

The Clock Is Ticking

The Sound of a Ticking Clock Speeds Up Women's Attitudes on Reproductive Timing

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Abstract The “biological clock” serves as a powerful metaphor that reflects the constraints posed by female reproductive biology. The biological clock refers to the progression of time from puberty to menopause, marking the period during which women can conceive children. Findings from two experiments suggest that priming the passage of time through the sound of a ticking clock influenced various aspects of women's (but not men's) reproductive timing. Moreover, consistent with recent research from the domain of life history theory, those effects depended on women's childhood socioeconomic status (SES). The subtle sound of a ticking clock led low (but not high) SES women to reduce the age at which they sought to get married and have their first child (Study 1), as well as the priority they placed on the social status and long-term earning potential of potential romantic partners (Study 2). Findings suggest that early developmental sensitization processes can interact with subtle environmental stimuli to affect reproductive timing during adulthood.

Keywords Life History Theory · Reproductive timing · Mate preferences · Sex differences · Priming · Evolutionary psychology

One factor that plays a critical role in maximizing an individual's reproductive fitness is that person's reproductive timing. Reproductive timing reflects the schedule and duration with which people (and members of other animal species) begin to focus their energy and resources toward bearing and caring for offspring. Evolutionary theories, most notably life history theory (e.g., Ellis 2004; Kaplan and Gangestad 2005), suggest that an individual's reproductive timing often is adaptively calibrated to help that individual maximize his or her overall level of reproductive fitness (Del Giudice, Ellis, and Shirtcliff 2011).

Recent research in evolutionary psychology suggests that people's reproductive timing can be influenced by interactions between early developmental experiences

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and proximate environmental triggers. For example, several recent studies suggest that proximate signs of environmental unpredictability or uncertainty interact with an individual's childhood socioeconomic status (SES) to affect their reproductive decision making (Griskevicius, Delton, Robertson, and Tybur 2011a). The overall pattern emerging from the literature suggests that salient signs of environmental unpredictability or uncertainty lead adults with a low childhood SES background to speed up their reproductive timing, whereas those same signs of unpredictability or uncertainty lead those with a high childhood SES background to slow down their reproductive timing. Thus, evidence suggests that experiencing high versus low early childhood SES differentially sensitizes individuals so that they respond differently—though adaptively—to the salient presence of stressors and reproductive threats later in life (Simpson, Griskevicius, Kuo, Sung, and Collins 2012).

Might childhood SES also interact with the presence of much subtler environmental cues that directly signal potential reproductive threat? In the current research we integrate evolutionary theories of reproductive timing with theories of priming and embodied cognition to test hypotheses about one very subtle stimulus—the simple sound of a ticking clock—that might affect women's reproductive timing.

Life History Theory and Moderating Effects of Childhood Socioeconomic Status

Life history theory (LHT; Kaplan and Gangestad 2005), a theory from evolutionary biology that has been widely supported in studies of many species, suggests that the schedule and duration of key events in an organism's lifetime are shaped by natural selection to produce the highest possible number of surviving offspring (Mucignat-Caretta, Caretta, and Cavagioni 1995). There is wide variability across species in how organisms develop, how long they live, and how many offspring they produce across their lifespan (Fabian and Flatt 2012). Some organisms focus their energy on reproductive quantity, thereby increasing the probability that they will give birth to at least one surviving offspring. Other organisms, in contrast, focus their energy on reproductive quality, creating offspring that have the greatest chance at survival. The key is that different organisms employ different strategies on how best to produce surviving offspring.

For humans, there is wide variability in life history strategies. Most humans tend to create few offspring and invest heavily in those offspring. However, some individuals tend to have many children and, in doing so, sometimes sacrifice the amount of investment each child receives. Deciding whether to invest heavily in a few offspring or invest less in many offspring is one of the fundamental trade-offs that humans face during their lifespans.

