



## Retrospective time travel in life satisfaction judgment: A life history approach<sup>☆</sup>

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### ABSTRACT

We are products of past events and experiences, but only a few of them linger in our memory to affect our present lives. The current research examined whether there are individual differences in how far people look back to judge their present life satisfaction using the evolutionary framework of life history theory. The results showed that perceived ecological uncertainty interacts with a key aspect of life history strategy (childhood socioeconomic status; SES) to influence the span of retrospective mental time travel. When asked to list past events that had crossed their minds during life satisfaction judgments, individuals who grew up in low-SES environments mentioned more recent events, whereas individuals who grew up in high-SES environments wrote more distant past events. This difference was found only when the perception of ecological uncertainty was high, but not when it was low. It appears that life history strategy shapes people's retrospective lens during life satisfaction judgments.

“Happiness isn't something you experience; it's something you remember.”

— Oscar Levant

How far do you look back to evaluate how happy you are today? Human beings are unique in their ability to mentally travel back in time (Tulving, 1985). Like historians who review the past and sort out key events, people draw on select moments among the myriad of past events in interpreting their current lives. During this journey through time, some people may recall mostly recent past events, while others may muse over more distant ones. We examine in this research whether the person's early-life experience influences the scope of temporal sampling in one's evaluation of life as a whole.

Past research on retrospective reports of happiness has produced various accounts of how past events influence the present. Some researchers have suggested that life events cause only short-term changes to the level of subjective well-being, because people adapt quickly to most life circumstances (Suh, Diener, & Fujita, 1996); others have argued that life events do have the potential to cause a major impact on long-term levels of subjective well-being (Lucas, 2007). There is also the claim that reports of happiness are less dependent on past experiences per se but more on how the past is subjectively framed by the person (Schwarz & Strack, 1991).

Recently, studies have suggested the importance of taking the large inter-individual differences in reaction and adaptation to life events

into account (Diener, Lucas, & Scollon, 2006; Lucas, 2007). Demographic, social, and personality factors can lead to multiple trajectories of delight or distress following the same event. For example, individuals high in extraversion and low in neuroticism tend to adapt faster than others to negative life events such as divorce or unemployment (Luhmann & Eid, 2009). Yet, most of the existing work have focused on *how positively* one thinks of the past, leaving open the question of *how far* one mentally reaches to the past.

How deeply does the person dig into the past to evaluate her current happiness? We believe a stable individual difference exists, which partly depends on the person's early-life experiences. Specifically, we assumed that people brought up in resource-scarce environments would be more likely to think of relatively recent past events, whereas people from resource-abundant environments would be more likely to think of more distant past events in their construction of life satisfaction judgments.

The theoretical underpinning of this assumption comes from life history theory research. Life history theory explains how the best strategy for navigating through life varies by the lessons one acquires from his or her early-life experiences. People who have grown up in harsh and unpredictable childhoods, referred to as fast strategists, are characterized by short life expectancy, accelerated maturation, and early childbirth (see Kaplan & Gangestad, 2005, for a review). By contrast, people who have grown up in benign and predictable

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childhoods, referred to as slow strategists, have long life expectancy and favor investment in the future over current mating or childbirth. Essentially, the core difference between fast and slow strategists is the breadth of their time perspective in life (Kruger, Reischl, & Zimmerman, 2008). Slow strategies entail “long-term thinking and reflective, deliberate, and thoughtful attitudes towards the past, present, and future,” while fast strategies take the opposite pattern (Figueredo, Vásquez, Brumbach, & Schneider, 2007, p. 56). Importantly, past research has documented that these patterns remain latent in stable environments, but they become pronounced when people are faced with ecological uncertainties, such as the unpredictability of economy or crime (e.g., Mittal & Griskevicius, 2014; White, Li, Griskevicius, Neuberg, & Kenrick, 2013).

