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The Implicit Activation Mechanism of Culture: A Survey Experiment on Associations with Childbearing

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Abstract

This paper proposes a mechanism by which exposure to forms of culture “in the world” activates individuals’ cognitive associations beneath conscious awareness, making certain behaviors more likely. A survey experiment illustrates part of the proposed mechanism, testing whether cues that make salient a shared cultural representation affect the activation of individuals’ associations with childbearing. Drawing on cultural beliefs regarding the ostensible contradiction between close relations and monetary exchange, we expect that making one of these spheres salient would inhibit activation of associations with the other sphere. As predicted, respondents randomly assigned to a cue regarding family have fewer associations between childbearing and finances. We demonstrate the relevance of these findings to respondents’ fertility desires, a measure connected to behavior. We discuss the conditions under which this mechanism may exert the most influence on behavior and outline key future research questions that the proposed model introduces.

Keywords

culture; cognition; culture-cognition interaction; fertility; experimental methods

Introduction

One of the most important debates in cultural sociology in the last several decades concerns the nature of the relationship between elements of culture located and assessed at the individual level—such as attitudes, beliefs, values, schemas, mental models, repertoires, and toolkits—and action (see Patterson 2014; Swidler 1986; Swidler 2001; Vaisey 2009). Most of this literature has focused on those aspects of culture located within individuals and has paid less attention to those aspects of culture that exist and are assessed at the supraindividual level (DiMaggio 1997). There is analytical value to considering the concept we refer to as culture at both the individual, cognitive level and at the supraindividual level (e.g., D’Andrade 1995; DiMaggio 1997; Strauss and Quinn 1997); Lizardo (2017) refers to this distinction as one between personal and public culture.

At the individual level, culture is encoded as cognitive structures that store information about previous experiences; individual-level (or personal) culture draws on cognitive processes involved in building and using those stored representations (e.g., attention, interpretation, inference). At the supraindividual (or public) level, culture includes representations that can exist independent of their articulation or display by specific individuals, such as narratives, symbols, signs, widely available messages, discourses, and ideologies. Understanding culture, according to DiMaggio (1997), requires attention not only to how shared information is stored in individuals' memory or to the external symbolic environment, but to the interaction between them. Most research on culture examines either one form of culture or the other, but relatively little work directly addresses the interaction between the two.

Work in cognitive psychology helps illustrate one possible mechanism by which public or supraindividual forms of culture interface with personal cultural forms to make certain behaviors more likely. We propose that this mechanism operates largely through forms of individual culture that individuals often cannot explicitly articulate, or what Lizardo (2017) refers to as non-declarative personal culture. We call this the *implicit activation mechanism* of culture. This paper develops an empirical application of this theoretical approach to the study of childbearing, using an experimental survey design.

We use experimental methods to bring to mind widely circulating cultural beliefs about a perceived contradiction between intimate relations and economic transactions and then observe how those cues influence cognition about childbearing. We illustrate the implications of this interaction for a measure of fertility-related behavioral desires—preferences about tradeoffs between work and family size. While we do not provide empirical evidence for all elements of the proposed mechanism, the evidence here indicates the value of additional empirical research into this mechanism and we provide suggestions regarding the direction of that research in the discussion. By applying the proposed mechanism to the domain of childbearing, we contribute to a growing literature that calls for building more realistic models of cognitive processes into the study of demographic behavior (Bachrach 2014; Bachrach and Morgan 2013; Thornton et al. 2012; Johnson-Hanks et al. 2011).

Implicit Activation Mechanism and the Interaction of Cultural Forms

Culture scholars have drawn on current work in social and cognitive psychology to improve our understanding of the relationship between individual cognition, conceptualized as a key element of culture, and supraindividual forms of culture (e.g. Cerulo 2002; Lizardo 2004; Martin 2010; Miles 2014; Vaisey 2009). In linking these two levels of analysis of culture, most scholars have focused on the processes by which supraindividual culture is learned and stored cognitively at the individual level; how supraindividual culture becomes “internalized.” As Collett and Lizardo (2014) note, this research “...argues that culture is powerful in social life because it becomes internalized as highly accessible schemas: cognitive structures used for categorization and interpretation of events, objects, situations, and persons” (p. 97). One way in which culture is shared is that individuals learn similar patterns and associations, stored at the individual level as sets of cognitive associations. This

process, which occurs over time and depends on repeated exposures in order to consolidate learning, is how individuals acquire forms of supraindividual culture.

The implicit activation mechanism differs from most existing studies by providing an account of how supraindividual culture and the cultural environment interact with culture stored at the individual level *after* individuals learn and store cognitive associations. This proposed mechanism addresses how supraindividual forms of culture *activate* culture stored at the individual level in everyday life, in a manner that operates beneath the conscious awareness of individuals. We illustrate the mechanism, and its contrast to other accounts of the interaction between supraindividual forms of culture and individual level forms of culture, in Figure 1, which presents the conceptual model and our study design.

The implicit activation mechanism (arrow A) is based on short-term exposures to supraindividual elements of culture, in contrast to the mechanism represented by arrow B, which relies on long-term or repeated exposure that shapes the learning of cognitive associations.¹ Frequently encountered elements of supraindividual culture can make certain cognitive associations salient to individuals exposed to those elements. The effects of activating cognitive concepts through the implicit activation mechanism are short-lived and context-dependent. The effects of supraindividual elements of culture occur regardless of an individual's endorsement of the meaning of that element of culture. For example, Alter and Kwan (2009) find that exposing white Americans to symbols associated with East Asia (e.g., the yin-yang symbol) affects subsequent evaluations of the likelihood of change, a meaning generally associated with those symbols.