At any point in time, a person also faces a trade-off between investing in current reproduction (faster life history strategy) and future reproduction (slower life history strategy). Many factors can determine how a person navigates this trade-off. One key factor identified by recent LHT research is a person's childhood socioeconomic status (SES; Griskevicius et al. 2011a, 2011b). Poorer environments are likely to involve a greater prevalence of unpredictable stressors such as residence changes, fluctuating employment, and unpredictable resource availability (Belsky, Steinberg, and Draper 1991). Such unpredictable features are likely to be relatively absent from wealthier

environments. Recent studies suggest that the unpredictability of early childhood environments plays a key role in shaping an individual's life history strategy through adulthood (Belsky, Schlomer, and Ellis 2012; Simpson et al. 2012).

When confronted with circumstances that signal threats to their reproductive potential (e.g., mortality cues or signs of economic uncertainty or instability), people with high versus low SES in childhood respond in very different ways. Because their childhood environment signals that payoffs associated with long-term investments are uncertain and unpredictable, people from low SES backgrounds are sensitized at an early age to the possibility of poor long-term reproductive prospects. People from low SES childhood backgrounds tend to develop a mindset in which investing in building long-term somatic resources is unwise because of frequent threats posed by the environment. Consequently, people with low SES backgrounds tend to respond to forms of threat (e.g., economic threat, stress, or uncertainty) by focusing on short-term gains associated with reproducing quickly (Griskevicius et al. 2011a). Individuals from wealthier childhood backgrounds, in contrast, are sensitized to the presence of strong, long-term reproductive prospects and learn that those prospects are relatively positive and predictable—in which they can afford to invest by building somatic resources now so that they can attract a desirable long-term partner and care for offspring more effectively in the future. People from high SES backgrounds, thus, tend to respond to environmental threat by “weathering the storm”—by focusing more on long-term investments likely to enhance the reproductive quality and welfare of their offspring over the lifespan (Griskevicius et al. 2011a).

The effects of childhood SES tend not to generalize to current or future (i.e., anticipated) SES (Griskevicius et al. 2011a, 2011b). This is consistent with the idea that childhood SES exerts an early developmental sensitization effect. Although the current literature is not yet fully definitive with regard to what ages, in particular, see the strongest sensitization effects, extant evidence suggests that sensitization to environmental stressors occurs more strongly during early childhood (0–5 years of age) than during adolescence or adulthood (Belsky et al. 2012; Simpson et al. 2012). A consistent pattern of evidence indicates that responses to immediate environmental stressors are moderated by childhood SES, but not adolescent or adult SES. Thus, in the current studies, we expected moderating effects of SES to be limited to childhood SES.

Signals of Reproductive Threat

Thus far, the literature has focused on how childhood SES moderates people's responses to environmental cues that signal threats to one's physical and financial well-being. For example, Griskevicius et al. (2011a) found that mortality cues shift individuals into different life history strategies as a function of their childhood SES. To prime mortality, the authors had participants read a newspaper article describing recent trends (ostensibly) suggesting a sharp increase in violence in the United States. The article mentioned increases in shootings in both residential and commercial areas and emphasized that seemingly random deaths were becoming a more common part of life. Thus, the threat communicated by the article involved the presence of physical danger and potential for injury and death.

The presence of economic threat has been shown to produce similar effects. For example, Griskevicius et al. (2013) found that cues of economic uncertainty also affected individuals from different childhood socioeconomic backgrounds in different ways. In

these studies, the authors primed economic uncertainty by having participants view images related to recession, such as foreclosure signs and unemployment lines, as well as read a newspaper article describing the recent economic recession. Thus, the threat communicated by these manipulations involved the presence of economic uncertainty, rather than threats to one's physical well-being. Individuals from low SES backgrounds responded to the financial threat by becoming more impulsive and riskier whereas individuals from high SES backgrounds responded to the financial threat by becoming less risky. Taken together, these studies have focused primarily on how one's reproductive timing is affected by acute stressors and signs of physical or financial threat.

There are reasons to think that the proximate triggers affecting a person's reproductive timing are not limited to overt signs of physical threat but may extend also to highly subtle cues that directly signal the presence of reproductive threat. In the current paper, we investigate the possibility that subtle environmental cues that signal limitations on women's reproductive capacity will influence their reproductive timing.

To test this hypothesis, we recruited ideas and methods from research on priming and embodied cognition. Research on priming suggests that psychological processes can be powerfully influenced by environmental triggers that are highly subtle and perhaps even subconscious (e.g., Ackerman, Nocera, and Bargh 2010). In the current research, we used a subtle trigger—the simple sound of a ticking clock—to activate cognitions associated with women's temporally limited reproductive capacity.