Here, we explored how such different childhood backgrounds may extend to the utility of remembering past events. Memory is designed by natural selection to not only relive the past but to promote adaptive behaviors in the specific environment one is situated within (Klein, 2013). Researchers have speculated that fast strategists use past experiences less than slow strategists to figure out current situations (Figueredo et al., 2007), but this assumption needs empirical verification. Since fast strategists grew up in relatively harsh and unpredictable childhoods, they are more likely to view the world as unstable and unstructured with few regular procedures to achieve desired end states (Ross & Hill, 2002). In this unreliable environment, it may be more adaptive for fast strategists to put more weight on the recent than the distant past, since there are no manageable patterns to use for guidance. For instance, if you live in a place with fickle weather, you should plan your day according to the weather in the morning than considering the weather two weeks ago. By contrast, slow strategists' early-life experiences are characterized by supportive environments with regular patterns for producing desired goals. For such individuals who are programmed with the image of a predictable world, it may be more sensible to look far back to the distant past to extract structure and meaning from past experiences. This belief is central to sense of control and ability to plan long-term goals (Mittal & Griskevicius, 2014). Thus, the scope of retrospective thinking in response to ecological uncertainty can diverge as a function of one's early experiences.

Although happiness judgment itself is not a life strategy, evaluation of one's life functions as a barometer of the current state of affairs and a monitoring system for future behaviors (Nesse, 2004). Positive evaluations of one's life are known to prospectively trigger approach motives, whereas negative evaluations trigger avoidant motives (Fredrickson, 2001). Even a similar past event can invoke pleasant or unpleasant memory depending on the person's subjective framing of the past (Schwarz & Strack, 1991). We go beyond the issue of valence, and examine whether the temporal scope of past events integrated into life satisfaction judgments also varies predictably as a function of the person's life experience. Using childhood socioeconomic status (SES) as a proxy of childhood adversity (cf. Griskevicius, Delton, Robertson, & Tybur, 2011), we hypothesized that ecological uncertainty cues would lead people from low- versus high-SES childhoods to adopt different spans of past narratives in constructing current life satisfaction judgments. Those from low-SES backgrounds were expected to retrieve more recent past events. By contrast, those from high-SES backgrounds were expected to retrieve more distant past events.

## 1. Method

### 1.1. Participants

Two hundred and five participants from the United States ranging in age from 18 to 65 years ( $M = 32.21$  years,  $SD = 10.23$ ; 128 females, 77 males) were recruited from Amazon's Mechanical Turk (MTurk) in exchange for monetary compensation. Eighty-five percent of participants were Caucasian, 7% African American, 3% East Asian, 1% South Asian, 1% Pacific Islander or Native Hawaiian, and 3% Other. A power

analysis using G\*Power 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009) indicated that a minimum of 159 participants were required for a small-to-medium effect size ( $f^2 = 0.05$ ; Cohen, 1992) with statistical power of 0.80 and  $\alpha$  of 0.05.

### 1.2. Procedure

Upon consenting, participants first responded to the Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985), which is a widely used questionnaire for measuring global life satisfaction. They were asked to evaluate their life as a whole by indicating their agreement with five items ( $\alpha = 0.93$ ) from 1 (*strongly disagree*) to 7 (*strongly agree*).

Participants were then asked to write about three positive and three negative events in the last five years that crossed their minds when they were completing the SWLS. The instructions were as follows: “On the previous page, you answered five questions about how satisfied you are with your life. People use different criteria to evaluate how happy they are. On the space below, please write three positive (negative) events in the last five years that crossed your mind when you were completing the life-evaluation questions.” A potential bias (reminiscence bump) that occurs in autobiographical memory is that adults remember more events from their 20s and 30s than from other periods of their lives (Rubin, Wetzler, & Nebes, 1986). Given the diverse age distribution of the sample, the span of retrospective time travel was restricted to the last five years in order to minimize this bias. Participants also indicated the year and month of when the positive and negative events happened (order counter-balanced).

