finances, health, education, and well-being (Brooks-Gunn and Duncan 1997; Shonkoff et al. 2012). A particularly important aspect of childhood is the availability of resources (Bradley and Corwyn 2002; Guo and Harris 2000). Childhood resources include both monetary and nonmonetary resources, such as the money, clothing, food, time, and attention available during early life (Evans 2004; Heckman 2006; Lareau 2011; Rindfleisch, Burroughs, and Denton 1997). We propose that childhood resources influence people's estimates of their life expectancy. Support for this claim comes from two different realms. First, at the population level, people growing up in poorer environments tend to have a lower actuarial life expectancy compared to those growing up in richer environments (Dwyer-Lindgren et al. 2017; Galobardes, Lynch, and Davey Smith 2004). Growing up poor is also associated with worse health outcomes in adulthood (Duncan, Ziol-Guest, and Kalil 2010; Pollitt et al. 2007). Individuals might consider such actuarial information when estimating their own personal longevity.

Second, a cornerstone of the literature in evolutionary biology indicates that the length of an individual's lifespan is associated with whether the individual's environment is harsh and unpredictable, which is emblematic of resource-poor environments (Ellis et al. 2009). Children growing up in poorer families are likely to experience more stress, chaos, and instability than children growing up in richer families (Bradley et al. 2001; Evans et al. 2005). In the animal kingdom, stressful and unpredictable environments

speed up an animal's physiological rate of development, leading it to reach maturity faster, produce offspring at earlier ages, and die younger. By contrast, resource-rich and predictable environments slow down an animal's rate of development, leading it to mature more slowly physiologically, delay reproduction, and live to an older age (Promislow and Harvey 1990; Stearns 1992). These findings are grounded in basic evolutionary logic: if one is born into an environment that is dangerous and resource-poor, it makes evolutionarily adaptive sense to speed up development and reproduce as soon as possible or otherwise risk starvation or death before ever being able to reproduce.

Importantly for the current research, theory in evolutionary development highlights that *early-life environments* are a critical period for determining the speed at which individuals will move through different life stages (Belsky, Steinberg, and Draper 1991; Ellis 2004). The stressfulness of people's childhood environment calibrates their physiology and psychology, leading them down a "slower" or a "faster" life trajectory (Simpson et al. 2012). For example, girls who grew up in stressful environments experienced menarche—a physiological marker of sexual maturation—eight months earlier than girls raised in low-stress environments (Costello et al. 2007; Sung et al. 2016). Such environmental effects remain even when one controls for genetic factors. Similarly, kids who grow up in stressful environments tend to develop a psychology that focuses them on a shorter-term horizon (Simpson et al. 2012). We surmise that this kind of myopic psychology might also include the expectation of dying at an earlier age.

As a starting point, we conducted a preliminary study to test the relationship between childhood resources and people's subjective estimates of how long they are going to live (see the web appendix for additional details on measures and results). Two hundred fifty-four participants from Amazon's Mechanical Turk (MTurk) indicated their subjective life expectancy, level of childhood resources, level of current resources, education level, and current health. Results showed that people's health status was positively and significantly related to their subjective life expectancy ($\beta = .33$, $p < .001$). Surprisingly, however, we found no effect of childhood resources, current resources, or education on subjective life expectancy. Thus, although our initial theorizing suggested that childhood resources should influence how long one expects to live, we did not find this effect.

## Childhood Environment and Current Environmental Stress

Even though results from the preliminary study suggest that childhood resources do not appear to be related to subjective life expectancy, we believe there is more to this null finding than meets the eye. We suggest that childhood

resources *do* exert an effect on subjective life expectancy, but that the influence of childhood resources might be undetectable unless we add another critical variable to the equation: the nature of the current adult environment.

We propose that childhood resources are most likely to influence subjective life expectations when adults experience a current environmental stressor. Environmental stress is rooted in the concept of *extrinsic risk* in evolutionary biology (Quinlan 2007). Extrinsic risk refers to the incidence of largely uncontrollable events in one's current environment that pose a potential threat to survival or well-being (Chisholm et al. 1993; Schulte 2014). Environmental stressors produce a sense of anxiety, worry, and uncertainty, and could stem from economic uncertainty (e.g., stock market volatility, recession, job loss), societal uncertainty (the future state of one's country or the world), mortality uncertainty (e.g., terrorism, new disease epidemic), or anything in the environment that poses a threat to future well-being.

Environmental stressors can trigger the human stress response system, which governs how people react to stressful situations. This is important because the stress response system is known to be calibrated by early-life environments (McEwen 2012). Differences in social and material experiences between children from poorer and richer environments can lead to very different stress response profiles that persist until adulthood (Del Giudice, Ellis, and Shirtcliff 2011; Koss and Gunnar 2018; Taylor 2010). For example, one of the most widely examined stress regulatory systems is the hypothalamic–pituitary–adrenal (HPA) axis. The HPA axis develops throughout childhood and is particularly sensitive to early-life environments. Frequent or excessive activation due to harsh circumstances prevalent in poorer childhood environments alters the programming of the HPA axis (McEwen 2012; Tyrka et al. 2008). This results in childhood-based differences in physiological responses to stressors experienced later in life. For example, childhood adversity is associated with dampened cortisol and heart-rate responses to psychological stressors (Lovallo et al. 2012). But these physiological reactions do not necessarily translate into differences in subjective feelings of distress, implying that subjective experiences of stress may be different and may not capture the complexity underlying stress biology among people from different childhood backgrounds. Taken together, these studies show multiple ways in which people from poor and rich backgrounds differ while responding to stressors.

Supporting our theorizing, converging research from different fields is uncovering the joint effects of both childhood *and* the current environment. For example, when tested under benign laboratory conditions, rats reared in adverse environments tend to perform similarly on learning and foraging tasks as rats reared in nurturing environments.

However, when the rats were tested in stressful conditions—such as when a stressor is experimentally induced in the laboratory—their performance diverged as a function of their early-life environment (Bagot et al. 2009; Chaby et al. 2015). Recent work in psychology also indicates that differences in cognitive functioning between people from diverse childhood backgrounds can sometimes emerge specifically when those people face a stressor (Griskevicius et al. 2011, 2013; Mittal et al. 2015; Young et al. 2018). For example, stressors experienced in adulthood led people from poor versus wealthy childhoods to diverge in their executive functioning, working memory, temporal discounting, and their preferences for risk (Mittal and Griskevicius 2014, 2016; Mittal et al. 2015; Young et al. 2018).

We believe this recent research provides a theoretically plausible reason for why our preliminary correlational study failed to detect an effect of childhood resources on subjective life expectancy. It is not that childhood has no effect; it may instead be that the effect of childhood is dormant and invisible when current adult conditions are low-stress (Taylor 2010). The current research set out to test this possibility. Based on our preliminary study and on theory about the early-life calibration of stress responses, we predicted that the effect of childhood resources on subjective life expectancy would be either small or undetectable when the current conditions are low-stress. However, we predicted that the presence of an environmental stressor should draw out our earlier predicted effect of childhood resources on subjective life expectancy. Formally:

> **H1:** An environmental stressor should alter subjective life expectancy in different ways depending on people's childhood resources. People from poorer backgrounds should expect to live significantly shorter lives compared to those from richer backgrounds when experiencing environmental stress.

## Mechanism Linking Childhood Resources to Subjective Life Expectations

We propose that a fundamental difference between how people from poorer versus richer backgrounds respond to stressors is their level of optimism. Optimism refers to having positive expectations about one's life and future outcomes (Scheier and Carver 1985). Optimism lies on a continuum (Scheier, Carver, and Bridges 1994), with optimists having a rosier outlook toward life and expecting better things to happen to them compared to pessimists. Optimism has been found to influence goal pursuit (Zhang, Fishbach, and Dhar 2007), anticipatory purchases (Chan, Sengupta, and Mukhopadhyay 2013), expectations of behaving in an "ideal" manner (Tanner and Carlson 2009),

and consistency in sequential choices (Yang and Urminsky 2015). Optimists also believe they will have a longer life-span (Griffin et al. 2013; Weinstein 1980).

Although optimism may reflect a general dispositional characteristic, contextual factors can influence specific optimistic beliefs (Chan et al. 2013). For example, some people may deliberately lower expectations when faced with risky situations in order to defend against a possible failure (Norem and Cantor 1986). In contrast, when social comparisons are made salient, certain people tend to have more positive judgments about their own qualities and abilities (Chambers and Windschitl 2004). Similarly, threatening situations may lead some people to develop positive expectations about themselves and their lives (Taylor et al. 2000). For example, a segment of individuals who experienced life-threatening events such as contracting AIDS or developing heart disease developed positive expectations about their abilities and life outcomes (Helgeson and Taylor 1993; Reed et al. 1994). Taken together, these findings suggest that experiencing stressful situations can lead people to distort their beliefs by having pessimistic or optimistic expectations about themselves.

We propose that people's sense of pessimism and optimism in response to stressors depends on their childhood environment. Support for this notion comes from recent research on the effect of stressors and childhood resources on people's beliefs and self-evaluations (Mittal and Griskevicius 2014, 2016). When facing stressful situations, people from poorer childhoods tend to have more unfavorable evaluations about themselves compared to those from richer backgrounds. For example, stressors led individuals raised in poorer environments to have a lower perceived sense of control and to exaggerate their chances of experiencing negative health-related events compared to those raised in richer environments. In sum, people from poorer backgrounds had more negative perceptions in response to stressors compared to people from richer backgrounds.

Based on these findings, we surmise that stressors should also affect people's level of pessimism/optimism differently depending on their level of childhood resources. Experiencing stress should lead people from poorer backgrounds to have more pessimistic beliefs compared to those from richer backgrounds. Furthermore, these differences in pessimism/optimism should mediate the effect of childhood resources and environmental stressors on subjective life expectations. That is, we think that stress-induced pessimism (optimism) should lead people from poorer (richer) childhoods to expect a shorter (longer) life. Thus, we propose:

> **H2:** The joint effect of childhood resources *and* environmental stressors on subjective life expectancy (hypothesis 1) should be mediated by differences in people's level of pessimism/optimism.

