# ADVANCES IN GROUP PROCESSES

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ADVANCES IN GROUP PROCESSES VOLUME 35

# ADVANCES IN GROUP PROCESSES

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INVESTOR IN PEOPLE

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# PREFACE

*Advances in Group Processes* is a peer-reviewed annual volume that publishes theoretical analyses, reviews, and theory-based empirical chapters on group phenomena. The series adopts a broad conception of "group processes." This includes work on groups ranging from the very small to the very large, and on classic and contemporary topics, such as status, power, trust, justice, conflict, social influence, identity, decision-making, intergroup relations, and social networks. Previous contributors have included scholars from diverse fields, including sociology, psychology, political science, economics, business, philosophy, computer science, mathematics, and organizational behavior.

Several years ago, we added an editorial board to the series to broaden the review process and draw upon the expertise of some of the top scholars in the discipline. That board consists of Steve Benard, Jessica Collett, Karen Hegtvedt, Michael Hogg, Will Kalkhoff, David Melamed, and Jane Sell. This group of scholars has made the series better, and we are grateful for their service, guidance, and advice.

The volume opens with a paper that addresses a topic probably somewhat novel for the readers of *Advances*. "Can a Girl's Best Friend Be Born in a Lab?" The Role of Ritual in Production Process Conservatism" by Jaekyung Ha, Renée Gosline, and Ezra Zuckerman Sivan aims to understand why consumers often prefer goods that are manufactured in a traditional manner rather than those created using new technologies and practices, even when the latter are of higher quality. This question is posed in the context of a widespread preference for traditionally mined diamonds (as engagement or wedding rings) over diamonds created in a laboratory. This preference is termed "production process conservatism" and is examined using two experiments involving online and student MBA samples. The results indicate that women do prefer traditionally mined diamonds and that this process is mediated by the perceived risk associated with the ritualism of the event. This chapter yields provocative insights into fundamental sociological processes as they relate to macro-consumer behavior.

The next two chapters address issues within the realm of measurement. First, Christin L. Munsch and Elizabeth S. Zack present "Accelerometers as a Methodological Tool in Group Processes." They review the literature in a variety of disciplines that use accelerometers – a device used to measure force due to gravity or a change in speed or direction. They present data from four unique experiments that address the reliability, validity, and sociological relevance of

accelerometers for use in the study of aggression. They convincingly demonstrate the utility of these tools for sociological research and social sciences more generally. The next chapter "Modeling Small Group Status and Power Dynamics Using Vocal Accommodation" by Joseph Dippong and Will Kalkhoff offers insights into the development of status and dominance hierarchies. They first review the literature that links patterns of vocal accommodation in the paraverbal range of the voice to the emergence of status and dominance hierarchies in small groups. This measure of voice variability is discussed in the context of two theoretical traditions: the communication accommodation theory and the expectation states research program. They find that vocal accommodation is consistently linked to viewer perceptions of dominance, but not perceptions of prestige. This chapter will certainly interest scholars interested in communication theory, small group structures, social influence, and debate strategy.

The next three papers address theoretical and empirical issues regarding status and identity. The first paper "Identity Theory Paradigm Integration: Assessing the Role of Prominence and Salience in the Verification and Self-esteem Relationship" by Kelly L. Markowski and Richard T. Serpe integrates the structural and perceptual control programs of the structural identity theory. Examining data on the parent spouse identities, they test the direct impacts of salience, prominence, and nonverification on the authenticity, efficacy, and worth as indicators of self-esteem. They find significant interactions among the three independent variables as they impact authenticity, efficacy, and worth. Overall, this paper represents an important integration of two important research programs in the identity domain and suggests key directions for future research. Next, Amy Kroska and Marshall R. Schmidt examine the antecedents of criminal sentencing recommendations in "Occupational Status, Impression Formation, and Criminal Sanctioning: A Vignette Experiment." Specifically, they examine the effects of an offender's occupational status (white- vs blue- or pink-collar) and crime label (overcharging vs robbery) on recommended criminal sentences. Using predictions from the affect control theory, they find that white-collar offenders and those who commit robbery receive higher recommended sentences, and that these effects are mediated by perceptions of crime seriousness. In the final paper of the trio, Deena A. Isom Scott examines reverse discrimination in "Understanding White Americans' Perceptions of 'Reverse' Discrimination: An Application of a New Theory of Status Dissonance." Using the Pew Research Center's Racial Attitudes in America Survey III, she develops and tests a theory that addresses why it is that some White Americans perceive an anti-White racial bias and reverse discrimination. The theoretical and empirical analysis yields provocative insights into the causes and consequences of perceived social inequality.

The final two papers address issues of influence and cooperation in groups. A relatively unexplored phenomenon is examined in "When Do We Feel Responsible for Other People's Behavior and Attitudes?" by Vanessa K. Bohns, Daniel A. Newark and Erica Boothby. For many years, sociologists and psychologists have explored how the social environment produces social influence processes such as conformity, persuasion, and obedience. However, the focus of

this past research has been primarily on the target of social influence or characteristics of the influencer. This paper asks a new question – how accurately do people assess their own influence over another person's attitudes and behaviors. In this sense, the paper addresses an important yet unexplored facet of social influence. The final paper explores whether or not rules for expectation formation directly improve coordination. In "Expectations and Coordination in Small Groups," Antonio D. Sirianni uses agent-based simulations to examine how empirically observed expectation-generating rules produce group coordination. The results indicate that expectations about one another often produce suboptimal levels of coordination. Theoretically, the paper adopts a game theoretic notion of interaction to the e-state structuralism model of hierarchy formation. This paper should be of particular interest to scholars focused on coordination or cooperation, status structures, game theory, or behavioral economics.

Shane Thye
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*Series and Volume Coeditors*

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# "CAN A GIRL'S BEST FRIEND BE BORN IN A LAB?" THE ROLE OF RITUAL IN PRODUCTION PROCESS CONSERVATISM

Jaekyung Ha, Renée Gosline and
Ezra Zuckerman Sivan

## ABSTRACT

Purpose – *In this paper, we aim to understand why consumers often prefer products made using traditional practices even when products made using new practices are not of lower quality. We argue that this resistance, which we call "production process conservatism," is heightened when the product is used in the performance of a social ritual.*

Methodology – *We develop this argument in the context of diamond jewelry, as consumers have generally been resistant to diamonds that are produced in laboratories, i.e., lab-created diamonds. Hypotheses were tested using experiments conducted with an online sample (Experiment 1) and with an MBA student sample (Experiment 2).*

Findings – *In Experiment 1, we find that married female respondents significantly prefer mined diamonds to lab-created diamonds when they are used as part of an engagement gift as opposed to a more routine gift. In Experiment 2, we find the same effect among women; in addition, the perceived risk associated with the ritual is found to mediate this production process conservatism.*

Social Implications – *This paper contributes to the understanding of a macrosocial phenomenon – acceptance of an innovation – by examining microinteractive processes in groups.*

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Originality/value of Paper – *This paper develops an original theory that when individuals deviate from traditional aspects of rituals, they risk signaling a lack of commitment or cultural competence to the group even when such aspects are not explicitly stated.*

**Keywords:** Ritual; social valuation; public knowledge; production process; lab-created diamonds; technological innovation

## INTRODUCTION

Why do consumers care about production processes – namely, where, how, and by whom a product has been made – at some times but not at other times? One obvious consideration is that different production processes potentially lead to different products, as in the cases of nouvelle cuisine (Rao, Monin, & Durand, 2003) and grass-fed meat (Weber, Heinze, & DeSoucey, 2008). Thus, in some instances, consumers may regard production processes as proxies for the product quality. Moreover, even when the difference in the product quality is difficult to verify, consumers may *perceive* a difference and act accordingly; that is, consumers may be willing to pay a premium for certain production processes under the assumption that such processes indicate the differential quality, even when the quality of the product is indistinguishable or physically identical (e.g., Carroll & Swaminathan, 2000; Frake, 2017; Newman & Bloom, 2012).