We contend that this mechanism is important for two reasons. First, because different supraindividual elements of culture are unevenly distributed (e.g., there are more Christian crosses in certain neighborhoods or in certain states than others, corresponding to the distribution of Christian-identified organizations or how frequently individuals display the cross in jewelry and clothing, or around their houses), some individuals are repeatedly exposed to some primes more than others. The repeated activation of particular cognitive associations makes those cognitive associations more chronically accessible (e.g., Hall 2003), increasing the frequency of their use across situations. Differential exposure to supraindividual elements of culture may map onto different social categories and thus constitute one way in which these categories become meaningful in shaping behavior. Second, while the proposed mechanism may not play a large role in shaping behavior most of the time, it may be particularly influential at specific decision moments in life. We elaborate on this point below.

The “study design” layer of Figure 1 describes the relationship between the conceptual model and our empirical evidence. We use an experimental method to illustrate arrow A of this mechanism. We randomly assign respondents to conditions where they are exposed to certain cues (regarding family or finances) meant to introduce widely shared cultural beliefs

¹-Connectionist models of cognition—where cognition emerges from the activation of interconnected networks of neurons—elide the distinction between the storage of representations (memory) and the activation of associations. Learning, or long-term storage of representations, is a result of repeated activation in these models (e.g., Conrey and Smith 2007, Rumelhart, Hinton, and McClelland 1986, Smith 1998).

about intimate relations or economic transactions, or to a control group exposed to no framework. The cues make shared cultural beliefs about families or money psychologically salient to individuals. We then ask respondents to generate a list of words that come to mind when they think about the decision to have children, which we refer to as keywords. We assess how the cues, which bring to mind supraindividual cultural beliefs, affect the activation or inhibition of individual cognitive concepts, represented by keywords.

Finally, we conduct a validity check that demonstrates the relevance of activated cognitive concepts to an outcome measure. We analyze the relationship between respondent-generated keywords and reported desired work-family size tradeoffs, a measure of fertility preferences that is associated with behavior (Barber 2001).

Cognitive Associations at the Individual Level

The model relies on findings from cognitive psychology about how information is stored and how it is accessed at the individual level. Individuals cognitively encode a vast set of associations between concepts. Some of these associations are idiosyncratic while some of them—individual-level culture—are shared with others or represent others' beliefs. Representations at the individual level are stored not as unitary *things* but instead as *states* that can become activated by external stimuli (e.g., Conrey and Smith 2007). *Priming* is a method for eliciting cognitive associations by making particular concepts salient and observing how cognitive associations are activated. Once particular cognitive concepts are activated, they also activate concepts that have been learned in conjunction with, or are frequently associated with, the original concepts. Individuals can have stronger or weaker associations between the concepts, which translate to faster or slower activation of associated concepts. Culture at the individual level is thus not encoded as static, cohesive representations, but instead is a set of associations that can be activated by context.

The activation of concepts also leads to the inhibition of related, but competing concepts. While the field of cognitive psychology continues to debate the exact nature and role of cognitive inhibition, a substantial body of work demonstrates empirical effects that seem to be explained by a cognitive inhibition mechanism. Activating particular concepts is associated with delayed retrieval of similar, but non-activated concepts. Some researchers posit a mechanism by which greater activation of a concept is associated with greater inhibition of related concepts (Berg and Schade 1992). The influential parallel distributed processing model of memory systems includes the inhibition of activation of units, represented in formal models by negative weights (McClelland and Rumelhart 1989). A separate body of work on memory demonstrates that concepts that are used repeatedly slow the activation of related but non-activated concepts in a phenomenon known as retrieval-induced forgetting (e.g., Veling and van Knippenberg 2004).

Psychologically salient cognitive associations do not directly affect behavior, but they instead shape how individuals process new information and how they interpret situations, which has implications for behavior (e.g., Bargh 2014; Loersch and Payne 2011). Wheeler and DeMarree (2009) review empirical support for several mechanisms through which primed concepts shape behavior, including through activating perceptions of others, of the self, of the situation, of behaviors, and of goals. In the proposed mechanism, it is through the

activation of individual cognitive associations that public forms of culture exert influence on individual cognition and behavior (see Shepherd 2011).

The implicit activation mechanism has the potential to impact behavior in many domains. For example, a large literature in social psychology illustrates the relationship between environmental cues (e.g., anti-racist messages on t-shirts) and the activation of associations with particular racial groups, with implications for how an individual behaves towards members of other groups (e.g., Sinclair et al. 2005). A white manager's call into the police in response to two black men in her store may thus be made more likely by the presence of forms of public culture that activate negative associations between black men and crime. We might conjecture that in another domain, more exposure to religious symbols in the environment may make helping behavior more likely through activation associations with altruism, regardless of one's own religious beliefs. Similarly, exposure to political slogans that enlist particular representations of citizenship or nationhood activate particular cognitive associations with government or different social groups, shaping how individual interpret situations like a conflict at a political rally, and potentially shaping behavioral responses. This paper examines part of the proposed mechanism – how supraindividual elements of culture activate cognitive concepts at the individual level. The study is only a first step toward confirmation of the mechanism and investigation of the contexts in which the mechanism is more or less relevant to shaping behavior, which can be applied in other domains in future studies.

Proposed Mechanism and Childbearing

We apply the *implicit activation mechanism* to the domain of childbearing in order to better understand how culture and cognition shape associations with childbearing and related behaviors. The agenda for this type of work has been developed in theoretical contributions by demographers (e.g., Bachrach 2014; Bachrach & Morgan 2013; Thornton et al. 2012; Johnson-Hanks et al. 2011) as well as in recent empirical studies (e.g., Frye 2017; Marshall & Shepherd 2018; Rackin & Bachrach 2016; Strandell 2018). This emerging literature underscores that fertility decisions are the product not only of rational calculation and deliberate cognition, but also of supraindividual cultural factors—widely shared beliefs and assumptions. This work builds on earlier accounts demonstrating that cultural identity is an important factor shaping fertility behavior (e.g., Watkins 1991), shifting the focus to cognitive processes that mediate cultural influences on behavior.