## Influence of Subjective Life Expectancy on Consumer Decision-Making

While subjective life expectancy has received minimal attention in consumer research, we believe subjective life expectancy is important because it might be a powerful psychological mechanism that drives a variety of consumer decisions. We sought to test this proposition by examining whether subjective life expectancy will statistically mediate consumer decisions that have long-term implications such as long-term care insurance, retirement planning, and choice of long-term bonds. Because the likelihood of utilizing long-term care services and retirement money increases with age (Kessler 2008; Somers 1982), we propose that people who expect to have shorter lives would be less likely to consider getting long-term care insurance or being interested in retirement planning compared to those who expect to live longer. In addition, because consumers investing in bonds with extended maturity periods run the risk of death before the bond's maturity date (Hurd 1989), we propose that those who expect to have shorter lives should prefer bonds with shorter maturity periods.

Importantly, we propose that consumer decision-making for long-term outcomes should be jointly influenced by the combination of childhood resources *and* current stress. Whereas the effect of childhood resources on long-term decisions should be either small or undetectable when the current conditions are low-stress, the presence of a current environmental stressor should lead people who grew up poorer to have less interest in long-term care insurance, allocate fewer resources toward retirement, and prefer bonds with shorter maturity periods compared to people who grew up in resource-poor environments. Formally stated:

> **H3:** An environmental stressor should lead people from poorer backgrounds to have a lower interest in long-term care insurance, retirement planning, and long-term bonds compared to those from richer backgrounds.

Importantly, based on our theoretical model, we predict that the effect of childhood resources and current environmental stress on long-term decision-making should be mediated by subjective life expectancy. Thus, we hypothesize:

> **H4:** The joint effect of childhood resources *and* environmental stressors on long-term decision-making (hypothesis 3) should be mediated by subjective life expectancy.

## STUDY 1: SUBJECTIVE LIFE EXPECTANCY

Study 1 tested how growing up relatively poor versus rich affects people's subjective life expectancy in adulthood. Based on our preliminary study, we anticipated that

childhood resources would not have an effect on subjective life expectancy under conditions devoid of a current environmental stressor—the control experimental condition. Consistent with hypothesis 1, we predicted that people from poorer backgrounds should expect to live significantly shorter lives compared to those from richer backgrounds in the presence of an environmental stressor.

## Method

*Participants and Study Design.* One hundred twenty-five respondents (53.7% female; one participant did not provide gender information; $M_{age} = 21.2$, SD = 1.6) at a large North American university participated in exchange for course credit. Participants arrived to a laboratory in groups and were seated at computer stations separated by partitions. Two respondents could not be included in the analyses due to missing data for either the dependent measure or for the childhood resources measure. Thus, the final sample consisted of 123 participants. All participants were randomly assigned to one of two between-subjects experimental conditions: environmental stressor or control.

*Environmental Stressor.* A financial stressor was used to highlight current environmental stress. Participants were informed that the study consisted of multiple tasks, including getting people's feedback about the current state of the economy. As part of the stress manipulation, participants completed a writing task based on previous work (Mittal and Griskevicius 2016; Roux et al. 2015). Specifically, participants in the financial stressor condition wrote about three indicators that suggested the economy is "becoming increasingly unpredictable and that resources such as jobs are becoming scarcer." Typical responses included national debt, overpopulation, and bad government regulations. Those in the control condition were asked to list three indicators that suggest the economy is "getting better and that resources such as jobs are no longer scarce." Typical participant responses included noting that unemployment is low and that the stock market and corporations are doing well.

To ascertain the efficacy of our environmental stress manipulation, we conducted a pretest with 68 participants drawn from a similar student participant pool. Participants were assigned either to the environmental stressor or to the control condition. After undergoing the same manipulation procedures as in the current study, all participants indicated the extent to which they agreed with five statements: "I am feeling anxious," "I am feeling worried," and "I am feeling stressed out," "I feel like the world is uncertain," and "I feel like the world is unpredictable." Responses were provided on a seven-point scale (1 = Strongly Disagree; 7 = Strongly Agree). The five items were aggregated into a stress index for further analyses ($\alpha = .88$). Findings showed that participants in the environmental stressor condition reported feeling significantly more stress ($M = 4.36$, SD = 0.92) compared to participants in the control condition ($M = 3.52$, SD = 1.47; $t(66) = 2.80$, $p = .007$). There was no significant interaction effect of childhood resources and environmental stress condition ($p > .27$). This means that people from different childhood backgrounds perceived the manipulation to be similarly stressful.

*Subjective Life Expectancy.* Immediately after the writing task, we assessed people's subjective life expectancy using the same item as in the preliminary study (Griffin et al. 2012; Ross and Mirowsky 2002). Participants indicated the age to which they expected to live. Answers were recorded on a slider scale ranging from 18 to 100 years. The mean response was 85.9 years (SD = 10.1). There was no significant difference between males ($M = 84.9$, SD = 12.2) and females ($M = 86.6$ years; SD = 8.03; $t(120) = -0.89$, $p = .38$).

*Childhood Resources.* As in the preliminary study, we relied on a validated eight-item measure to assess childhood resources (Rindfleisch et al. 1997; see web appendix for all items). Participants provided their responses to each item on a seven-point scale (1 = Inadequate Support; 7 = Exceptional Support) and were aggregated into a childhood resources index ($\alpha = .91$; $M = 5.99$, SD = 1.08). To minimize the influence of its salience on our other variables, childhood resources were always measured toward the end in all the studies, right before the section on demographics. Current level of resources was also assessed using the same three items as in the preliminary study (Griskevicius et al. 2011; see web appendix for all items). Responses were recorded on a seven-point scale (1 = Strongly Disagree; 7 = Strongly Agree). The three items were averaged into a current resources index ($\alpha = .85$; $M = 4.13$, SD = 1.51). There were no significant differences in childhood or current resources across the two conditions ($ps > .38$). This means that our environmental stressor manipulation did not influence people's level of current or childhood resources.
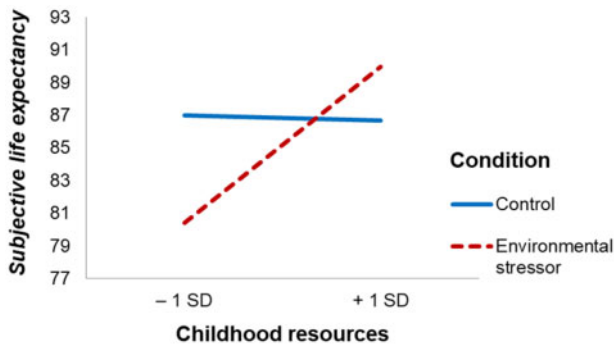
## Results

*Subjective Life Expectancy.* Using a general linear model (GLM) approach, we entered experimental condition as a categorical variable and childhood and current resources as mean-centered continuous variables. Subjective life expectancy was entered as a continuous dependent variable. We also tested our key predictions in all the studies using a difference score of the age to which someone expects to live minus their current age as the dependent variable, which yielded highly similar results (all results in the web appendix).

We first examined the effects of our key variables, environmental stress condition and childhood resources, on

**FIGURE 1**

EFFECT OF CHILDHOOD RESOURCES AND ENVIRONMENTAL
STRESSOR CONDITION ON SUBJECTIVE LIFE EXPECTANCY
(STUDY 1)



subjective life expectancy across the two experimental conditions. Consistent with hypothesis 1, results revealed a significant environmental stressor condition by childhood resources interaction ($F(1, 119) = 7.45$, $p = .007$, $\eta^2 = .06$). This effect remained significant even after we controlled for age and gender ($F(1, 117) = 7.01$, $p = .009$, $\eta^2 = .06$).

To formally test hypothesis 1, we examined the relation between childhood resources and expected lifespan in each of the two experimental conditions. As seen in figure 1, in the control condition, there was no relation between childhood resources and the age that people expected to live to ($b = .22$, SE $= 1.23$, $t(119) = .18$, $p = .86$), a result consistent with our preliminary study finding. However, in the environmental stressor condition, people from poorer backgrounds expected to live significantly fewer years, as predicted in hypothesis 1 ($b = 4.62$, SE $= 1.04$, $t(119) = 4.42$, $p < .001$). In fact, although there was an overall main effect in the model of childhood resources on subjective life expectancy ($F(1, 120) = 11.49$, $p = .001$, $\eta^2 = .09$), this effect was driven entirely by the effect in the stressor condition. There was also no main effect of condition on subjective life expectancy ($p > .35$).

Finally, we explored the effect of current resources on subjective life expectancy by including both current resources and a current resources by condition interaction term in the model. Results showed no significant effect of either current resources or condition by current resources interaction ($ps > .23$). Importantly, the condition by childhood resources interaction remained significant even when we included current resource level and its interaction with condition in the model ($F(1, 117) = 5.03$, $p = .027$, $\eta^2 = .04$). The finding that the current level of resources does not significantly influence people's subjective life expectancy is consistent with our preliminary study and multiple previous findings (Kobayashi, Beeken, and Meisel 2017;

van Solinge and Henkens 2018). Although not central to our hypotheses, we also conducted floodlight analyses, which are reported in the web appendix.

## Discussion

Study 1 provided support for our first hypothesis by showing that childhood resources and stressors in the current environment jointly affect subjective life expectancy. Consistent with the findings in the preliminary study, there were no differences in the expected lifespan between people from rich and poor backgrounds in the control condition. However, we found that the effect of childhood resources became apparent when we induced an environmental stressor. Under duress, people with fewer resources during childhood expected to have significantly shorter lives compared to people who grew up with more resources.

## STUDY 2: SUBJECTIVE LIFE EXPECTANCY IN A BROADER SAMPLE

The goal of study 2 was to conceptually replicate and extend the findings from study 1. Whereas study 1 relied on student participants, study 2 sought to test our core predictions in a more diverse population in terms of age, socioeconomic status, and childhood backgrounds. In addition, we measured people's current health status, which is a known predictor of people's life expectancy beliefs (Hurd and McGarry 1995). We sought to test whether the pattern of findings found in study 1 would be observed even after we controlled for people's current health.