However, it is puzzling why people often have preferences for production processes – in particular, "traditional" practices – when alternative processes are more efficient or produce higher-quality products (Hahl, 2016; Negro, Hannan, & Rao, 2011; Rao et al., 2003; Simons & Roberts, 2008). In these cases, the reasons for such preferences are unclear. Under what conditions will consumers be conservative with regard to their evaluation of production processes? In other words, when will they be reluctant to accept the very same product when it is produced by a new production process – a phenomenon we call "production process conservatism"? The existing literature does not provide a clear answer to this question. Several studies acknowledge that "domains" (Podolny & Hill-Popper, 2004), "tastes for popularity" (Lieberson, 2000; Lieberson & Lynn, 2003), or "audience type" (Goldberg, Hannan, & Kovács, 2015; Pontikes, 2012) vary in terms of the extent to which certain dimensions of value – including the production process – are salient. However, the following question remains: Why does such salience vary, and why are production processes sometimes regarded as defining features of an item?

In this paper, we argue that the salience of the production process varies depending on the social context, and we suggest that consumers will be concerned about deviation from traditional production processes when the products in question are used in socially consequential rituals. A ritual is a group process in which members of the group conform to the "conventions that set up visible public definitions" (Douglas & Isherwood, 1979, p. 65). Rituals use symbols to create public knowledge and coordinate people's expectations (Chwe, 2003;

Douglas & Isherwood, 1979; Durkheim, 1976). When people perform rituals, they intend to express appropriate messages to other members of the group about their social relationships (Caplow, 1984; Swidler, 2003). If performers deviate from the rules, they risk inadvertently signaling that they are either incapable of doing or unmotivated to do what is necessary to maintain or strengthen said relationships (Chwe, 2003; Schelling, 1980). Thus, especially when the ritual has *high stakes* (i.e., when the outcome of a ritual is intended to be highly consequential to the parties involved), the parties will tend to signal competence and commitment by conforming to the rules and practicing general conservatism (cf. Zuckerman, 1999).

This paper presents a test of this mechanism by focusing on a case in which the production process is not explicitly prescribed as a rule; however, the high-stakes nature of the ritual will make consumers conservative with regard to buying products that are made using a new process. The specific case is diamond jewelry. Although diamonds have long been used in various forms of jewelry, a special segment of diamond jewelry – engagement rings – is associated with the widespread ritual of engagement and marriage (Brinig, 1990; Epstein, 1982a; Kunz, 1973; Rothman, 1987). In the United States (and many other Western countries), clear conventional social expectations surround engagement rings – for example, the ring's appearance, the finger on which it should be worn, and the amount of money men should spend on it (Bowers, 2015; Spar, 2006). The production process has not been explicitly regarded as a feature of the ritual rules, because diamonds are used to be produced exclusively through mining; therefore, an explicit rule regarding the production process was unnecessary. However, diamonds can now be produced synthetically in laboratories (called "lab-created diamonds" or "synthetic diamonds"). These diamonds have exactly the same chemical, physical, and optical characteristics as mined diamonds, and they are available at lower prices (Markoff, 2015). The advent of an alternative production process thus poses a question to ritual performers: Should the production process be regarded as part of the ritual rules? Is it problematic if the diamond was born in a lab? We aim to show that the answer is yes for people who are knowledgeable about the ritual and are motivated to perform it well.

The rest of the paper proceeds as follows. We first develop a theoretical framework that clarifies the logic of rituals and suggest why traditional practices associated with rituals might be maintained even when no codified rules proscribe change. We then focus on the case of mined vs lab-created diamonds. We briefly review the ritual of giving and receiving diamond engagement rings in the United States and summarize the production processes for mined diamonds and lab-created diamonds. We then test our hypotheses in a series of experiments. We conclude by discussing general implications.

## THEORETICAL FRAMEWORK

### *Why Do People Follow Ritual Rules?*

Rituals are a specific form of interpersonal interaction found in various social settings, from shaking hands (Goffman, 1955) to rites of passage (Turner, 1995)

to communal religious events (Durkheim, 1976). Rituals generally enable performers to either create or reinforce an institutionalized role relationship in their social group (Collins, 2014). The successful accomplishment of a ritual affirms that the performer is capable of and committed to a particular role and the relationships associated with it.

To communicate a clear message to relevant audiences, rituals play by a set of symbolic rules. A performer's observance of ritual rules serves as the primary basis of an audience's evaluation of said performer. Thus, people follow ritual rules to avoid being evaluated negatively by an audience. For instance, by participating in rituals, performers show their economic competence (Barnett, 1938) and publicize their social status and mutual obligations (Malinowski, 1920). If a performer does not follow ritual rules, his or her message risks being misunderstood and perhaps being cast in a negative light.

In many cases, ritual rules include specifications regarding artifacts or commodities (Douglas & Isherwood, 1979). For example, in the Western Christian culture, people often wear black suits to funerals to express their condolences, and the Americans present each other with wrapped gifts at Christmas. In these examples, "black suits" and "Christmas gifts" are ritual products that are prescribed by each ritual's rules (Caplow, 1984). If an individual performs a ritual without following these rules, he risks not properly publicizing his capability and commitment to a social role. For example, if a person wears a colorful dress to an American funeral, she risks being considered rude, regardless of her true intentions. Disobeying the rules of funeral rituals may impair her relationship with others, particularly the family of the deceased, and weaken her social status relative to others who dress appropriately. Similarly, consider a case in which an American man wants to marry a woman but does not follow the conventional rules of giving her an engagement ring. The risk is that his audience, including his would-be fiancée, will downgrade its evaluation of his cultural competence or commitment compared with that of other men. It could even cause his proposal to be rejected.

The upshot is that when the stakes are high, any given ritual performer will tend to not deviate from ritual rules, thereby reinforcing the primacy of ritual rules for subsequent performers. That is, once established and widely observed, a ritual rule can acquire great social weight, even when there is no functional reason for it (Centola, Willer, & Macy, 2005; Chwe, 2003; Correll et al., 2017; Swidler, 2003). Accordingly, such rules can vary widely across social contexts, and there are social boundaries that separate groups of people who abide by the same ritual rules (Collins, 2014). Whereas mourners may wear black in the Western culture, white is worn at traditional Korean funerals. Obviously, color itself has no functional purpose at a funeral, but following what is known to be the rule in each culture is important. Color thus works as a focal point (Schelling, 1980) or a conventional equilibrium (Elster, 1989) from which no individual can benefit by unilaterally deviating. The more important the ritual is in establishing or reinforcing relationships, the

riskier a potential failed outcome is and the more we can expect a ritual performer to abide by ritual rules.

### *Sensitivity to the Stakes: When Are Ritual Rules Important to Follow?*

Ritual rules do not have the same importance in all cases. This variation may stem from two main sources: (1) situational factors in which the level of stakes varies and (2) differences in individuals' capabilities to recognize ritual rules and their sensitivity to them. In this section, we elaborate on these points by noting variation in both ritual types and individual role assignment.

As noted, rituals may facilitate the creation of a new role relationship or reinforce an existing one. In general, the stakes are higher in the former case, because entering a new phase typically entails a greater effort than maintaining the status quo. According to Turner (1995), in the former case, rituals are intervening *liminal* periods between one stable stage, in which an individual's status (reflected by her relationships to others) is stable, and another stable stage. During these periods, the characteristics of ritual performers are subject to close scrutiny. Assessments tend to be more relaxed when relationships are already established.

To illustrate this difference, consider the ritual of handshaking when individuals greet one another in the American business culture. Proper observance of this ritual is clearly more important when two executives meet for the first time than when they meet the second time (and, as they continue their relationship, they will be more likely to dispense with the ritual altogether). Similarly, compare giving a gift as part of a high-stakes ritual such as an engagement proposal, with giving a gift as part of a (relatively) low-stakes ritual such as a birthday. The former case carries much higher risk because this ritual is designed to disrupt the status quo and create a new role relationship. A relationship may be damaged by a poor performance of the gift-giving ritual on someone's birthday, but a relationship is much less likely to survive if the ritual relates to progressing from boyfriend–girlfriend status to marriage.

Consider now how a ritual may be more critical to some roles than others. For example, if anyone should wear black to a funeral, this will be especially true for close family members. By contrast, because much less is at stake for other participants, they can observe the rule at a lower level of compliance (e.g., wearing a gray skirt). Relatedly, the stakes may vary depending on the preexisting social roles among ritual performers. For example, suppose an employee invites his boss over for a Thanksgiving dinner. The employee would be expected to ensure that all the elements of a traditional Thanksgiving dinner were present more than his boss would if the roles were reversed.