Our study tests one mechanism of many that shapes fertility behavior. Certainly, structural and social factors including economic constraints, age, relationship status, pressures from family and friends, and feelings of self-efficacy are also important (e.g., Ananat et al. 2013, England et al. 2016; Johnson-Hanks 2002). This hypothesis-driven study tests whether the proposed mechanism may be relevant to complex behaviors like contraceptive use and childbearing in specific circumstances. Johnson-Hanks et al. (2011) use the term “conjunctures” to refer to crucial moments in which social action occurs, using the examples of “an unintended pregnancy, a job offer in Chicago, the expiration of a birth control prescription” (2011:15). Such crucial moments could also include choosing to return to work full-time or part-time after the birth of a child, or asking a new partner to use a condom

during sex. Individuals' exposure to such moments will be patterned by their social background and social environment, but in their reactions to these moments, contingency and agency interact with social structure (Johnson-Hanks et al. 2011). We follow Johnson-Hanks et al. (2011) in arguing that in such moments of conjuncture, cognitive structures guide interpretations of a situation and its potential consequences. Although this study cannot prove that the proposed implicit activation mechanism affects behavior at moments of conjuncture, support for our hypotheses would support the theory that at conjunctural moments, the supraindividual cultural elements that activate particular cognitive associations may be particularly important in shaping decisions and actions. As shown in Figure 1, we test whether cognitive associations are related to behavioral desires known to be associated with fertility behavior, but do not test their relationship to fertility behavior itself.

The Supraindividual Cultural Representation of “Hostile Worlds”

To illustrate the proposed implicit activation mechanism in the context of childbearing, we exploit a representation of an oppositional relationship between intimate relations and monetary exchange: what Zelizer (2005) calls the “hostile worlds/separate spheres” cultural belief. This cultural representation centers on a perceived contradiction between the realm of close, intimate relationships and the realm of rationalized market exchange. Work on institutional logics (Friedland and Alford 1991) or modes of justification (Boltanski and Thevenot 1991) posits that different domains have ways of explaining and organizing action that are used more frequently and valued more than others. These perspectives suggest that the motivations and justifications associated with childbearing will vary depending on whether the domain of family or the domain of money is invoked. The cultural representation refers to historical beliefs regarding the existence and necessity of “separate spheres” for the home and family, traditionally the domain of women and children, and for capitalism and market exchange, traditionally the domain of men. Under the logic of separate spheres, each sphere pollutes the other and thus creates “hostile worlds” and moral boundaries: for example, prohibitions against paying for sex (money corrupting the nature of intimate relations) and against close relationships in the workplace (intimate relations corrupting rational economic behavior). There is evidence of this cultural belief in legal cases, social norms, bureaucratic documents, and artifacts from popular culture like advice books (Zelizer 2005).

Across many examples and areas of social life, Zelizer (1994; 2005) finds that individuals do *not* treat economic exchange as separate from close relationships. Rather, they negotiate their own actions regarding monetary exchange in the context of personal relationships in light of a concern that one sphere sullies the other. Individuals adopt practices, including speech, body language, clothing, and spatial location, in order to signal to others the nature of particular relationships to avoid confusion between the intimate and market spheres. For example, when people socialize economic transactions by giving gift cards instead of cash, they feel the need to do so because they believe that the commercial nature of the transaction represents a “taint” that threatens the social relationship. While the belief derives from gendered expectations for behavior, we assume that both men and women are aware of the belief.

This belief that mixing between the two spheres threatens the meaning of social relations is the supraindividual cultural representation that we intend to invoke in our study. Existing research regarding the effects of priming individuals with money on subsequent cognition and behavior provides evidence that this perceived contradiction between economic exchange and personal relationships may be built into shared understandings of money. For example, when primed with money, individuals become less attuned to others, they become less caring and warm (Vohs 2015), and they anticipate spending less time with others (Mogilner 2010). Regardless of individuals' personal associations with money, invoking the cultural concept of money has patterned cognitive and behavioral effects consistent with hostile worlds cultural beliefs.

Hostile worlds beliefs may become relevant in the domain of childbearing if individuals perceive that a decision to have children is or should be one of sentiment (feelings, close relationships, sexual behavior) and that the moral standing of the decision is degraded by a discussion or consideration of financial costs of childbearing. We examine how instantiating a supraindividual cultural belief about two hostile worlds—the *relational sphere* of the family and the home, and the *financial sphere* of money and economic transactions—by making either of the worlds salient to survey respondents, shapes their cognitive associations with childbearing. The hostile worlds cultural belief is particularly useful for our analysis because it involves a *negative* association between the two spheres, allowing us to test whether the cognitive activation of one domain actively inhibits the cognitive activation of the other domain. Unlike most such studies, which only test whether priming a sphere increases the representation of positively associated concepts, our experiment tests for both the increased activation of concepts related to the primed sphere, and the decreased activation of concepts related to the opposing sphere. This stronger hypothesis allows fewer possible alternative explanations for our findings, increasing the likelihood that the expected results represent the effects of the implicit activation mechanism.²

Research Design

We used an experimental design, where respondents were randomly assigned to experimental conditions that prompted them to think about different spheres, and we compare their responses to the responses of a control group that received no cue. Our two experimental conditions were selected because they are closely related to cultural beliefs about hostile worlds: the relational sphere (family) and the economic sphere (financial considerations). Participants in the relational sphere condition answered questions making family relations particularly salient, while participants in the economic sphere condition answered questions making financial concerns salient. In the control condition, respondents received no first section of questions to highlight a particular sphere, and instead began with the second section of questions containing the respondent-generated keywords about fertility decisions. We then observed how the respondent-generated keywords varied for the two

²Our study cannot determine the exact mechanism by which the introduction of one aspect of the hostile worlds belief may inhibit activation of the other aspect of the belief at the individual level, leaving the question open for further empirical examination. We hypothesize that, because a key feature of the belief is the nature of the *relationship* between the sphere of intimate relations and the financial sphere, this negative relationship becomes encoded at the individual, cognitive level. Thus, when one domain is activated through environmental cues, activation of the other is inhibited because of how the relationship between the concepts has been stored.

experimental conditions—family or financial limitations—compared to the control group. The differences in the use of these keywords represent differences in salience of various associations with childbearing prompted by the experimental treatment. Finally, to demonstrate the relationship between the salience of these different spheres and a measure of behavioral desires, we analyze how the relative psychological salience of different concepts matters to differences in reported fertility preferences, in the form of preferred work-family size tradeoff.