Women's reproductive capacity is strongly constrained by their age. Unlike men, who can produce offspring until very old age, women lose their ability to conceive children at menopause. Consequently, environmental cues that signal the passage of time may prime the presence of reproductive threat for women. Because a woman's reproductive capacity is temporally limited, subtle cues that signal the passage of time—such as the perception of a ticking clock—may signal threats to women's reproductive potential.

Building on the work of Griskevicius and colleagues, we predicted that priming the passage of time would interact with women's childhood SES to affect reproductive timing. Paralleling findings from studies that have primed physical and financial threat, we predicted that priming the passage of time via a ticking clock would speed up reproductive timing primarily for women from low SES childhood backgrounds, but not high childhood SES backgrounds.

These hypothesized effects of a ticking clock are also consistent with theories of embodied cognition (e.g., Kaschak and Maner 2009). One aspect of an embodied approach focuses on the presence of psychological metaphors that link basic sensory-motor processes with higher-order cognition. Recent empirical examples illustrate that suspicion is metaphorically associated with viewing something as “fishy”; consequently, exposure to a fishy smell led participants to perceive partners as more suspicious and less trustworthy (Lee and Schwarz 2012). Physical warmth is metaphorically associated with interpersonal closeness; consequently, merely holding a cup of warm coffee activated affiliative thoughts and led participants to perceive others as kinder and more trustworthy (Fay and Maner 2012; Williams and Bargh 2008). Over time and continued association, the semantic links between basic perceptions such as warmth and higher-order cognitions such as judgments of trustworthiness become strengthened. Consequently, exposing an individual to the basic sensory stimulus (e.g., a fishy smell or a warm cup) activates a network of associated cognitions that give rise to higher-order judgments and decisions (Schröder and Thagard 2013).

The current research tests a set of hypotheses about a social metaphor relevant to a woman's reproductive timing: the notion of the "biological clock." The biological clock metaphorically represents the progression of time from puberty to menopause, marking the period during which women can conceive children. Because a woman's reproductive capacity is temporally limited, the perception of a ticking clock may serve as a subtle sign of reproductive threat, thereby activating the life history strategies typically seen in people from high versus low SES childhood environments.

As described above, we predicted that the subtle perception of a ticking clock would prime participants with the passage of time, speeding up the reproductive timing of women from low SES backgrounds. However, we predicted that this same prime would not speed up—and might even slow down—the reproductive timing of women from high SES backgrounds. Notably, these predictions should not be expected to generalize to men. Because men's reproductive potential is not temporally limited in the same way as it is for women, we did not anticipate strong effects of a ticking clock on men's reproductive timing. Despite not predicting any findings for men, we included men in the studies as a point of comparison.

Overview of the Current Studies

Two experiments primed people with the sound of a ticking clock and tested whether the prime would interact with childhood SES to speed up women's (but not men's) reproductive timing. Study 1 tested the hypothesis that the prime would reduce the age at which low SES women (but not high SES women) wanted to commit to a long-term relationship and have their first child. In Study 2, we examined another reflection of reproductive timing—the extent to which women would alter the characteristics they seek in potential mates. Women pursuing a faster mating strategy aimed at reaping immediate reproductive benefits tend to shift their priorities away from signs of social status and long-term earning potential and instead toward physical attractiveness (Haselton and Gangestad 2006; Li and Kenrick 2006). We therefore expected the ticking clock prime to interact with childhood SES to elicit this shift, such that low SES women (but not high SES women) primed with the sound of a ticking clock would reduce the priority they placed on social status and increase the priority placed on attractiveness. Finally, we predicted no moderating effects of current or future SES. Because responses to proximate signs of reproductive threat reflect sensitization effects during early development, the effects of current or anticipated SES should have minimal bearing on women's reproductive timing in the presence of the ticking clock.

Study 1

Method

Participants Fifty-nine heterosexual undergraduates (41 women, 18 men) participated for course credit. All participants gave their informed consent prior to their inclusion in the study. Age ranged from 18 to 21 years ($M=18.75$, $SD=0.94$).