### *Why Do People Care about Implicit Ritual Rules?*

Let us now return to the case at hand and clarify why ritual performers might prefer conservative practices, even when they do not constitute an explicit dimension of ritual rules. In particular, we focus on consumers' acceptance

(or lack thereof) of new production processes in rituals, even when (1) no explicit rule dictates the use of a particular production process and (2) the new production process offers clear benefits (in the form of either a lower price for a given quality or higher quality for a given price). These conditions provide a conservative context to examine the presence of ritual rules and thus help us calibrate the extent of "production process conservatism" that is driven by rituals.

We argue that consumers should be conservative, even with regard to dimensions that are not explicitly prescribed as ritual rules, as long as they have good reason to assume that the other people might regard these dimensions as ritual rules (Chwe, 2003; Correll et al., 2017). Insofar, as other people might regard a certain dimension as a ritual rule, a person risks triggering a negative reaction when he or she deviates from such "rules." In other words, when the stakes are sufficiently high, the performer's personal belief – whether *he* thinks a certain thing is (or should be) a ritual – is overridden by his interpretation of the public belief – what *others* think is (or should be) a ritual rule. Thus, the presumption that potential audiences *might* regard a particular practice as a ritual rule is a sufficient condition for a ritual performer's preference for a conservative practice.

Consider production processes as a dimension of ritual rules, which are the focus of this paper. When production processes are part of the ritual rules (such as Halal or Kosher food), alternative production processes, regardless of how technologically advanced or efficient they are, cannot be accepted as long as the ritual rule proscribes any alternative to the traditional production process. But the implications are unclear when product has historically been produced in only one way such that alternative production processes were unimaginable before. In this case, the advent of a new production process raises the unprecedented question of whether it *is* or *is not* included in the ritual rules. Moreover, if the alternative production process provides clear advantages, a dilemma arises. On one hand, if the production process is not included in the ritual rules, choosing a new production process will not harm the performance of rituals and promises benefits. On the other hand, if the production process is an important part of the ritual, choosing the new production process risks a negative outcome: the failure of the ritual.

We argue that the latter consideration should weigh heavily in a high-stakes ritual context. In this paper, we can hold constant the coupling of the production process with the product, and we vary the extent to which the product is used in a high-stakes ritual context or a low-stakes ritual context. We expect that when the stakes are high, consumers will be conservative about the production process and abide by traditional practices, even when the process may not pertain to a ritual rule and when consumers must forgo a clear advantage. Throughout this paper, we call the conservative preference – in particular, with regard to production process – in ritual contexts the "ritual effect" and aim to both capture its presence and provide an explanation for the underlying mechanism of such an effect. Support for our prediction will provide conservative evidence showing that consumers abide by ritual rules. Our theory leads to the following set of hypotheses.

*H1.* When products are associated with a high-stakes ritual, people are less accepting of new alternative production processes, even when the production process is not explicitly proscribed and new production processes provide clear advantages.

*H2.* The perceived level of risk mediates the ritual effect in generating production process conservatism.

## SETTING: THE PRODUCTION PROCESS OF DIAMONDS

### *Diamonds and Engagement Rituals*

Diamond rings were not considered to be a prerequisite for betrothal by most of the American brides and grooms until the early twentieth century (Brinig, 1990; Epstein, 1982b). The practice of giving and receiving diamond rings in the process of engagement is believed to be traceable to the successful efforts of De Beers and its marketing agency. Along with the famous slogan of "A Diamond is Forever," De Beers successfully invented the image of a diamond ring as an expression of everlasting love (Epstein, 1982b). As a result, diamond rings became virtually synonymous with engagement among the Americans; by 1965, more than 80% of all brides in the United States received a diamond engagement ring, and the diamond ring is still widely regarded as an inseparable part of courtship and engagement (Bowers, 2015; Brinig, 1990; Kunz, 1973; O'Rourke, 2007; Rothman, 1987).

As the giving and receiving of an engagement ring has become a widespread ritual associated with marriage, conventional social expectations – or "ritual rules" – have emerged about how to perform this practice. For instance, general expectations have developed about the ring's appearance, the finger on which it should be worn, and the amount of money men should spend on it (Bowers, 2015; Spar, 2006). The performance of this ritual practice was partly evaluated by the features of diamonds, commonly known as the "4Cs" – color, cut, clarity, and carats. Developed and standardized by the Gemological Institute of America (GIA) in the 1950s, the 4Cs are a widely adopted measure of quality in the diamond industry; diamonds are highly valued when they are larger, when they are nearly or absolutely colorless, when they have fewer inclusions (i.e., imperfections), and when they have a balanced cut that allows the maximum reflection of light (Scott & Yelowitz, 2010).

### *Mined Diamonds and the Diamond Pipeline*

Diamonds have a particular processing and distribution structure, often called the diamond pipeline that distinguishes them from other materials and natural resources. Because the specific features of the diamond-production process have made a significant contribution to the historical image of the end product, we will briefly explain the full process.

Historically, gem-quality diamonds have been sourced from nature, mostly from the underground mines. Diamonds are formed deep in the earth when carbon is subjected to high pressure and high temperature. *Kimberlite*, a type of volcanic rock, is known to be the major source of diamonds. In the exploration stage, producers attempt to find these kimberlite pipes and perform a geological analysis of minerals to find a diamond-bearing kimberlite and assess whether the kimberlite is a commercially viable source of diamonds. The production of rough diamonds is a highly concentrated industry in terms of both the country of origin and the number of firms involved (Even-Zohar, 2007, pp. 166–168).

A long history of cartel behavior, led by De Beers, has characterized the distribution of rough diamonds. Rough diamond stones are purchased by either small traders or the diamond trading company (DTC), which is the distribution arm of De Beers. Rough diamonds are sorted based on various characteristics that determine their value when they are processed, and they are sold either through the *sightholder* system, tenders, or spot sales. In the processing stage, diamonds are cut and polished from rough stones into finished gems. This stage of the process is highly labor intensive and competitive, and thousands of small players populate this segment of the diamond industry. In the preparation for jewelry manufacturing, finished stones may be graded by organizations such as the GIA. Finally, these polished diamonds are made into diamond jewelry. Diamond jewelry manufacturers tend to be located close to the end market. The United States is the single largest diamond consumer market, consuming roughly half of the world's polished diamonds (Even-Zohar, 2007).

### *Technological Innovation in the Production Process of Diamonds*

Although it has been possible to synthetically produce diamonds since the 1950s, the technology to produce gem-quality diamonds in a cost-effective manner emerged only in the past decade (Markoff, 2015). The production process for lab-created diamonds stands in stark contrast to that of mined diamonds, which are created by geological processes. Whereas mined diamonds rely on natural resources and specialized labor around the globe, lab-created diamonds are based on the technology. Lab-made gemstone diamonds are mostly created using one of two methods. The high pressure-high temperature (HPHT) method replicates the natural geological process. General Electric used this method when it first introduced gem-quality lab-created diamonds in 1970 (Olson, 2000). In the first stage of this process, small seed diamonds are placed into a machine and are covered with a mixture of catalyst metal and graphite powders. The machine replicates the natural geological process, increasing temperatures up to 2,500°C and pressure up to 60,000 atmospheres. With the second method, chemical vapor deposition (CVD), manufacturers create diamond crystals in a low-pressure environment using carbon-bearing gases. This process involves depositing a carbon vapor onto a substrate to grow the stones (Isberg et al., 2002; Spear & Dismukes, 1994).

These lab-created diamonds are different from inexpensive diamond alternatives such as cubic zirconium or moissanite, which bear some visual resemblance to diamonds but have completely different molecular structures. In contrast, lab-created diamonds are chemically, physically, and optically equivalent to mined diamonds. In other words, colorless lab-created diamond gemstones can be made identical to naturally occurring mined diamonds of high quality. However, the market share of lab-created diamonds is very small in the gemstone market. Whereas lab-created diamonds accounted for more than 90% of industrial diamond consumption (Olson, 2000), lab-created diamonds were estimated to represent only 0.01% of the volume of US diamond gemstones sales in 2010 (Bain and Company, 2011, p. 75).

## EMPIRICAL EVIDENCE

We designed a series of experiments to test our hypotheses. For Pretests 1 and 2 and Study 1, we recruited participants through Amazon Mechanical Turk (AMT), an online website where researchers can recruit subjects by offering a monetary reward upon task completion. AMT has been found to provide a reliable pool of subjects and to serve as a useful resource for experimental research (Mason & Suri, 2012; Paolacci, Chandler, & Ipeirotis, 2010). However, because the salience of the engagement ritual may be sensitive to respondents' age and life stage, in Study 2, we test our theory using MBA students. For Study 2, we conducted an experiment as a course credit for Master of Business Administration (MBA) students at a private university in the northeastern United States.

