The Big, Predictable Picture:

Construal-Level Reflects Underlying Life History Strategy

by

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ABSTRACT

Integrating research from life history theory with investigations of construal-level theory, the researcher proposes a novel relationship between life history strategy and construal-level. Slow life history strategies arise in safe, predictable environments where individuals give up current reproductive effort in favor of future reproductive effort. Correspondingly, high-level construals allow individuals to transcend the current context and act according to global concerns, such as the type of future planning necessary to enact slow life history strategies. Meanwhile, fast life history strategies arise in harsh, unpredictable environments where the future is uncertain and individuals need to pay close attention to the current context to survive. Correspondingly, low-level construals immerse individuals in the immediate situation, enabling them the flexibility needed to respond to local concerns.

Given the correspondence between aspects of life history and construal-level, it seems possible that individuals adopting slow life history strategies should more frequently use high-level construals to assist in transcending the current situation to plan for the future, while individuals adopting fast life history strategies should more frequently use low-level construals to assist in monitoring the details of their harsh, unpredictable environment. To test the relationship between life history and construal, the researcher investigated whether or not a childhood cue of environmental harshness and unpredictability, childhood SES, and a current cue of environmental harshness and unpredictability, local mortality rate, influenced construal-level. In line with past research, the researcher

predicted that childhood SES would interact with current cues of local mortality rate to influence construal-level. For individuals growing up in high SES households, a high local mortality rate will lead to an increase in high-level construals. For individuals growing up in low SES households, a high local mortality rate will lead to an increase in low-level construals. Overall, results did not support the hypotheses. Childhood SES did not interact with prime condition to influence either categorization or trend predictions. Examining how the prime interacted with another measure of life history strategy, the Mini-K, yielded mixed results. However, there are several ways in which the current study could be altered to reexamine the relationship between life history strategy and construal.

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“They cannot see the forest for the trees."

- Christoph Martin Wieland

Do you typically concentrate on the details of a situation or do you focus on the big picture? Following the logic of the above proverb, are you a tree person or a forest person? Questions such as these lay at the heart of construal-level theory, a social psychological theory that relates level of abstraction to psychological distance. Construal-level theory proposes that objects and events that are psychologically near are characterized by concrete, low-level construals while objects and events that are psychologically distant are characterized by abstract, high-level construals (Trope & Liberman, 2010). Importantly, construal-level theory has successfully accounted for variability in a range of cognitions and behaviors, from differences in basic cognitive processes like categorization and attribution style to complex behaviors such as predicting the stock market and negotiation tactics (Liberman, Sristano, & Trope, 2002; Ledgerwood, Trope, & Chaiken, 2010; Wakslak & Trope, 2009; Henderson & Trope, 2009). In each instance, situational cues of psychological distance (e.g. cues of temporal or spatial distance) influence level of construal. For example, people use broader, more abstract categories to classify objects to take on a camping trip when the trip is described as occurring in 1 year, compared to a trip occurring in 1 day (Liberman et al., 2002). However, while it’s true construal-level theory has been quite useful for understanding the relationship between situational variability in psychological distance and construal-level, it is yet account for individual

differences in construal or demonstrate how situational differences, other than explicit manipulations of psychological distance, affect construal.

Integrating construal-level theory with biological principles from life history theory, the current investigation seeks to account for individual and situational variation in construal-level by linking construal to environmental cues, both from childhood and adulthood, which shape a person's life history strategy. From a life-history perspective, individuals adopt different strategies for allocating resources to growth, maintenance, and reproduction over course of their lives as a function of features of the local ecology (Figueredo et al., 2005). It is our assertion that construal-level is an adaptive psychological process that is linked to a person's life history strategy because differing levels of construal can help individuals navigate ecologies that vary in harshness and unpredictability.

Life History Theory

All organisms compete with one another to convert energy from material resources in the environment into reproductive effort. However, it is unlikely that a single best strategy for allocating resources has evolved (Gangestad & Simpson, 2000). Rather, the "best" allocation strategy likely varies as a function of the physical, economic, and social parameters of the ecology (Crawford & Anderson, 1989). Life history theory attempts to account for divergent resource allocation strategies by predicting how the allocation of material resources to growth, survival, and reproductive effort over the lifespan changes as a function of the local ecology (Figueredo et al., 2005).

A critical problem for every organism is how to navigate trade-offs in

resource allocation at any given point in time. Resources spent on growth cannot be spent attracting a mate and resources spent on parenting cannot be spent to maintain the body (e.g., on the immune system), etc. Gadgil and Bossert (1970) identify the energetic trade-off between growth and maintenance, termed *somatic effort,* and mate seeking and childcare, termed *reproductive effort,* as the fundamental problem shaping an organism's life history. Investment in somatic effort helps organisms outcompete others for mates and for resources for their children. However, investment in somatic effort necessarily delays investment in reproductive effort and an organism may not live long enough to transfer the benefits accrued from early somatic effort into later reproductive effort. How an organism balances the allocation of resources to somatic vs reproductive effort over time constitutes that organism's *life history strategy*.

Despite the astounding diversity of traits influenced by an organism's life history strategy, scientists have uncovered a single dimension that accounts for variance in life history traits across organisms. Age at sexual maturity, gestational length, litter size, offspring size, postnatal growth rate, birth spacing, weaning age, length of juvenile dependence, level of parental investment per child, adult body size, and longevity are each indicators of how and when an organism allocates its resources (Ellis, Figueredo, Brumbach, & Schlomer, 2009). Across the nearly 3,000 species for which detailed life history indicators are know, scientists have determined that organisms' life history strategies can be described along a single slow-fast continuum (Bielby et al., 2007). Organisms employing slow life history strategies invest heavily in somatic effort and delay reproduction,

whereas those with fast life history strategies invest heavily in current reproduction at the expense somatic effort. Generally, organisms with a slow life history strategy can be characterized by bigger size and longer life with fewer children and a larger parental investment per child, while those with a fast life history strategy can be characterized by smaller size and shorter life with many children and smaller parental investment per child (Figueredo et al., 2005).

Originally, life history strategies were thought of as being species-typical, with little variation in life history strategy within a species, (e.g., Lack, 1950). However, increasing evidence reveals this is not the case (e.g., Daan & Tinbergen, 1997; Tinbergen & Both, 1999). Instead, natural selection seems to have favored mechanisms of phenotypic plasticity that enable individuals, even individuals within the same species, to adjust their life history strategy to match local conditions (Belsky, Steinberg, & Draper, 1991; Chisholm, 1999).

