GAD SAAD*

There is a growing interest among marketing scholars to examine the evolutionary bases of a wide range of consumer phenomena. While specific evolutionary hypotheses are typically tested using tools familiar to marketing researchers (e.g., experiments, surveys), the method of evolutionary psychology is rooted in its unique epistemology (the manner in which knowledge is generated and organized), which comprises three elements: (1) the distinction between proximate and ultimate explanations, (2) the building of nomolological networks of cumulative evidence (triangulation of convergent lines of evidence), and (3) an organizing tree of knowledge. The purpose of this article is to describe this process using marketing-relevant examples as a means of providing a framework of best practices to marketing scholars aiming to incorporate the evolutionary lens within their research programs.

Keywords: consumer research, evolutionary psychology, proximate versus ultimate explanations, nomological networks, trees of knowledge

On the Method of Evolutionary Psychology and Its Applicability to Consumer Research

Over the past two decades, evolutionary psychology and evolutionary theory in general have made important inroads across the humanities, social sciences, and the natural sciences (see Saad 2007, Table 2.3, pp. 57–58; Saad 2011b, Table 1, p. 726). The infusion of evolutionary theorizing is increasingly taking place within the marketing discipline, as researchers aim to explore the evolutionary bases of consumer phenomena (Colarelli and Dettmann 2003; Durante et al. 2014, 2015; Griskevicius and Kenrick 2013; Griskevicius et al. 2009; Saad and Gill 2000; Saad and Vongas 2009; Saad 2006, 2007, 2008b, 2011a, 2013, 2015). While specific hypotheses derived from evolutionary theory are tested using many of the standard data collection tools familiar to marketing researchers (e.g., lab and field experiments, surveys, ethnographic observations), the underlying evolutionary explanations are rooted in the unique epistemology of evolutionary psychology (i.e., the manner in which research questions are generated and subsequent knowledge is organized). I refer to this as the method of evolutionary psychology, which comprises three elements (see Figure 1): (1) the distinction between proximate and ultimate explanations, (2) the use of nomolological networks of cumulative evidence, and (3) organizing trees of knowledge. The objective of this article is to explain this process, illustrate it with a few marketing-relevant examples, and offer a set of best practices to marketing researchers who might aspire to include the evolutionary approach within their research agendas.

I begin with a discussion of the crucial epistemological distinction between proximate and ultimate explanations using consumer-related menstrual cycle effects as a case example. This is followed by the manner in which evolutionary behavioral scientists build nomological networks of cumulative evidence. I offer three examples of such a process, all of which are relevant to consumer scholars: the biological roots of toy preferences (used to broach the nature–nurture debate), men's evolved preference for the hourglass figure (used as an advertising cue), and the biological/evolutionary roots of loss aversion (relevant to marketing scholars steeped in the behavioral decision theory [BDT] tradition). I show how the building of these nomological networks is an instantiation of sequential analysis—namely, the collecting of sufficient cumulative evidence until one reaches a stopping threshold that signifies near-irrefutable evidence for a hypothesis/explanation. I then explain how knowledge in evolutionary psychology is organized using trees of knowledge starting with foundational evolutionary principles at the root node that flow into middle-

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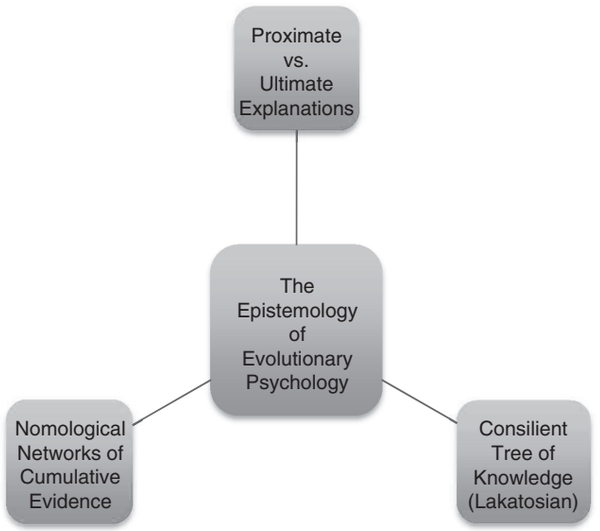
Figure 1
THE EPISTEMOLOGICAL METHOD OF EVOLUTIONARY PSYCHOLOGY



level theories and ultimately end at leaf nodes composed of falsifiable hypotheses and propositions. Ultimately, the method of evolutionary psychology is antithetical to the common (albeit incorrect) criticism that it consists of unfalsifiable just-so stories.

The effects of genetic relatedness and genetic assuredness on gift-giving behavior are then offered as a case example of how the method of evolutionary psychology is applied. This is contrasted with a few hypothetical examples of fanciful storytelling as a means of demonstrating how intuitively appealing evolutionary explanations that are otherwise void of any scientific grounding might be generated. Several key epistemological, theoretical, and methodological benefits of Darwinizing consumer research are described next, followed by some concluding remarks.

PROXIMATE VERSUS ULTIMATE EXPLANATIONS

The ethologist Nikko Tinbergen asserted that a full explanation of animal (human) behavior requires that it be studied at four levels: causation, development, evolution, and function (Bateson and Laland 2013; O'Brien and Gallup 2011; Tinbergen 1963). The first two levels are known as proximate explanations, and the last two are ultimate explanations (Mayr 1961; Scott-Phillips, Dickins, and West 2011). Proximate causes address how something operates (causation) and explore its ontogenetic trajectory (development), whereas ultimate causes tackle the Darwinian forces that have shaped the evolution of the trait, including its phylogenetic history (evolution) and its adaptive utility (function). Take, for example, women's menstrual cycles. This physiological reality could be tackled at each of the four levels: (1) Causation: How do various hormones such as estradiol, progesterone, luteinizing hormone, and follicle-stimulating hormone wax and wane throughout the menstrual cycle? (2) Development: What are some environmental factors that might alter the onset of the menses? (3) Evolution: How does the increased sexual receptivity associated with estrus manifest itself across the hominid line? Why have some primate species evolved highly conspicuous visual and olfactory estrus signals while cryptic ovulation is the norm for human females? (4) Function: What are the reproductive advantages associated with conspicuous sexual signaling at estrus/ovulation? In other words, how is such sexual signaling adaptive? These four levels are not in conflict with one another. Rather, they each contribute toward a full understanding of a given phenomenon. Note that being mindful of the proximate–ultimate distinction does not imply that researchers need to address all four levels within their individual research programs. Marketing scholars largely operate at the causation level but nearly always ignore the other three levels.