### *Pretests 1 and 2: Expected Market Value for Products Made Using a Non-traditional Production Process*

Pretests 1 and 2 sought to confirm a few assumptions that underlie the test of our theory in the main study. First, we wished to confirm that diamonds are associated with rituals. Second, we aimed to establish that people care about the production process of diamonds when the objective measure of quality is identical and the ways in which their evaluations are translated into price discounts.

#### *Method*

A total of 232[1] were recruited through AMT, and they completed a short survey for US$0.25. Subjects who had graduated from high school and lived in the United States were eligible for our survey. At the beginning of the survey, subjects were told a cover story, i.e., that the survey aimed to determine how to display and value items to develop an online game and that participants would be given questions on various items. Pretest 1 was conducted as a between-subject design whereby participants were randomly assigned to a survey for either a mined diamond condition or a lab-created diamond condition.

The survey consists of our main questions, questions that supply relevant information, and filler questions designed to disguise the survey's true purpose.

To provide relevant information to the subjects, the survey asked a series of questions that subjects had to read and understand. For example, they were told that "color, cut, carat, and clarity, widely known as the 4Cs, are the standard ways of evaluating a diamond" and were asked, "If you were buying a diamond, which would you think is the most important?" Subjects were also given information about alternative production processes – lab-created diamonds – through these questions. The answers to these questions were not necessarily important for our research purpose; the goal was to provide respondents with relevant knowledge. The survey also included a few filler questions that were unrelated to our research question to make the survey flow more naturally and to make the cover story more credible.

In the main questions, we first asked how much a diamond was associated with special occasions on the 5-point scale. Later, subjects were given descriptions of two diamonds whose objective quality was (almost) the same but that were different in dimensions unrelated to quality such as shape and the date polished. Whereas the basic idea was to provide two items that were identical except for their production processes, to avoid a demand effect, we made slight adjustments in the diamonds' properties such that the production process differences were not explicit (see Fig. 1). Subjects were then asked how much they would expect a lab-created diamond to sell for if a mined diamond was sold for

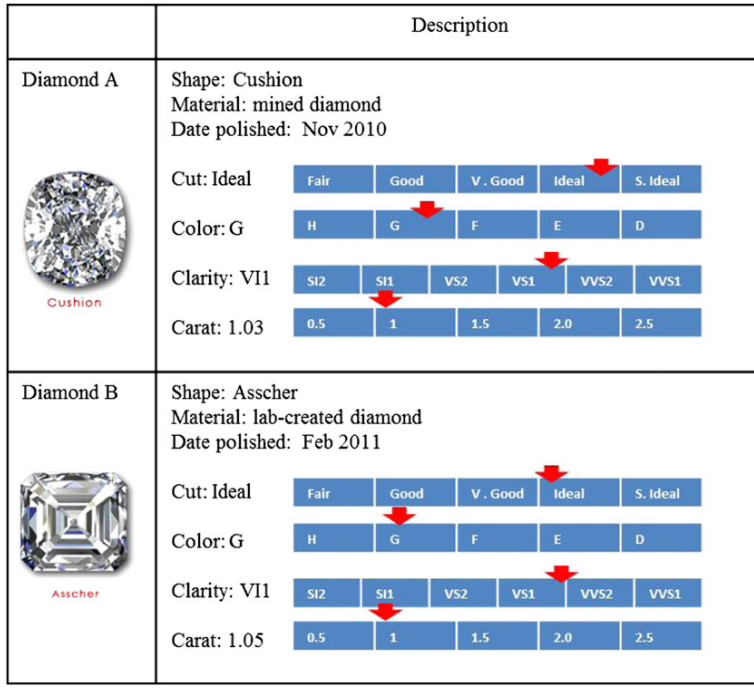


*Fig. 1.* Product Description for the Diamond Module in Pretests 1 and 2.

10,000 dollars. To check the effect of our adjustments of diamond properties, we counterbalanced those differences.

Although we intended a subtle manipulation to avoid a demand effect, one unavoidable downside was that we could not determine how many of the subjects were actually paying attention to the production process and how their level of attention would influence the result. To clarify subjects' thinking when they revealed their price expectations for lab-created diamonds, Pretest 2 replicated and extended Pretest 1. A total of 319 additional subjects were recruited from AMT. In addition to the questions asked in Pretest 1, these participants were asked the main reason for their price expectations after they submitted their expected prices for lab-created diamonds.

*Results and Discussion*

Pretest 1 and Pretest 2 present two findings. First, with respect to the first question about the extent to which diamonds are associated with special occasions, the mean response was 1.52 (1 = very strong association and 5 = no association at all; $N = 232$; 95% confidence interval [1.42, 1.62]). This result shows that diamonds are a good example of a ritual product. Second, we find that the subjects cared about the production process independent of the quality and that they expected significantly lower prices for a lab-created diamonds. Compared with US$10,000 for a mined diamond, subjects expected to pay US$8,399 for a lab-created diamond of the same quality ($N = 213$),[2] which indicates a significant difference given that the 95% confidence interval ranged from US$7,973 to US $8,825. Additionally, because no significant difference existed in price expectations with the counterbalance, we can conclude that the pairs of quality measure in our product descriptions were successfully manipulated to represent diamonds of the same quality with slight differences.

Surprisingly, however, a significant percentage of subjects (25.4%) expected even higher prices for lab-created diamonds. Because we planted a subtle manipulation to avoid a demand effect, a considerable number of subjects might have focused on properties rather than the production process and formed their price expectations based on their assessment of such properties.

Pretest 2 confirmed that subjects who focused on the production process expected significantly lower prices for lab-created diamonds. After the expected price question, subjects were asked a follow-up question: "What was your main reason for thinking that Diamond B would sell for a lower [a higher, an equal] price?" Approximately 48% of the subjects answered that they focused on the

***Table 1.*** *T*-test of Expected Price by Attention to the Production Process (Without Outliers).

| The production process is […] | *N* | Mean | SE | 95% CI | |
|---|---|---|---|---|---|
| […] not the main reason for the price expectation | 167 | 9,791.81 | 128.45 | 9,538.20 | 10,045.42 |
| […] the main reason for the price expectation | 152 | 7,075.21 | 168.28 | 6,742.72 | 7,407.71 |

production process. As summarized in Table 1, these subjects expected a significant price discount for the alternative production process (mean = US$7,075.21, $N = 152$, SE = 168.28), compared to other subjects who said the production process was not the main reason for their price expectations (mean = US$9,791.81, $N = 167$, SE = 128.45). The difference between these two groups is statistically significant ($t(317) = 12.97$, $p < 0.001$).

### *Experiment 1: Ritual and Production Process Conservatism*

Experiment 1 is designed to test H1. This experiment includes four important features. First, we test the effect of high-stakes rituals by comparing the same gift-giving behavior in two different social contexts. In particular, we compare two scenarios: (1) a man giving diamond jewelry to his girlfriend purely as a gift and (2) a man giving diamond jewelry to his girlfriend as a part of an engagement ritual. Whereas gift-giving often involves both attention to rules and the performer's identity statements (Camerer, 1988; Mauss, 2006), greater risk is involved when gift-giving is performed as part of a ritual (especially one with high stakes) than when it has no explicit ritual implications. Second, subjects were made to understand that although the naked eye cannot distinguish lab-created diamonds from mined diamonds, they can be distinguished with certificates. This allowed us to test for acceptance of the production process *per se* rather than the ability of a new production process to "pass" as a traditional process. Third, instead of asking the expected price, we asked about subjects' behavioral choices in the form of advice for a friend, which should be more effective in tapping into consumers' lived experience, as subjects were primed for actual involvement. Fourth, when choosing between the two diamonds, subjects were told that they could trade production processes for a larger diamond, i.e., for the same price, they could get a larger diamond when they chose a lab-created diamond than when they choose a mined diamond, providing an incentive to choose the nontraditional production process. Our main dependent variable investigates the extent to which the subjects were willing to move to the nonconventional production process across social settings.