According to Ellis et al. (2009) there are two fundamental environmental factors that influence an organism's life history strategy: harshness and unpredictability. Environmental harshness describes the physical strain on an organism caused by factors such as: local mortality rate, resource scarcity, pathogen prevalence, climate extremes, and predator threat. Environmental unpredictability describes unpredictable variance in aspects of environmental harshness. Together, harshness and unpredictability function to influence whether an organism adopts a slower or faster life history strategy. For example, when the environment is safe and predictable, organisms tend to adopt slow life history strategies, a shift toward having a few, high quality offspring that can outcompete

others in the environment for access to resources. Conversely, under conditions of harshness and unpredictability, organisms tend to adopt fast life history strategies. That is, organisms invest heavily in current reproduction at the expense of future reproduction because the future is uncertain and the organism may not live long enough to reap the reproductive advantages of investing in early growth and maintenance. Generally, organisms with a slow life history strategy come from stable environments with little environmental harshness, while organisms with a fast life history strategy come from unstable environs with high mortality and fluctuating resource availability (Firueredo et al., 2005).

For humans, three of the most important cues of environmental harshness and unpredictability are: mortality rate, socioeconomic status (SES), and family stability (Ellis et al., 2009). High mortality rate, which can indicate either high levels of violence or pathogen prevalence or both, low SES, which is related to higher levels of morbidity and mortality (e.g., Adler et al. 1993), and high family instability, such as parental conflict, absence of either parent, or increased residential mobility, each signal environmental harshness and unpredictability and push individuals toward faster life history strategies. Mounting evidence indicates that these cues have a strong influence on nearly every aspect of biological development. For example, all three cues have been linked to smaller adult body size, (Walker & Hamilton, 2008; Wilson & Daly, 1997), earlier sexual maturation (Ellis, McFadyen-Ketchum, Dodge, Pettit, & Bates, 1999, Ellis et al., 2003; Nettle, 2010; Tither & Ellis, 2008; Walker et al., 2006; Wilson and Daly, 1997) decreased parenting effort, (Belsky et al., 1991; Ellis et al. 1999; Draper &

Harpending 1988; Geary 2000; Nettle, 2010; Quinlan, 2007), and diminished overall health (Cohen, Doyle, Turner, Alper, & Skoner, 2004; Galobardes, Lynch, & Davey-Smith, 2004; Miller et al., 2009).

In addition to these biological outcomes, cues of harshness and unpredictability can also affect psychological processes and behaviors. For instance, increased environmental and family unpredictability are each associated with placing a greater value on immediate rewards and increased risk-taking (Hill, Jenkins, & Farmer, 2008; Hill, Ross, & Low, 1997). This makes sense because if the future is unpredictable and uncertain, it may be better to take risk than to conserve. In addition to risk-taking, another key psychological component of life history strategy is time perspective. Individuals naturally vary in the extent to which they think about the present vs the future, but researchers suggest that future discounting is a rational response to environmental uncertainty (Gardner, 1993; Wilson & Daly, 1997). Dunkel and Decker (2010) find support for this hypothesis as individuals with slower life history strategies have a more future oriented time perspective than those with faster life history strategies.

In the past, researchers have examined how chronic, individual differences in life history strategies are shaped by childhood experiences. However, recent experimental research has revealed that an individual's life history strategy can be altered by situational factors well into adulthood. In a series of studies, Griskevicius, Tybur, Delton, & Robertson (2010) revealed that temporary beliefs that the local environment is unpredicatable (e.g., increased mortality rates) alter an individual's life history strategy. However, unlike the

straightforward relationship between high mortality rate and fast life history strategy found in correlational studies, Griskevicius et al. found that current mortality cues interacted with a person's childhood environment to influence life history strategy. Specifically, after exposure to cues of increased mortality rate, individuals who grew up in low SES environments shifted toward faster life history strategies, while those who grew up in high SES environments, shifted toward slower life history strategies. This pattern of findings was replicated with two critical indicators of life history strategy- reproductive timing and risk taking (Griskevicius. Delton, Robertson, & Tybur, 2010; Griskevicisu et al., 2010). Taken together these emerging, experimental studies demonstrate two novel findings related to life history theory: (1) that the psychological mechanisms that control a person's life history strategy are sensitive to changes in current environmental conditions and (2) that the effect of current environmental cues on life history strategy depend on childhood environmental cues.

As demonstrated, life history strategy can influence a wide range of biological and psychological processes, from age at menarche and immune system functioning to risk-taking and time perspective (Walker et al. 2006; Galobardes et al., 2004; Hill et al., 2008; Dunkel & Decker 2010). In addition to the psychological variables already examined by life history researchers, it's possible that life history strategy can also explain variation in construal-level, a psychological phenomenon that measures level of abstraction.

Construal Level Theory

Construal level theory proposes that the same object or event can be

construed on multiple levels of abstraction (Trope & Liberman, 2003). Low-level construals consist of concrete conceptualizations that capture subordinate, incidental features and convey unique and specific information about an object or event. Conversely, high-level construals consist of abstract conceptualizations that capture superordinate, central features and convey the general meaning of an object or event. For example, reading this masters proposal can be thought of in low-level, concrete terms, as following lines of text, or in high-level, abstract terms, as gaining valuable knowledge. Importantly, construal level is tied to psychological distance, which is any dimension along which an object or event can be removed from direct, current experience (Ledgerwood, Trope, & Chaiken, 2010). Researchers posit that the function of high-level construals is to enable people to mentally transcend direct, current experience by forming representations that consist of the most important, invariant features of the available information (Trope & Liberman, 2010). Moreover, by transcending current experiences people can consider unlikely possibilities by generating novel and hypothetical examples (Wakslak & Trope, 2009).

Construal-level has been linked to four dimensions of psychological distance: temporal distance, spatial distance, social distance, and hypothetical distance. Across all four dimensions, psychological nearness is associated with low-level, concrete construals, while psychological distance is associated with high-level, abstract construals (Trope & Liberman, 2010). In fact, the relationship between psychological distance and construal-level occurs automatically, as low-level construals are implicitly associated with psychological nearness and high-

level construals are implicitly associated with psychological distance (Bar-Anan, Liberman, & Trope 2006). Importantly, this automatic relationship between psychological distance and construal-level has been shown to influence a wide range of cognitions, attitudes, and behaviors.

Differences in psychological distance and construal have been shown to affect cognitive information processing and categorization. For example, increasing psychological distance is related to the tendency to process information more abstractly and to group things into broad, rather than specific categories (Liberman, et al., 2002; Smith & Trope, 2006). Moreover, when events are described along the temporal distance dimension, as happening a year from now (vs today), or along the spatial distance dimension, as occurring in a distant location (vs a close location), people tend to place psychologically distant events into broader, more abstract categories. Additionally, as psychological distance increases, individuals are better able to pick up on the abstract structures of jumbled puzzles and pictures (Smith & Trope, 2006). This ability to find structure and broader, abstract meaning has important implications for how individuals navigate social conflict, as individuals primed with high-level construals are able to make more multi-issue offers in negotiations and achieve higher joint gain (Henderson & Trope, 2009). In addition to negotiation tactics, construal can influence another aspect of judgment and decision- making, the tendency to make predictions based on local or global trends. For example, Wakslak and Trope (2009) demonstrated that as psychological distance increases, people tend to focus on global, rather than local, trends in the stock market and use global trends more

to make predictions about future stock performance.