Design and procedure Participants were randomly assigned to complete measures in either the presence or absence of a ticking clock (a small white kitchen timer). The clock was located on a table and was both visible and audible to the participant. Participants in the control condition completed the survey in a silent room.¹

The main dependent variable reflected participants' thoughts about and attitudes toward reproductive timing. Items were taken from previous research (Griskevicius et al. 2011a). Participants responded to four items: (1) "How old do you think you'll be when you get married?" (2) "If you were to get married, in how many years from now do you think you'll want to get married?" (3) "How old do you think you'll be when you have your first child?" (4) "If you were to have children, in how many years from now do you think you'll want to have your first child?" The four items were standardized and averaged ($\alpha=0.84$). Higher numbers reflected slower reproductive timing.

We assessed both childhood SES and current/future SES. Measures were adopted from previous research (Griskevicius et al. 2011a, 2011b). Items assessing childhood SES were: (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" (1=strongly disagree, 7=strongly agree; $M=4.33$, $SD=1.38$, $\alpha=0.83$). Items assessing current/future SES were: (1) "I have enough money to buy things I want"; (2) "I don't worry too much about paying my bills"; (3) "I don't think I'll have to worry about money too much in the future" (1=strongly disagree, 7=strongly agree; $M=4.23$, $SD=1.52$, $\alpha=0.74$). Participants were also asked their household family income during their childhood. Participants selected from a range of response options: (1) \$10,000 or less, (2) \$10,001–\$25,000, (3) \$25,001–\$40,000, (4) \$40,001–\$50,000, (5) \$50,001–\$75,000, (6) \$75,001–\$100,000, or (7) \$100,000 or more ($M=4.85$, $SD=1.69$).

Results and Discussion

We used a linear regression model to predict reproductive timing from participant sex, experimental condition (ticking clock vs. control), childhood SES (a continuous variable), and their centered interactions. We observed the predicted three-way interaction among condition, sex, and childhood SES, $\beta=-0.87$, $p=0.03$, partial r^2 (pr^2)= -0.30 (Fig. 1). Because SES was a continuous variable, we used regression to test the simple slopes. Among participants high in childhood SES (1 SD above the mean), no significant effects

¹ Because previous LHT studies have focused on the role of stress, we considered the possibility that the ticking clock could have made people feel rushed, which could have created some sense of stress. To rule out this explanation for our findings, we collected data from an independent sample (50 women, 26 men) and showed that the ticking clock did not make people feel especially rushed. While they completed a short questionnaire, we subjected them to both the kitchen timer condition and a mild but explicit time-constraint condition (the experimenter asked the participant to complete the questionnaire quickly). We then asked participants to indicate how rushed they felt (1=not rushed at all, 9=extremely rushed). Participants did not report feeling rushed in the kitchen timer condition ($M=2.89$, $SD=2.24$) and, if anything, they felt less rushed than in the time constraint condition ($M=3.71$, $SD=2.48$; $t_{74}=-1.50$, $p=0.14$). Thus, it seems unlikely that the effects we observed were due to participants feeling rushed or stressed.

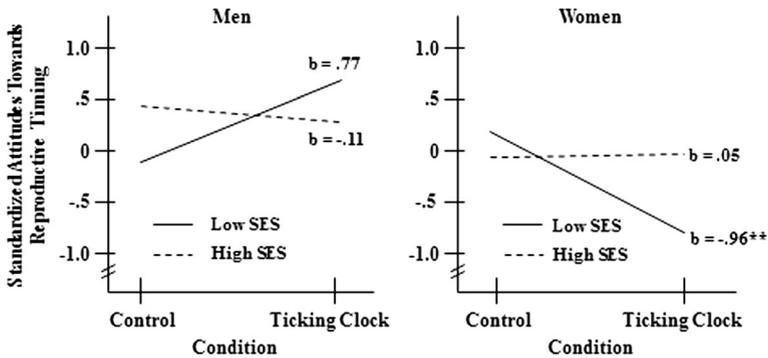


Fig. 1 A ticking clock prime interacted with childhood socioeconomic status, leading women from poorer childhood socioeconomic backgrounds to want to get married and have children at an earlier age. Lower numbers reflect a desire to get married and have children at an earlier age. *b* refers to unstandardized regression coefficients. ** $p < 0.01$

were observed. Among participants low in childhood SES (1 SD below the mean), we observed the predicted interaction between condition and sex, $\beta = 0.49$, $p = 0.01$, $pr^2 = 0.37$.