Saad and Gill (2000, p. 1024) propose ways by which the menstrual cycle might operate within the consumer realm. Several research teams have since examined this link, the most common topic of which has been to document women's greater proclivities to engage in sexual signaling when maximally fertile (e.g., through the clothes they wear). Notably, this menstrual signaling effect has been found using widely different data sets and methodologies, including analyzing women's product choices stemming from a virtual shopping task (Durante et al. 2011); taking photos of women as they showed up for an experiment and then having independent raters evaluate the attire depicted in the photos (Durante, Li, and Haselton 2008; Haselton et al. 2007); and asking women to draw the attire that they would wear at a social event that evening, then getting independent raters to evaluate the attire depicted in the drawings (Durante, Li, and Haselton 2008). In each of the latter cases, the measures in question were compared across two time periods—namely, a fertile and nonfertile phase. Saad and Stenstrom (2012) collected data across 35 contiguous days using a much broader range of beautification measures including actual dollars spent on such products. In doing so, they examined the waxing and waning of hormonal effects across the menstrual cycle in a more granular manner. They too confirmed that sexual signaling peaked at the maximal fertile phase.

Field observations have also been conducted to explore the menstrual effect in consumer-related contexts. Grammer, Renninger, and Fischer (2004) coded how scantily clad women were at five Austrian discotheques and correlated these with the women's estradiol and testosterone levels (as collected on site). Women who were in relationships but unaccompanied by their male partners (at the nightclub) and who were not taking the contraceptive pill exhibited a positive correlation between their estradiol levels and the three measures of clothing sexiness. Because estradiol levels peak at ovulation, this serves as indirect evidence of the menstrual signaling effect. In another naturalistic study, Miller, Tybur, and Jordan (2007) found that female strippers garnered larger tips when maximally fertile, which could be due to male patrons' abilities to detect physiological cues of ovulation and/or because the strippers engage in more lascivious dances when ovulating.

Note that the studies covered in this section would not have been possible without an evolutionary lens. They each examined women's signaling during the menstrual cycle by focusing on different proximate issues (causation), though all were informed by the same ultimate explanation (function). Furthermore, the totality of findings highlights how the method

of evolutionary psychology relies on the building of nomological networks of cumulative evidence through a commitment to methodological pluralism and conceptual replications.

BUILDING/USING NOMOLOGICAL NETWORKS OF CUMULATIVE EVIDENCE

Evolutionary scientists have proposed elaborate evidentiary rules to determine what constitutes a psychological adaptation (Andrews, Gangestad, and Matthews 2002; Williams 1966), one of which is to establish the adaptation's universality (Norenzayan and Heine 2005). What is common to all of the approaches is that they do not rely on a single source of data in constructing an adaptationist argument. Schmitt and Pilcher (2004) analogize the cumulative evidentiary process for an adaptation to those used in ascertaining the validity of a psychological construct. Unlike many physiological variables, which are amenable to direct and precise measurements (e.g., blood pressure), most psychological constructs are somewhat more nebulous in nature. To address this issue, powerful methodological and epistemological evidentiary rules have been advanced for establishing a construct's validity including multitrait-multimethod matrices (Campbell and Fiske 1959) and nomological networks (Cronbach and Meehl 1955). These approaches recognize that construct validity is not established by a single datum but rather by the weight of the accumulated evidence stemming from multiple sources. The evolutionary paradigm is similar in spirit in that it utilizes multiple evidentiary lines stemming from disparate data sources and methodologies in gauging the veracity of an adaptationist account. Schmitt and Pilcher (2004) offer eight such sources of evidence—theoretical, cross-cultural, hunter-gatherer, phylogenetic, genetic, physiological, medical, and psychological—and then offer case examples to highlight this approach. Perhaps their most powerful demonstration is that of pregnancy sickness, to which I turn next.