The goal of this study is not to develop estimates of the prevalence or strength of the cultural belief in a population; we do not test how many respondents endorse hostile worlds thinking, nor do we examine the strength of their beliefs. Instead, we test whether and how this supraindividual cultural belief, widely represented in both formal institutions and popular culture, affects the activation of cognitive associations of individuals in a systematic way. Random assignment allows us to attribute observed variation to the causal effects of exposure to experimental condition, and thus to test whether there is a shared response to spheres of family or money, representing supraindividual culture.

Hypotheses

According to the logic of hostile worlds, the two worlds—family and financial—are seen as polluting each other, as described above. According to the proposed implicit activation mechanism, a supraindividual cultural form, the shared cultural belief regarding hostile worlds, would make salient relevant cognitive associations at the individual level. We thus expect that prompting individuals to think about their own family will make them more likely to consider factors related to love, and less likely to consider money-related factors, when making decisions about fertility. Comparing the results of each experimental condition to the control condition provides a more rigorous test of the hypotheses than does comparing across experimental conditions.

Hypothesis 1A: Respondents in the family experimental condition will report more love-related keywords than will respondents in the control condition.

Hypothesis 1B: Respondents in the family experimental condition will report fewer money-related keywords than will respondents in the control condition.

We would also expect that prompting respondents to think about the financial sphere will make them more likely to consider factors related to money and less likely to consider love-related factors in their decision making regarding fertility.

Hypothesis 2A: Respondents in the finance experimental condition will report more money-related keywords than will respondents in the control condition.

Hypothesis 2B: Respondents in the finance experimental condition will report fewer love-related keywords than will respondents in the control condition.

The predictions in part A of these hypotheses draw on a basic feature of cognitive priming: The priming literature suggests that providing a framework like family or finances makes concepts related to family or finances more cognitively salient. Thus, we would expect part A of each hypothesis: an increase in the prevalence of words related to love in the family

condition and an increase in the prevalence of words related to money in the finance conditions.

The predictions in part B of these hypotheses are distinct from standard predictions regarding the effect that priming concepts has on responses; they are most central to the hypothesis about how supraindividual cultural beliefs activate culture in the form of cognitive associations, stored at the individual level. Specifically, based on the priming and inhibition literature alone, we would not expect that when one sphere of the hostile worlds belief is invoked, the hostile worlds cultural belief makes factors related to the *other sphere* less cognitively accessible and therefore less reported. The greater contribution of this study is to demonstrate that cultural beliefs about the opposition of two spheres, relational and monetary, lead individuals to consider the opposite set of factors *less* frequently in a decision making context. This illustrates a mechanism by which public forms of a cultural belief become relevant and used at the individual level.

Data and Analytical Approach

Sample

Survey respondents were drawn from the population of undergraduate students at a large, prestigious Midwestern state university in the United States. Though this is a non-representative population, a representative sample is not required to achieve the study's goals of demonstrating how public cultural beliefs shape individual cognition relevant to childbearing. University students belong to a narrow age group in which most of them have not had children yet, which greatly simplifies our analysis, as fertility preferences can change over the life course to correspond to actual fertility (Morgan and Rackin 2010; Hayford 2009). In addition, we expect that the proposed mechanism might be more observable among younger adults, for whom structural and resource constraints on fertility are less salient, so for whom cognitive representations are expected to be more salient (Rackin and Bachrach 2016). The approach used here could be applied to representative samples of populations of interest in the future.

An invitation to participate in the survey was sent to the population of undergraduate students (26,000 students) with a link to the web survey. Students who completed the survey were entered into a drawing for prizes of \$50. A total of 5,113 students responded to the survey (which included other experimental conditions not reported here), for an overall response rate of about 20%. This response rate is in line with other web surveys of undergraduate students using similar recruitment methods (Kaplowitz et al. 2004). We restrict the analysis below to those participants who completed the main dependent variable by providing keywords associated with childbearing: 417 respondents in the Control condition, 384 respondents in the Family condition, and 372 respondents in the Finance condition. Since the main goal is to study variation resulting from experimental manipulation of contexts, low response rates would only threaten our findings if respondents react to the experimental conditions differently than non-respondents would have, indicating that respondents and non-respondents have different thought processes about childbearing.³

Experimental Manipulation

The first section of the survey constituted the experimental manipulation. In that section, respondents randomly assigned to the two treatment conditions answered a series of questions. In the Family condition, respondents reported how many brothers and sisters they have, three words that describe the family they grew up in, and a family member they spent a lot of time with growing up and what they did regularly with that family member. In the Finance condition, respondents reported how much they spend in a week on entertainment and eating out, what they last had to save up to buy, and a time when they could not buy something because it cost too much. Respondents randomly assigned to the control condition were immediately directed to the second section of the survey that contained the dependent measures.

Dependent Measures

The dependent measures are reported in the order they were presented in the surveys.

Keywords.—Respondents were asked to “Think about your decision of whether to have children and how many children to have. What are some keywords that describe or summarize the factors that influence your decision?” Respondents were provided 10 spaces for keywords and asked to list at least five. Across conditions, 22 percent of respondents reported from one to four keywords, 53 percent of respondents reported exactly five keywords, and close to 25 percent of respondents reported from six to ten keywords. From these reported keywords, a coding scheme was generated to capture the types of responses. A research assistant blind to the study hypotheses assigned each of the keywords to one of the 27 codes using first an inductive approach to generate the categories, then returning to the data to assign each keyword to one of the categories. Here we analyze the codes related to love and relationships, and to money. Each participant received a value for the count of keywords related to love and relationships, and a value for the count of keywords related to money. The love and relationship code included keywords like affection, care, closeness, connectedness, compassion, bond, support, passion, friendship, relationship—a total of 16 words were coded as love and relations. The count of money-related keywords included terms such as money, wealth, income, financial, finances, cost, expensive, affordable, economy, means—a total of 10 words.