Study 2 also sought to test whether the nature of the environmental stressor was critical to our findings. Specifically, study 2 tested whether the pattern of findings was specific to financial stress (as operationalized in study 1), or whether it would extend to more general environmental stressors. Based on past work showing that people's childhood environments calibrate their general stress response, we anticipated that similar findings would emerge regardless of whether the stressor was financial or nonfinancial. Finally, study 2 employed a control condition that did not relate to financial or economic conditions.

## Method

*Participants and Study Design.* Five hundred ninety-four participants were recruited via MTurk (55.4% female; $M_{\text{age}} = 34.5$, SD $= 11.4$) in exchange for a small monetary payment. Participants were randomly assigned to one of three between-subjects experimental conditions: financial stressor, general stressor, or control. As in study 1, participants in the financial stressor condition wrote about three indicators that suggested the economy is "becoming increasingly unpredictable and that resources such as jobs

are becoming scarcer." Participants in the general stressor condition wrote about three indicators that suggested "that the world is becoming threatening and our lives are becoming increasingly unpredictable." This general environmental stress manipulation is based directly on the concept of "extrinsic risk" in evolutionary biology, as discussed earlier (Quinlan 2007).

In the control condition, participants wrote about a completely unrelated topic: three activities that they had done in the past seven days. This methodology was used to minimize any mention of financial or economic resources in the control condition. Finally, we measured childhood resources ($M = 4.99$, SD = 1.32) and current resources ($M = 3.75$, SD = 1.70) using the same items as in study 1 and the preliminary study reported earlier.

*Subjective Life Expectancy.* Next, everybody was asked to indicate the age to which they expected to live on a slider scale ranging from 0 to 110 years. The mean response was 84.5 years (SD = 10.38).

*Current Health.* To control for the effects of people's health status, we measured participants' current health using the two-item health status scale also used in the preliminary study (Moorman and Matulich 1993). Specifically, participants responded to the items: "Please rate your overall health," and "How serious have your health problems been?" (reverse-coded). Responses were recorded on a seven-point scale (1 = poor; 7 = excellent). The two items were relatively highly correlated ($r = .50$, $p < .001$) and were averaged for the analyses.

## Results

*Subjective Life Expectancy.* We first conducted an omnibus test with all three experimental conditions and childhood resources. As seen in figure 2, findings revealed a significant experimental conditions by childhood resources interaction ($F(2, 588) = 6.85$, $p = .001$, $\eta^2 = .02$). This effect remained significant even after we controlled for age, gender, and current health ($F(2, 584) = 5.70$, $p = .004$, $\eta^2 = .02$).

We next examined whether the current study conceptually replicated the findings for subjective life expectancy from study 1 by focusing specifically on the financial stressor condition and the control condition. Focusing on these two conditions revealed the same financial stressor by childhood resources interaction as in study 1 ($F(1, 393) = 12.41$, $p < .001$, $\eta^2 = .03$). This effect remained significant even after we controlled for participant gender, age, and current health ($F(1, 390) = 9.70$, $p = .002$, $\eta^2 = .02$).

To further test hypothesis 1, we examined the relation between childhood resources and subjective life expectancy in the control and the financial stressor conditions. As seen in figure 2, in the control condition, there was no relation between childhood resources and life expectancy

FIGURE 2

EFFECT OF CHILDHOOD RESOURCES AND ENVIRONMENTAL STRESSOR CONDITIONS ON SUBJECTIVE LIFE EXPECTANCY (STUDY 2)
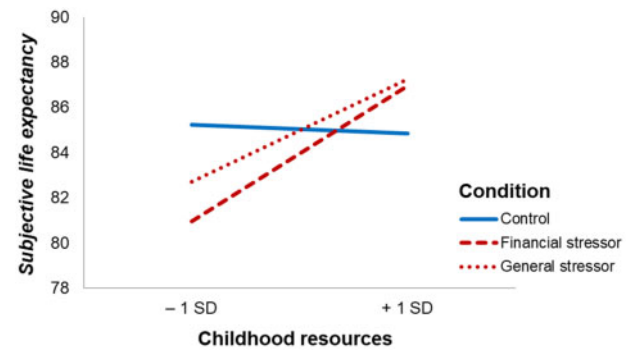


($b = .09$, SE = .53, $t(393) = .18$, $p = .85$). However, in the financial stressor condition, people from poorer backgrounds expected to live significantly fewer years ($b = 2.84$, SE = .57, $t(393) = 4.99$, $p < .001$). As in study 1, there was an overall significant main effect of childhood resources ($F(1, 394) = 12.22$, $p < .001$, $\eta^2 = .03$), but this main effect was driven entirely by the financial stressor condition. Finally, there was no significant overall main effect of financial stressor condition on subjective life expectancy ($p = .072$).

Next, we included current resources as well as financial stressor condition by current resources interaction terms in the model. Consistent with findings in study 1, results showed no significant effect of either current resources or the financial stressor condition by current resources interaction ($ps > .19$). Importantly, the financial stressor condition by childhood resources interaction remained significant even when we included current resource level and its interaction with condition in the model ($F(1, 388) = 8.97$, $p = .003$, $\eta^2 = .02$).

We next examined how the findings in the control condition fared with the new general stressor condition. Overall, all of the findings in the new general stressor condition were similar to those in the financial stressor condition. Focusing on the control and the general stressor conditions, we found a significant general stressor by childhood resources interaction ($F(1, 391) = 6.93$, $p = .009$, $\eta^2 = .02$). This effect remained significant even after we controlled for participant gender, age, and current health ($F(1, 387) = 5.71$, $p = .017$, $\eta^2 = .02$).

Whereas there was no relation between childhood resources and life expectancy in the control condition ($b = .09$, SE = .52, $t(391) = .19$, $p = .85$), consistent with hypothesis 1, people from poorer backgrounds expected to live a significantly lower number of years in the general stressor condition ($b = 2.04$, SE = .53, $t(391) = 3.86$,

$p < .001$). There was once again a significant main effect of childhood resources ($F(1, 392) = 7.91$, $p = .005$, $\eta^2 = .02$), but this main effect was driven entirely by findings in the general stressor condition. Results revealed no main effect of general stressor condition on subjective life expectancy ($p = .40$).

When included in the model, results showed no significant effect of either current resources or condition by current resources interaction ($ps > .33$). Importantly, the condition by childhood resources interaction remained significant despite the inclusion of current resource level and its interaction with condition in the model ($F(1, 385) = 5.07$, $p = .025$, $\eta^2 = .01$).

Finally, we compared the two stressor conditions. As expected, results showed no main effect of condition on subjective life expectancy ($p > .42$). The condition by childhood resources interaction was also not significant ($F(1, 392) = 1.04$, $p = .31$). This means that people's subjective life expectancy did not differ across the two stressor conditions.

## Discussion

Study 2 conceptually replicated the findings from study 1 by showing that in response to financial stressors, people with fewer childhood resources expected to live shorter lives compared to people with greater childhood resources. This very specific pattern was obtained both in a student sample (study 1) and in a more diverse MTurk sample (study 2). Moreover, study 2 extended these findings by showing that the effect of childhood resources on subjective life expectancy is not limited just to stressors about finances but also extends to other, more general, environmental stressors. Finally, study 2 showed that the effects of childhood resources and environmental stressors on subjective life expectancy remain even after we control for people's current health status.

## STUDY 3: UNDERLYING ROLE OF PESSIMISM/OPTIMISM

The goal of study 3 was to examine why childhood resources influence people's subjective life expectancy. As described in hypothesis 2, we reason that people growing up poorer expect to live fewer years because they tend to be more pessimistic compared to those from richer backgrounds in the presence of an environmental stressor. Thus, study 3 tested whether pessimism/optimism mediated the effect of childhood resources and environmental stress on subjective life expectancy.

## Method

*Participants and Study Design.* Two hundred twenty-seven students (48.5% female; $M_{age} = 20.8$, SD = 1.43) at a large North American university participated in exchange for course credit. Participants were part of an online student subject pool and completed the study on their own using a study link provided to them. Upon beginning the study, participants were randomly assigned to one of two between-subjects conditions: environmental stressor or control. The study used the same financial stressor manipulation as in study 1. The control condition was borrowed from past work (Mittal and Griskevicius 2016), in which participants wrote about three indicators that suggested that the economy was "neither getting better nor becoming worse." Our intention was to use a more neutral condition within the economic context instead of one that is more positive as in the control condition used in study 1. We measured childhood resources ($M = 6.12$, SD = 0.86) and current resources ($M = 4.35$, SD = 1.64) using the same items as in the previous studies.

Following the manipulation, participants were told that the next set of questions were related to people's perceptions. This part included measures of perceived optimism and subjective life expectancy. The order of the questions was counterbalanced such that half of the participants indicated their perceived optimism before stating their subjective life expectancy and the other half did so after. The order of presentation affected neither responses on subjective life expectancy nor perceptions of pessimism/optimism (all $ps > .86$).

*Perceptions of Pessimism/Optimism.* Participants' perceptions of pessimism/optimism were measured based on the Life Orientation Test – Revised (LOT-R; Scheier et al. 1994), which is one of the most widely used measure of pessimism/optimism. LOT-R is used as a continuous measure such that higher scores suggest optimism and lower scores suggest pessimism. Because LOT-R was developed to assess trait pessimism/optimism, we slightly modified the language in order to better capture people's contextual perceptions of pessimism/optimism. The five items were: "I feel optimistic about my future," "I expect more good things will happen in my life than bad," "If something can go wrong for me, it will" (reverse-scored), "I don't count on many good things happening to me in the future" (reverse-scored), and "I have a feeling that things will not go my way in the future" (reverse-scored). Responses were recorded on a seven-point scale (1 = Strongly Disagree; 7 = Strongly Agree). The five items were combined into a pessimism/optimism index for analyses ($\alpha = .67$; $M = 5.28$, SD = 0.81).