After the event description, life history strategy was assessed with established scales of perceived childhood SES and current SES. Research has documented that individuals reared in low-SES environments have higher rates of morbidity-mortality in all forms, from acute illnesses and injuries to chronic health issues (Chen, Matthews, & Boyce, 2002). Poor children also face higher levels of chaos, such as unpredictable daily routines and frantic home atmosphere (Belsky, Schlomer, & Ellis, 2012; Evans, Gonnella, Marcynyszyn, Gentile, & Salpekar, 2005). Therefore, people from low-SES backgrounds are more likely to adopt a faster life history strategy, whereas those from high-SES backgrounds are more likely to adopt a slower life history strategy. The SES items measured in this study were adopted from prior work on life history theory (Griskevicius et al., 2011; Mittal & Griskevicius, 2014; White et al., 2013). For an index of perceived childhood SES, participants were led to think about their childhood before age 12 and to indicate their agreement with the three following items: (a) “My family usually had enough money or things when I was growing up.”; (b) “I grew up in a relatively wealthy neighborhood.”; and (c) “I felt relatively wealthy compared to the other kids in my school,”  $\alpha = 0.86$ . For an index of current SES, participants were asked to think about their current life situation and to indicate their agreement with the three following items: (a) “I have enough money to buy things I want.”; (b) “I don't need to worry too much about paying my bills.”; and (c) “I feel relatively wealthy these days,”  $\alpha = 0.89$ . Responses to these two SES scales ranged from 1 (*strongly disagree*) to 7 (*strongly agree*).

For assessment of perceived ecological uncertainty, participants indicated their current perceptions of crime unpredictability (adopted from White et al., 2013). They responded to the three following questions: (a) “How predictable is crime in your country these days?”; (b) “How predictable is crime in your state these days?”; and (c) “How predictable is crime in your local community these days?” from 1 (*extremely predictable*) to 7 (*extremely unpredictable*),  $\alpha = 0.85$ . As the sensitization model in life history research suggests (Griskevicius et al., 2011), we expected that the span of retrospection would vary only when the perception of ecological uncertainty is high, but not when the perception of ecological uncertainty is low.

## 2. Results

Descriptive statistics and correlations among all variables are presented in the Appendix A. The temporal distance of retrospection was calculated by averaging the number of months that have passed since each described event. On average, the reported distance of events ranged from 1.67 to 45.00 months ( $M = 22.31$  months,  $SD = 9.16$ ). Specifically, the three positive events ranged from 1.33 to 49.33 months ( $M = 21.46$  months,  $SD = 10.90$ ), and the three negative events ranged from 1.00 to 59.33 months ( $M = 23.16$  months,  $SD = 12.10$ ).

We first examined the interactive influence of ecological uncertainty and childhood SES on the retrospective span of recalled events. No significant main effects emerged for perceived ecological uncertainty,  $b = -0.36$ ,  $SE = 0.40$ ,  $t(201) = -0.88$ ,  $p = .378$ , 95% CI  $[-1.15, 0.44]$ , and childhood SES,  $b = 0.53$ ,  $SE = 0.40$ ,  $t(201) = 1.34$ ,  $p = .180$ , 95% CI  $[-0.25, 1.32]$ . However, as expected, the regression analysis on retrospective span revealed a significant interaction between perceived ecological uncertainty and childhood SES,  $b = 0.84$ ,  $SE = 0.27$ ,  $t(201) = 3.14$ ,  $p = .002$ , 95% CI  $[0.31, 1.37]$ . We probed this interaction by examining the relationship between childhood SES and retrospective span at one standard deviation above or below the mean of perceived ecological uncertainty. As expected, when perceived ecological uncertainty was low ( $-1$  SD), individuals from low-SES and high-SES backgrounds did not differ in the span of retrospection,  $b = -0.79$ ,  $SE = 0.58$ ,  $t(201) = -1.35$ ,  $p = .178$ , 95% CI  $[-1.94, 0.36]$ . However, when ecological uncertainty was high ( $+1$  SD), people from low-SES backgrounds were significantly more likely to mention more recent past events than people from high-SES backgrounds,  $b = 1.86$ ,  $SE = 0.58$ ,  $t(201) = 3.23$ ,  $p = .001$ , 95% CI  $[0.72, 2.99]$  (see Fig. 1).