Desired Work/Family-Size Tradeoff.—Respondents reported their relative fertility preferences, using a question regarding a choice among four specific trade-offs between work and number of children: “no children and a full-time job”, “1 child and a three-quarter-time job”, “2 children and a half-time job”, or “3 children and no job”. Lower values on this scale indicated a stronger preference for work over children and higher values indicated a stronger preference for children over work. This hypothetical tradeoff measure was originally developed to observe how respondents made a conjoint evaluation of their

³Forty-three out of 460 (9%), 67 out of 451 (15%) and 76 out of 450 (17%) respondents in the control, Family, and Finance conditions, respectively, completed no keywords and were excluded from the analysis. The differences between the control condition and each of the experimental conditions are significant; the difference between the two experimental conditions is not. Because experimental conditions asked participants to answer a number of additional questions before responding to the keywords, we expect that the differences between control and experimental are due to participant fatigue.

preferences for family size and work commitment, if they were constrained to tradeoffs between the two (Coombs 1979). It was included in the Intergenerational Panel Study of Parents and Children, which grew out of the Detroit Area Study (Thornton, Axinn, and Xie 2007). An earlier study found this measure to be a significant predictor of the rate of marital first births, controlling for socio-demographic characteristics (Barber 2001).⁴

Control Variables

Following the dependent variables, respondents answered questions about their background characteristics including gender, age, race and ethnicity, number of siblings, parents' educational attainment, US-born status (both respondents' and their parents'), religiosity, attitudes regarding whether there is always a tradeoff between career and family, and personal attachment to family. Religiosity was measured by asking respondents "How important is religion in your life?" using a four-point scale (0 = "Not at all important" to 3 = "Very important") (see Hayford and Morgan 2008). Attitudes about career and personal tradeoffs ("For professionals, there will always be big trade-offs between career goals and family commitments") and attachment to family ("How attached do you feel to your family?") were assessed on a scale of 0–100, where 100 indicated the strongest possible agreement with the statement and greatest attachment to family, respectively. We also include a count of the total number of keywords an individual filled out, and a dummy variable for whether an individual completed exactly five keywords, in order to assess whether participants could have experienced the number of keywords as a constraint. Table 1 provides descriptive statistics for all respondents in the control group and two experimental groups, pooled across groups.

Analysis

For each of the experimental conditions, we estimate the effect of the cues on each main dependent variable (the count of love-related keywords and count of money-related keywords) with ordinary least squares regression models that include a dummy variable for assignment to experimental condition (control condition is the reference), and control variables for the count of total keywords completed and whether the participant completed exactly five keywords. We exclude participants who did not complete the experimental cue questions (40 in the Family condition and 41 in the Finance condition), but the results are robust to these exclusions. Because the dependent variable is not normally distributed (see Table 2), we ran identical models first using ordered logistic regressions, then assuming a Poisson distribution, and the results were identical. We report the standardized coefficients of the OLS results for ease of interpretation. The standardized coefficient of the experimental condition variable represents the effect of that experimental condition on respondents' reports of the dependent variable, compared to respondents in the control condition.

⁴The study also included a more common measure of desired fertility, "How many children do you want to have?", but this question was asked before the keywords related to childbearing so we do not use it in this analysis given that it does not conform to the logical order of the proposed mechanism. When we conduct the analyses presented in the paper with this other measure of desired fertility, we find the same results.

In a second model, we also include controls for the family background and socio-demographic characteristics reported above, and personal beliefs about a tradeoff between career and family. These covariates were chosen since they are associated with realized fertility in the U.S., and with the outcomes of interest in this sample (e.g., Axinn, Clarkberg, and Thornton 1994; Hagewen and Morgan 2005; Hayford 2009; Morgan 1996; Smock and Rose-Greenland 2010). Since our study uses an experimental design with random assignment to experimental and control groups to allow causal inference, controlling for sociodemographic variables is not intended to establish a causal relationship, but instead to allow us to compare the size of the experimental effect to the size of associations between the dependent variable and other factors associated with fertility preferences, and to account for incidental differences in the composition of experimental and control groups to provide a more precise estimate of experimental effects.

In order to assess the relevance of keywords to a measure of behavioral desires (respondents' reports of desired work-family size tradeoff), we conduct an ordered logistic regression analysis of the effect of experimental condition on preferences for tradeoffs between number of children and work commitments. For each condition, we ran three models: regressing the outcome variable on experimental condition, then adding a count of the number of keywords related to love and the number of keywords related to money that respondents reported, and finally including family and demographic characteristics. Again, higher values on the tradeoff scale represent lower preferred work commitments and larger families.

Results

Love-Related Keywords

We first consider the effect of the experimental conditions on the number of love and relationship-related keywords that respondents reported as related to their decisions about childbearing (e.g., love, affection, caring). The results of the ordinary least square regression models examining the effect of experimental condition on respondents' reports are in Table 3. Models 1A and 2A show that respondents assigned to the Family condition reported more love-related keywords than did respondents in the Control condition, but this difference was not significant (mean of 0.86, SD = 0.98 in Family condition; mean of 0.73, SD = 0.96 in the control condition, as seen in Table 2).⁵ Models 1C and 2C in Table 3 show that respondents in the Finance condition reported fewer love-related keywords than did respondents in the control condition, as predicted by the logic of the hostile worlds cultural belief and hypothesis 2B, but this difference was marginally significant ($p < .10$) (mean of 0.66, SD = 0.91 in Finance condition, as seen in Table 2).