*Subjective Life Expectancy.* The same item was used to measure subjective life expectancy as in the previous studies. The response scale ranged from 0 to 110 years. The mean subjective life expectancy was 88.7 years (SD = 8.84).

**FIGURE 3**

(A) EFFECT OF CHILDHOOD RESOURCES AND ENVIRONMENTAL STRESSOR CONDITION ON SUBJECTIVE LIFE EXPECTANCY (STUDY 3) (B) EFFECT OF CHILDHOOD RESOURCES AND ENVIRONMENTAL STRESSOR CONDITION ON PERCEIVED PESSIMISM/ OPTIMISM (STUDY 3). (C) MEDIATED MODERATION MODEL SHOWING THAT THE EFFECT OF CHILDHOOD RESOURCES AND A CURRENT ENVIRONMENTAL STRESSOR ON SUBJECTIVE LIFE EXPECTANCY IS MEDIATED BY PERCEPTIONS OF PESSIMISM/ OPTIMISM (STUDY 3)
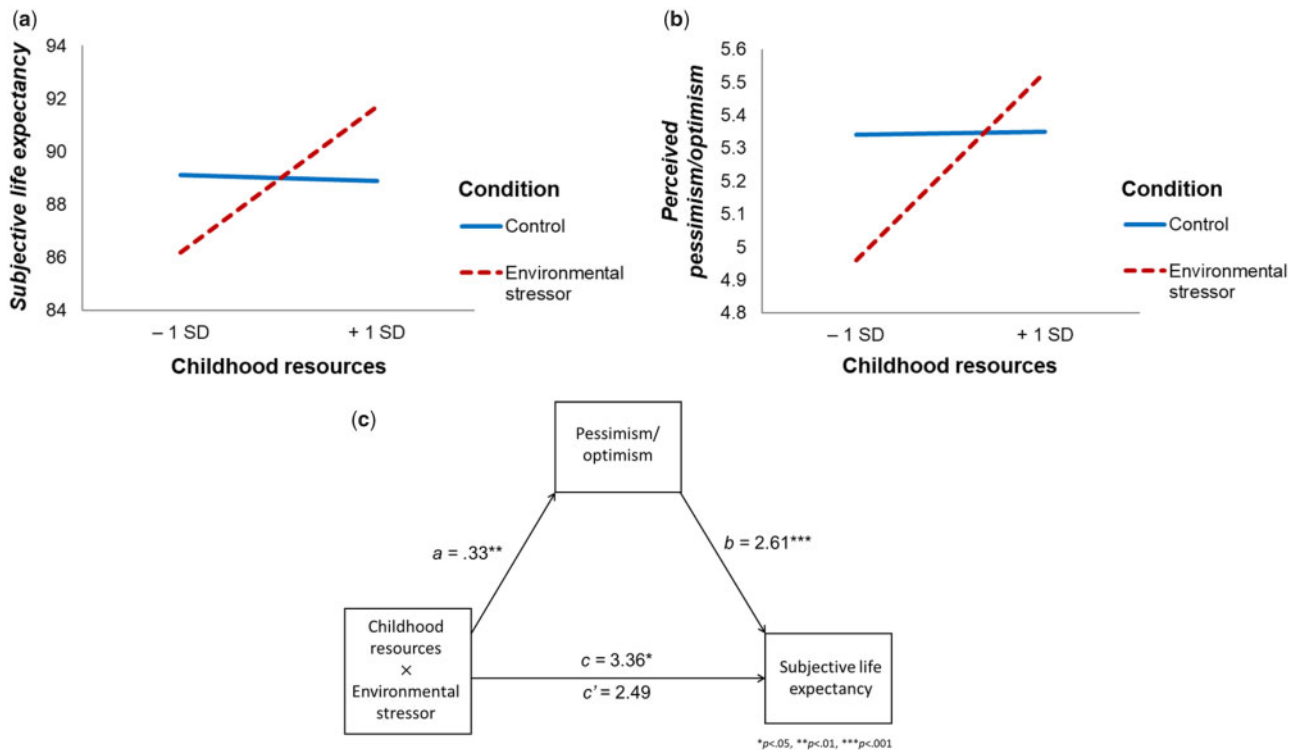


## Results

*Subjective Life Expectancy.* Consistent with our predictions, results revealed a significant condition by childhood resources interaction ($F(1, 223) = 6.15$, $p = .014$, $\eta^2 = .03$). This effect remained significant even after we controlled for participant gender and age ($F(1, 221) = 5.95$, $p = .016$, $\eta^2 = .03$).

We next examined the relation between childhood resources and subjective life expectancy in the two experimental conditions. There was no relation between childhood resources and subjective life expectancy in the control condition ($b = -.10$, SE = .93, $t(223) = -.11$, $p = .91$; see figure 3a). However, in the environmental stressor condition, people from poorer backgrounds expected to live significantly fewer number of years ($b = 3.26$, SE = .99, $t(223) = 3.29$, $p = .001$), supporting hypothesis 1. As in studies 1 and 2, although the overall main effect of childhood resources was significant ($F(1, 224) = 4.59$, $p = .033$, $\eta^2 = .02$), this effect was driven by the stressor

condition. Finally, results revealed no main effect of the stressor condition on subjective life expectancy ($p > .87$).

Results showed no significant effect of either current resources or stressor condition by current resources interaction ($ps > .37$). Importantly, the environmental stressor condition by childhood resources interaction remained significant even when we included current resource level and its interaction with condition in the model ($F(1, 219) = 7.14$, $p = .008$, $\eta^2 = .03$).

*Perceptions of Pessimism/Optimism.* Results revealed a significant environmental stressor by childhood resources interaction on perceptions of pessimism/optimism ($F(1, 223) = 7.38$, $p = .007$, $\eta^2 = .03$). This effect remained significant even after we controlled for participant gender and age ($F(1, 221) = 6.90$, $p = .009$, $\eta^2 = .03$).

We next examined the relation between childhood resources and perceived pessimism/optimism in the two experimental conditions. As seen in figure 3b, in the control condition, there was no relation between childhood

resources and perceptions of pessimism/optimism ($b = .01$, SE $= .08$, $t(223) = .01$, $p = .99$). However, in the environmental stressor condition, people from poorer backgrounds were significantly less optimistic ($b = .33$, SE $= .09$, $t(223) = 3.73$, $p < .001$). Although there was an overall significant main effect of childhood resources ($F(1, 224) = 6.32$, $p = .013$, $\eta^2 = .03$), this effect was driven by the stressor condition. There was no main effect of environmental stressor condition on perceived pessimism/optimism ($p > .27$).

Finally, we added current resources and condition by current resources interaction terms in our model. Results showed a significant main effect of current resources such that those with a greater level of current resources were more optimistic ($F(1, 219) = 5.03$, $p = .026$, $\eta^2 = .02$). However, the condition by current resources interaction was not significant ($p > .23$). This means that the effect of current resources on perceptions of pessimism/optimism did not differ across the two experimental conditions. Important for our predictions, the stressor condition by childhood resources interaction remained significant even when we included current resource level and its interaction with stressor condition in the model ($F(1, 219) = 5.42$, $p = .021$, $\eta^2 = .03$).

*Mediated Moderation Analysis.* To test hypothesis 2, we conducted a mediated moderation analysis to examine whether people's perceptions of pessimism/optimism mediate the effect of childhood resources and environmental stressor condition on subjective life expectancy (figure 3c). A 10,000 bootstrapped samples test, using PROCESS Model 8 (Hayes 2013), revealed that the indirect effect of childhood resources on the age up to which people expected to live through perceptions of pessimism/optimism was significant and did not include zero in the environmental stressor condition (effect $= .87$, 95% CI [.20, 1.74]), but not in the control condition (effect $= .01$, 95% CI [–.42, .47]). This indicates that the effect of childhood resources and environmental stressor on subjective life expectancy is statistically mediated by people's perceived pessimism/optimism.

## Discussion

Study 3 once again showed that the combination of childhood resources and current environmental stressors predicts subjective life expectancy. People who grew up poorer expected to live fewer years compared to those who grew up richer in the presence of a current environmental stressor. Moreover, we found that poorer childhoods were associated with a more pessimistic outlook, which emerged in response to an environmental stressor. Because of this tendency, people from poorer childhood backgrounds expected to have shorter lives than those from richer backgrounds. Supporting hypothesis 2, this study showed that

pessimism/optimism is an important psychological construct mediating the effect of childhood resources and current environmental stressors on people's subjective life expectations.

## STUDY 4: DESIRE FOR LONG-TERM CARE INSURANCE

Having established the joint impact of childhood resources and current environmental stressors on subjective life expectancy, we sought in study 4 to examine whether this joint effect would influence consumer decision-making related to long-term care. Annual spending on long-term care in the U.S. is over $300 billion, representing nearly 10% of all health care spending (Reaves and Musumeci 2015). Therefore, understanding factors that influence people's desire for long-term care insurance is an important question for consumer researchers.

Long-term care includes a variety of services that individuals may need to meet their health or personal needs over a long period of time. Most long-term care does not include medical care, but rather help with basic activities of daily living such as bathing, dressing, and eating. Because declines in cognitive and motor skills influence these activities, individuals who survive to older ages are more likely to need assistance (Somers 1982). Estimates suggest that 70% of the population aged 65 or over will need long-term care at some point for an average duration of three years (Doty and Shipley 2012).

Our model proposes that people from poorer backgrounds expect to live a shorter life in stressful conditions compared to those from richer backgrounds. We therefore predict that individuals from poorer backgrounds should be relatively less interested in getting long-term care insurance (hypothesis 3). In addition, we predict that consumers' desire to get long-term care insurance should depend on the number of years they expect to live, whereby subjective life expectancy should mediate the effect on long-term care insurance (hypothesis 4).