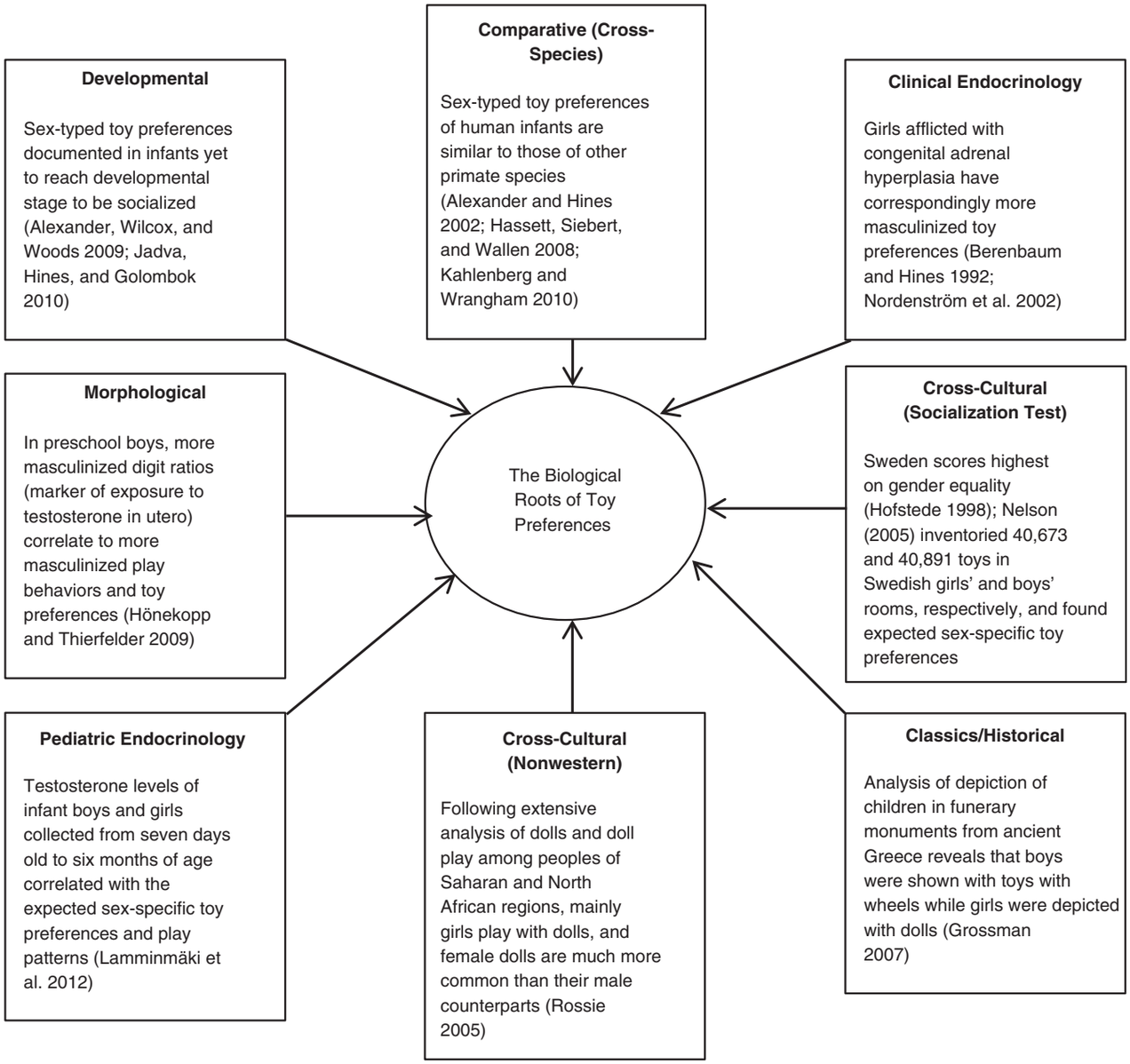
Two strategies used by evolutionary psychologists in positing that a trait is an adaptation is to demonstrate its special design features using function-to-form or form-to-function arguments (Buss 1995). The former strategy begins with a foundational evolutionary reality (e.g., paternity uncertainty exists but maternity uncertainty does not) and then posits sex-specific emotional and cognitive systems that would have evolved to solve this problem (function: thwart paternity uncertainty; form: greater sexual jealousy exhibited by men). The second strategy begins with an observed universal reality (form: pregnancy sickness) and then, using reverse engineering, attempts to identify which evolutionary function it might have evolved to solve. Schmitt and Pilcher (2004) organize the cumulative evidence regarding the adaptive nature of pregnancy sickness within each of their eight categories (for additional details, see Profet [1988, 1992], Flaxman and Sherman [2000], and references therein), which I summarize in the current article. Teratogens (e.g., plant toxins in this case) can be quite harmless and minimally toxic when ingested by adults, but when consumed by pregnant women, they can produce birth defects and trigger miscarriages. As such, the evolutionary selection pressures associated with this phenomenon are clear (theoretical). This argument has been empirically validated, because women who endure more pronounced pregnancy sickness are indeed less likely to have miscarriages and to have children with birth defects (medical). The timeline of pregnancy sickness is such that it takes place at the exact gestational time period known as organogenesis, when the organs of the fetus are forming and when it is a particularly dangerous period to be exposed to teratogens (medical). This demonstrates a highly important feature when determining whether a trait is an adaptation—namely, whether the trait possesses design specificity (in this case, developmental specificity). Women exhibit psychological aversions and cravings that are very much linked to the avoidance of teratogens or the expulsion of teratogens (if ingested). In other words, gustatory preferences exhibit design specificity. Furthermore, women's sense of smell is differentially sensitive throughout their gestation in part to keep them away from foods that are potentially harmful to their developing fetuses (physiological). Pregnancy sickness has been documented cross-culturally and in hunter-gatherer societies, and it is differentially prevalent as a function of the pathogenic load within a particular niche. As such, this demonstrates that pregnancy sickness is a facultative adaptation; that is, its relative frequency and strength are modulated by environmental contingencies. The phenomenon has been linked to feeding styles across species (phylogenetic). Specifically, it should be most prevalent in species that are experimental herbivores and experimental omnivores (i.e., dangers of being exposed to food pathogens are greater). Finally, pregnancy sickness has been shown to be heritable (genetic). The cumulative and complementary lines of evidence across the eight categories establish the adaptive roots of pregnancy sickness (for a pictorial representation of the nomological network in question, see Schmitt and Pilcher [2004], Figure 1, p. 645).

By adopting such an epistemological approach, marketing scholars would generate nomological networks of cumulative knowledge (see Kenrick, Saad, and Griskevicius, 2013) that fit into a coherent and organized tree of knowledge. Next, I build three nomological networks of cumulative evidence to demonstrate how the process operates.