⁵.When we account for attachment to family by including an interaction between attachment to family and experimental condition, the Family condition produces a significantly higher number of love-related words and significantly fewer money-related words among respondents who report low attachment to their family. The interaction between attachment to family and experimental condition is significant for both love-related words and money-related words; the effect of making the sphere of family salient on increasing love-related words and decreasing money-related words in the hypothesized direction works for those with low attachment to their family and not for those with high attachment to their family. The effect of the family cue varies based on evaluation of one's own family; those who experience distance from their own family demonstrate the hypothesized effect. The proposed model accommodates the fact that individuals hold specific, idiosyncratic associations with the concepts we prime, such as family. There is no differential effect of the Finance condition based on attachment to family.

Money-Related Keywords

Models 1D and 2D in Table 3 show that respondents in the Finance condition reported money-related factors (e.g., money, income, cost) as relevant to their decision making about fertility significantly more frequently than did respondents in the control condition, as predicted in Hypothesis 2A (mean of 0.69, SD = 0.61 in Finance condition; mean of 0.57, SD = 0.61 in the control condition, as seen in Table 2; $p < .05$). More importantly for our test of the interaction between the hostile worlds cultural belief at the supraindividual and the individual level, Models 1B and 2B show that respondents in the Family condition reported fewer money-related keywords relevant to fertility than respondents in the Control condition (mean of 0.49, SD = 0.55 shown in Table 2, $p < .05$), as predicted in Hypothesis 1B. Thus, we find support for the key 1B hypothesis.

Alternative Explanations

A potential competing explanation for the decrease in love-related keywords and increase in money-related keywords in the Finance condition is that with limited spaces for keywords on the survey, providing more keywords of one type leaves less space for keywords of other types. Therefore, we controlled for whether a respondent listed exactly five keywords (only 2 percent of the sample listed 10 keywords); this did not change our results. As another check, we analyzed the effect of experimental condition on the other 25 keyword categories not reported above (results not shown). Again, we find evidence that the reported inhibition results are not due to space limitations: for example, in the Finance condition, the greater number of keywords related to money is accompanied by a greater number of keywords related to social and environmental concerns.

Another possible explanation for the observed effects is that the Family condition primes positive emotions, thus making positive associations like love more likely while inhibiting negative associations like finances, and vice versa for the Finance condition. To rule out this possible explanation, we test whether the Finance condition cues the use of more keywords coded as explicitly negative (e.g., annoying, bad genes, brat, burden) than the Control or Family conditions. We find no evidence supporting this explanation; the Family condition *increases* the use of more negative keywords compared to the Control condition ($p < 0.1$), and there is no significant difference between the Family and Finance conditions.

Relevance of Keywords to a Behavioral Desire

We establish the relevance of love-related and money-related keywords to a measure of behavioral desire: preferred tradeoff between work and family-size. The results are reported in Table 4 as odds ratios. Model 1 includes only experimental condition. Model 2 includes experimental condition and a count of love-related and money-related keywords. Model 3 includes experimental condition, a count of love-related and money-related keywords, and demographic and socioeconomic controls including age, number of siblings, mothers' education, the respondents' religiosity, race, foreign born status, and gender. We find significant effects of keyword counts on desired work-family size tradeoff, but no direct effect of experimental condition. Regardless of condition, reporting more love-related keywords is associated with greater odds of reporting wanting less work and more children (models 2A and 2B), and this effect holds net of other controls (models 3A and 3B).

Conversely, respondents who report more money-related keywords report wanting more work and fewer children (models 2A and 2B). These results are not significant when including controls (models 3A and 3B). Likelihood ratio tests indicate that models including keywords describe the data significantly better than those without keywords.

There is a strong association between the number of keywords, in particular love-related keywords, and desired work-family size tradeoff. Because there are not direct effects of experimental condition on desired work-family size tradeoff, we cannot conclude whether the association with keywords is a result of the proposed mechanism, where experimental cues activate cognitive associations, or whether the effect is independent of the activation by experimental cues. We anticipate that stronger supraindividual culture primes would increase the likelihood of observing effects of the activation of cognitive associations on behavioral desires.

Discussion

This paper provides a theoretical account and an empirical illustration of how culture represented at the supraindividual level—in this case, a broad, often unstated cultural belief in the separation of two spheres of life—can impact individuals' cognition and considerations about childbearing by activating associations stored at the individual level. Our results provide evidence that supraindividual cultural representations can activate culture at the individual level by bringing some associations front of mind and inhibiting other associations. We posit that the activation of these associations can make some behaviors more or less likely, although we do not observe behavior here. This method and these findings provide further evidence of the importance of implicit forms of culture stored at the individual level, which operate below conscious awareness (DiMaggio 1997; Vaisey 2009). The evidence we present here also supports an account where culture at the individual level is not encoded as a static, cohesive representation, but instead as a diverse set of stored associations that can be activated by context (e.g., Conrey and Smith 2007).

Our primes are quite weak in comparison to stimuli in the world, which activate associations within a context that involves emotions and real implications for future events and behaviors. Our cues occur in an artificial situation with extremely low consequences, a voluntary survey, which participants took in a variety of settings that themselves could carry institutional meanings that we do not have information about. The relatively small effect sizes and amount of variation explained by the number and type of keywords participants report are likely the result of the weakness of these primes. Our empirical evidence is thus a conservative test of the effect of supraindividual cultural stimuli on the activation of cognitive associations at the individual level.