Previous research has found that only childhood SES (but not current SES) interacts with ecological uncertainty to affect various life history strategies (e.g., Griskevicius et al., 2011; White et al., 2013). Consistent with past findings, even though current SES and childhood SES were mildly correlated,  $r(203) = 0.17$ ,  $p = .016$ , current SES did not interact with ecological uncertainty to predict the retrospective span,  $b = 0.41$ ,  $SE = 0.25$ ,  $t(201) = 1.63$ ,  $p = .104$ , 95% CI  $[-0.08, 0.89]$ . The Ecological Uncertainty  $\times$  Childhood SES interaction remained significant even when current SES was controlled,  $b = 0.85$ ,  $SE = 0.27$ ,  $t(201) = 3.15$ ,  $p = .002$ , 95% CI  $[0.32, 1.38]$ . In addition, we conducted a hierarchical multiple regression analysis with temporal distance of events as the criterion variable. Age, gender, and current SES were entered at Step 1, and ecological uncertainty and childhood SES were entered at Step 2, followed by the interaction term at Step 3 (see Table 1 for each step of the regression analysis). The Ecological Uncertainty  $\times$  Childhood SES interaction entered at Step 3 was the only significant predictor in the regression model,  $\Delta R^2 = 0.043$ ,  $p = .003$ . Thus, in the face of ecological threat, people's construction of life

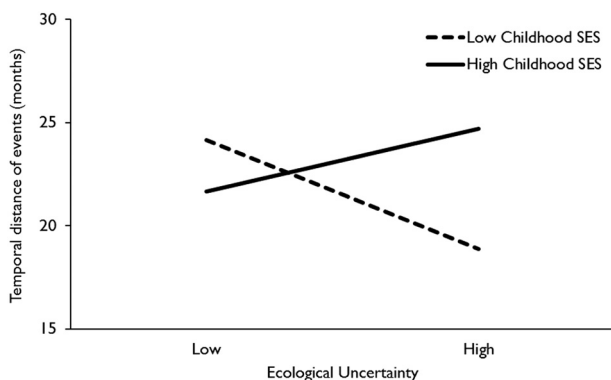


Fig. 1. Retrospective span in life satisfaction judgment as a function of perceived ecological threat and childhood SES (low = 1 SD below the mean; high = 1 SD above the mean).

Table 1  
Hierarchical regression analysis predicting temporal distance of events by childhood SES, ecological uncertainty, and their interaction.

Predictor	B	SE B	t	95% CI	$\Delta R^2$
Step 1					
Age	0.11	0.06	1.77 <sup>†</sup>	[-0.01, 0.24]	0.024
Gender	-0.11	1.34	-0.08	[-2.74, 2.53]	
Current SES	0.43	0.39	1.10	[-0.34, 1.19]	
Step 2					
Childhood SES	0.54	0.41	1.30	[-0.28, 1.35]	0.014
Ecological uncertainty	-0.45	0.41	-1.09	[-1.25, 0.36]	
Step 3					
Childhood SES $\times$ Ecological uncertainty	0.82	0.27	3.03 <sup>**</sup>	[0.29, 1.35]	0.043 <sup>**</sup>

Note.  $N = 205$ . CI = confidence interval. SES = socioeconomic status. All continuous variables were mean-centered.

<sup>†</sup>  $p < .10$ .

<sup>\*\*</sup>  $p < .01$ .

satisfaction diverged as a function of their early-life experiences aside from their current social standings. Recent past events loomed large in the life satisfaction judgment of fast strategists, whereas slow strategists reached deeper into their past in constructing the same judgment.

We also analyzed the positive and negative events separately. As for predicting the retrospective span of positive events, a significant Ecological Uncertainty  $\times$  Childhood SES interaction emerged,  $b = 0.68$ ,  $SE = 0.33$ ,  $t(201) = 2.08$ ,  $p = .039$ , 95% CI  $[0.04, 1.32]$ . Results for the retrospective span of negative events were largely similar. The Ecological Uncertainty  $\times$  Childhood SES interaction was significant,  $b = 1.01$ ,  $SE = 0.35$ ,  $t(201) = 2.85$ ,  $p = .005$ , 95% CI  $[0.31, 1.71]$ . In sum, for both positive and negative events, retrospectively closer events were considered by individuals from low-SES backgrounds when ecological uncertainty was high.