Among low SES men, we found no significant effect of condition, $\beta = 0.47$, $p = 0.13$. However, we did find the predicted effect for women, $\beta = -0.59$, $p = 0.01$, $pr^2 = -0.36$. The ticking clock sped up reproductive timing among women from lower SES backgrounds. No priming effect was observed among men or women with high childhood SES (p values > 0.80). Thus, the effect was specific to women from low childhood socioeconomic backgrounds.

Similar analyses assessed the possibility that moderating effects would generalize to participants' current/future SES. However, as predicted, we did not find a significant interaction among condition, sex, and current/future SES, $\beta = -1.11$, $p = 0.28$, $pr^2 = -0.15$. Nor did the ticking clock speed up reproductive timing for women with currently low SES, $\beta = -0.30$, $p = 0.16$, $pr^2 = -0.20$. Thus, the effect we observed was limited to moderation by childhood SES and did not generalize to current SES.

Findings suggest that the sound of a ticking clock caused women with low childhood SES to speed up their reproductive timing by wanting to get married and have their first child at an earlier age. This pattern of results provides evidence suggesting that, like highly overt reproductive threats, a very subtle sign of reproductive threat (a ticking clock) interacted with childhood SES to affect women's reproductive timing.

Study 2

In Study 2 we examined another reflection of reproductive timing—the extent to which women would alter the characteristics they seek in potential mates. Women pursuing a faster mating strategy aimed at reaping immediate reproductive benefits tend to shift their priorities away from signs of social status and long-term earning potential and toward physical attractiveness instead (Haselton and Gangestad 2006; Li and Kenrick 2006). We predicted that the ticking clock prime would elicit this shift among women with low (but not high) childhood SES. Consistent with previous research, we expected that high childhood SES would buffer against this effect and, if anything, women from

high SES backgrounds would respond by increasing—not decreasing—the priority they placed on social status. Furthermore, we wanted to highlight the specificity of the biological clock metaphor by using a different control condition than used in Study 1—a non-ticking clock. If the metaphor “the biological clock is ticking” is activated by the sound of the ticking clock, rather than just the presence of a clock, then we should find effects for the ticking clock, but not for the non-ticking clock.

Method

Participants Seventy-four heterosexual undergraduates (51 women, 23 men) participated for course credit. All participants gave their informed consent prior to their inclusion in the study. Ages ranged from 18 to 32 years ($M=19.51$, $SD=2.48$).

Design and procedure As in Study 1, participants assigned to the ticking clock condition completed measures in the presence of a small, ticking kitchen timer. To ensure that any effects were from the ticking of the clock, as opposed to the mere presence of a clock, the control condition was altered so that participants completed measures in the presence of the same timer, which was not ticking.

We used a task from previous research (Li, Bailey, Kenrick, and Linsenmeier 2002; Li and Kenrick 2006) in which participants allocated “mate dollars” to traits they wished to prioritize in a long-term romantic partner. Participants allocated low (\$10), medium (\$20), and high (\$30) budgets to purchase percentile levels of five characteristics (social status, creativity, kindness, physical attractiveness, and liveliness). For each budget, participants started with a mate who was at the 0th percentile for each characteristic. To purchase additional percentiles, participants spent mate dollars. The proportion of the budget one spent on a characteristic corresponded to the percentile they desired for that characteristic. For example, in a \$10 budget, if a participant desired a mate who was at the 50th percentile in physical attractiveness, they would spend \$5 on attractiveness. Thus, spending money on one characteristic meant spending less money on other characteristics.

Consistent with previous research (Li et al. 2002), we expected priming effects to be most apparent at the lowest budgets (\$10 and \$20), when trade-offs among the characteristics forced the participant to prioritize the traits that he or she desired in a partner. The primary dependent measure was the proportion of the budget spent on each characteristic (on social status and physical attractiveness, in particular).