## Method

*Participants and Study Design.* Three hundred sixty-four respondents (57.4% female; $M_{age} = 40.8$, SD $= 13.86$) from MTurk participated for a small payment. Because the primary goal of this study was to examine desire for long-term care insurance, we excluded participants who already had long-term care insurance prior to analyses ($N = 37$). Thus, our final sample comprised 327 respondents.

The study had two between-subjects conditions: environmental stressor and control. Procedure and materials in the two conditions were identical to those used in study 3. We measured childhood resources ($M = 4.92$, SD $= 1.38$), current resources ($M = 3.55$, SD $= 1.76$), and subjective

**FIGURE 4**

(A) EFFECT OF CHILDHOOD RESOURCES AND ENVIRONMENTAL STRESSOR CONDITION ON SUBJECTIVE LIFE EXPECTANCY (STUDY 4). (B) EFFECT OF CHILDHOOD RESOURCES AND ENVIRONMENTAL STRESSOR CONDITION ON DESIRE FOR LONG-TERM CARE INSURANCE (STUDY 4). (C) MEDIATED MODERATION MODEL SHOWING THAT THE EFFECT OF CHILDHOOD RESOURCES AND ENVIRONMENTAL STRESS ON THE DESIRE FOR LONG-TERM INSURANCE IS MEDIATED BY SUBJECTIVE LIFE EXPECTANCY (STUDY 4)
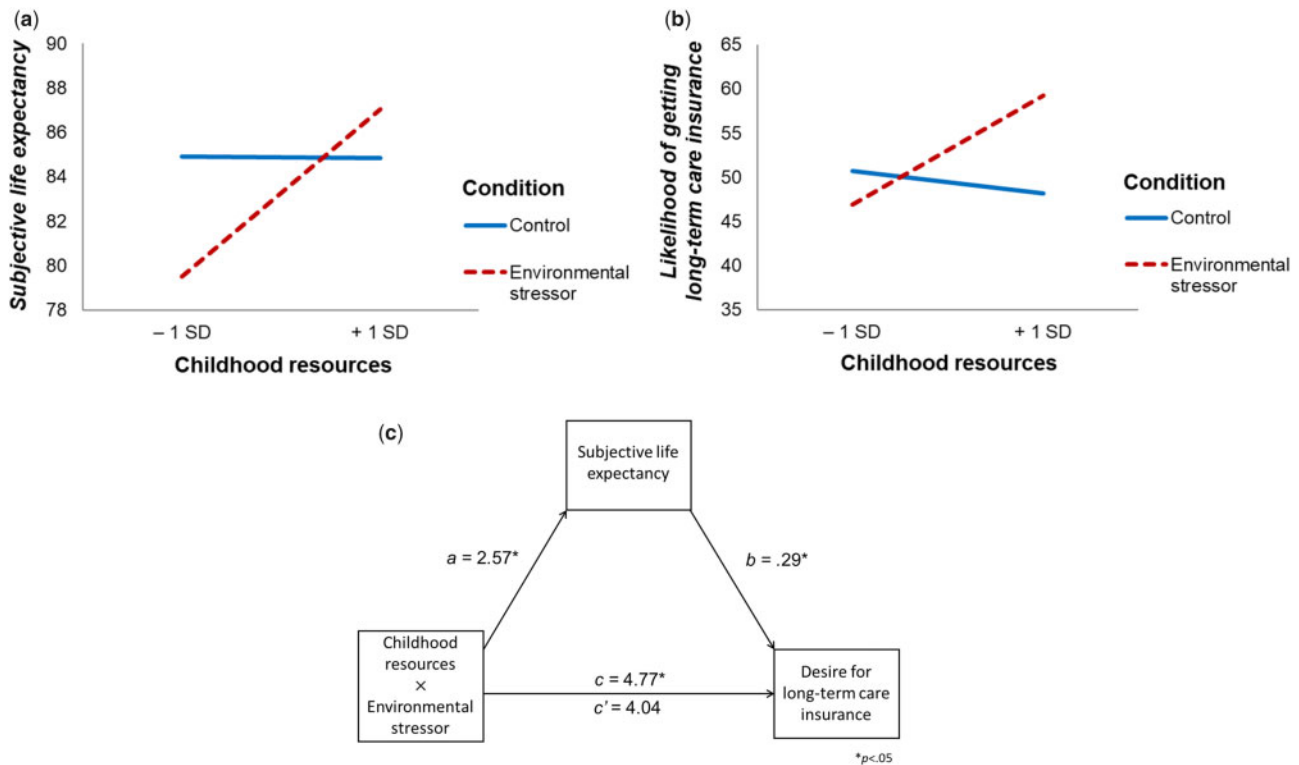


life expectancy using the same items as in the previous studies. Responses for subjective life expectancy were recorded on a scale ranging from 0 to 110 years ($M = 84.04$ years, SD = 13.85). We also assessed people's health status using the same two items as in study 2, averaged for analyses ($r = .59, p < .001$).

After the experimental manipulation, participants were told that the next part of the survey included questions about consumer preferences and perceptions. This part included measures of desire for long-term care insurance and subjective life expectancy with their order of presentation counterbalanced. The order of presentation did not affect participants' subjective life expectancy or their desire for long-term care (all $ps > .40$).

*Desire for Long-Term Care Insurance.* Participants first saw a brief 143-word description about the basics of long-term care insurance commonly included in consumer messages (see web appendix for details). The goal of presenting this information was to make sure that the participants knew what long-term care insurance was. After

reading the description, participants indicated their desire for long-term care insurance by answering: "How likely are you to consider getting long-term care insurance for yourself at some point?" Responses were recorded on a slider scale ranging from 0 to 100. The mean response was 51.1 (SD = 29.55). As expected, we found people's desire for long-term care insurance to be associated with their subjective life expectancy ($r = .15, p = .008$). This means that the longer one expected to live, the more one wished to get long-term care insurance.

## Results

*Subjective Life Expectancy.* Consistent with our predictions and results of studies 1–3, results revealed a significant condition by childhood resources interaction ($F(1, 323) = 5.47, p = .020, \eta^2 = .02$). There was no relation between childhood resources and the age people expect to live to in the control condition ($b = .21$, SE = .77, $t(323) = .27, p = .79$; figure 4a). However, in the environmental

stressor condition, people from poorer backgrounds expected to live a significantly fewer number of years ($b = 2.78$, SE $= .78$, $t(323) = 3.55$, $p < .001$), supporting hypothesis 1 and consistent with our prior studies (see web appendix for detailed results).

*Desire for Long-Term Care Insurance.* Results revealed a significant environmental stressor by childhood resources interaction on desire for long-term care insurance ($F(1, 323) = 4.05$, $p = .045$, $\eta^2 = .01$). This effect remained significant even after we controlled for participant gender, age, and current health ($F(1, 320) = 7.10$, $p = .008$, $\eta^2 = .02$).

To further test hypothesis 3, we next examined the relation between childhood resources and desire for long-term care insurance in the two experimental conditions. As figure 4b shows, in the control condition, there was no relation between childhood resources and desire for long-term care insurance ($b = -.82$, SE $= 1.66$, $t(323) = -.49$, $p = .62$). However, in the environmental stressor condition, people from poorer backgrounds indicated a significantly lower likelihood of getting long-term care insurance ($b = 3.95$, SE $= 1.69$, $t(323) = 2.34$, $p = .020$). There was no main effect of childhood resources or of environmental stressor condition on desire for long-term care insurance ($p > .15$).

We next added current resources and stressor condition by current resources interaction terms in our model. Results showed a significant main effect of current resources on the desire for long-term care insurance such that those with more current resources indicated a higher likelihood of getting long-term care insurance ($F(1, 318) = 4.54$, $p = .034$, $\eta^2 = .01$). However, the stressor condition by current resources interaction was not significant ($p > .17$). Importantly, the environmental stressor condition by childhood resources interaction remained significant despite our inclusion of current resource level and its interaction with condition in the model ($F(1, 318) = 9.50$, $p = .002$, $\eta^2 = .03$).

*Mediated Moderation Analysis.* To test hypothesis 4, we conducted a mediated moderation analysis using PROCESS Model 8 to examine whether people's subjective life expectancy statistically mediates the effect of childhood resources and environmental stressor condition on their desire for long-term care insurance (figure 4c). A 10,000 bootstrapped samples test revealed that the indirect effect of childhood resources on the likelihood of getting long-term care insurance via subjective life expectancy was significant in the current environmental stressor condition (effect $= .79$, 95% CI [.08, 1.83]), but not in the control condition (effect $= .06$, 95% CI [–.43, .50]). This means that the effect of childhood resources and environmental stressor on desire for long-term care is statistically mediated by people's subjective life expectancy.

## Discussion

Study 4 examined a consumer-relevant consequence of our key effect by examining how stressor-induced changes in subjective life expectancy influenced people's desire for long-term care insurance. Consistent with hypothesis 3, we find that in response to an environmental stressor, individuals from poorer backgrounds indicated a lower desire for long-term care insurance compared to those from richer backgrounds. Importantly, this effect was mediated by subjective life expectancy. Supporting hypothesis 4, this means that people from poorer backgrounds had lower desire for long-term care insurance under stressful conditions because they expected to have shorter lives.

## STUDY 5: RETIREMENT ALLOCATION

Study 5 sought to extend our results by examining the influence of subjective life expectations on a different consumer outcome: retirement allocation. Surveys of older individuals find that perceptions of longevity are associated with intended retirement age and desire to work after retirement (Griffin et al. 2012; Khan, Rutledge, and Wu 2014). We aimed to test whether subjective life expectancy directly affects people's decision-making process pertaining to retirement planning in the laboratory. As stated in hypothesis 3, we predict that in response to an environmental stressor, people from poorer backgrounds will allocate less toward their retirement savings compared to people from richer backgrounds. We do not expect retirement allocation to differ among people from different childhood environments in the control condition. Further, as stated in hypothesis 4, we expect differences in retirement allocations to be mediated by differences in subjective life expectancy.