CASE I: ON TOY PREFERENCES AND THE NATURE–NURTURE DIVIDE

Are consumers born or made? Evolutionary psychologists reject the notion of the mind starting off as an empty slate. Rather, they posit that human minds possess innate biological blueprints that do not require any learning to be activated. Notwithstanding the fact that most human traits involve an interaction between genes and environments, there are at least two strategies for decoupling the effects of nature and nurture. The first stems from behavioral genetics and utilizes twin registries composed of identical and fraternal twins to identify the percentage of variance that is due to genes, shared environments, and nonshared environments. However, marketing scholars have seldom used such registries (cf. Perry 1973; Saad et al. 2015; Simonson and Sela 2011). A second, more conceptually elaborate approach amasses findings across multiple disciplines to establish a coherent nomological network of cumulative evidence teasing out the influence of nature and nurture. Toy preferences constitute an ideal case study because they fall within the consumer realm (see Fine and Rush 2016). Social constructivists have long argued that such preferences are learned through "arbitrarily sexist" gender role socialization (e.g., parental influence). In Figure 2, I offer converging evidence spanning multiple disciplines (developmental psychology, comparative psychology, cross-cultural psychology, endocrinology, anthropology, and classics), cultures, time

Figure 2
NOMOLOGICAL NETWORK OF CUMULATIVE EVIDENCE: BIOLOGICAL ROOTS OF TOY PREFERENCES



periods, samples (clinical vs. normal), species, and methodologies that casts doubt on the veracity of this premise. The biological/evolutionary roots of toy preferences (Alexander 2003) are not established by a single datum but rather through the building of a nomological network of consilient evidence.

Note that, in this example, I am not arguing that sex-specific toy preferences are adaptive, nor am I seeking to explain the phenomenon at any of the four levels that speak to the proximate–ultimate distinction. Rather, I am demonstrating how one might tease out the effects of nature and nurture for a consumer-related phenomenon. The totality of findings presented in Figure 2 makes it difficult to ignore the biological bases of toy preferences.

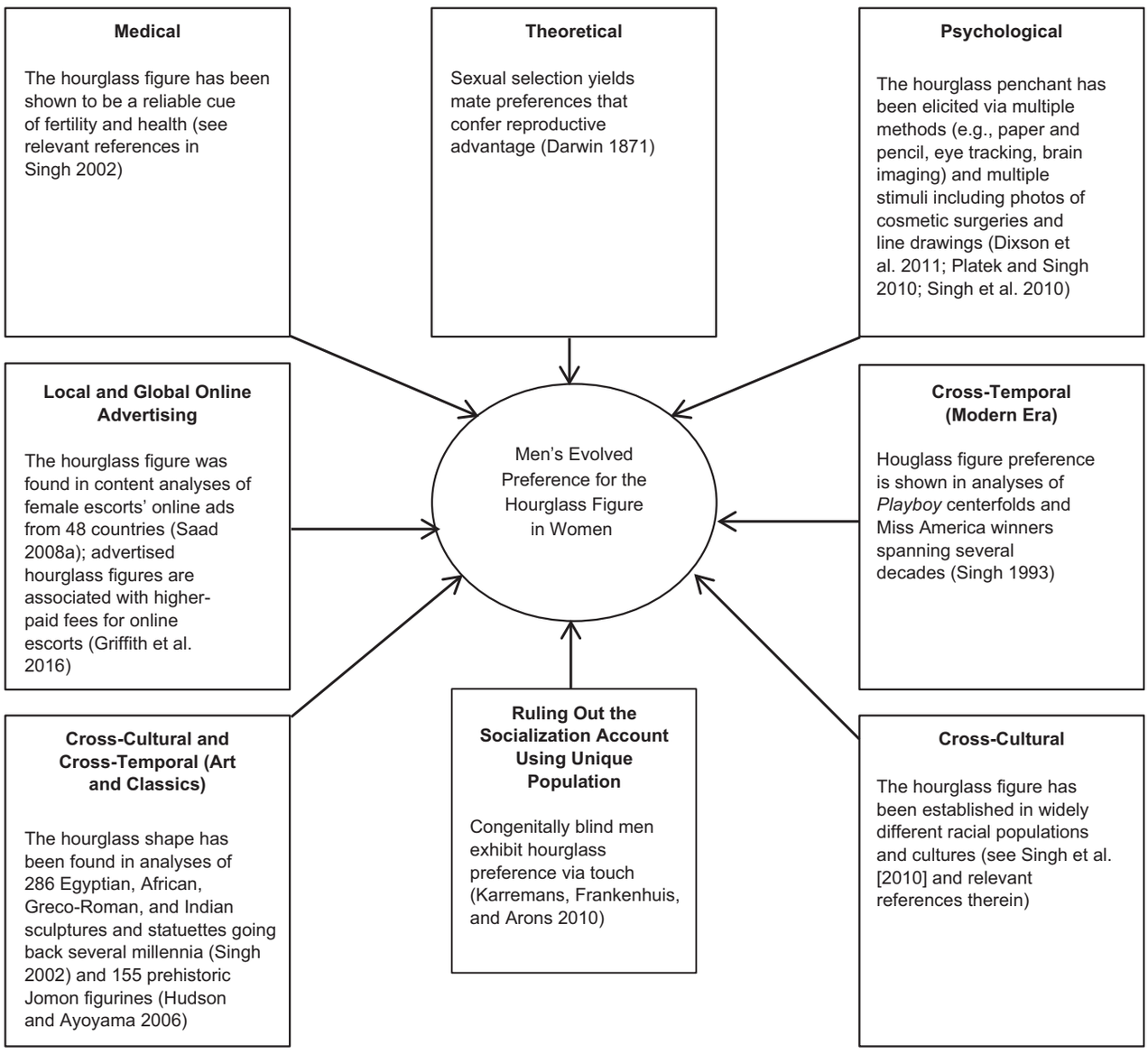
CASE II: THE EVOLVED PREFERENCE FOR THE HOURGLASS FIGURE IN ADVERTISEMENTS

Marketing scholars have investigated the efficacy of countless advertising copy decisions (use of, e.g., humor, fear appeals, one-sided vs. two-sided arguments). What has been missing is an exploration of how evolutionarily relevant cues (e.g., an endorser's facial symmetry) might affect various measures of advertising effectiveness (Saad 2004). Vyncke (2011) tackles