Lastly, we explored the possibility of a floor effect among younger participants. As one anonymous reviewer noted, simply using age as a covariate may not be enough to partial out the strong influence of age. For instance, a 50-year-old person may be more likely to look further into the past even in the five-year window, since five years comprise a smaller portion of her entire life compared to a teenager. Thus, the total sample was subdivided into two groups based on the median age of 29 and the same analyses were performed for the two groups separately. Overall, the results showed similar patterns of results as previous analyses. In the older group (99 participants above the age of 29), there was a significant interaction between ecological uncertainty and childhood SES in predicting the span of retrospection,  $b = 0.89$ ,  $SE = 0.37$ ,  $t(95) = 2.41$ ,  $p = .018$ , 95% CI  $[0.16, 1.63]$ . As for the younger group (106 participants equal to or below the age of 29), the interaction between ecological uncertainty and childhood SES was again significant in predicting the scope of retrospection,  $b = 0.79$ ,  $SE = 0.39$ ,  $t(102) = 2.00$ ,  $p = .048$ , 95% CI  $[0.01, 1.57]$ . Although the interaction effect was slightly stronger for the older group than the younger group, both regression analyses showed that relatively recent events are mentioned by people from low-SES backgrounds when ecological uncertainty is high.

## 3. Discussion

We constantly experience small dots of the present, but these dots are given meaning only when we look back to connect them into a coherent line. The current study explored whether early-life experiences lead to individual differences in how far people temporally reach back to evaluate how satisfied they are with their current lives. Using the framework of life history theory, we proposed that people from harsh and unpredictable childhoods would integrate relatively recent events into their present life satisfaction judgments, whereas people from benign and predictable childhoods would reach further to

combine more distant events.

Consistent with our hypothesis, individuals reared in low-SES environments were significantly more likely to mention more recent past events (as opposed to distant past events) during life satisfaction judgments than individuals reared in high-SES environments. As the sensitization model in life history research suggests, an interactive pattern was found in which this retrospective span difference emerged only when the perceived ecological uncertainty was high, but not when the perceived ecological uncertainty was low. Moreover, ecological uncertainty interacted with childhood SES, but not current SES, in predicting the span of retrospection. Our findings obtained in the context of life satisfaction judgment are largely consistent with the basic presumptions of life history theory (Belsky et al., 2012; Kaplan & Gangestad, 2005).

One potential explanation for the present result is that people from harsh childhoods and benign childhoods have different perceptions about how much of the past seems to belong to the present. While the life satisfaction measure seeks to capture judgments of the present state of affairs, the present moment does not have any objectively measurable duration (James, 1890). It is up to the subjective interpretation of the respondent to decide what the present consists of. Within the logic of life history theory, early-life experiences provide information about how to adapt to the surrounding situation and solve adaptive problems later in life. Even in the face of the same ecological threat, fast strategists, due to their image of an unpredictable and uncontrollable world, seem to base their evaluation of the present on a narrower span of the past. On the other hand, slow strategists may apportion more attention on the distant past and try to deduce regular patterns from the environment guided by a working idea of a predictable and controllable world.

A number of recent studies have begun to support this hypothesized link between life history strategy and retrospective temporal extension. For example, Mittal, Griskevicius, Simpson, Sung, and Young (2015; see also Frankenhuys, Panchanathan, & Nettle, 2016) found that people from unpredictable childhoods perform better at shifting and worse at inhibition in executive function tasks, because shifting attention quickly to ecologically relevant stimuli is more important for them than lingering on past stimuli. This finding points to the possibility that childhood backgrounds shape how information from the past are differently sampled and incorporated into present choice and decisions.

**Appendix A. Descriptive statistics and correlations among all variables**

Variable	M	SD	Correlations							
			1	2	3	4	5	6	7	
1. Age	32.21	10.23								
2. Childhood SES	3.66	1.58	−0.06							
3. Current SES	3.33	1.67	0.11	0.17*						
4. Ecological uncertainty	4.39	1.57	−0.04	−0.02	−0.01					
5. Life satisfaction	4.22	1.50	−0.02	0.27**	0.56**	0.05				
Temporal distance (months)										
6. All events	22.31	9.16	0.13†	0.10	0.09	−0.08	0.09			
7. Positive events	21.46	10.90	0.09	0.02	0.05	−0.02	0.04	0.77**		
8. Negative events	23.16	12.10	0.12†	0.13†	0.09	−0.11	0.10	0.82**	0.27**	

Note. N = 205. SES = socioeconomic status.

† p < .10.

\* p < .05.

\*\* p < .01.

Our finding illustrates how this individual difference in temporal span might be expanded for understanding why some people look further back into their past in constructing judgments of life satisfaction.