## Method

*Participants and Study Design.* Three hundred thirty-three students (52.0% female; $M_{age} = 20.5$, SD $= 1.04$) at a large North American university participated in exchange for course credit. Participants arrived in small groups and were randomly assigned either to the environmental stressor condition or to the control condition. The same control and financial stressor manipulations as in study 2 were used. We measured childhood resources ($M = 6.26$, SD $= 0.79$), current resources ($M = 4.29$, SD $= 1.64$), and subjective life expectancy ($M = 87.6$, SD $= 8.18$) using the same items as in the previous studies.

*Retirement Allocation.* We assessed participants' desired retirement allocation using a task borrowed from past research (Dholakia et al. 2016; Hershfield et al. 2011). Participants were asked to indicate the amount of money they wished to allocate toward their retirement savings from each paycheck (see web appendix for details). The

**FIGURE 5**

(A) EFFECT OF CHILDHOOD RESOURCES AND ENVIRONMENTAL STRESSOR CONDITION ON SUBJECTIVE LIFE EXPECTANCY (STUDY 5). (B) EFFECT OF CHILDHOOD RESOURCES AND ENVIRONMENTAL STRESSOR CONDITION ON RETIREMENT ALLOCATION (STUDY 5). (C) MEDIATED MODERATION MODEL SHOWING THAT THE EFFECT OF CHILDHOOD RESOURCES AND A CURRENT ENVIRONMENTAL STRESSOR ON RETIREMENT ALLOCATION IS MEDIATED BY SUBJECTIVE LIFE EXPECTANCY (STUDY 5)
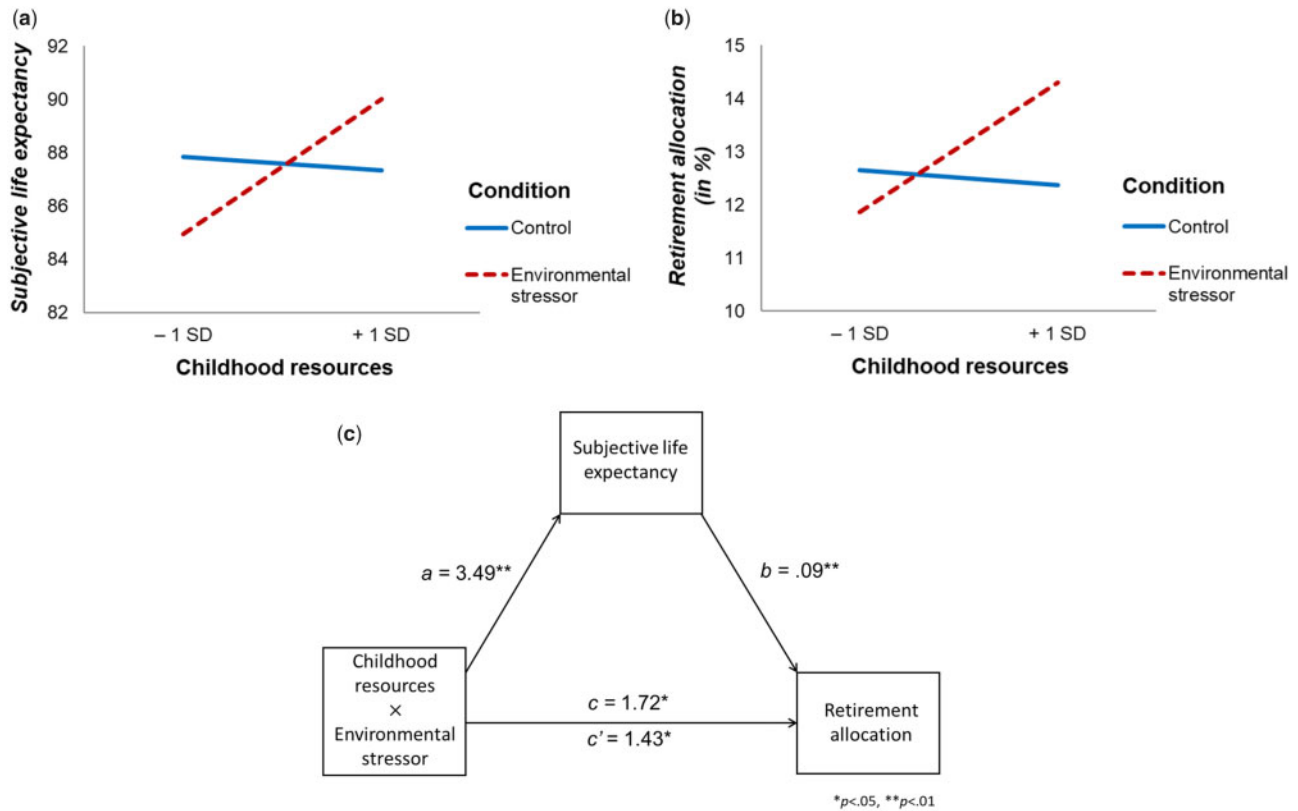


responses were recorded on a slider scale that ranged from 0 to 20%. The mean allocation was 12.8% (SD = 4.86).

*Financial Knowledge.* We also assessed people's knowledge about retirement planning, as it may influence their allocation decisions (Hilgert, Hogarth, and Beverly 2003; Lusardi and Mitchelli 2007). All participants answered two questions: "How knowledgeable would you say you are about retirement planning?" (1 = no knowledge at all; 7 = a lot of knowledge) and "How much do you know about retirement planning in general?" (1 = not at all; 7 = a lot). Responses to the two questions were strongly correlated ($r = .74$, $p < .001$) and the items were combined for subsequent analyses. Financial knowledge was positively associated with retirement allocation such that those with greater knowledge allocated a greater proportion toward retirement savings ($r = .11$, $p = .046$). However, financial knowledge was not associated with either childhood or current resources (all $ps > .56$).

## Results

*Subjective Life Expectancy.* Consistent with our predictions, results revealed a significant condition by childhood resources interaction ($F(1, 329) = 9.46$, $p = .002$, $\eta^2 = .03$). As shown in figure 5a, in the control condition, there was no relation between childhood resources and the age people expect to live to ($b = -.31$, SE = .72, $t(329) = -.43$, $p = .67$). However, in the environmental stressor condition, people from poorer backgrounds expected to live significantly fewer years ($b = 3.18$, SE = .88, $t(329) = 3.62$, $p < .001$), supporting hypothesis 1 (see web appendix for detailed results).

*Retirement Allocation.* As predicted, results revealed a significant environmental stressor by childhood resources interaction ($F(1, 329) = 6.46$, $p = .011$, $\eta^2 = .02$). This effect remained significant even after we controlled for participant gender, age, and financial knowledge ($F(1, 326) = 6.65$, $p = .010$, $\eta^2 = .02$). To further illuminate this

interaction, we next examined the relation between childhood resources and desired retirement allocation in the two experimental conditions. As shown in figure 5b, in the control condition, there was no relation between childhood resources and retirement allocation ($b = -.19$, SE $= .43$, $t(329) = -.43$, $p = .67$). However, in the environmental stressor condition, people from poorer backgrounds allocated a significantly lower percentage of their income toward retirement ($b = 1.53$, SE $= .52$, $t(329) = 2.94$, $p = .004$). We found no main effects of either stressor condition or childhood resources on retirement allocation (all $p$s $> .13$).

Finally, results showed no significant effect of either current resources or stressor condition by current resources interaction ($p$s $> .41$). Importantly, the environmental stressor condition by childhood resources interaction remained significant despite the inclusion of current resource level and its interaction with condition in the model ($F(1, 324) = 3.95$, $p = .048$, $\eta^2 = .01$).

*Mediated Moderation Analysis.* We next conducted a mediated moderation analysis using PROCESS Model 8 with the stressor condition as the independent variable, childhood resources as the moderator, subjective life expectancy as the mediator, and retirement allocation as the dependent variable (figure 5c). Supporting hypothesis 4, a 10,000 bootstrapped samples test revealed a significant indirect effect of childhood resources on retirement savings allocation via subjective life expectancy in the environmental stressor condition (effect $= .26$, 95% CI [.05, .55]), but not in the control condition (effect $= -.03$, 95% CI [−.23, .17]). This indicates that the effect of childhood resources and a current environmental stressor on retirement allocation is statistically mediated by people's subjective life expectancy.

## Discussion

Study 5 showed that childhood resources and a current environmental stressor jointly affect people's desired allocation toward their retirement. Results indicate that in response to an environmental stressor, people from poorer childhood environments allocated a smaller proportion of their income toward retirement compared to people from richer environments. Moreover, study 5 provided evidence that this effect was statistically mediated by subjective life expectancy. This means that a reason why people from poorer backgrounds allocated a smaller proportion toward their retirement under conditions of current stress was because they expected to have a relatively shorter lifespan compared to people from richer backgrounds.

To further explore the influence of our key variables on retirement planning, we also examined how childhood resources, environmental stress, and subjective life

expectancy affected people's motivation for retirement in a separate study (see study 7 in the web appendix).

## STUDY 6: PREFERENCE FOR LONG-TERM BONDS

Study 6 examined the influence of childhood resources, environmental stress, and subjective life expectancy on a financial choice with real consequences. Specifically, we tested people's choice among different bond options that vary in their payout amounts and maturity periods (e.g., \$150 in 45 years vs. \$900 in 75 years). The context of bonds enabled us to make the task incentive-compatible such that we could offer a group of participants the chance of receiving actual financial payouts.

Although long-term bonds typically have higher yields, they also come with greater mortality risk (Hurd 1989). That is, investors in long-term bonds have a higher probability of dying before the bond's maturity date. Thus, bonds with longer maturity periods should be relatively less attractive to people who expect to have shorter lives. Our model proposes that people from poorer backgrounds expect to have shorter lives under stressful conditions compared to those from richer backgrounds. Therefore, we predict that people from poorer backgrounds will be less likely to prefer bonds with longer maturity periods compared to people from richer backgrounds in response to environmental stressors (hypothesis 3). We further predict that this effect will be mediated by people's subjective life expectancy, as stated in hypothesis 4. Study 6 tested for these possibilities.