this exact issue and confirms that people respond more favorably to advertisements that possess cues depicting evolved preferences for specific morphological features such as a woman's hourglass figure. Are the arguments for the supposed evolved preference of the hourglass figure nothing more than fanciful just-so storytelling? In Figure 3, I offer theoretical, medical, psychological, cross-cultural, intertemporal, and clinical evidence spanning numerous disciplines including classics, art, neurosciences, anthropology, psychology, medicine, evolutionary biology, and advertising in support of the evolved preference for such a figure. This near-universal preference has been established using a wide range of dependent measures, data collection sources, methodologies, and cultural settings (many of which are drastically different from Western societies). Thus, the evolutionary roots of this preference are not established by a single datum, single paradigm, or single study but by the systematic building of a nomological network of cumulative evidence. The expansive set of studies used to test the hourglass hypothesis highlight how incorrect the "just-so storytelling" criticism is.

Note that evolutionary psychologists recognize that the evolutionary-based waist-to-hip ratio preference is not cast in stone. Rather, the inclination has a built-in malleability so that it might be fine-tuned as a response to local environments. In

Figure 3
NOMOLOGICAL NETWORK OF CUMULATIVE EVIDENCE: MEN'S EVOLVED PREFERENCE FOR THE HOURGLASS FIGURE IN WOMEN



settings that have historically experienced greater famine, men's preferences shift toward higher waist-to-hip ratios (Wetsman and Marlowe 1999). Such adaptive responses to local environments are central to evolutionary theorizing and, as such, counter the mistaken view that evolutionary psychology is synonymous with genetic determinism.

CASE III: THE BIOLOGICAL/EVOLUTIONARY ROOTS OF LOSS AVERSION

Building on the foundational works of Amos Tversky and Daniel Kahneman, marketing scholars have been at the forefront of the BDT paradigm. Generally speaking, the framework has focused on identifying ways by which human decision making departs from axioms of rational choice. The relentless pursuit to slay *Homo economicus* has yielded a large catalog of judgment and decision-making biases (e.g., the conjunction fallacy, the base rate fallacy, the decoy effect, the endowment effect, the framing effect, the overconfidence bias). If these biases are so pervasive, an important question to ask is why have human minds evolved to exhibit such biases? It is insufficient to repeatedly demonstrate that human minds do not adhere to the postulates of *Homo economicus* without explaining the ultimate Darwinian *why*. The proximate phenomenology of these biases has been convincingly established across nearly five decades of BDT research. Ultimate explanations of human rationality situate this concept within an evolutionary rubric (e.g., ecological rationality [Gigerenzer 2000], deep rationality [Kenrick et al. 2009]).

Of all the heuristics and biases that have been uncovered, many do not possess a clear evolutionary explanation (if any). It is unclear how an evolutionary lens might clarify the reasons that people succumb to the attraction effect, which violates the regularity axiom (Huber, Payne, and Puto 2014). However, loss aversion seems amenable to such an analysis, because there are distinct lines of evidence that point to this possibility. How might one go about constructing a nomological network of cumulative evidence in support of the biological/evolutionary roots of loss aversion?[1] In Figure 4, I offer theoretical, developmental (to rule out socialization), mathematical (evolutionary game theory), genomic, neuroscientific, behavioral genetic, cross-cultural (pointing to a human universal), and comparative psychological (cross-species) lines of evidence. No singular study suffices in establishing the biological/evolutionary roots of loss aversion. Yet when taken together, the disparate lines of evidence offer a strong argument in favor of such a possibility.

Having established the likely biological/evolutionary roots of loss aversion, how might one generate research questions rooted within an evolutionary lens? One possibility is to explore whether people's loss aversion is responsive to evolutionarily relevant cues. On a related note, people's intertemporal choices (discounting rate) are indeed affected by such factors including the consumption of sugar (Wang and Dvorak 2010), exposure to mate-related imagery (Van den Bergh, Dewitte, and Warlop 2008; Wilson and Daly 2004), and immersion in natural outdoor settings (Van der Wal et al. 2013). It is quite plausible that similar effects would be operative for loss aversion. This line of research is rooted in a clear understanding of the proximate–ultimate distinction.

[1]Many thanks to Robert Meyer for suggesting this example.