One interesting finding from our study was that on average, the memory age (in months) of negative events (M = 23.16, SD = 12.10) was marginally older than that of positive events (M = 21.46, SD = 10.90), t(204) = −1.74, p = .084, 95% CI [−3.62, 0.23]. This pattern dovetails with past research suggesting that the impact of negative events on happiness is more powerful and long-lasting than the impact of positive ones (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001). From an evolutionary perspective, it may be adaptive to remember negative events longer than positive events, because negative events bring fitness costs that are generally higher than fitness gains from positive events (Baumeister et al., 2001).

A limit of our study is that a causal conclusion between life history strategy and retrospective extension cannot be made from our data, since childhood SES and perceptions of the current environment were not directly manipulated. Despite this limitation, the present study provides interesting avenues for future research at the interface of subjective well-being and evolutionary psychology. Evolutionary psychologists have recently begun to apply the framework of life history theory in understanding individual differences in the definition of a happy life (Kenrick & Krems, 2018). One worthy future question is whether fast and slow strategists pursue distinctive patterns of happiness. For instance, given that slow strategists have a longer time horizon than fast strategists, it may be that fast strategists pursue the hedonic aspects of happiness more and focus on having their immediate desires satisfied, while slow strategists adopt the eudaimonic approach to happiness and value meaningfulness of their lives more (see Baumeister, Vohs, Aaker, & Garbinsky, 2013, for this possibility). Directing attention to the evolutionary account of individual variation in life history strategy could offer new insights into the existing research on subjective well-being. The current study provides a first step in this direction to illustrate how childhood environment can shape the breadth of our remembered past, and how this breadth affects evaluation of life as a whole.

**Declarations of interest**

None.