Taken together, the findings reported above reveal that level of construal can influence basic aspects of cognition, categorization and information processing, and that differences in construal can have important, real-world, consequences, such as in negotiation tactics and in making stock predictions. While this research has repeatedly demonstrated how variability in the psychological distance of objects, events, or people can influence a person's construal-level, no research has examined if individual differences in construal-level exist or how such individual differences might arise. Moreover, researchers have not demonstrated whether situational variability in anything other than explicit manipulations

OVERVIEW

Integrating research from life history theory with investigations of construal-level theory, the researcher propose a novel relationship between life history strategy and construal-level. Slow life history strategies arise in safe, predictable environments where individuals give up current reproductive effort in favor of future reproductive effort. Correspondingly, high-level construals allow individuals to transcend the current context and act according to global concerns, such as the type of future planning that is necessary to enact a slow life history strategy. Meanwhile, fast life history strategies arise in harsh, unpredictable environments where the future is uncertain and individuals need to pay close attention to the current context to survive. Correspondingly, low-level construals immerse individuals in the immediate situation, enabling them the flexibility

needed to respond to local concerns. Given the correspondence between aspects of life history strategy and construal-level, it seems possible that individuals adopting slow life history strategies should more frequently use high-level construals to assist in transcending the current situation to plan for the future, while individuals adopting fast life history strategies should more frequently use low-level construals to assist in monitoring the details of their harsh, unpredictable environment.

To test the relationship between life history strategy and construal, the researcher investigated whether or not a childhood cue of environmental harshness and unpredictability, childhood SES, and a current cue of environmental harshness and unpredictability, local mortality rate, influenced construal-level. While it's possible to have main effects of either childhood SES or current, local mortality rate on construal-level, past experimental research has failed to demonstrate main effects of either childhood SES or current mortality rate on other measures of life history strategy- desired age of reproduction and risk taking (Griskevicius et al., 2010). Rather, this research has demonstrated interactive effects of childhood SES with current, local mortality rate, such that the combination of high childhood SES and high local mortality rate pushes individuals toward slower life history strategies and the combination low childhood SES and of high local mortality rate pushes individuals toward faster life history strategies. In line with this research, the investigators predicted that:

> Childhood SES will interact with current cues of local mortality rate to influence construal-level. For individuals growing up in high SES

households, a high local mortality rate will lead to an increase in high-level construals. For individuals growing up in low SES households, a high local mortality rate will lead to an increase in low-level construals.

Method

Participants

One hundred thirty-seven students were recruited from introductory psychology courses to complete a study for partial fulfillment of course credit.

Design

Participants were randomly assigned to one of two conditions: a mortality prime condition or a control condition. All participants completed two measures of construal, a categorization task and a prediction task, and later completed a measure of childhood SES.

Upon entering the lab, participants were told they would be participating in two studies, the first of which was concerned with memory. In the first study, participants read a news article that served as the experimental manipulation. Consistent with the cover story, participants were told that they would complete a separate study about attitudes and cognition (actually, measures of construal and SES), before they were given the memory test for the news article.

Materials

The mortality prime was the same prime used by Griskevicius et al. (2010) and consisted of a short article entitled “Dangerous Times Ahead: Life and Death in the 21st Century” (See Appendix A). Based on the cover story, participants were told, “this article was chosen because it is exactly 600 words in length,

which makes it ideal for psychological memory tasks." The article described recent trends in the increases in violence in the United States, noting that there have been increases in shootings in both residential and commercial areas. The article ended by emphasizing the increasingly random nature of the deaths. The control condition involved reading a short article about a person's afternoon at home, during which the person lost their keys and spent several hours searching for them around the house. The control article was identical in length and style to the mortality article, came from the same source, and was designed to elicit similar levels of general arousal. Past use of the same mortality and control primes has demonstrated that they elicit similar levels of emotional arousal (Griskevicius et al., 2010).

One of the most essential differences between low-level and high-level construals is categorization. Individuals using low-level construals make concrete, specific categorizations, while individuals using high-level construals make broad, abstract categorizations. Consistent with past research on construal-level, we assessed cognitive categorization using a task created by Isen and Daubman (1984). In it, participants were given a category (e.g. vegetable) and were asked to rate the extent to which 10 items did or did not belong in the given category on a 6-point scale (1 = *definitely does not belong to the category*; 3 = *does not belong to the category, but is very similar to members of that category*; 4 = *does belong to the category, but is not a very good example of it*; 6 = *definitely does belong to the category*). Participants categorized 10 items for each of four categories (see Appendix B). The critical test was how participants categorized atypical members

of each category. For example, how participants rated pickles, seaweed, rice in relation to the category of vegetable. For each category, participants rated four typical exemplars, three atypical exemplars, and four items that did not belong in the category. Construal-level was measured by how participants rated the three atypical exemplars for all four categories. The ratings for the 12 total atypical items were averaged to form a mean categorization score.

Another important difference between low-level construals and high-level construals lies in the tendency to make predictions based on local vs global trends. Henderson, Fujita, Liberman, & Trope (2006) revealed that when using low-level construals people tend to make predictions based on local trends, whereas when using high-level construals people tend to make predictions based on global trends. Following Henderson, et al., participants were presented with a series of six graphs, each showing an upward or downward trend of cases charted over several years for various events related to an academic year (e.g., hours of sleep per night). On each of the graphs, the final year presented always deviated from the overall trend from previous years. That is, the last and most recent case of a generally upward graph deviated in the downward direction, and vice-versa for a generally downward graph (see Appendix C). Participants were asked to predict the likelihood that the trend will go upward on a 7-point scale (1 = *very unlikely to* 7 = *very likely*) and the likelihood that the trend will go downward on a 7-point scale (1 = *very unlikely to* 7 = *very likely*). Construal-level was measured by the extent to which participants made predictions based on local vs global tends. Prediction ratings were averaged across all six graphs to form a mean prediction

score.

We assessed past socioeconomic standing using the same measures as Griskevicius et al. (2010). Three questions measured the extent to which people felt resource-deprived in their childhood. (1) “My family usually had enough money for things when I was growing up;” (2) “I grew up in a relatively wealthy neighborhood;” (3) “I felt relatively wealthy compared to the other kids in my school.” Participants responded to each question on a 7-point scale (1 = strongly disagree, 7 = strongly agree).