## Method

*Participants and Study Design.* One hundred forty-four students (47.9% female; $M_{age} = 21.0$, SD $= 1.28$) participated for course credit at a large North American university. Participants came to the lab in small groups for a research session on consumer decision-making. Participants were told that the study had questions related to consumer feedback and preferences. After providing consent, participants were assigned to one of two between-subjects conditions: environmental stressor condition or a control condition. Environmental stress was manipulated with a writing task similar to the one used in the general stressor condition in study 2. To provide additional evidence that our effects are not limited to financial stressors, we modified the instructions slightly to make sure that the stressors participants wrote about were not financial in nature. Specifically, we instructed participants in the general stressor condition to write about three "non-financial indicators that suggest that the world is becoming more threatening and that our lives are becoming more unpredictable." The writing task in the control condition was identical to the one used in study 1. Following the writing task,

participants responded to the bond choice question and their subjective life expectancy. The order of responses was counterbalanced and did not affect the choice of bond or subjective life expectancy (all $ps > .18$). We measured childhood resources ($M = 6.13$, SD = .82), current resources ($M = 4.45$, SD = 1.57), and subjective life expectancy ($M = 87.6$ years; SD = 9.23) using the same items as in the previous studies.

*Bond Choice.* Participants were told that the researchers were interested in how people valued bonds. To make sure participants understood how bonds work, we first provided a brief description: "When people buy a bond, they pay money today to receive a larger amount of money at a specified date in the future. For example, you might pay $50 today for a bond that will pay you $200 in 30 years. Bonds are like long-term investments. But if your bond pays out after you die, then you end up with nothing." We customized some of the specific bond features to specifically map onto our predictions while still allowing decisions to be incentive-compatible. Participants were next presented with seven different bond options that varied in their final payouts and maturity periods (1 = "$150 bond that matures after 45 years," 2 = "$275 bond that matures after 50 years," 3 = "$400 bond that matures after 55 years," 4 = "$525 bond that matures after 60 years," 5 = "$650 bond that matures after 65 years," 6 = "$775 bond that matures after 70 years,' 7 = "$900 bond that matures after 75 years"). We made it clear that the bond amounts represent the value of the bond at maturity. All participants were then asked to choose the bond option they preferred. The options were designed such that bonds maturing later had a higher yield compared to the ones maturing sooner, which is typical in bond markets. Participants' choice served as our dependent measure ($M = 3.39$, SD = 1.60).

To make the task as realistic as possible, we told participants that at least 5% of them would actually receive the bond option they chose. Thus, participants made their decisions knowing that their choice had real consequences. Keeping in mind the logistical challenges of waiting until the end of the maturity of the long-term bonds before paying participants, we made final payouts by giving participants the net present value of their chosen option according to calculations described in the web appendix, although participants were unaware of this at the time of their decision. The possible present values of the seven bond options presented ranged from $62 to $204. Eight participants were subsequently chosen at random for payouts. The average payout per participant was $133.50.

## Results

*Subjective Life Expectancy.* Consistent with our predictions and findings from previous studies, results revealed a significant condition by childhood resources interaction ($F(1, 140) = 7.83$, $p = .006$, $\eta^2 = .05$). As seen in figure 6a, in the control condition, there was no relation between childhood resources and the age people expect to live to ($b = -.75$, SE = 1.29, $t(140) = -.58$, $p = .56$). However, in the environmental stressor condition, people from poorer backgrounds expected to live significantly fewer years ($b = 4.39$, SE = 1.31, $t(140) = 3.35$, $p = .001$), supporting hypothesis 1 (see web appendix for detailed results).

*Bond Choice.* As predicted, results revealed a significant environmental stressor by childhood resources interaction ($F(1, 140) = 7.13$, $p = .008$, $\eta^2 = .05$). This effect remained significant even after we controlled for participant gender and age ($F(1, 138) = 5.93$, $p = .016$, $\eta^2 = .04$). To further test hypothesis 3, we next examined the relation between childhood resources and bond choice in the two experimental conditions. As shown in figure 6b, in the control condition, there was no relation between childhood resources and bond choice ($b = -.19$, SE = .22, $t(140) = -.84$, $p = .40$). However, in the environmental stressor condition, people from poorer backgrounds were significantly less likely to choose bonds with longer maturity periods ($b = .66$, SE = .23, $t(140) = 2.92$, $p = .004$). We found no main effects of either stressor condition or childhood resources on bond choice (all $ps > .10$).

Further, results showed no significant effect of either current resources or stressor condition by current resources interaction ($ps > .11$). Importantly, the environmental stressor condition by childhood resources interaction remained significant even when we included current resource level and its interaction with condition in the model ($F(1, 138) = 4.48$, $p = .036$, $\eta^2 = .03$).

*Mediated Moderation Analysis.* Findings showed that bond choice was associated with subjective life expectancy ($r = .29$, $p < .001$), suggesting that the longer one expected to live, the more likely one was to choose a higher payout bond with a longer maturity period. To formally test hypothesis 4, we conducted a mediated moderation analysis using PROCESS Model 8 to examine whether people's subjective life expectancy statistically mediates the effect of childhood resources and environmental stressor condition on their choice of bond (figure 6c). A 10,000 bootstrapped samples test showed support for a significant indirect effect of childhood resources on bond choice via subjective life expectancy in the environmental stressor condition (effect = .19, 95% CI [.04, .44]), but not in the control condition (effect = −.03, 95% CI [−.18, .06]). This indicates that the effect of childhood resources and a current environmental stressor on choice of bond was statistically mediated by people's subjective life expectancy.

FIGURE 6

(A) EFFECT OF CHILDHOOD RESOURCES AND ENVIRONMENTAL STRESSOR CONDITION ON SUBJECTIVE LIFE EXPECTANCY (STUDY 6). (B) EFFECT OF CHILDHOOD RESOURCES AND ENVIRONMENTAL STRESSOR CONDITION ON BOND CHOICE (STUDY 6). LOWER VALUES ON THE Y-AXIS REPRESENT PREFERENCE FOR LOWER PAYING BONDS THAT MATURE SOONER. (C) MEDIATED MODERATION MODEL SHOWING THAT THE EFFECT OF CHILDHOOD RESOURCES AND A CURRENT ENVIRONMENTAL STRESSOR ON THE CHOICE OF BOND IS MEDIATED BY SUBJECTIVE LIFE EXPECTANCY (STUDY 6)
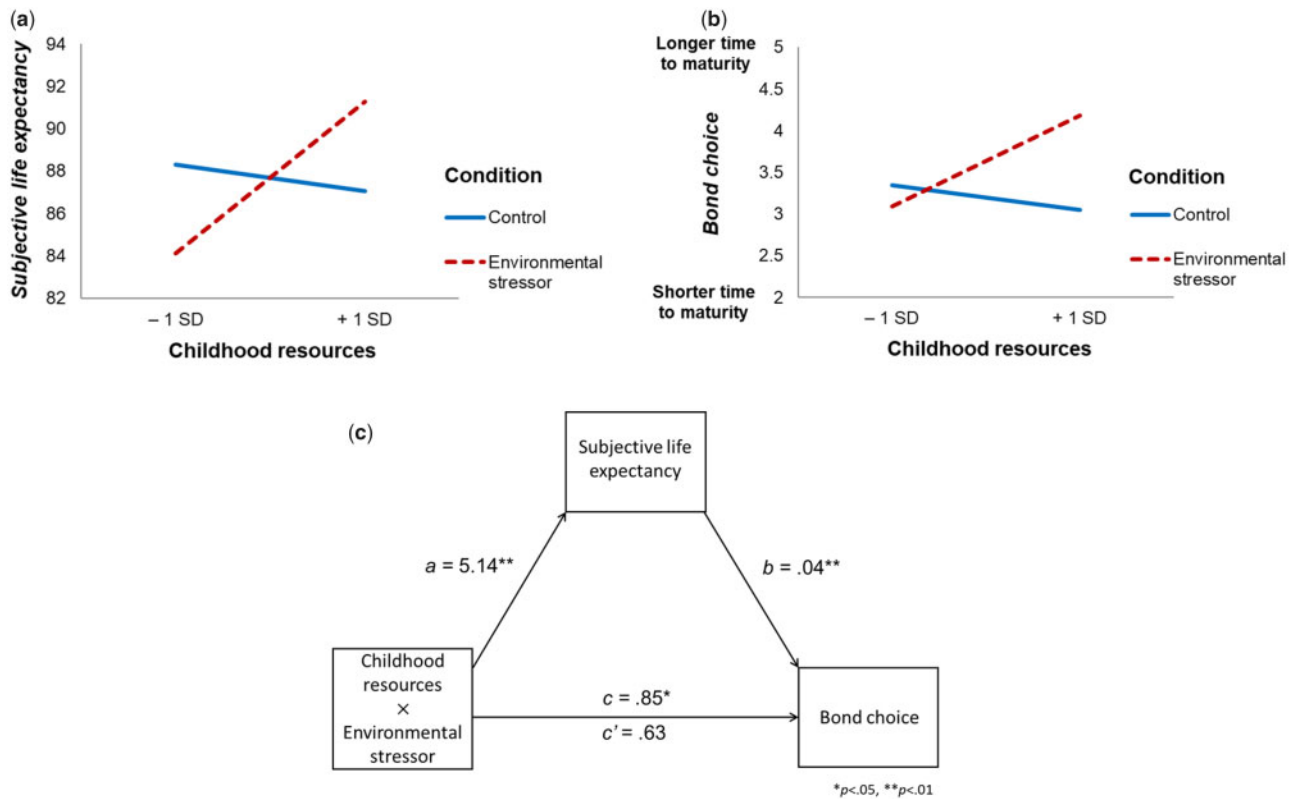


## Discussion

Results from study 6 once again showed that childhood resources and current stress jointly influence people's subjective life expectancy. In addition, study 6 identified and tested for the influence of subjective life expectancy on a consequential consumer-related phenomenon. Our findings showed that under stressful situations, people from poorer backgrounds preferred bonds with shorter maturity periods (for example, bond maturing in 30 years vs. in 50 years) compared to those from richer backgrounds. Mediational evidence suggested that bond choice was driven by people from poorer backgrounds expecting to have shorter lives in response to environmental stressors.