## References

- Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad is stronger than good. *Review of General Psychology*, 5, 323–370. <http://dx.doi.org/10.1037/1089-2680.5.4.323>.
- Baumeister, R. F., Vohs, K. D., Aaker, J. L., & Garbinsky, E. N. (2013). Some key differences between a happy life and a meaningful life. *The Journal of Positive Psychology*, 8, 505–516. <http://dx.doi.org/10.1080/17439760.2013.830764>.
- Belsky, J., Schlomer, G. L., & Ellis, B. J. (2012). Beyond cumulative risk: Distinguishing harshness and unpredictability as determinants of parenting and early life history strategy. *Developmental Psychology*, 48, 662–673. <http://dx.doi.org/10.1037/a0024454>.
- Chen, E., Matthews, K. A., & Boyce, W. T. (2002). Socioeconomic differences in children's health: How and why do these relationships change with age? *Psychological Bulletin*, 128, 295–329. <http://dx.doi.org/10.1037/0033-2909.128.2.295>.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112, 155–159. <http://dx.doi.org/10.1037/0033-2909.112.1.155>.
- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction With Life Scale. *Journal of Personality Assessment*, 49, 71–75. [http://dx.doi.org/10.1207/s15327752jpa4901\\_13](http://dx.doi.org/10.1207/s15327752jpa4901_13).
- Diener, E., Lucas, R. E., & Scollon, C. N. (2006). Beyond the hedonic treadmill: Revising the adaptation theory of well-being. *American Psychologist*, 61, 305–314. <http://dx.doi.org/10.1037/0003-066X.61.4.305>.
- Evans, G. W., Gonnella, C., Marcynyszyn, L. A., Gentile, L., & Salpekar, N. (2005). The role of chaos in poverty and children's socioemotional adjustment. *Psychological Science*, 16, 560–565. <http://dx.doi.org/10.1111/j.0956-7976.2005.01575.x>.
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G\*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41, 1149–1160. <http://dx.doi.org/10.3758/BRM.41.4.1149>.
- Figueredo, A. J., Vásquez, G., Brumbach, B. H., & Schneider, S. M. R. (2007). The K-factor, covitality, and personality. *Human Nature*, 18, 47–73. <http://dx.doi.org/10.1007/BF02820846>.
- Frankenhuis, W. E., Panchanathan, K., & Nettle, D. (2016). Cognition in harsh and unpredictable environments. *Current Opinion in Psychology*, 7, 76–80. <http://dx.doi.org/10.1016/j.copsyc.2015.08.011>.
- Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist*, 56, 218–226. <http://dx.doi.org/10.1037/0003-066X.56.3.218>.
- Griskevicius, V., Delton, A. W., Robertson, T. E., & Tybur, J. M. (2011). Environmental contingency in life history strategies: The influence of mortality and socioeconomic status on reproductive timing. *Journal of Personality and Social Psychology*, 100, 241–254. <http://dx.doi.org/10.1037/a0021082>.
- James, W. (1890). *Principles of psychology*. Vol. 2. New York, NY: Henry Holt.
- Kaplan, H. S., & Gangestad, S. W. (2005). Life history theory and evolutionary psychology. In D. M. Buss (Ed.). *The handbook of evolutionary psychology* (pp. 68–95). New York, NY: Wiley.
- Kenrick, D. T., & Krens, J. A. (2018). Well-being, self-actualization, and fundamental motives: An evolutionary perspective. In E. Diener, S. Oishi, & L. Tay (Eds.). *Handbook of well-being* Salt Lake City, UT: DEF Publishers (doi:nobascholar.com).
- Klein, S. B. (2013). The temporal orientation of memory: It's time for a change of direction. *Journal of Applied Research in Memory and Cognition*, 2, 222–234. <http://dx.doi.org/10.1016/j.jarmac.2013.08.001>.
- Kruger, D. J., Reischl, T., & Zimmerman, M. A. (2008). Time perspective as a mechanism for functional developmental adaptation. *Journal of Social, Evolutionary, and Cultural Psychology*, 2, 1–22. <http://dx.doi.org/10.1037/h0099336>.
- Lucas, R. E. (2007). Adaptation and the set-point model of subjective well-being: Does happiness change after major life events? *Current Directions in Psychological Science*, 16, 75–79. <http://dx.doi.org/10.1111/j.1467-8721.2007.00479.x>.
- Luhmann, M., & Eid, M. (2009). Does it really feel the same? Changes in life satisfaction following repeated life events. *Journal of Personality and Social Psychology*, 97, 363–381. <http://dx.doi.org/10.1037/a0015809>.
- Mittal, C., & Griskevicius, V. (2014). Sense of control under uncertainty depends on people's childhood environment: A life history theory approach. *Journal of Personality and Social Psychology*, 107, 621–637. <http://dx.doi.org/10.1037/a0037398>.
- Mittal, C., Griskevicius, V., Simpson, J. A., Sung, S., & Young, E. S. (2015). Cognitive adaptations to stressful environments: When childhood adversity enhances adult executive function. *Journal of Personality and Social Psychology*, 109, 604–621. <http://dx.doi.org/10.1037/pspi0000028>.
- Nesse, R. M. (2004). Natural selection and the elusiveness of happiness. *Philosophical Transactions of the Royal Society of London B*, 359, 1333–1347. <http://dx.doi.org/10.1098/rstb.2004.1511>.
- Ross, L. T., & Hill, E. M. (2002). Childhood unpredictability, schemas for unpredictability, and risk taking. *Social Behavior and Personality*, 30, 453–473. <http://dx.doi.org/10.2224/sbp.2002.30.5.453>.
- Rubin, D. C., Wetzler, S. E., & Nebes, R. D. (1986). Autobiographical memory across the adult lifespan. In D. C. Rubin (Ed.). *Autobiographical memory* (pp. 202–221). Cambridge: Cambridge University Press.
- Schwarz, N., & Strack, F. (1991). Evaluating one's life: A judgment model of subjective well-being. In F. Strack, M. Argyle, & N. Schwarz (Eds.). *Subjective well-being: An interdisciplinary perspective* (pp. 27–48). Elmsford, NY: Pergamon Press.
- Suh, E., Diener, E., & Fujita, F. (1996). Events and subjective well-being: Only recent events matter. *Journal of Personality and Social Psychology*, 70, 1091–1102. <http://dx.doi.org/10.1037/0022-3514.70.5.1091>.
- Tulving, E. (1985). Memory and consciousness. *Canadian Psychology*, 26, 1–12. <http://dx.doi.org/10.1037/h0080017>.
- White, A. E., Li, Y. J., Griskevicius, V., Neuberger, S. L., & Kenrick, D. T. (2013). Putting all your eggs in one basket: Life-history strategies, bet hedging, and diversification. *Psychological Science*, 24, 715–722. <http://dx.doi.org/10.1177/0956797612461919>.