RESULTS

The main prediction was that childhood SES would moderate the effect of the mortality prime on categorization, such that for individuals growing up in high SES households, a high local mortality rate will lead to more abstract, broad categorizations, but for individuals growing up in low SES households, a high local mortality rate will lead to more concrete, specific categorizations. To test this prediction, prime condition, childhood SES, and the prime condition X childhood SES interaction were entered into a regression equation with categorization as the criterion variable. There was not a main effect of prime condition on categorization, $\beta = .085$, $t(134) = 1.01$, $p = .316$. There was a marginal main effect of childhood SES on categorization, $\beta = -.22$, $t(134) = -1.82$, $p = .072$, such that individuals with a lower childhood SES made more abstract categorizations than individuals with a higher childhood SES. There was not a significant prime condition X childhood SES interaction on categorization $\beta = .042$, $t(134) = .340$, $p = .734$ (see Figure 1).

The main prediction was that childhood SES would moderate the effect of the mortality prime on trend predictions, such that for individuals growing up in high SES households, a high local mortality rate would lead them to make predictions based on global trends, but for individuals growing up in low SES households, a high local mortality rate would lead them to make predictions based on local trends. Participants were asked to rate both the likelihood that a trend would follow a global pattern and the likelihood that a trend would follow a local pattern. To measure the tendency to make global versus local trends, a difference score was created by subtracting ratings of the likelihood of a trend to follow a local pattern from ratings of the likelihood of a trend to follow a make global pattern. For this difference score, higher numbers indicate the tendency to make predictions based on global patterns. To test the prediction that childhood SES would moderate the effect of the mortality prime on trend predictions, prime condition, childhood SES, and the prime condition X childhood SES interaction were entered into a regression equation with the global-local difference score as the criterion variable. There was not a main effect of prime condition on trend predictions, $\beta = .013$, $t(141) = .149$, $p = .882$. There was not a main effect of childhood SES on trend predictions, $\beta = .026$, $t(141) = .210$, $p = .834$. There was not a significant prime condition X childhood SES interaction on trend predictions, $\beta = .09$, $t(141) = .729$, $p = .468$ (see Figure 2).

Childhood SES is one way to measure life history strategy, but because our predictions were based on life history strategy more generally and were not specific to childhood SES, it may be useful to examine how other measures of life

history strategy interact with prime condition. The Mini-K is a scale specifically designed to measure life history strategy (Figueredo et al., 2006) and it asks questions that get at many facets of life history strategy including: future planning (e.g., I often make plans in advance), risk-taking (e.g., I avoid taking risks), closeness to family (e.g., While growing up, I had a close and warm relationship with my biological mother), and interpersonal relationships (e.g., I often give emotional support to my friends). Using the Mini-K to measure life history, we might predict that life history strategy would moderate the effect of the mortality prime on categorization, such that for individuals with a slow life history strategy, a high local mortality rate will lead to more abstract, broad categorizations, but for individuals with a fast life history strategy, a high local mortality rate will lead to more concrete, specific categorizations. To test this prediction, prime condition, Mini-K score, and the prime condition X Mini-K interaction were entered into a regression equation with categorization as the criterion variable. There was not a main effect of prime condition on categorization, $\beta = .085$, $t(134) = .998$, $p = .320$. There was a main effect of Mini-K on categorization, $\beta = -.27$, $t(134) = -2.20$, $p = .029$, such that individuals with a slower life history strategy made more concrete categorizations than individuals with a faster life history strategy. There was also a significant prime condition X Mini-K interaction on categorization $\beta = .249$, $t(134) = 2.04$, $p = .044$ (see Figure 3). Following Aiken and West (1991), we next probed the interaction between prime condition and Mini-K by calculating the difference in categorization in the mortality prime vs. control prime for individuals at ±1 standard deviations from the mean of Mini-K. This

analysis revealed that participants with a slow life history strategy, at one standard deviation above the mean of Mini-K, made more abstract categorizations in the mortality prime condition compared to the control condition, $t(134) = 2.18$, $p = .031$, but participants with a fast life history strategy, at one standard deviation below the mean of Mini-K, did not change in their categorizations, $t(134) = .771$, $p = .44$.

Using the Mini-K to measure life history, we might also predict that life history strategy would moderate the effect of the mortality prime on trend predictions, such that for individuals with a slow life history strategy, a high local mortality rate would lead them to make predictions based on global trends, but for individuals with a fast life history strategy, a high local mortality rate would lead them to make predictions based on local trends. To test this prediction, prime condition, Mini-K score, and the prime condition X Mini-K interaction were entered into a regression equation with the global-local difference score as the criterion variable. There was not a main effect of prime condition on trend predictions, $\beta = .020$, $t(141) = .232$, $p = .817$. There was not a main effect of Mini-K on trend predictions, $\beta = -.053$, $t(141) = -.168$, $p = .867$. There was not a significant prime condition X Mini-K interaction on trend predictions, $\beta = -.036$, $t(141) = -.293$, $p = .770$ (see Figure 4).

Previous results did not yield the hypothesized prime condition X childhood SES interaction on the categorization task. However, the categorization task asked people to categorize targets from four distinct subcategories- tools, clothing, vehicles, and vegetables. It's possible that there was a significant prime

condition X childhood SES interaction for some of these subcategories, but not others. To test each subcategory individually, a separate categorization variable was computed for each subcategory. Each subcategory composite was comprised of 3 atypical subcategory members. For example, the clothing subcategory composite consisted of ratings of whether or not *purse*, *hat*, and *cane* belonged in the clothing category. Four separate regression analyses were run with prime condition, childhood SES, and the prime condition X childhood SES interaction as the predictor variables and each subcategory as the criterion variable. Results demonstrated that there was not a significant prime condition X childhood SES interaction on any of the subcategories (*p*s of .39, .26, .32, and .67 for the tool, clothing, vehicle, and vegetable subcategories respectively).

Past research has demonstrated that an individual's life history strategy can be influenced by an interaction between current cues of mortality (e.g, a mortality salience prime) and childhood SES. While the current study used an identical prime and an identical measure of childhood SES and did not find the hypothesized effects on categorization and trend prediction, it's possible that the prime may have interacted with other measures of SES. In addition to childhood SES, the current study assessed participant's current SES, expected future SES, family income, social class, paternal education, and maternal education (see Appendix D for measures). To examine the interaction between prime condition and each measure of SES on categorization and trend prediction, a separate regression equation was created for each of the six additional measures of SES and for each of the two dependent variables. There was not a significant prime

condition X current SES interaction on categorization or trend prediction (*p*s of .09 and .58 respectively). There was not a significant prime X expected future SES interaction on categorization or trend prediction (*p*s of .87 and .14 respectively). There was not a significant prime condition X family income interaction on categorization or trend prediction (*p*s of .55 and .77 respectively). There was not a significant prime condition X social class interaction on categorization or trend prediction (*p*s of .55 and .89 respectively). There was not a significant prime condition X paternal education interaction on categorization or trend prediction (*p*s of .09 and .46 respectively). There was not a significant prime condition X maternal education interaction on categorization or trend prediction (*p*s of .63 and .78 respectively).