## GENERAL DISCUSSION

The age to which one expects to live likely influences consumer behavior in a variety of consumption contexts.

Yet we know little about the factors that influence people's subjective life expectations and the consequences of such judgments for consumer decisions. In this research, we provide evidence that people's subjective life expectancy is shaped by the *combination* of their childhood and their current environments. Through a series of experiments, our results show that people who grew up with fewer resources had lower subjective life expectancy compared to people who grew up with more resources in the presence of a current environmental stressor. Further, we demonstrated important downstream consequences of this key effect by showing that when the current environment is stressful, people from poorer backgrounds were less interested in long-term care insurance, allocated less money toward their retirement, and preferred bonds with shorter maturity periods because they expect to have relatively shorter life-spans. These results suggest that beliefs about the length of their lifespan may be an important element preventing people from poorer backgrounds from making better long-term

decisions such as saving enough for their future. Overall, the present work shows how, why, and under what circumstances subjective life expectancy influences consumer behavior.

## Contributions and Implications

This work makes several contributions to the consumer behavior literature. First, whereas prior work has mostly examined how childhood environment influences consumer behavior among children and adolescents (Chaplin and John 2010; John 1999; Moore and Moschis 1981; Richins and Chaplin 2015; Ward 1974), we show that one's childhood environment can have long-lasting effects on consumer behavior. Our findings indicate that growing up with fewer versus more resources shapes judgments and decisions much later in life. Furthermore, we find that these judgments and decisions in adulthood can be more strongly influenced by people's childhood resource levels than their current wealth. This suggests that the effects of childhood environments may be etched into our adult psychology, continuing to influence adult consumer decision-making regardless of one's socioeconomic situation later in life. These findings contribute to a growing literature on how early-life environment influences consumer behavior (Connell, Brucks, and Nielsen 2014; Laran and Salerno 2013; Mittal and Griskevicius 2016; VanBergen and Laran 2016; Whelan and Hingston 2018).

Second, the current studies are among the first to show that childhood resources and environmental stressors influence consumers' judgments about their lifespan. Subjective life expectations play a pivotal role in influencing consumer behavior and decision-making (Browning and Crossley 2001; Hamermesh 1985), but we know little about the origins of these judgments. Our findings show that childhood experiences can shape how individuals perceive their lifespan, leading people from different backgrounds to have different longevity expectations under certain conditions. In addition to documenting this novel effect, we also establish pessimism/optimism as a mediator of this effect. Results shows that a reason why people from poorer backgrounds have lower subjective life expectancy in response to environmental stressors is because they have more pessimistic beliefs about themselves. These findings extend prior work on how early-life experiences influence behavioral responses in adulthood (Mittal and Griskevicius 2014) by establishing the importance of subjective life expectancy differences in determined important consumer outcomes.

Third, this research highlights the importance of subjective life expectancy in consumer behavior literature and documents various decisions and behaviors it impacts. For example, we find that subjective life expectancy influences people's desire to get long-term care insurance, the amount they wish to allocate toward retirement, and the extent to which they prefer long-term bonds. These findings implicate subjective life expectancy as an important factor for consumer researchers to consider, and we hope that future research will uncover more ways in which it affects consumer behavior and decision-making.

Fourth, we consistently found that the effect of childhood resources on subjective life expectancy and consumer outcomes emerged most strongly in response to environmental stressors. This not only suggests that situational contexts influence longevity judgments, but also highlights that current stressors may be an important trigger leading to individual differences based on early-life experiences. Our findings are consistent with biological research showing that resource availability during early life shapes the development of stress response systems, whereby adults respond to the same threats differently depending on their early-life environments (Del Giudice et al. 2011; McEwen 2012; Taylor 2010; Taylor et al. 2004). We believe this is especially useful for researchers and policy makers interested in understanding the mechanisms through which early-life factors continue to influence outcomes much later in life, often creating wide gaps between people from poorer and richer environments (Brooks-Gunn and Duncan 1997; Heckman 2006; Marmot 2015).

Finally, our findings add to the literature by showing that even nonfinancial stressors experienced later in life can lead to childhood-based differences among people. Past literature finds that financial threats and uncertainty lead people from different childhood environments to diverge in their psychological and behavioral responses (Griskevicius et al. 2013; Mittal and Griskevicius 2016). We find that even general stressors, which extend beyond the context of finances, can have similar effects. These findings suggest that childhood-based effects may surface in response to a variety of environmental stressors beyond just financial ones.

## Limitations and Avenues for Future Research

The current research revealed that environmental stressors influence subjective life expectations differently depending on people's level of childhood resources. We further demonstrated optimism/pessimism as an underlying mechanism of this effect (study 3) and examined three different consumer outcomes directly impacted by subjective life expectations. There may well be other processes that could affect our results as well as other outcomes that would be affected, all of which could be further examined in future studies, including those conducted in the field. Beyond these clear limitations, there remain additional questions that probe deeper into the core independent variables of our research—current environmental stressors and childhood resources. In this section we discuss key limitations of our current treatment of these constructs and highlight fruitful avenues for future research.

Across multiple studies, we find that a current stressor has a different effect depending on one's childhood resources, and as a result, it might be important to fully understand exactly what resources matter most. As detailed earlier, childhood resources include both monetary and nonmonetary resources, such as money, clothing, food, time, and attention available during early life, and our measure likewise included both types of resources (Rindfleisch et al. 1997). Although we found that the measure had high internal consistency ($\alpha = .91$), we also analyzed each study by separating tangible resources (money, food, and clothing) and intangible resources (discipline, time and attention, life skills and instruction, emotional support and love, role modeling and guidance). As seen in the web appendix, findings generally showed that both subdimensions produced a similar pattern of findings. However, the intangible resources subdimension seems to produce a slightly stronger pattern of findings. Future research is needed to examine more carefully exactly what underlying aspects of the childhood environment this measure is capturing. For example, past work suggests that experiencing unpredictability in one's childhood environment may be particularly important in shaping future cognition (Mittal et al. 2015; Young et al. 2018). We suspect that childhood resources are likely related to the stability and predictability of one's childhood environment. We also want to note that very few of our participants come from abject poverty. The means on the measure of childhood resources are high across all studies, indicating a relatively high level of childhood resources on average. It is possible that if our samples included a higher number of participants from the lower end of this scale, the results may have been different. For example, we may have detected differences in subjective life expectancy as a function of childhood environment in the *control* condition when comparing individuals from very wealthy versus poverty-stricken childhoods. Future research could delve deeper into these questions.

As related to environmental stressors, our conceptualization herein is based on research in evolutionary biology (extrinsic risk), which broadly describes them as largely uncontrollable and threatening events in one's current environment (Chisholm et al. 1993; Schulte 2014). Consistent with our definition of environmental stressors, our operationalizations constituted largely uncontrollable stressors and emphasized their threatening nature. In the present studies, we found that the pattern was similar for both financial and more general environmental stressors, as shown in study 2. Although we believe that any type of environmental stressor that produces a sense of uncertainty, worry, and anxiety is likely to produce a similar pattern of findings, future research is needed to ascertain whether different types of environmental stressors (e.g., relationship stress) would lead to qualitatively or quantitatively different results than those we present here. Moreover, although research suggests that the different components of stress

such as uncertainty and anxiety may not be mutually exclusive (McEwen 2006; Peters, McEwen, and Friston 2017), it is possible that one of them is implicated to a greater extent in generating childhood-based effects. Future research is poised to explore this further.

Future research is also required to produce a richer understanding of exactly how childhood environment and current environment work together to jointly influence outcomes.

One possibility is that adults from high-stress versus low-stress childhood environments experience the same environmental stressor in adulthood in different ways. In our pretests (see studies 1 and 2), we found that people from wealthier versus poorer childhoods did not differ significantly in the amount of post-stressor anxiety, stress, worry, or uncertainty. However, it is possible that these self-report measures are not sensitive enough to detect important differences. Future research is needed using more precise techniques, such as physiological measures of stress (e.g., galvanic skin response), to examine how people from different backgrounds are coping with environmental stressors.

Finally, research is needed to explore whether the effects in the studies are driven by cognitive or affective components of stress. Past research shows that the underlying biology of stress responses implicates a cascade of brain regions and processes, including the hypothalamic pituitary adrenal axis, the limbic system, the hypothalamus, the amygdala, and the prefrontal cortex (Arnsten 2009; McEwen and Gianaros 2010). These findings suggest that there are likely many components to a stress response. Given the current state of scientific methodologies available to examine these kinds of questions, it is challenging to tease apart the independent effects of specific cognitive and affective aspects of stress (Lovallo and Buchanan 2016). Nonetheless, as more sophisticated devices and methods are developed, future research is poised to investigate this rich question.

## Conclusion

Growing up with limited resources not only influences childhood development but can also have long-lasting effects on consumer judgments, decisions, and behaviors. Our results show that childhood environments affect people's subjective life expectancy, which then influences their decision-making in adulthood. This suggests not only that early-life influences are an important consideration for a well-rounded understanding of consumer decisions, but also that interventions during formative years may prove beneficial at improving decision-making among those who are at risk. Moreover, given that one reason why people growing up poor do not save enough for retirement is that stressful situations lead them to perceive a shorter life expectancy, trying to change their longevity expectations

may increase their desired retirement allocation. In conclusion, the present work provides various policy implications and avenues for future research on how childhood environments influence consumer judgment and decision-making later in life.

## DATA COLLECTION INFORMATION

All the studies were programed using Qualtrics. Data collection for all the lab studies was managed by the first author with help from research assistants blind to the research questions at Texas A&M University. All data were collected between fall 2016 and fall 2019. The first author did the majority of data analyses with input from the second author. Data were discussed on multiple occasions by all authors.

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