NOMOLOGICAL NETWORKS OF CUMULATIVE EVIDENCE AS A FORM OF SEQUENTIAL ANALYSIS

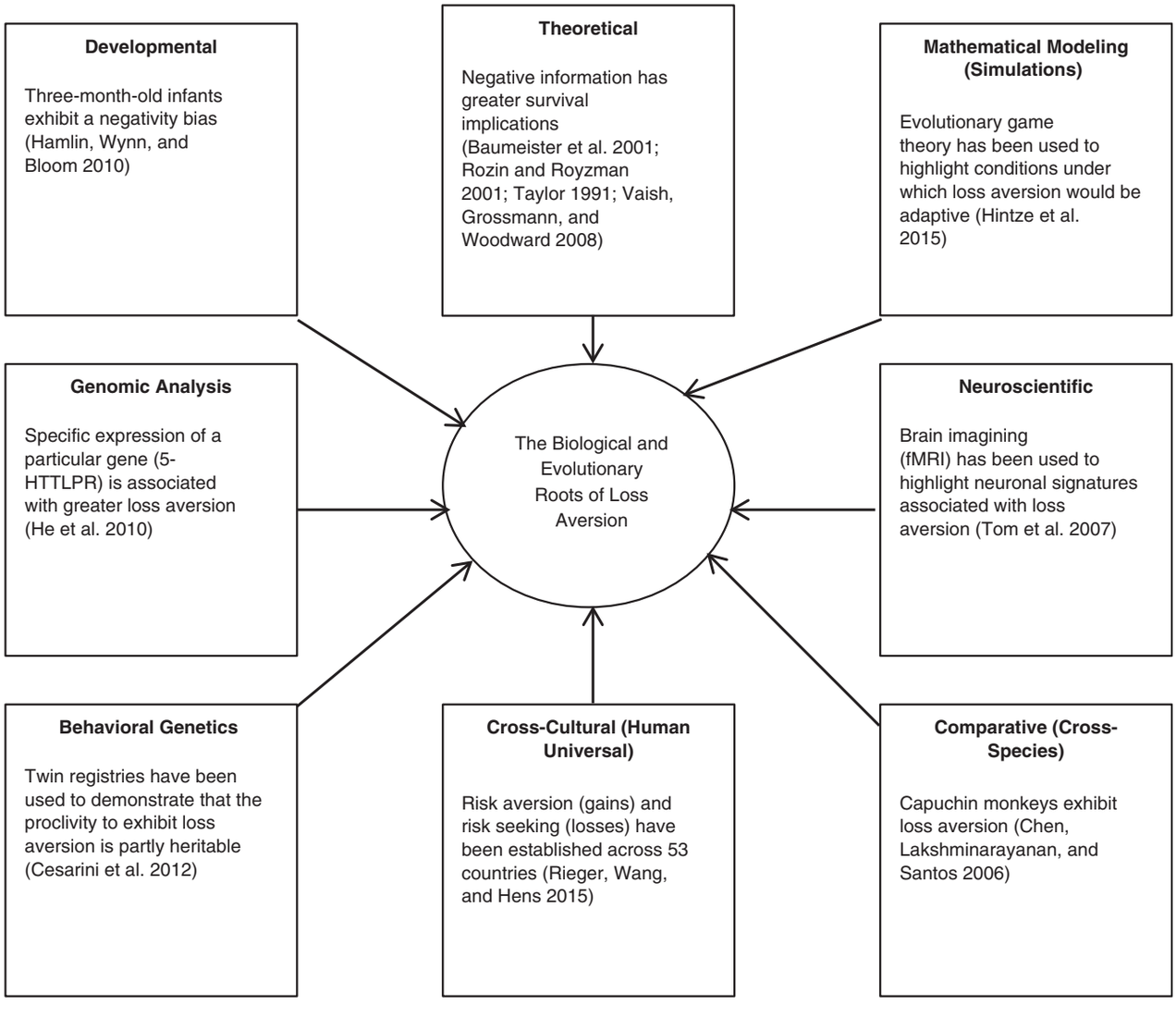
Sequential hypothesis testing (Wald 1947) posits that the sample size in a study is not established a priori; rather, it is established as data are being collected. Specifically, if and when the cumulative evidence in favor of a working hypothesis is reached (through the crossing of a predetermined threshold), the sampling ends. So, contrary to traditional statistical approaches wherein the sample size is established a priori (e.g., to take into account statistical power), sequential hypothesis testing treats the sample size as a random variable. In other words, it effectively addresses whether the researchers have amassed sufficient cumulative evidence to support or refute a working hypothesis. Of relevance to marketing scholars, this sequential process has been used to explain how people make stopping decisions when faced with multiattribute choices (Saad, Eba, and Sejean 2009; Saad and Russo 1996). I am proposing here that this same model could be used at the epistemological level. In the examples shown in Figures 2, 3, and 4, I have aimed to build nomological networks wherein the cumulative evidence, in support of the central premise in question, surpasses the relevant support threshold. In the hypothetical example depicted in Figure 5, five equally impactful lines of evidence were needed to reach the support threshold (the information contained in a given box of Figures 2–4 constitutes a line of evidence).

The nomological networks presented in Figures 2, 3, and 4 are not merely expansive literature reviews. Rather, they serve as an epistemological process by which researchers build new nomological networks, or use existing ones, in establishing the deep theoretical veracity of their work. Although there are no definitive guidelines or recipes for generating these networks, general rules of thumb include identifying cross-cultural data that point to a human universal; establishing cross-species commonalities; documenting the effect in question in very young infants; explaining the issue using first-order evolutionary principles; and verifying the genetic, medical, and phylogenetic bases of the phenomenon at hand (recall the eight categories enunciated by Schmitt and Pilcher [2004]). Note that many of the lines of evidence that I gathered in building the nomological networks depicted in Figures 2, 3, and 4 do not stem from evolutionary-based works (e.g., the study conducted by Nelson [2005] on toy preferences in Sweden). However, they each serve an important and unique role in building the narrative of the nomological network in question (i.e., in seeking to reach the support threshold shown in Figure 5).

TREES OF KNOWLEDGE

Evolutionary psychology adheres to a philosophy of science wherein knowledge is hierarchically structured with established supra meta-theories (core knowledge) from which flows a protective belt composed of middle-level theories, hypotheses, and propositions (Buss 1995; Ketelaar and Ellis 2000). Figure 6 highlights how evolutionary-based trees of knowledge are generated. The root node consists of general evolutionary principles that have been tested and confirmed across innumerable species and contexts. They constitute the core knowledge of evolutionary theory, which is validated through the building of nomological networks of cumulative evidence. In developing his theory of natural selection, Darwin (1859) painstakingly amassed many lines of evidence in