We use an experimental method drawn from cognitive psychology to make spheres relevant to the hostile worlds cultural belief, close relations and money, salient. Our results provide evidence of how a widely shared cultural belief can affect cognition related to childbearing at the individual level (see Strandell 2018 for a similar argument about cognition related to marriage using qualitative methods). Participants who are first exposed to the sphere of close relations are less likely to report that monetary concerns are relevant to their decisions about

having children. Our findings suggest an asymmetrical effect of the Family and Finance cues where the Family cue provides stronger evidence of the proposed inhibition effect (step A in the proposed mechanism) than does the Finance cue. The lack of equally strong evidence when exposing individuals to the sphere of money seems to be the result of survey design, not a feature of the theory or of differential effects of the two spheres (analyses available upon request). We show the importance of these keywords by demonstrating that they are significantly related to desired work-family size tradeoff, independent of the effect of experimental condition. Because this tradeoff measure is a significant predictor of achieved fertility (Barber 2001), we contend that keywords may have implications for behaviors related to fertility.⁶

Supraindividual Culture and Primes in the World

Supraindividual elements of culture that activate cognitive associations are omnipresent. They may take the form of physical context in institutions where certain assumptions and modes of acting occur more frequently and are more valued, or media messages and symbols, or interactions with others that rely on shared beliefs and expectations. While the effect of any one exposure to a supraindividual feature of culture may be fairly weak, short-lived, and inconsequential, accumulated exposure to forms of supraindividual culture and their activation of associations is likely very important. Repeated activation of particular associations strengthens the connection between associations and makes future activation more likely (e.g., Smith 1998). This means that the activation of cognitive associations is linked to long-term learning processes by which associations between concepts are stored, an integration of the A and B mechanisms in Figure 1.

Supraindividual elements of culture in the world may also exert a stronger effect than the primes we use in this experiment because they often convey social information. Primes that are experienced in the presence of others, as when everyone in a car sees an anti-abortion message on a highway billboard, or in the implied presence of others (as when one infers that everyone driving on the highway sees the message), exert more influence on subsequent cognition and behavior (e.g., Shteynberg 2015). These primes can also communicate the tacit endorsement of the message among a population, as when one assumes that the presence of an anti-abortion highway billboard represents the beliefs of many of the people in the town closest to the billboard, communicating information about norms that can influence subsequent behavior.

Implicit Activation Mechanism and Fertility

Behaviors related to childbearing are influenced by many factors. Some behaviors that have important consequences for fertility, such as refilling a birth control prescription, asking a partner to use a condom, or working part-time after a birth, are decisions made at conjunctural moments. We argue that the supraindividual elements of culture that activate

⁶The relationship between fertility preferences and fertility behavior is not straightforward, particularly at the individual level (e.g., Quesnel-Vallée and Morgan 2003; Morgan and Rackin 2010). Studies have shown that fertility intentions at older ages predict behavior better than intentions at younger ages (Hayford 2009; Rackin and Bachrach 2016), which may indicate that intentions at younger ages represent general ideals or norms. However, several studies have shown that fertility preferences even at relatively young ages are significant predictors of fertility behavior including age at first birth and completed fertility (Barber 2001; Hayford 2009). Surprisingly, desired fertility has been found to predict realized fertility better than do fertility intentions (Miller 2011).

particular cognitive associations have the potential to influence such key decisions by shaping individuals' interpretations of the situation and the consequences of their actions in these uncertain, conjunctural moments. Because elements of supraindividual culture are unevenly distributed across space (e.g., anti-abortion highway billboards), some people are exposed to some messages more or less frequently than others, varying their relative influence at conjunctural moments. Similarly, as we note above, the relevance of this particular mechanism may vary based on the life course; we expect that this process will be particularly relevant during periods where economic and institutional constraints are less salient for individuals. The implicit activation mechanism provides an account of how supraindividual cultural cues may influence behaviors relevant to childbearing.

Again, the current study only addresses transient cognitive activations of representations for a select population at a particular point in their life course and does not assess the translation to behavior. The evidence provided here suggests the value of more empirical work to confirm other elements of the proposed mechanism and the conditions under which it is most relevant to behavior.

Future Research

The mechanism and initial evidence we provide in this paper open a number of important areas of research that can bridge the concerns of scholars of culture and cognition by articulating how the study of situations and context is intimately implicated in the *process* of culture (e.g., Shepherd 2014). Specifically, situations carry in them supraindividual forms of culture that individuals draw on to form strategies of action. In this paper, we provide a model by which situational cues can shape individual behavior: through the implicit activation of cognitive associations at the individual level.

In addition to shedding light on cultural processes relevant to the domain of fertility, this study provides an example of how to apply theories of cognition and culture in a hypothesis-testing framework. Similar approaches could be used to examine the implicit activation mechanism in other domains, furthering our knowledge of how supraindividual and individual-level cultural features interact. We might focus future inquiry on a few areas in particular: What are the features of supraindividual culture and the contexts in which they appear (e.g., in the presence of strangers or in the presence of close others) that are most likely to activate particular cognitive associations? For example, what are the activation effects of institutional logics in the places we inhabit daily compared to exposure to Christian crosses we see when walking down the street? How does the effect of supraindividual primes on the activation of cognition vary based on individual and other group characteristics? Finally, under what conditions does the activation of cognitive associations have the strongest behavioral effects, and what features of supraindividual cultural elements are associated with stronger behavioral effects? The evidence we provide should encourage research in these directions.

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A: Short exposure; Can occur with awareness and beneath awareness; Effects are context-dependent.

B: Repeated, prolonged exposure; Can occur with awareness and beneath awareness; Effects more likely to be context-independent.

Figure 1.
Conceptual Model and Study Design.
Note: Darker gray shapes and arrows indicate the elements of the mechanism that our empirical evidence addresses directly while the lighter gray arrows and shapes are not addressed by our empirical evidence.

Table 1:

Descriptive characteristics of sample pooled across three conditions.