Using the same measures from Study 1, we also assessed childhood SES ($M=4.94$, $SD=1.42$, $\alpha=0.85$), current/future SES ($M=4.47$, $SD=1.44$, $\alpha=0.77$), and household family income during childhood ($M=5.51$, $SD=1.58$).

Results and Discussion

The means and standard deviations for allocation to the five characteristics for both the \$10 and \$20 budgets are provided in Table 1. Using linear regression, we predicted the proportion of the budget allocated to attractiveness and social status from participant sex, priming condition, childhood SES, and their centered interactions. No significant

Table 1 Means (and standard deviations) for the amounts allocated to five traits of potential mates

	Ticking Clock		Control	
	Males	Females	Males	Females
\$10 budget				
Attractiveness	3.45 (1.13)	2.48 (1.42)	4.58 (1.56)	3.04 (1.46)
Creativity	1.09 (1.04)	0.76 (0.93)	0.42 (0.79)	0.46 (0.58)
Kindness	2.64 (1.29)	3.20 (1.47)	2.92 (1.51)	2.69 (1.32)
Liveliness	1.36 (0.81)	1.40 (1.00)	1.25 (0.75)	1.77 (1.45)
Social level	1.45 (0.93)	2.16 (1.91)	0.83 (0.72)	2.04 (1.76)
\$20 budget				
Attractiveness	5.64 (1.57)	4.72 (1.49)	6.42 (1.31)	5.58 (2.06)
Creativity	2.64 (0.92)	2.00 (1.96)	2.50 (1.38)	1.81 (1.47)
Kindness	4.82 (1.60)	5.36 (1.22)	5.17 (1.47)	5.12 (1.75)
Liveliness	3.09 (1.70)	3.68 (1.41)	3.42 (0.90)	3.65 (1.98)
Social level	3.82 (1.47)	4.24 (2.57)	2.50 (1.62)	3.85 (2.46)

effects were found for attractiveness. However, for social status, we observed the predicted three-way interaction for the \$10 budget, $\beta=-2.88$, $p=0.01$, $pr^2=-0.30$, and \$20 budget, $\beta=-2.89$, $p=0.02$, $pr^2=-0.30$ (Fig 2). Consistent with Li and Kenrick (2006), the size of the interaction was reduced as the budget size increased to \$30 and participants were not forced to prioritize as much among the traits, $\beta=-1.91$, $p=0.11$.

Consistent with Study 1, there were no significant effects among participants with high childhood SES (1 SD above the mean) for either the \$10 budget, $\beta=-0.20$, $p=0.23$, or the \$20 budget, $\beta=-0.19$, $p=0.26$. However, for participants with low childhood SES (1 SD below the mean), we observed the predicted interaction between

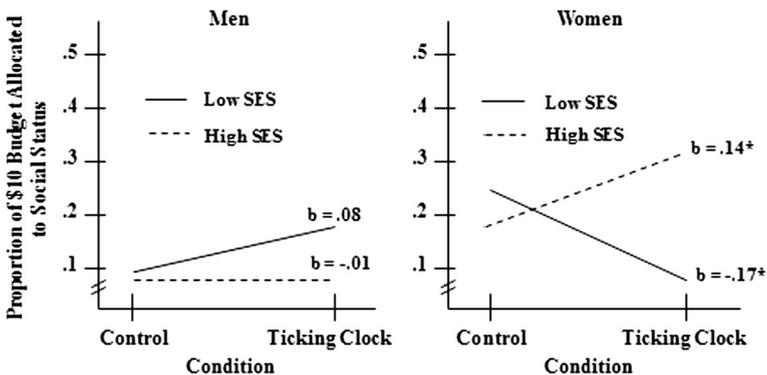


Fig. 2 A ticking clock prime interacted with childhood socioeconomic status, leading women from poorer childhood socioeconomic backgrounds to reduce the priority they placed on social status in a potential mate. Women from higher socioeconomic backgrounds displayed the opposite effect. b refers to unstandardized regression coefficients. $*p<0.05$

condition and sex for both the \$10 budget, $\beta=0.36$, $p=0.02$, and the \$20 budget, $\beta=0.38$, $p=0.02$.