In addition to looking at the interaction between the prime condition and each measure of SES individually, it is also possible to examine the interaction between the prime condition and the composite of all SES measures. To create a composite, all seven SES measures (childhood SES, current SES, expected future SES, family income, social class, paternal education, and maternal education) were standardized. Then, the seven standardized SES measures were averaged to form an overall SES score. Prime condition, overall SES, and the prime condition X overall SES interaction were entered as predictors into two regression equations with categorization and trend prediction as the criterion variables. There was not a significant prime condition X overall SES interaction on categorization or trend prediction (*p*s of .94 and .67 respectively).

Discussion

The current investigation proposed a relationship between life history strategy and construal-level. Specifically, we predicted that individuals with slow life history strategies would use high-level construals to help them transcend the current context and plan for the future. Conversely, we predicted that individuals with fast life history strategies would use low-level construals to help them focus on the immediate environment. Building on recent life history research (Griskevicius et al., 2010), we explored how a childhood cue of environmental harshness and unpredictability, childhood SES, and a current cue of environmental harshness and unpredictability, local mortality rate, interact to influence construal-level. We predicted that for individuals growing up in high SES households, a high local mortality rate would lead to an increase in high-level construals, but for individuals growing up in low SES households, a high local mortality rate will lead to an increase in low-level construals.

Overall, results did not support our hypotheses. Childhood SES did not interact with prime condition to influence either categorization or trend predictions. Examining how the prime condition interacted with another measure of life history strategy, the Mini-K, yielded mixed results. While there was a significant prime condition X Mini-K interaction for the categorization task, there was not a significant prime condition X Mini-K interaction for the trend prediction task. Looking at the prime condition X Mini-K interaction more closely, revealed an unexpected pattern. In the control condition, individuals with faster life history strategies used more high-level, abstract categorizations, but

individuals with slower life history strategies used more low-level, concrete categorizations. In the mortality prime condition, there was no difference in categorization between fast and slow life history individuals. While the shift from the control condition to the mortality prime condition was in the predicted direction, we did not anticipate that fast life history individuals would use more high-level, abstract construals than slow life history individuals in the control condition. Overall, the findings provide inconclusive support for notion that life history strategy is linked to construal level.

Limitations

Recent research has used an identical experimental manipulation and identical measure of childhood SES to examine the interaction between current and childhood cues of environmental harshness and predictability (Griskevicius et al., 2010). Therefore, it's unlikely that either the manipulation or the SES measure themselves are at fault for the inconclusive findings. However, examining the SES variable more closely reveals some unusual patterns. For example, while past research has demonstrated relationships between SES and life history strategy, as measured by the Mini-K, and future time orientation (Ellis et al., 2009; Thornhill & Fincher, 2007), in the control condition of the current study there was no correlation between the SES variable and either the Mini-K scale or future time orientation (*R*s $< .15$). Why exactly these relationships did not emerge in our data and whether or not this could have affected the results of the study are unclear. Participants did indeed use the full range of the scale for each of the SES variable, so a restricted range of participant responses is not a problem. Still, it is possible

that students at ASU do not represent a wide enough range of socioeconomic statuses to detect the predicted relationships. Perhaps, people from poorer backgrounds can not afford to attend college, or might opt to attend one of the many community colleges in the greater Phoenix area, and people from richer backgrounds elect to attend private universities or out-of-state universities. If so, the student population at ASU may be primarily comprised of people from middle class backgrounds. Another possibility is that there is a wealth X life history selection bias inherent in attending ASU. People from poorer backgrounds who performed well in school, worked hard, and planned ahead, characteristics associated with a slow life history strategy, may elect to go to ASU because, for them, attending ASU and getting a financial scholarship to do so is an achievement. Students from poorer backgrounds who did not work as hard or perform as well in school, characteristics that might be connected to a fast life history strategy, may be attending community colleges. Conversely, students from wealthy backgrounds who worked hard and performed well in school may have chosen to attend prestigious, private universities rather than ASU. Students from wealthy backgrounds who did not work as hard or perform as well in school may be those who are attending ASU. Therefore, it's possible that the student population at ASU is biased toward attracting slow life history individuals from poor backgrounds and fast life history individuals from wealthy backgrounds. Whatever the peculiarities of the ASU student population, a restriction of the range of socioeconomic statuses is unlikely to fully account for the inconclusive findings. Griskevicius et al. (2010) used an almost identical method as the current

study with students attending a MBA program, a population that likely has an even more restricted range of socioeconomic status than ASU, and found interactions between current and childhood cues of environmental harshness on relevant life history variables.

In addition to the SES responses, it's also possible that the measures of construal used in the current study contributed to the inconclusive findings. We chose two measures that we thought would each measure construal, a categorization task and a trend prediction task. However, in our study the tasks were not correlated with one another (R = -.03). This seems puzzling because both tasks have been used to assess construal in the past. However, while the categorization task has been used in a number of studies (Smith & Trope, 2006; Lee, Keller, & Sternthal, 2010; Wakslak & Trope, 2006), the trend prediction task has only been used in one previous study of construal (Henderson, Fujita, Trope & Liberman, 2006). Therefore, it is possible that the trend prediction task is not a suitable measure of construal. If so, this may explain why there was a prime condition X Mini-K interaction for the categorization task, but not the trend prediction task.

Future Directions

While it is disappointing that current investigation did not yield the predicted pattern of results, the proposed relationship between life history strategy and construal-level is solidly grounded in past research and, at face value, the relationship seems to make sense. People who expect to live a long time really should use high-level construals to take themselves out of the present and plan for

the future. People living in unpredictable environments really do need to pay more attention to specific details of the current context than people living in predictable environments. Therefore, it may be better to reassess the experimental method that was used to test the relationship between life history strategy and construal-level, rather than assume the hypotheses are incorrect. There are several ways in which the current study could be altered to reexamine the relationship between life history strategy and construal.

For example, one way of improving the current study may be to run it in a population that represents a full range of socioeconomic statuses. As mentioned earlier, in the current study SES was not correlated with Mini-K or future time perspective as has been found in previous studies (Ellis et al., 2009; Thornhill & Fincher, 2007). Perhaps, recruiting participants from a nationally representative sample, such as from the Amazon Mechanical Turk website (Buhrmester, Kwang, & Gosling, in press) would allow us to test the interaction between childhood SES and current mortality cues on a full range of socioeconomic statuses.

Another means of improving the current study might be to change the dependent variables. Even though the measures of construal used were identical to those from previous studies, as a whole, they were abstract and unrelated to factors that can influence life history strategy. Perhaps, the relationship between life history strategy and construal-level only exists for objects or experiences relevant to an individual's life history strategy. Adjusting the construal measures to more closely fit with life history cues may yield a different pattern of results. For instance, the categorization task could be modified to be about categorizing

food or tools necessary for surviving harsh conditions. Similarly, the trend prediction task could be modified to display trends about surviving danger or famine.