#### *Method*

A total of 642 subjects were recruited through AMT, and they completed a survey for US$0.25 each (64% females, average age = 30.8). The survey was constructed as a between-subjects experiment, in which each subject was randomly assigned to either a ritual setting or a nonritual setting. To avoid a demand effect, subjects were told a cover story at the beginning of the survey: The purpose of the survey was to develop an online shopping game, and they would be asked questions about one of the items, which they then found out was diamonds. In practice, all the subjects were given questions about diamonds.

In the ritual setting, subjects were told to imagine an engagement context, in which they ultimately had to give an advice to an imaginary friend who was buying diamond jewelry for *an engagement gift*. In the nonritual setting, subjects

were told to imagine that they were giving advice about a diamond jewelry purchase to a friend who was buying *a gift*. The description of this imaginary friend was identical in both settings, i.e., "a 32-year-old male friend who lives in Chicago and who has been in a serious relationship with his girlfriend for 2 years."

Similar to our previous experiments, we used questions that the subjects had to read and understand to provide relevant background knowledge for the experiment. For example, in a series of questions, the subjects read that it is now technically possible to grow diamonds in laboratories and that these lab-created diamonds have the exact same chemical, physical, and optical characteristics as mined diamonds; they also read that even though a mined diamond and a lab-created diamond are identical in 4C measures and indistinguishable to the naked eye, lab-created diamonds are laser-inscribed with an identity name and number that are declared in their certifications.

After the subjects were given information on lab diamonds through this series of questions, they were asked whether a lab-created diamond should sell for the same price, a higher price or a lower price than a mined diamond. In the next section, the subjects were given a description of the specific design and profile of the "mined" diamond that the friend chose to buy. This description was identical in both conditions. Finally, in our key question, subjects were told that the jeweler told the friend that the exact jewelry could also be made with a lab-created diamond and that if he chose to make it with a lab-created diamond, he could obtain a larger diamond for the same price. The subjects were then asked if they "would recommend that he buy a mined diamond (henceforth, "Mined Diamonds")"; they "would recommend that he buy a lab-created diamond (henceforth, "Lab-created Diamonds")"; or their "recommendation would depend on how big the lab-created diamond is (henceforth, "It Depends")." The order of these choices was counterbalanced. Starting with a mined diamond and determining respondents' willingness to change increases the external validity, with the traditional production process acting as the conventional equilibrium and the acceptance of a new production process requiring additional knowledge and an active effort.

*Results*

Our key question for the dependent variable, "Which one would you recommend that your friend buy?", is measured using a multiple-choice question with three possible answers. The results are summarized in Fig. 2. We approached testing *H1* in two ways. First, as a direct test, we compared respondents' willingness to recommend a mined diamond across conditions using the Mann−Whitney *U* test, a nonparametric test that is suitable for ordinal but not normally distributed dependent variables (Mann & Whitney, 1947). However, we did not find a significantly higher preference for a mined diamond in the engagement condition than in the gift-giving condition ($U/\text{mn} = 0.48$, $z = 0.91$, $p = 0.36$). The respondents in the engagement condition ($N = 319$, mean = 1.96) did not show a higher preference for a mined diamond than did the respondents randomly assigned to the gift-giving condition ($N = 323$, mean = 1.90). We then ran a series of *t*-tests of

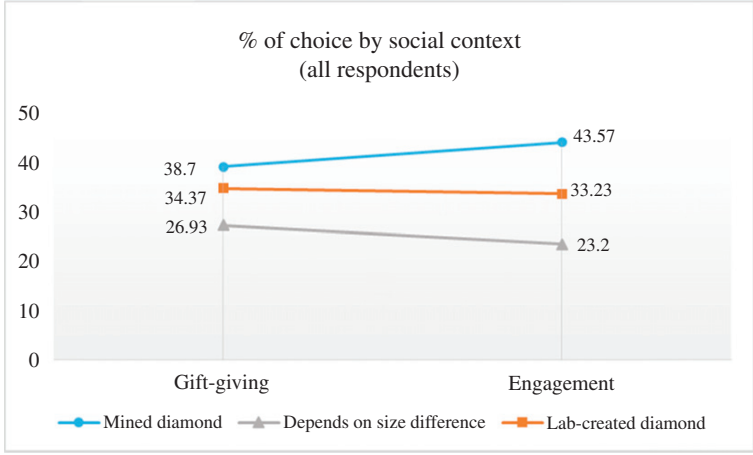


*Fig. 2.* Experiment 1: The Effect of the Ritual Context (All Respondents).

proportions between the choices of the same diamond across conditions. When the percentage is compared across conditions, neither the proportions recommending a mined diamond (43.57% vs 38.70%, $p = 0.22$ (two-tailed)) nor the proportions recommending a lab-created diamond (33.23% vs 34.37%, $p = 0.8$ (two-tailed)) are statistically significant, although the directions are consistent with our predictions.

Second, in a supplementary approach, we ran a chi-square goodness-of-fit test to show the distributions of diamond choices in *each* social context. In the engagement condition, we find that the frequencies of "mined diamonds" and "lab-created diamonds" are significantly different from random chance (Pearson $\chi^2(1) = 4.44$, $p < 0.05$), with a higher frequency in the former category, whereas in the gift-giving condition, the two categories do not show such significant differences (Pearson $\chi^2(1) = 0.83$, $p = 0.36$). Overall, although the contrast shown in the second approach is aligned with our prediction, we do not find sufficient support for *H1*.

*Post hoc analysis.* We then ran a series of post hoc analyses to pursue specific objectives. First, because the ritual effect in production process conservatism was suggestive but not strong (as discussed above), we investigated whether certain demographic groups show more salient ritual effects than others. As discussed in the theory section, depending on each respondent's social role in the real world, they might be differently attuned to the importance – or even the existence – of a potential ritual rule. In particular, given that conventional gender roles exist and that people may be more knowledgeable about ritual rules when they experience them, we suspected that gender and marital status might affect the respondents' sensitivity to the production process of diamonds in engagement rituals. Second, we aimed to address the potential argument that stronger preferences for mined diamonds in a ritual setting stem from the giver's

increased willingness to buy whatever is more expensive rather than his attention to the production process. To address this possibility, we included price expectations as a control variable and investigated the extent to which this "price signal" works in parallel with the ritual effect.

Since the dependent variable includes three categories, for the sake of simplicity in interpretation, we first tested whether the respondent displays a strict preference for a mined diamond by combining "Lab-created Diamonds" and "It Depends" (coded 0), as opposed to "Mined diamonds" (coded 1).[3]

Tables 2 summarizes the regression results. Model 1 is the baseline model that introduces the control variables. The results show that price expectations are a strong predictor of one's preference for a mined diamond. Compared with when respondents expected a mined diamond to be more expensive (reference category), the odds of recommending a mined diamond decreased when they expected a lab-created diamond to be more expensive ($b = -2.43$, $p < 0.05$) or when they expected the price to be equal ($b = -2.35$, $p < 0.001$). Additionally, older respondents − the fourth age quantile − were more likely to recommend a mined diamond ($b = 0.72$, $p < 0.01$).

Model 2 adds the main independent variable: the ritual context. However, although the coefficient is in the expected direction, there was no significant evidence of a ritual effect ($b = 0.23$, $p = 0.17$). In Model 3, we added interaction terms − marital status and the engagement condition. The results suggest that the ritual effect was present among married respondents (reference category; $b = 0.67$, $p < 0.05$); the odds of recommending a mined diamond increased by 95% [exp(0.67) − 1], suggesting a significant ritual effect in this group. To further rule out the "price signal" explanation, in Model 4, we limited the sample to respondents who expected a mined diamond to be more expensive (87% of the respondents). The results show that a preference for mined diamonds among currently married respondents holds. Finally, in Models 5 and 6, we explored whether gender moderates the observed ritual effect. To avoid the difficulty of interpreting three-way interaction effects, we conducted separate analyses for female respondents (Model 5) and male respondents (Model 6). Models 5 and 6 show that the ritual effect is driven by female respondents who are currently married (Model 5: $b = 0.80$, $p < 0.05$).

We further conducted a multinomial logistic regression analysis, treating the three choices of the dependent variable as categorical. The results are summarized in Table 3. Model 1 shows that in the ritual condition, married females are 2.46 [exp(0.90)] times more likely to choose "Mined Diamonds" than "It Depends," but there was no statistically significant difference by the social context in respondents' likelihood of choosing "Lab-created Diamonds" over "It Depends" ($b = 0.44$, $p = 0.25$). This pattern held when we limited the sample to respondents who expected a mined diamond to be more expensive (Model 2, $b = 1.01$, $p < 0.01$) or when we limited the sample to female respondents (Model 3, $b = 1.14$, $p < 0.01$).