Variable	Proportion or Mean	N	Variable	Proportion or Mean	N
Gender		1,164	Nativity Status		1,163
Male	0.33		US-born	0.90	
Female	0.67		Non-US-born	0.10	
Age		1,166	Religiosity		1,155
Mean	20.1		Not at all	0.32	
Std. Deviation	1.5		A little	0.25	
Number of siblings		1,230	Fairly	0.21	
0	0.08		Very	0.22	
1	0.43		Attachment to Family (0–100)	1.140	
2	0.30		Mean	66.97	
3	0.12		Std. Deviation	23.49	
4 or more	0.07		Attitude: Perceived Tradeoff between Career and Family (0–100)		1,170
Mother's Education		1,160	Mean	74.93	
Less than 4-year college	0.30		Std. Deviation	23.90	
4-year college	0.38		Completed Exactly 5 Keywords		1,359
MA	0.22		No	47.02	
Other graduate degree	0.10		Yes	52.98	
Race and Ethnicity		1,157	Total Keywords (0–10)		1,359
White	0.75		Mean	4.62	
Black or African-American	0.04		Std. Deviation	2.23	
Latino/a or Hispanic	0.03				
East Asian	0.09				
South Asian	0.06				
Other	0.04				

Table 2:

Descriptive Statistics for Keywords and Behavioral Desire by Condition.

a. Love-Related Words Used				
	Control	Family	Finance	
0	220	172	206	
1	121	127	113	
2	51	57	36	
3	18	23	10	
4	6	4	6	
5	1	1	1	
Mean	0.73	0.86	0.66	
Standard Deviation	0.96	0.98	0.91	
Total	417	384	372	
b. Money-Related Words Used				
	Control	Family	Finance	
0	195	204	144	
1	213	171	200	
2	6	9	27	
3	1	0	1	
4	1	0	0	
5	1	0	0	
Mean	0.57	0.49	0.69	
Standard Deviation	0.61	0.55	0.61	
Total	417	384	372	
c. Desired Work-Family Size Tradeoff				
	Control	Family	Finance	
No children, full-time job	87 (21%)	78 (20%)	77 (21%)	
1 child and three-quarter time job	100 (24%)	99 (26%)	117 (31%)	
2 children and half-time job	207 (49%)	166 (43%)	157 (42%)	
3 children and no job	30 (7%)	39 (10%)	32 (9%)	
Total	424	382	372	

Table 3:
Effect of Experimental Condition on Number of Reported Love- and Money-Related Keywords, Standardized Coefficients.

	FAMILY CONDITION				FINANCE CONDITION			
	Love-Related Keywords		Money-Related Keywords		Love-Related Keywords		Money-Related Keywords	
	Model 1A	Model 2A	Model 1B	Model 2B	Model 1C	Model 2C	Model 1D	Model 2D
Experimental Condition (Control is reference)	0.10 (0.07)	0.08 (0.07)	-0.08 * (0.04)	-0.1 * (0.04)	-0.11 + (0.07)	-0.12 + (0.07)	0.11 * (0.04)	0.22 * (0.09)
Gender (male is reference)		0.31 *** (0.08)		-0.03 (0.05)		0.21 ** (0.07)		-0.2 * (0.10)
Number of siblings		0.03 (0.03)		-0.05 * (0.02)		0.02 (0.03)		-0.07 + (0.04)
Black (white is reference)		0.29 (0.17)		0.04 (0.10)		-0.13 (0.16)		0.25 (0.22)
Born outside US (US-born is reference)		0.14 (0.12)		-0.03 (0.08)		0.02 (0.12)		-0.05 (0.17)
Mom has low edu (4-year degree or more is reference)		0.06 (0.07)		0.03 (0.05)		0.04 (0.08)		0.01 (0.10)
Religiosity (4-point scale)		0.06 + (0.03)		-0.03 (0.02)		0.1 ** (0.03)		-0.16 *** (0.04)
Perceived Tradeoff between Career and Family		-0.002 (0.002)		0.002 * (0.001)		-0.003 + (0.001)		0.004 * (0.002)
Exactly 5 keywords (number other than 5 is reference)	0.04 (0.07)	0.03 (0.07)	0.03 (0.04)	0.04 (0.05)	-0.03 (0.07)	-0.02 (0.07)	0.01 (0.05)	0.04 (0.10)
Total number of keywords	0.14 *** (0.03)	0.13 *** (0.03)	0.05 ** (0.02)	0.04 * (0.02)	0.15 *** (0.03)	0.15 *** (0.03)	0.06 ** (0.02)	-0.10 ** (0.04)
Constant	-0.02 (0.16)	-0.71 *** (0.28)	0.31 ** (0.09)	0.50 *** (0.17)	-0.05 (0.16)	-0.51 + (0.28)	0.26 * (0.10)	1.01 ** (0.39)
N	801	746	801	746	785	741	785	741
Adj R2	0.04	0.07	0.01	0.02	0.05	0.08	0.02	0.05

Table 4:

Regression of Desired Fertility on Love- and Money-Related Keywords.

	FAMILY CONDITION			FINANCE CONDITION		
	Model 1A Experimental Condition Alone	Model 2A Experimental Condition and Keywords	Model 3A Experimental Condition, Keywords, and Controls	Model 1B Experimental Condition Alone	Model 2B Experimental Condition and Keywords	Model 3B Experimental Condition, Keywords, and Controls
Experimental Condition	1.01 (0.13)	0.94 (0.12)	0.89 (0.12)	0.88 (0.11)	0.95 (0.13)	0.92 (0.13)
Count of Love-Related Keywords		1.53 *** (0.11)	1.45 *** (0.11)		1.61 *** (0.12)	1.51 *** (0.12)
Count of Money-Related Keywords		0.82 + (0.10)	0.84 (0.11)		0.79 * (0.09)	0.88 (0.11)
Gender			2.56 *** (0.39)			2.31 *** (0.34)
Age			1.05 (0.05)			1.00 (0.05)
Number of siblings			1.12 + (0.07)			1.20 ** (0.08)
Number of cousins			1.06 (0.05)			1.07 (0.05)
Black (ref = white)			0.50 * (0.17)			0.24 *** (0.08)
Born outside US (ref = US-born)			0.68 (0.16)			0.98 (0.24)
Mom worked full-time (ref = part-time/none)			0.72 * (0.10)			0.75 * (0.10)
Mom's education (ref = < 4-year degree)			0.58 *** (0.09)			0.78 (0.12)
Religiosity			1.38 *** (0.09)			1.45 *** (0.10)
N	806	806	764	807	807	771
Log-likelihood	-997.07	-973.76	-866.97	-994.74	-967.07	-871.26

Notes: Including keywords significantly improves model fit over model with condition and controls.