In addition to modifying the construal measures, another means of improving the current study may be to include a slow life history manipulation as a contrast to the fast life history manipulation. While a slow life history manipulation has not been used in the past, it seems like comparing slow and fast life history primes would create the greatest contrast between conditions. However, since the fast life history prime interacts with childhood SES, it is unclear whether or not a slow life history prime would also interact with childhood SES and if it that interaction would occur in the opposite direction. Nevertheless, a slow life history prime may be useful in future studies. Because the fast life history prime describes the current environment as being harsh and unpredictable, any future slow life history prime should describe the current environment as being particularly safe and predictable.

Implications

The potential relationship between life history strategy and construal level has important implications for both evolutionary biologists and social psychologists. Life history theorists have successfully linked environmental cues of harshness and unpredictability to many biological outcomes, such as age at menstruation, body size, and life expectancy (Ellis, McFadyen-Ketchum, Dodge, Pettit, & Bates, 1999 Walker & Hamilton, 2008; Wilson & Daly, 1997); yet, they have rarely examined *psychological* outcomes. Investigating the relationship

between cues of environmental harshness and unpredictability and construal-level has the potential broaden the scope of current life history theory to include an increasing number of psychological variables. Moreover, analyzing the relationship between life history strategy and construal-level can help highlight the role that psychological processes play in enacting life history strategies. For example, do psychological processes mediate the relationship between environmental inputs of harshness and unpredictability and life history consistent behaviors, such as number of sexual partners or emphasis on physical health? Construal-level may be just one of many psychological processes, yet to be explored, that clarify the mechanisms that bring about divergent life history strategies.

In addition to helping gain a more comprehensive understanding of life history theory, examining the relationship between life history strategy and construal-level can provide a completely new context for studying psychological construal. Past research on construal-level has solely examined the bidirectional relationship between construal-level and psychological distance. Construal has not been related to any other situational factors or individual differences. If construal is related to life history strategy, then construal researchers have a range of novel variables, such as mortality rate, socioeconomic status, disease threat, and family stability, with which to explore variability in construal-level. Moreover, a relationship between life-history strategy and construal-level would create a new way of thinking about construal because it might mean that stable individual differences in construal exist. If true, then construal has the potential to

influence an even wider range of psychological phenomenon that previously expected. Furthermore, construal as an individual difference might have important implications for applied topics like social influence and decision-making, as abstract vs concrete messages can be targeted to specific groups.

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APPENDIX A

MORTALITY PRIME

Life in 21st Century More Unpredictable Than Most Think

By MORGAN JAMESTON, Senior Times Writer

Jonathan Pierce died at 5:37 am last Tuesday in the quiet pre-dawn hours at Memorial Hospital. The cause—a gunshot wound. Just last night, Jon was driving home from work. Suddenly, in the middle of a seemingly safe intersection that he had crossed hundreds of time, he was shot six times by a gunman in a nearby car. Police have no motive for the shooting, chalking it up to yet another random act of violence.

The staff at the police station is worried. They are astonished at the exponential increase in deaths from random acts of violence. “Ten years ago, these kinds of deaths accounted for maybe 30 or 40 deaths a year,” Joan Michaels, a captain at the police station, recalls. “Two years ago we had over 200. This year it’s tripled to over 600. The fluctuations are amazing. You just don’t know what tomorrow is going to bring.”

Michaels is shocked by the senselessness of many of these deaths. “It seems that at least half of these attacks occur for no reason. An innocent young man just happens to be wearing the wrong colored shirt and is gunned down by gang members. A young woman is waiting for a bus, and she’s assaulted by a group of men she’s never seen before. What really gets me is the person who dies is often not even the target. The person was just standing nearby, minding his own business. Anyone is a potential victim for this new wave of violence.”

The high prevalence of random violence is also being seen in emerging studies from Harvard Medical School. Dr. Douglas Kenrick, head of the research project, notes a worrisome pattern: “Comparing violent crime across the last century, we find that it is very difficult to predict what’s going to happen from year to year. For example, people today are at a much higher risk of being violently assaulted and killed than people merely a few years ago.” The evidence shows that our cities, neighborhoods, workplaces, and schools are essentially under attack. “This has important implications,” Dr. Kenrick points out. “Because you never know what’s going to happen and how the environment is going to fluctuate, people will need to take this into account when they’re deciding how to behave.”

The risks associated with random acts of personal violence only exacerbate the terrorism threat that has been growing over the past few decades. Patricia Wharton of the Federal Bureau of Investigations points out that people mistakenly believe foreign attacks, such as 9/11, to be the only terrorism threat facing our nation. “It is certainly true that Islamic terrorism poses a grave threat to Americans’ safety. Another hijacking, radioactive dirty bombs, or a rogue nuclear weapon stolen from Iran or Pakistan could kill thousands or millions of Americans with little to no warning.”

"But what people forget is that the vast majority of terrorist acts are committed by Americans. It is our own neighbors who are killing us." Take several examples. The Oklahoma City bombings of 1995 were committed by Timothy McVeigh, an individual from New York who many thought was a normal person. The 1996 Olympic Bombings in Atlanta were committed by Eric Rudolph, a person born in Florida. The 2001 anthrax attacks were carried out by Bruce Ivins, a man from Ohio. The 2002 Washington D.C. sniper shootings that killed over a dozen people in several weeks were committed by two Americans. These are just a few of the countless examples in which American citizens carried out lethal attacks against random, innocent compatriots.

The random nature of violence is clearest in schools and universities across the world. Just five years ago, it was almost unheard of that someone would be shot at school or at work. Today, this is part of normal life. "The Police can't be at every corner of every street," notes captain Joan Michaels. "We know that even video cameras do little because most of these violent individuals have no regard for their own lives. More and more, citizens find themselves injured or even dying on the street for reasons beyond their control, hunted down for no discernible purpose."

As Jonathan Pierce waits to be buried after being the latest victim of random violence, we can't help but be reminded about the unpredictability of the world in which we live. Whether it is random acts of violence, outbreaks of new diseases, or the uncertainty of mother nature, the ability to predict what next year—or even tomorrow—will bring is impossible. People need to brace themselves for a new reality in an unpredictable world.