Among women with low SES, we found a significant priming effect for both the \$10 budget, $\beta=0.54$, $p=0.03$, $pr^2=0.27$, and the \$20 budget, $\beta=0.44$, $p=0.07$, $pr^2=0.22$. The ticking clock prime led low SES women to allocate less of their budget to social status. We also found a priming effect among high SES women for the \$10 budget, $\beta=-0.40$, $p=0.04$, $pr^2=-0.25$, and the \$20 budget, $\beta=-0.43$, $p=0.03$, $pr^2=-0.26$. This effect was in the opposite direction, such that the ticking clock led high SES women to allocate more of their budget to social status. Among men with low SES, we found no effect of prime for either the \$10 budget, $\beta=-0.25$, $p=0.29$, $pr^2=-0.13$, or the \$20 budget, $\beta=-0.37$, $p=0.12$, $pr^2=-0.19$.

As in Study 1, additional analyses assessed whether moderating effects of SES would generalize to current/future SES. No evidence for such moderating effects was found. Thus, the sound of a ticking clock altered the traits women prioritized in long-term partners. The prime led women with low childhood SES to de-prioritize social status—a trait on which women typically place a premium in long-term mating contexts (Li et al. 2002). In contrast, the prime increased rather than decreased the priority placed on social status by women with high childhood SES. This last finding is consistent with previous evidence (Griskevicius et al. 2011a) suggesting that, among individuals with high childhood SES, salient reproductive threats can slow down reproductive timing.

General Discussion

Two studies supported the prediction that the subtle sound of a ticking clock would interact with childhood SES to influence women's reproductive timing. Women with low childhood SES who were primed with the sound of a ticking clock sought to get married and have their first child at an earlier age, whereas no such effect was observed among women from a high SES background. In addition, low SES women primed with the sound of a ticking clock also reduced the priority they placed on men's social status and long-term earning potential—a characteristic valued primarily in long-term mating contexts. In contrast, high SES women primed with the sound of a ticking clock increased the priority they placed on men's social status. These moderating effects were limited to childhood SES and did not extend to current or future SES, highlighting the significance of early sensitization periods for responses to reproductive threat later in life (see Belsky et al. 2012; Simpson et al. 2012).

Although our manipulation interacted with childhood SES to affect important aspects of women's reproductive decision-making, we saw no effects among male participants. This is consistent with the fact that, because men's reproductive potential is not temporally limited to the same extent that women's is, men should be less threatened by environmental cues that signal the passage of time. Indeed, the fact that we found effects for women but not for men supports the idea that the manipulation primed threats linked with the temporally limited nature of women's (but not men's) reproductive capacity, as opposed to more general forms of uncertainty or stress. If the effects we observed were driven by uncertainty or stress, one would have expected equivalent effects in men and women. Although we did observe non-significant trends

for men in these studies, notably, those trends were in the opposite direction from those for women.²

Although women primed with the ticking clock reduced the value placed on men's social status, we did not find a corresponding increase in the value they placed on physical attractiveness. One possible explanation is that our undergraduate women already placed a high priority on attractiveness. Indeed, secondary data analyses showed that in all budgets women placed significantly higher priority on attractiveness than on status (see also Table 1). The lack of effects for attractiveness, therefore, could reflect a ceiling effect.

The current research expands the life history literature by demonstrating that threats linked to time constraints on women's reproductive capacity produce effects that are similar to those produced by environmental signals of stress and uncertainty. The current findings also illustrate that subtle proximate reproductive threat cues in the environment operate in a similar fashion to highly overt cues. For example, previous research has demonstrated that exposure to descriptions of mortality or unpredictability influences various aspects of reproductive timing (Griskevicius et al. 2011a). However, previous studies have employed cues that are highly overt and salient and thus likely to be processed at a highly conscious level. The present research, in contrast, integrated insights from the literatures on priming and embodied cognition to demonstrate that reproductive timing is also affected by exposure to subtle sensory cues in the immediate environment.

The current findings also extend recent work in the embodied cognition literature. For example, previous embodiment studies have demonstrated that activation of a particular metaphor generates a perceptual lens through which people see the world. For instance, warm temperatures make people see others as warmer (Williams and Bargh 2008) and desired objects are seen as physically closer (Balcetis and Dunning 2010). However, previous embodiment studies have generally fallen short of integrating an adaptationist perspective. The integration of evolutionary thinking with embodiment provides an exciting and relatively unexplored avenue of research (Kaschak and Maner 2009). In the current research, it enabled us to generate specific and novel predictions pertaining to how, and for whom, the sound of a ticking clock might affect reproductive decision making.