In sum, although Experiment 1 does not provide direct support for *H1* in the overall sample, we found that the subsample of married women showed production process conservatism. Fig. 3 shows that strong production process

***Table 2.*** Experiment 1: Logistic Regression Analysis (DV: Recommend "Mined Diamonds").

| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
|---|---|---|---|---|---|---|
| Ritual | | 0.23 | 0.67* | 0.67* | 0.80* | 0.40 |
| | | (0.17) | (0.28) | (0.28) | (0.34) | (0.52) |
| Price expectation (*Ref*: mined, expensive) | | | | | | |
| Lab-created, expensive | −2.43* | −2.44* | −2.44* | | −2.38* | Omitted |
| | (1.05) | (1.05) | (1.05) | | (1.06) | |
| Same | −2.35*** | −2.35*** | −2.35*** | | −1.94*** | −3.19** |
| | (0.48) | (0.48) | (0.48) | | (0.55) | (1.03) |
| Female | 0.02 | 0.02 | 0.04 | 0 | | |
| | (0.18) | (0.18) | (0.18) | (0.18) | | |
| Marital status (*Ref*: married) | | | | | | |
| Widowed | −0.10 | −0.23 | −0.47 | −0.43 | −0.57 | Omitted |
| | (1.45) | (1.45) | (1.45) | (1.45) | (1.45) | |
| Divorced | −0.52 | −0.50 | −0.2 | −0.17 | −0.48 | 0.63 |
| | (0.36) | (0.36) | (0.47) | (0.47) | (0.57) | (0.96) |
| Separated | −2.10$^{+}$ | −2.10$^{+}$ | −14.29 | −13.93 | −14.34 | Omitted |
| | (1.08) | (1.08) | (666.35) | (562.59) | (786.11) | |
| Never married | −0.15 | −0.16 | 0.18 | 0.15 | 0.32 | −0.05 |
| | (0.21) | (0.21) | (0.27) | (0.27) | (0.33) | (0.49) |
| Marital status × ritual | | | | | | |
| Widowed × ritual | | | Omitted | Omitted | Omitted | Omitted |
| Divorced × ritual | | | −0.64 | −0.62 | −0.2 | −2.17 |
| | | | (0.71) | (0.72) | (0.84) | (1.55) |
| Separated × ritual | | | 12.76 | 12.43 | 13.11 | Omitted |
| | | | (666.35) | (562.59) | (786.11) | |
| Never married × ritual | | | −0.73* | −0.67$^{+}$ | −0.92* | −0.43 |
| | | | (0.36) | (0.37) | (0.45) | (0.64) |
| Age (*Ref*: 2nd quantile) | | | | | | |
| 1st Quantile | 0.13 | 0.12 | 0.12 | 0.1 | −0.19 | 0.58 |
| | (0.25) | (0.25) | (0.25) | (0.25) | (0.33) | (0.39) |
| 3rd Quantile | 0.19 | 0.17 | 0.13 | 0.18 | 0.07 | 0.18 |
| | (0.25) | (0.25) | (0.25) | (0.25) | (0.32) | (0.39) |
| 4th Quantile | 0.72** | 0.72** | 0.69* | 0.62* | 0.52 | 0.89$^{+}$ |
| | (0.27) | (0.27) | (0.28) | (0.28) | (0.34) | (0.50) |
| Constant | −0.28 | −0.39 | −0.58* | −0.55$^{+}$ | −0.49 | −0.54 |
| | (0.25) | (0.26) | (0.28) | (0.29) | (0.32) | (0.48) |
| Log likelihood | −399.62 | −398.67 | −395.88 | −375.64 | −255.61 | −136.23 |
| Pseudo $R^2$ | 0.08 | 0.08 | 0.09 | 0.03 | 0.08 | 0.11 |
| *N* | 642 | 642 | 642 | 560 | 409 | 229 |

*Notes:* *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$ (two-tailed test).
Coefficients are omitted when there is no variance in the dependent variable for the category.

***Table 3.*** Multinomial Regression Analysis (DV Reference Category: "It Depends").

| | Model 1 | | Model 2 | | Model 3 | |
|---|---|---|---|---|---|---|
| | Mined | Lab-created | Mined | Lab-created | Mined | Lab-created |
| Ritual | 0.90** | 0.44 | 1.01** | 0.66 | 1.14** | 0.63 |
| | (0.35) | (0.38) | (0.36) | (0.42) | (0.43) | (0.47) |
| Price expectation (*Ref*: mined, expensive) | | | | | | |
| Lab-created, expensive | −2.03$^{+}$ | 0.69 | | | −2.11$^{+}$ | 0.46 |
| | (1.13) | (0.64) | | | (1.14) | (0.67) |
| Same | −1.89*** | 0.72* | | | −1.62** | 0.57 |
| | (0.52) | (0.31) | | | (0.60) | (0.41) |
| Female | −0.21 | −0.43$^{+}$ | −0.18 | −0.31 | | |
| | (0.22) | (0.23) | (0.23) | (0.25) | | |
| Marital status (*Ref*: married) | | | | | | |
| Widowed | −1.25 | −13.48 | −1.28 | −13.54 | −1.51 | −15.03 |
| | (1.46) | (771.86) | (1.46) | (755.86) | (1.47) | (1472.43) |
| Divorced | 0.16 | 0.66 | 0.24 | 0.78 | −0.08 | 0.73 |
| | (0.60) | (0.63) | (0.60) | (0.64) | (0.71) | (0.70) |
| Separated | −13.12 | 1.28 | −12.96 | 1.40 | −14.61 | 0.88 |
| | (546.11) | (1.19) | (522.37) | (1.19) | (1153.59) | (1.27) |
| Never married | 0.41 | 0.43 | 0.42 | 0.56 | 0.28 | −0.09 |
| | (0.32) | (0.33) | (0.33) | (0.36) | (0.38) | (0.41) |
| Marital status × ritual | | | | | | |
| Widowed × ritual | Omitted | Omitted | Omitted | Omitted | Omitted | Omitted |
| Divorced × ritual | −0.58 | −0.01 | −0.82 | −0.45 | 0.41 | 0.62 |
| | (0.95) | (0.97) | (0.95) | (1.00) | (1.34) | (1.33) |
| Separated × ritual | 11.33 | −1.79 | 11.68 | −1.02 | 13.07 | −1.44 |
| | (546.11) | (1.61) | (522.37) | (1.74) | (1153.59) | (1.94) |
| Never married × ritual | −0.99* | −0.50 | −1.02* | −0.68 | −1.14* | −0.34 |
| | (0.44) | (0.47) | (0.46) | (0.52) | (0.55) | (0.60) |
| Age (*Ref*: 2nd quantile) | | | | | | |
| 1st Quantile | −0.17 | −0.54$^{+}$ | −0.09 | −0.36 | −0.30 | −0.24 |
| | (0.30) | (0.30) | (0.31) | (0.33) | (0.38) | (0.39) |
| 3rd Quantile | 0.15 | 0.03 | 0.2 | 0.04 | 0.15 | 0.14 |
| | (0.31) | (0.30) | (0.32) | (0.34) | (0.39) | (0.40) |
| 4th Quantile | 0.54 | −0.27 | 0.55 | −0.14 | 0.43 | −0.17 |
| | (0.34) | (0.36) | (0.35) | (0.39) | (0.41) | (0.44) |
| Constant | 0.29 | 0.28 | 0.18 | −0.01 | 0.15 | −0.11 |
| | (0.34) | (0.35) | (0.34) | (0.38) | (0.37) | (0.38) |
| Log likelihood | −642.07 | | −578.58 | | −411.91 | |
| Pseudo $R^2$ | 0.07 | | 0.02 | | 0.07 | |
| *N* | 642 | | 560 | | 409 | |

*Notes:* *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$ (two-tailed test).
Coefficients are omitted when there is no variance in the dependent variable for the category.