APPENDIX B

EXAMPLE CATEGORIZATION TASK

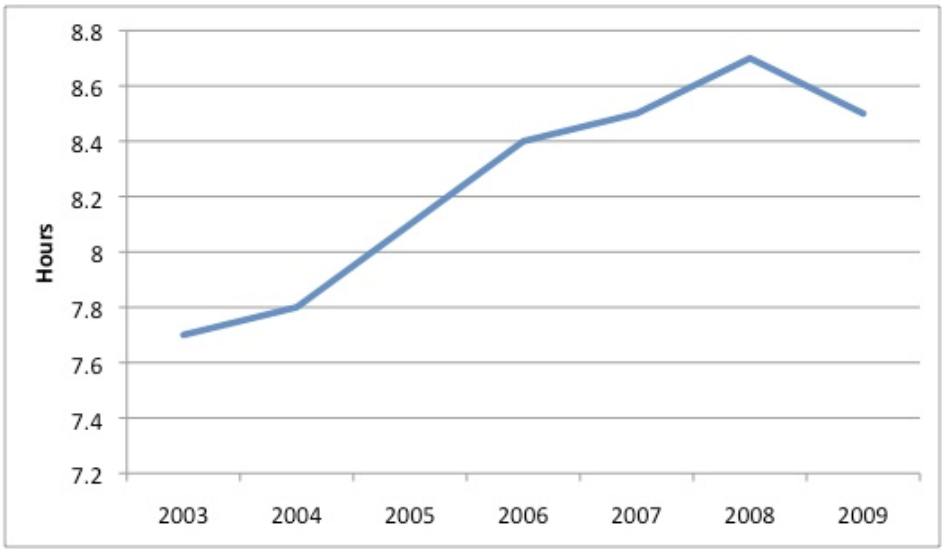
Please rate the extent to which the following items belong in the category of VEGETABLE

	Definetly does NOT belong in category		Does NOT belong in category, but is similar to category	Does belong in category, but not a good example of it		Definitely does belong in category
carrot						
seaweed						
lettuce						
rice						
broccoli						
pickles						
celery						
oven						
clock						
plate						

APPENDIX C

EXAMPLE PREDICTION TASK

Average hours per night of sleep reported by students at University A



Please examine the above graph for University A.

	Very likely to go down			Stay the same			Very likely to go up
For University A, will the average hours per night of sleep reported by students go up or down?	○	○	○	○	○	○	○

APPENDIX D

SOCIOECONOMIC STATUS QUESTIONS

1. Subjective Current SES (1=Strongly Disagree to 7= Strongly Agree)

I don't need to worry too much about paying my bills and tuition.
I have enough money to buy things I desire.
I feel relatively wealthy these days.

2. Subjective Future SES (1=Strongly Disagree to 7= Strongly Agree)

In the future, I don't think I'll have to worry about money too much.
I will probably be relatively poor later in life.
When I am older, I will be able to afford to buy things that I want.

3. Family Income

What was your household income growing up?

-Less than $15,000
-$15,001-$25,000
-$25,001-$35,000
-$35,001-$50,000
-$50,001-$75,000
-$75,001-$100,000
-$100,001-$150,000
-$150,000+

4. Social Class

How would you describe your social class?

Working class
Lower middle class
Middle class
Upper middle class
Upper class

5. Paternal Education

What is the highest level of education that your father achieved?

Less than high school
High school diploma
Some college
Bachelor's
Master's
Professional (MD, JD, etc.) or PhD
Unknown

6. Maternal Education

What is the highest level of education that your mother achieved?

- Less than high school
- High school diploma
- Some college
- Bachelor's
- Master's
- Professional (MD, JD, etc.) or PhD
- Unknown

Figure 1. Categorization as a function of mortality cues and childhood SES. Higher numbers indicate more abstract categorizations.

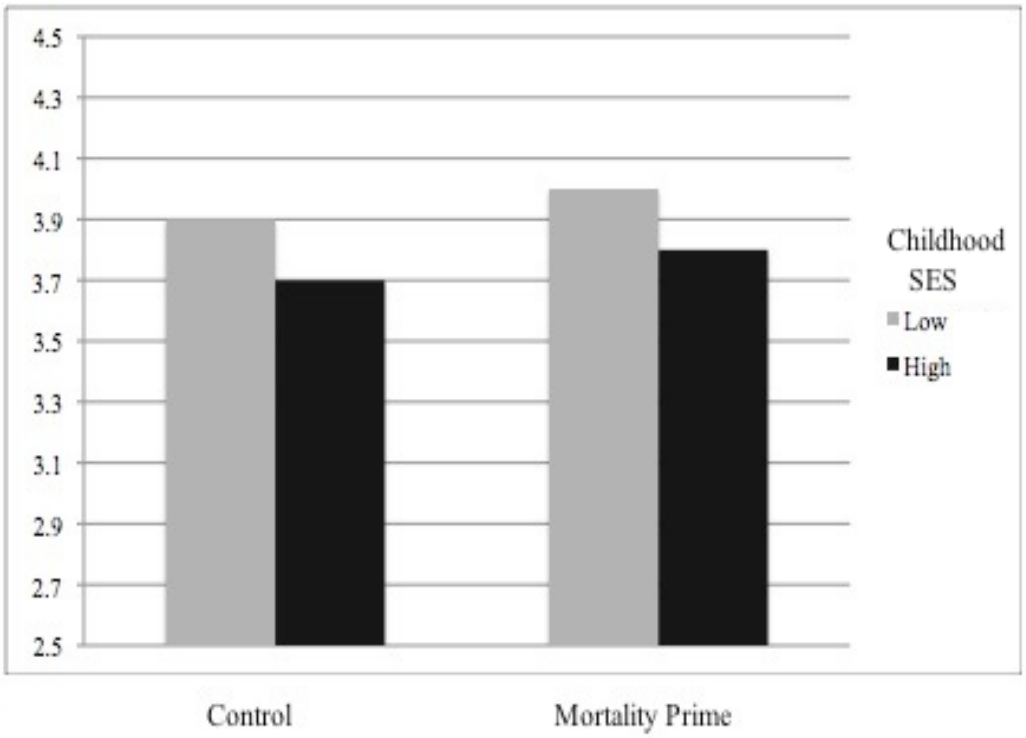


Figure 2. Trend predictions as a function of mortality cues and childhood SES. Positive numbers indicate predictions based on global trends. Negative numbers indicate predictions based on local trends.