Some aspects of the current findings may reflect a person's tendency to discount the future. For example, the findings of Study 1 suggest that women from low SES backgrounds responded to priming by seeking to reproduce earlier, which could reflect a lack of focus on events in the more distant future. However, findings from these studies are not fully explainable in terms of future discounting. For instance, women in Study 2 also changed the characteristics they sought in a long-term mate, reducing the importance placed on social status. While this effect is consistent with future discounting, it also seems to reflect a larger change in women's mating strategy. Future research would benefit from further examination of the role future discounting may play in determining people's life history strategies.

² We performed two meta-analyses to assess the overall significance and effect sizes of the ticking clock prime for low SES males across the two studies. The first analyzed low SES men across Study 1 and using the \$10 budget results from Study 2. The second analyzed low SES men across Study 1 and Study 2 using the \$20 budget. The effect was significant across Study 1 and Study 2's \$10 budget ($z=1.77$, $p=0.038$), as well as across Study 1 and Study 2's \$20 budget ($z=2.15$, $p=0.016$). Weighting each study by its degrees of freedom, the studies yielded an effect size across Study 1 and the Study 2 \$10 budget of $pr^2=0.165$ and across Study 1 and the Study 2 \$20 budget of $pr^2=0.198$.

Another future direction involves the role of acute stress. Previous evidence suggests that people's life history strategies are strongly influenced by experiences of acute stress (Del Giudice, Ellis, and Shirlcliff 2011). Although the effects we observed here do not seem to be explained by acute stress, it is likely that many women do experience stress when thinking about limitations on their child-bearing years. Such stress could become particularly pronounced as women approach ages at which bearing children becomes riskier and more difficult. Future research would benefit from investigating the role acute stress plays in women's reproductive decision-making and life history choices. Such investigations would benefit from including physiological measures of stress such as heart rate or cortisol.

One limitation of the current studies involves the relatively small sample sizes, particularly the samples of men. Although there were no significant effects for men across either study, meta-analyses demonstrated statistically reliable effects for low SES men (see footnote 2). Thus, priming low SES men with the passage of time may have slowed down their reproductive timing, leading them to delay marriage and reproduction. One possible explanation for this effect is that being primed with the passage of time activated a short-term mating strategy for low SES men. One roadblock to engaging in short-term casual sex is being married and having children. Thus, it is possible that low SES men responded to the ticking clock by slowing down their reproductive timing in an effort to engage in more short-term mating. However, this interpretation should be considered with caution. Because the effects did not reach statistical significance in either of the individual studies, future research should aim to replicate the current findings in an effort to understand more directly how the passage of time affects men's reproductive timing.

Another limitation of the current research involves the limited variability in age and SES within our samples. Both studies used university samples that consisted primarily of middle-class participants. We observed effects despite the limited variability, which speaks to the strength of the effects. Nevertheless, future research could benefit from examining whether the current findings generalize to older women and women from more diverse economic backgrounds.

A final limitation of our studies involves the use of overt measures of reproductive timing and mating preferences. It is likely that many of people's basic motivations—including those linked with reproduction—are not conscious or open to introspective awareness. Our use of the overt measures in these studies was based in part on the fact they have been used previously in published work based on an evolutionary perspective (Griskevicius et al. 2011a; Li et al. 2002). Thus, an advantage of these measures is that they facilitate comparison with previously published research. However, future research would profit from examining the extent to which people's reproductive strategies are reflected in more implicit measures of reproductive timing and mate preferences.

In conclusion, the current research suggests that priming the passage of time via the sound of a ticking clock affects important aspects of social decision-making. A very subtle auditory prime changed the timing with which women sought to have children and the traits they sought in potential partners—both central aspects of women's mating-related psychology. The current studies illustrate how the integration of evolutionary thinking with theories of priming and embodiment can help generate specific hypotheses that would not be generated by either approach on its own. The union of

these two approaches can provide valuable insight into the often adaptive links between subtle perceptual experiences and higher-order forms of cognition.

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