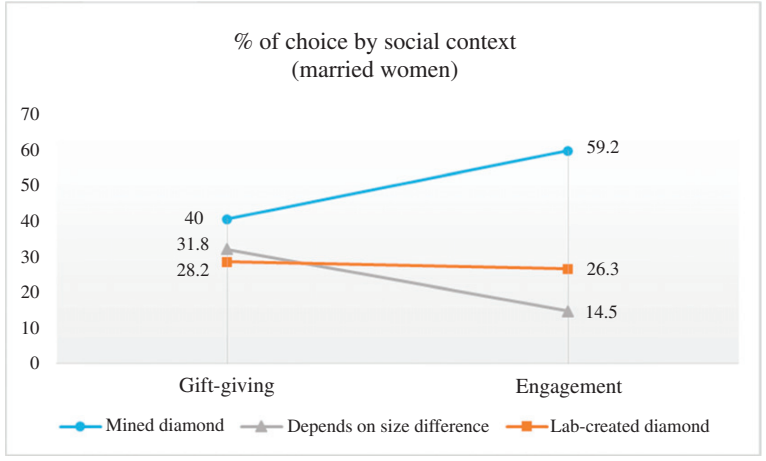


*Fig. 3.* Experiment 1: The Effect of the Ritual Context (Married Women).

conservatism exists among married women in this sample ($N = 161$). Two sample tests of proportions show that preference for a mined diamond is significantly higher in the engagement condition (59.2% vs 40.0%, $p < 0.05$ (two-tailed)), providing support for our theory.

As discussed earlier, marital status and gender likely produce significant variance in respondents' knowledge and sensitivity to the risks associated with the engagement ritual, and our post hoc analysis finds them to be important preconditions to exhibiting production process conservatism. However, the following question remains: Why might married women be the most sensitive to engagement rituals in choosing production processes? These results invite additional testing of the mechanism.

### *Experiment 2: Perceived Risk as a Mechanism of the Ritual Effect*

The goal of Experiment 2 is twofold. First, this study seeks to test whether the perceived risks associated with a ritual are the mediating factor that generates production process conservatism, as suggested in *H2*. Whereas Experiment 1 indicated that the ritual effect is limited to a subgroup of the sample, building on this finding, we aim to test whether the sensitivity to the perceived risk explains the ritual effect observed in the subgroup. The second goal of this study is to test our theory among a different population – MBA students. Although the engagement ritual is widely known to most of the people in society, as indicated by the Mturk subjects, the ritual effect we may observe in the real world is largely enacted by those who are currently involved in the engagement ritual. To increase the external validity of our empirical test, we conducted Experiment 2 as course credit for MBA students at a private university in the northeastern United States. Because we changed the sample pool from AMT participants to MBA

students, we start by identifying the presence of a ritual effect. Due to the size of the class, the sample size in Experiment 2 is smaller than that in Experiment 1.

*Method*

A total of 82 respondents completed the experiment (50% females, average age = 28.5). The procedure was largely similar to that used for Experiment 1, with three differences. First, when respondents reached the question about their recommendation, they were asked to answer on a 5-point scale ranging from 1 = "strongly recommend a mined diamond" to 5 = "strongly recommend a lab-created diamond." Second, if they recommended a lab-created diamond, they were given a follow-up question that asked the main reason for their recommendation; if their recommendation was not based on obtaining a bigger diamond, they were asked to fill in an open-ended blank. This open-ended option allowed respondents to list other reasons for choosing to recommend a lab-created diamond besides its bigger size (e.g., environmental consciousness or a preference for advanced technology) and revealed whether the salience of such reasons varied by the social context. Third, and most importantly, after they reported their recommendations, the respondents were given a battery of questions regarding their perceptions of a diamond purchase on a five-point scale (a higher value indicating stronger agreement). "If she is not satisfied with this [ring/necklace], it will lead to problems in their relationship" directly measured the perceived level of risk, and this statement was used to test the mediating effect proposed in *H2*. We also included multiple filler questions.

*Results*

The first step involved identifying the existence of a ritual effect in this sample of MBA students. Overall, we did not find a ritual effect in production process conservatism in the overall sample. Although the mean was higher in the gift-giving condition ($M_{\text{gift-giving}}(N = 36) = 2.86$ vs $M_{\text{ritual}}(N = 46) = 2.52$), the difference was not statistically significant ($t(80) = 1.35$, $p = 0.18$, two-tailed test). Among the 21 respondents who leaned toward recommending lab-created diamonds (11 in the gift-giving condition and 10 in the engagement condition), 18 reported that the bigger diamond was the main reason for their recommendation, and 3 said that the other reason informed their recommendation, although they did not specify that reason in the text. The mean difference between the two conditions remained statistically nonsignificant when those three respondents were excluded.

Building on the post hoc analysis in Experiment 1, we further examined subsample variations by employing a regression approach (OLS). In short, we found support for the existence of a ritual effect – i.e., preference for a traditional practice in the ritual context – among female respondents. Table 4 summarizes the results when we added interaction terms to the baseline model (Model 1). Because respondents were either married or never married in this sample, marital status was measured with a dichotomous variable. Model 2 adds the interaction term with gender and the engagement condition, and Model 3 adds the interaction term with marital status and the engagement

***Table 4.*** Experiment 2: OLS Regression Analysis.

| | Model 1 | Model 2 | Model 3 | Model 4 |
|---|---|---|---|---|
| Ritual | −0.31 | 0.24 | −0.04 | 0.29 |
| | (0.26) | (0.38) | (0.44) | (0.47) |
| Female | 0.49$^{+}$ | 1.04** | 0.52$^{+}$ | 1.03* |
| | (0.27) | (0.39) | (0.28) | (0.39) |
| Female × ritual | | −1.01$^{+}$ | | −0.98$^{+}$ |
| | | (0.52) | | (0.55) |
| Never married | −0.00 | 0.1 | 0.24 | 0.16 |
| | (0.28) | (0.28) | (0.42) | (0.42) |
| Never married × ritual | | | −0.43 | −0.12 |
| | | | (0.55) | (0.57) |
| Constant | 2.58*** | 2.29*** | 2.4*** | 2.17*** |
| | (0.28) | (0.33) | (0.37) | (0.38) |
| $R^2$ | 0.07 | 0.11 | 0.07 | 0.11 |
| $N$ | 79 | 79 | 79 | 79 |

*Note:* $+p < 0.1$; $*p < 0.05$; $**p < 0.01$; $***p < 0.001$ (two-tailed test).

condition, each to the baseline model. Although Model 2 shows that female respondents had a slight preference for mined diamonds in the engagement condition ($b = -1.01$, $p < 0.1$), in Model 3, marital status did not play a role in producing a ritual effect. The ritual effect among women found in Model 2 held in the full model (Model 4). In a $t$-test, women were significantly less accepting of a lab-created diamond in the engagement condition ($M_{\text{gift-giving}}(N = 19) = 3.32$ vs $M_{\text{ritual}}(N = 22) = 2.54$, $t(30) = 2.06$, $p < 0.05$ (two-tailed test)).

These results bear some similarities and dissimilarities with those of Experiment 1. In both experiments, we observed a preference for mined diamonds over lab-created diamonds in the engagement condition only among a subgroup of the samples – in particular, women. However, marital status was an important factor in Experiment 1, but not in Experiment 2. Although such dissimilarities may be attributable to the different populations from which our samples were drawn, determining the reason for these differences is beyond the scope of this study. Thus, we proceed to test the mediating effect of perceived risk as a direct mechanism for those who exhibited production process conservatism, which is the primary goal of Study 2.