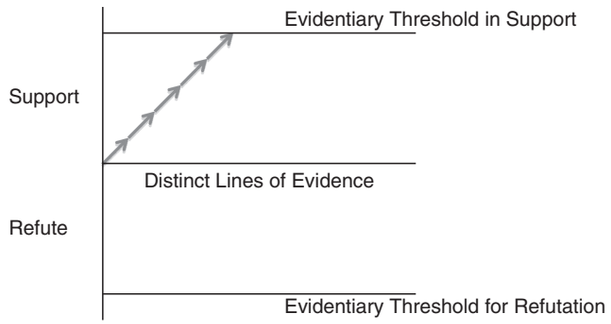
Figure 4
NOMOLOGICAL NETWORK OF CUMULATIVE EVIDENCE: BIOLOGICAL AND EVOLUTIONARY ROOTS OF LOSS AVERSION



making his case. The sheer weight of the cumulative evidence stemming from disparate sources served to validate his theory. One hundred fifty years after the release of *On the Origin of Species*, Coyne (2009) used a similar cumulative approach in demonstrating the veracity of key evolutionary principles. Irrespective of the amount of evidence in support of evolutionary theory, people often exhibit difficulty in accepting temporally distal scientific explanations—namely, those that offer ultimate causes stemming from deep evolutionary time (Conway and Schaller 2002). This invariably leads to the charge of just-so storytelling. However, all historical natural sciences, including the earth sciences, paleontology, archeology, physical anthropology, cosmology, and cosmogony (origin of the universe), operate using a similar historical-based epistemology (Cleland 2011).

From this first root node flows a set of middle-level theories, all of which have also been established using countless empirical tests rooted in the logic of nomological networks. Take, for example, parental investment theory (Trivers 1972). It proposes that in any given sexually reproducing species, the sex that provides the greater minimally required parental investment will be more sexually choosy in its mate choices (because the costs of a suboptimal mate choice carry greater consequences). Parental investment theory has been used to explain universal sex differences in a myriad of settings including in the proclivity to succumb to the framing effect within the mating domain (Saad and Gill 2014) and in the extent of information acquired before choosing or rejecting prospective mates (Saad, Eba, and Sejean 2009). Note that the leaf nodes correspond to specific hypotheses and propositions,

Figure 5
DISTINCT LINES OF EVIDENCE STEMMING FROM A NOMOLOGICAL NETWORK AS A FORM OF SEQUENTIAL ANALYSIS



all of which are perfectly falsifiable. The oft-repeated criticism that evolutionary explanations largely consist of unfalsifiable post hoc just-so stories is erroneous. The evidentiary threshold that is used to test evolutionary-based hypotheses is set higher than is typically the case in the social sciences. That said, when a proposition is falsified, it does not bring down the entire Darwinian edifice. One does not falsify evolutionary psychology any more than one falsifies organic chemistry. Specific hypotheses are often rejected, but the core principles regarding the evolution of the human mind are well established.

Engendering greater consilience or unity of knowledge (Wilson 1998) and conceptual integration (Brase 2014) is a crucial advantage that evolutionary psychology offers. Whereas the natural sciences have built organized and coherent knowledge trees, the social sciences have erected disjointed and haphazard empirical edifices (Saad 2007, 2008b). This is largely due to the fact that only the former possess meta-theories capable of yielding organized and unified knowledge. The reality is that the classic areas of interest to consumer scholars including emotions, attitude formation, memory, learning, perception, decision making, information processing personality, and culture cannot be fully investigated without recognizing the evolutionary roots of our affective, cognitive, and conative systems (Saad 2007, 2013). This is achieved in part by having a given middle-level evolutionary theory (e.g., parental investment theory) cut across several topical areas—for example, in offering new insights to better understand the genesis of some consumer-related sex differences.

On the issue of falsification, a common cognitive trap that detractors of evolutionary psychology commit is to generate a supposed "falsification" of a foundational evolutionary principle at the individual level when the phenomenon in question holds true at the population level. The evolutionary roots of heterosexual mating preferences are real notwithstanding the existence of celibate monks, asexual individuals, and same-sex orientations. Humans have survival instincts notwithstanding the tragic global epidemiology of suicide. Kin-based altruism holds true notwithstanding the deep emotional attachments felt between parents and their adopted (nonkin) children. Evolutionary facts need not apply to every single individual on earth for them to be veridical.

I next present a case example (gift giving) to highlight how the three elements that constitute the method of evolutionary psychology are applied. I then contrast this with hypothetical cases of fanciful evolutionary "explanations" that are not scientifically grounded.