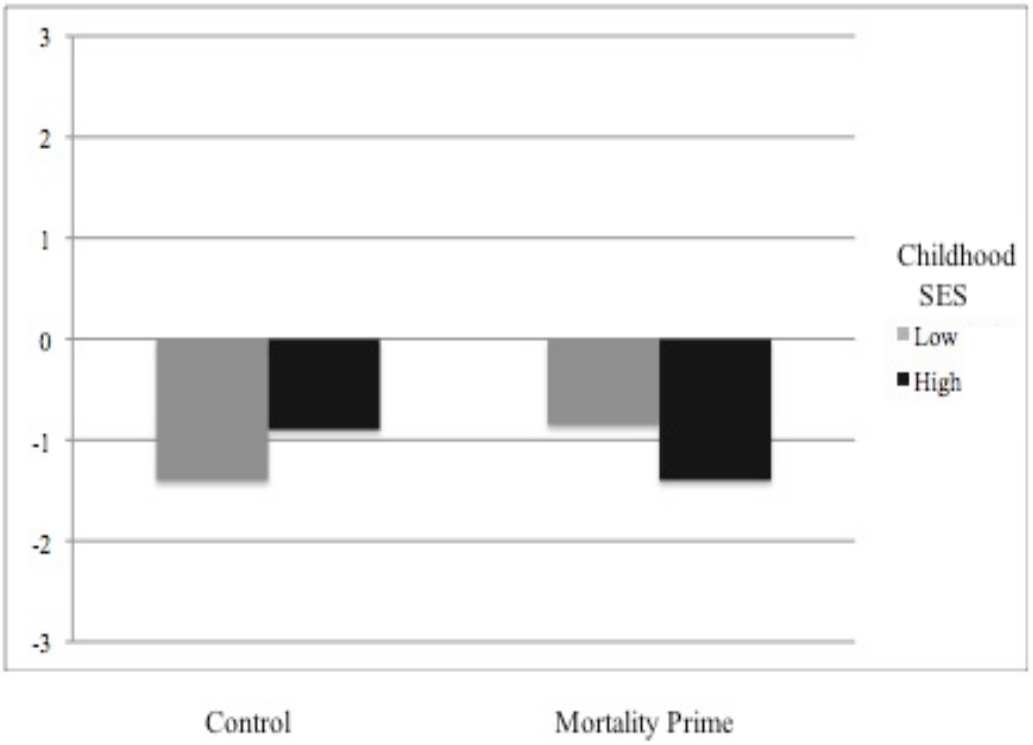


Figure 3. Categorization as a function of mortality cues and life history strategy. Higher numbers indicate more abstract categorizations.

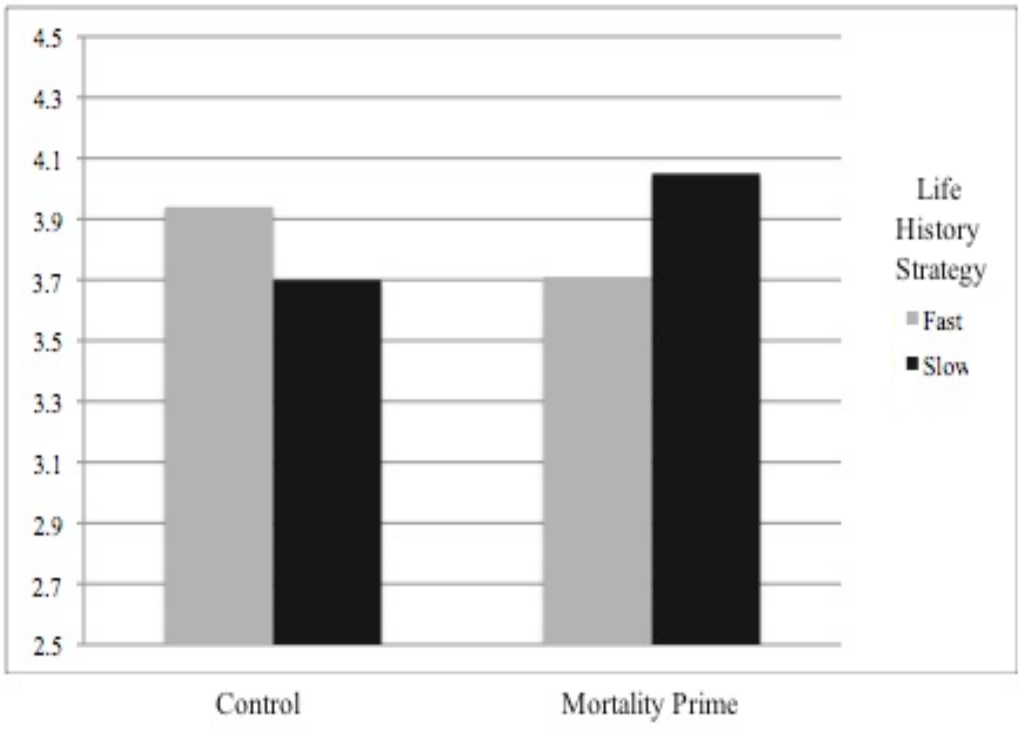
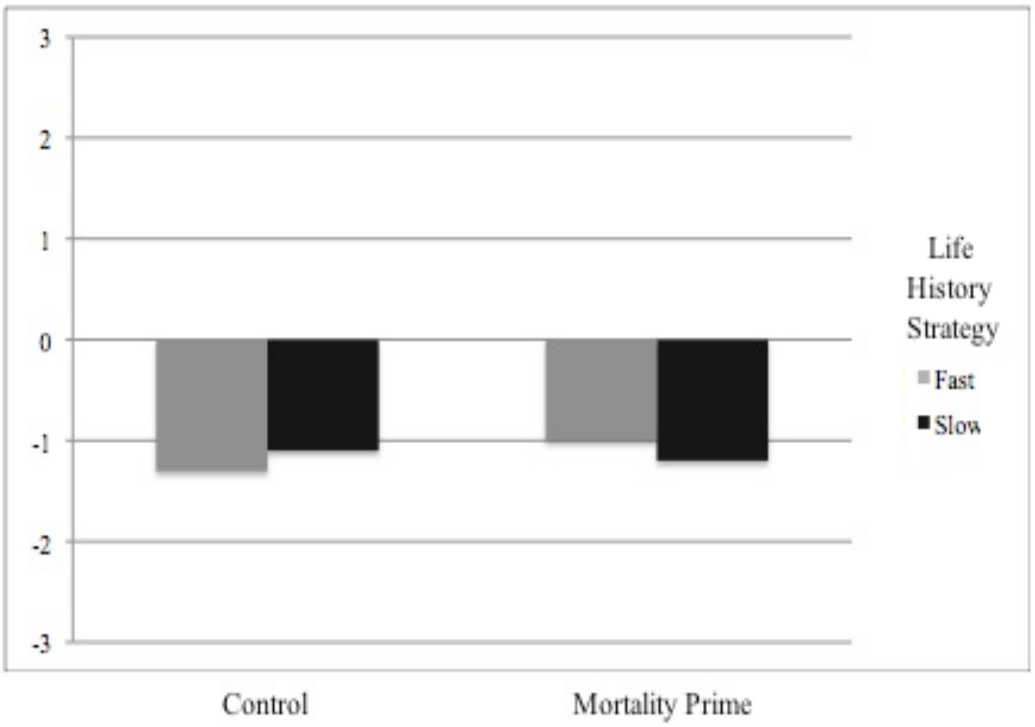


Figure 4. Trend predictions as a function of mortality cues and life history strategy. Positive numbers indicate predictions based on global trends. Negative numbers indicate predictions based on local trends.



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