Next, we tested *H2* using subjects' responses to the statement "If she is not satisfied with this [ring/necklace], it will lead to problems in their relationship" as a measure of the perceived risk associated with their recommendations, following Preacher and Hayes (2008). This approach is superior to the traditional Sobel (1982) test for mediation, which assumes a normal distribution of variables. Based on bootstrapping with 5,000 iterations, we estimated the indirect effects via perceived risk. Table 5 shows the moderated mediation (Muller, Judd, & Yzerbyt, 2005). Model 1 shows production process conservatism in the

***Table 5.*** Experiment 2: Moderated Mediation.

| | Model 1<br>DV: Recommendation | Model 2<br>DV: Perceived Risk | Model 3<br>DV: Recommendation |
|---|---|---|---|
| Ritual | 0.17 | −0.38 | 0.054 |
| | (0.36) | (0.33) | (0.35) |
| Female | 1.00** | −0.58$^{+}$ | 0.83* |
| | (0.37) | (0.35) | (0.37) |
| Female × ritual | −0.94$^{+}$ | 1.10* | −0.62 |
| | (0.50) | (0.46) | (0.50) |
| Perceived risk | | | −0.29* |
| | | | (0.12) |
| Constant | 2.31*** | 2.69*** | 3.10*** |
| | (0.28) | (0.26) | (0.42) |
| $R^2$ | 0.11 | 0.08 | 0.17 |
| $N$ | 80 | 80 | 80 |

*Note:* $+p < 0.1$; $*p < 0.05$; $**p < 0.01$; $***p < 0.001$ (two-tailed test).

ritual condition (i.e., ritual effect) among women, as discussed above ($b = -0.94$, $p < 0.1$), although females are generally more open to lab-created diamonds ($b = 1.0$, $p < 0.01$). Model 2 establishes the second step, in which female respondents perceive a significantly higher level of risk in the engagement condition ($b = 1.1$, $p < 0.05$). Notably, male respondents show no differences in perceived risks across conditions ($b = -0.38$, $p = 0.25$). Model 3 shows that this perceived risk significantly affects the dependent variable ($b = -0.29$, $p < 0.05$), whereas the effect of the ritual context among women significantly decreases ($b = -0.62$, $p = 0.22$). The 95% bias-corrected confidence interval for the size of the indirect effect excluded zero (−0.73, −0.02). Overall, this result shows mixed support for *H2*. We again did not find the ritual effect in the general population. However, for the subsample who exhibited production process conservatism in the ritual condition, the result supports our proposed theory in *H2* that sensitivity to the perceived risk mediated such preference. In sum, as explained above, our results show moderated mediation.

## GENERAL DISCUSSION

The issue of why the same objective conditions are often very differently perceived and evaluated has been a longstanding and important puzzle for social scientists (Salganik & Watts, 2008; Sgourev & Althuizen, 2017; Zuckerman, 2012). In most of the cases in which products made via different production processes are differently valued in the market, consumers have generally been assumed to use the production process as a proxy for quality, whether the quality difference is explicit or implicit. Nonetheless, we still see a few examples in which consumers care about the production process even when the process does not affect the quality of end product. Why do people care about production

processes (independent of quality) at some times but not at other times? In other words, when are traditional practices in demand and why?

In this study, we make a theoretical contribution by clarifying how such variations may derive from the social context. We theorize that rituals constitute one driver of "production process conservatism" when the ritual performer's social role, socioeconomic status or social relationships are enacted in a larger group context. To avoid negative social outcomes from a failed ritual, ritual performers must pay extra attention to ritual rules. We developed our argument in the case of diamonds; new and more efficient production processes have recently become available, but diamonds have traditionally been formed underground and extracted from mines. The contrast between a mined diamond and a lab-created diamond provides an excellent setting for our research question, as the advent of a new production process brings uncertainty in terms of what, precisely, the ritual rules prescribe. Thus, we focus on whether consumers care about a traditional production process, even when the production process is only *possibly* part of the ritual rules.

However, our empirical evidence has limitations and leaves some questions unanswered. Although we find support for our prediction in certain subsamples, the effect was not found in the entire sample. On one hand, this may be partially attributable to the conservative nature of our own research question and to the research design. As mentioned above, we used a case in which the production process is an implicit ritual rule rather than an explicit one. Therefore, production process conservatism might have only been relevant to respondents who were able to recognize it as an implicit ritual rule. In addition, in our experimental design, the ritual effect was tested against a control group – the gift-giving condition – that also involved risks of exhibiting low capability and commitment, though to a lesser degree. Thus, the effect that we found is based on the strength of ritual implications across contexts, not on the existence (or lack) of ritual implications altogether. We expect that if a certain practice is more explicitly understood as a ritual rule and the contrast between a ritual condition and a nonritual condition is stronger, the effect will be stronger and more pervasive.

On the other hand, our finding, i.e. production process conservatism in the ritual condition among a subgroup, raises another question. Experiment 2 shows the mechanism to be perceived risk, as hypothesized. But why should (married) women be more knowledgeable and sensitive to such risks than men? Although we did not have a priori predictions about this, our findings suggest possible interpretations based on the gendered nature of social roles and the risks in performing engagement rituals. Conventionally, men are responsible for choosing the ring, and women wear the ring. At first glance, men seem to have more risk in the engagement ritual, because they present the ring as part of a marriage proposal. However, women face another type of risk; because they are the ones who wear the ring, they take on the role of representing the couple's capability and commitment to any larger group in which they are members. In other words, whereas men's high stakes are temporary, the ring has a lasting impact on women. Our evidence suggests that for general respondents (i.e., those who are not likely to be purchasing or receiving a diamond ring at the time of the survey), women are more sensitive than men to their personal stakes.

Our research speaks to various lines of ongoing research. First, our theory of "production process conservatism" joins a broader institutional approach that investigates the question of "why certain practices persist" (e.g., DiMaggio & Powell, 1983; Zucker, 1977). Our study applies the logic of an "institutionalizing" process at the individual level and thus explains the persistence of a particular cultural practice. Just as organizations seek legitimacy for their own survival, individuals pay attention to "what is considered right" by *others* to obtain social approval. This view is in line with a broader literature in economic sociology that claims that individuals conform to other people's opinions (Centola et al., 2005) or a public signal of status (Benjamin & Podolny, 1999; Clark, Clark, & Polborn, 2006; for a review see Correll et al., 2017). We contribute to this literature by suggesting the minimally sufficient conditions for an institutionalizing process related to a ritual. In particular, we have shown that a production process for diamonds can be institutionalized in a ritual context, even when (1) it is not an explicit part of the rules; (2) it is not immediately distinguishable ex post (unless the violator confesses); and (3) it does not generate different quality. Moreover, our study highlights that such institutionalizing power can even trump economic benefits – i.e., in ritual contexts, individuals even forgo a "bigger size" for the sake of conformity to institutionalizing pressures.

Additionally, our analysis joins the literature on technological innovation with a body of research that shows cultural norms as constraints on economic activities (Turco, 2012; Zelizer, 1979, 2010). Our study suggests why technological innovations may not always be accepted in the market, even when they provide a clear benefit (in the form of economic efficiency or higher quality). Whereas existing innovation research largely answers this question by focusing on the trajectory of technology itself (e.g., Arthur, 1990; Cusumano, Mylonadis, & Rosenbloom, 1992; David, 1985; Liebowitz & Margolis, 1995) or organizational resistance (e.g., Strang & Macy, 2001; Tripsas, 2009; Westphal, Gulati, & Shortell, 1997), this paper focuses on the importance of cultural norms in limiting the demand for a technological innovation (cf. Hahl, 2016). A shared cultural understanding often sorts items into two dichotomous categories – what is "accepted" and what is "not accepted" (Douglas, 2002). When such norms are in play, people deem their commitments to certain cultural values to be absolute and inviolable, and they are unwilling to trade off sacred values – i.e., the observance of rules of engagement – with secular ones – e.g., a "larger size" (Fiske & Tetlock, 1997; Tetlock, 2003). However, an innovation that does not fit today's cultural norms will not necessarily be permanently rejected (e.g., Murray, 2010). When a new production process is coupled with new supporting logics, it may appeal to market participants and integrate into group processes. In our case, the sellers and innovators of lab-created diamonds have attempted to introduce the norms of labor ethics, environmental sustainability, and transparency to advocate for lab-created diamonds rather than traditionally mined diamonds (Markoff, 2015). These logics may gain more popularity among market participants, and, if so, we expect that the traditional boundaries of "what is acceptable" will become blurred and that the rules for the engagement ritual will find a new equilibrium.

## NOTES

1. The pretest had two additional conditions – "wine" and "Wagyu beef" – as other examples of items that have objective measures of quality and different production processes, with 402 additional respondents. Although the results are consistent with the diamond condition – the participants expect to pay less for the alternative production process – we omit the detailed procedure and the results for brevity.

2. Because the survey asked participants to reveal their expected prices in an open question, the answers varied considerably, including some insincere outliers. Whereas we must exclude values in the analysis that are more than 2 standard deviations from the mean to produce a more reliable result, the inclusion of outliers does not change the overall interpretation of the data.

3. Admittedly, the nature of the dependent variable is a limitation of the current regression approach. One may consider ordinal logit, but it would not be appropriate to do so in this case because we had asked respondents' recommendations in three ways, with no assumptions about the distance between the choices. We further conducted a multinomial analysis that treats the dependent variable as categorical with no natural ordering. To avoid this issue in the dependent variable, we collected the dependent measure in the form of a discrete variable in Experiment 2.

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