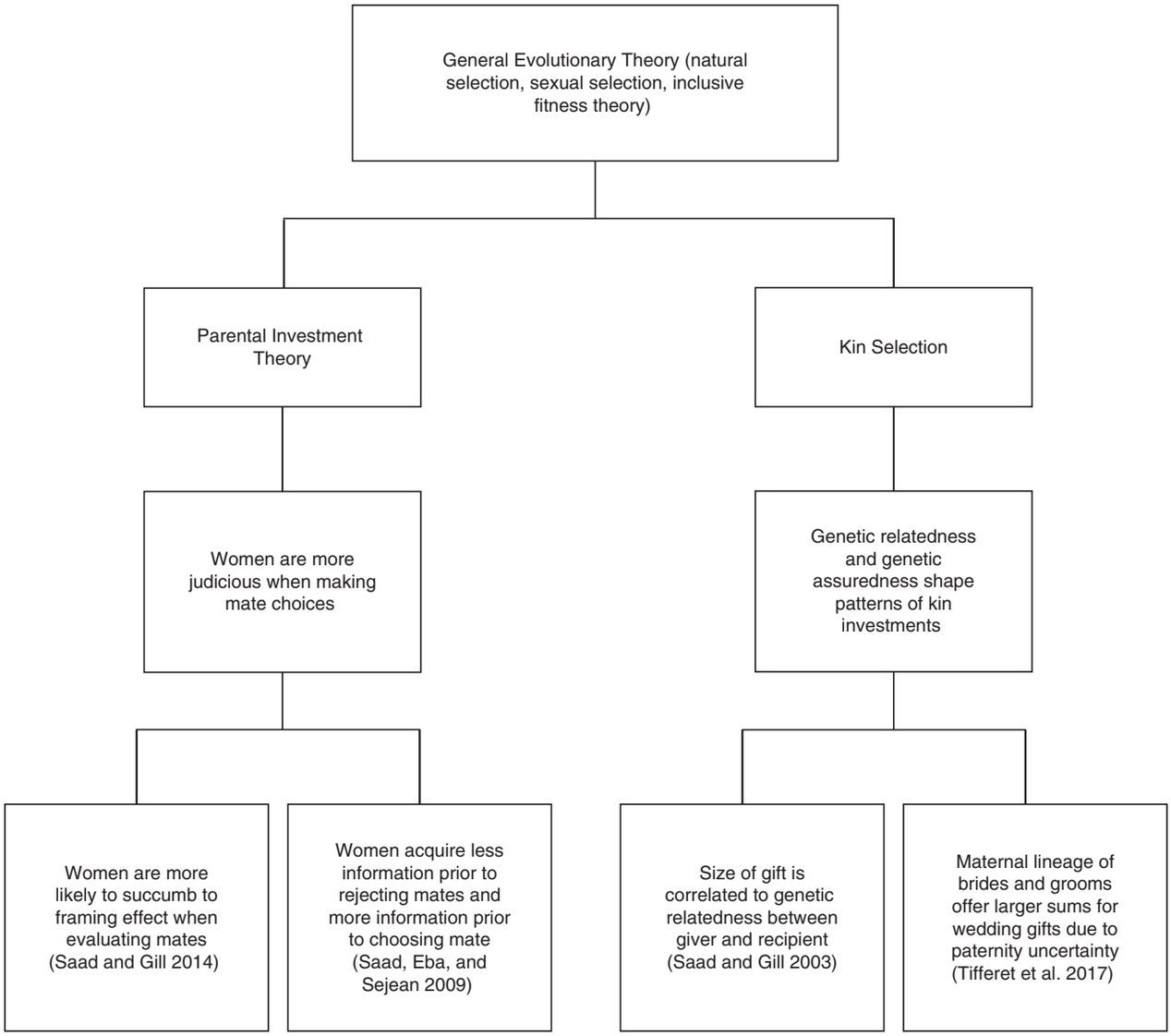
CASE EXAMPLE: GENETIC RELATEDNESS, GENETIC ASSUREDNESS, AND GIFT GIVING

Marketing scholars have contributed greatly to the gift-giving empirical literature, though few have done so from an evolutionary perspective (cf. Saad and Gill 2003). The first step in developing a research program at the nexus of gift giving and evolutionary theory is to identify a research question that is operative at the proximate level but that is otherwise rooted in an ultimate (adaptive) mechanism. While gift giving is instantiated across several key Darwinian modules including the reproductive, kin selection, and reciprocity modules (Saad 2007, 2011a), I focus herein on kin selection. First, does the genetic relatedness between gift givers and their recipients modulate the monetary size of the gift? Second, does the genetic assuredness between the two parties affect the monetary size of the gift? These two proximate questions are inherently biological/evolutionary in nature. The ultimate explanation in addressing these two questions is rooted in a foundational evolutionary process, kin selection. For a depiction of how these research questions are situated within the operative tree of knowledge, refer to the right-hand side of Figure 6.

If organisms have evolved adaptations that advance their survival and reproductive interests, why would they ever exhibit altruistic acts that are otherwise costly to them? Two of the most prominent evolutionary biologists of the twentieth century solved this conundrum by demonstrating how altruism would have evolved between kin (Hamilton 1964) and between nonkin (Trivers 1971). In kin altruism, the crucial issue is to recognize that selection operates at the gene's level. As such, a person who jumps into the river to save three brothers (each of whom shares, on average, half his genes with the altruist) is effectively pursuing an adaptive strategy at the gene level. Three consequences of kin selection are that humans have evolved a calculus wherein (1) they invest more in kin than in nonkin; (2) they invest more in close kin than in more distant kin, as measured by the coefficient of genetic relatedness; (3) for a given level of genetic relatedness (e.g., grandparents with their grandchildren), they invest more if the genetic assuredness of the relationship is greater (e.g., maternal grandmothers have zero genetic uncertainty to their grandchildren, whereas paternal grandfathers have two generations of paternal uncertainty) (for a cross-cultural study that explores findings 2 and 3 jointly, see Silva Júnior, Dunbar, and Brito [2014]).

These three findings have been empirically validated using a wide range of methodologies including archival data such as wills (Smith, Kish, and Crawford 1987), experiments that measure people's willingness to bear pain as a function genetic relatedness (Madsen et al. 2007), fieldwork among Mormon families (Jankowiak and Diderich 2000), national surveys (Zvoch 1999), pan-national surveys (Danielsbacka et al. 2011), and a twin-family design (Segal et al. 2007) using a large number of dependent measures across vastly different cultural settings. Notably, the matrilineal effect (finding 3) has been tested using grandparents (for a review, see Euler 2011),

Figure 6
TREE OF KNOWLEDGE COMPRISING A ROOT NODE (FOUNDATIONAL EVOLUTIONARY PRINCIPLES), MIDDLE-LEVEL THEORIES/EFFECTS, AND LEAF NODES (FALSIFIABLE HYPOTHESES)



uncles and aunts (Gaulin, McBurney, and Brakeman-Wartell 1997; Pashos and McBurney 2008), and cousins (Jeon and Buss 2007). The nomological network of cumulative evidence for these effects is incontrovertible.

Gift giving constitutes an ideal consumer-related phenomenon wherein the effects of genetic relatedness and genetic assuredness principles are operative. Using hypothetical gift-giving budget allocations to various individuals, Saad and Gill (2003) documented a positive correlation between the amount to be spent on a gift and the genetic relatedness between giver and recipient. This genetic relatedness effect was replicated using actual monetary gifts at Israeli weddings (Tifferet et al. 2017). Furthermore, Tifferet et al. (2017) showed that wedding guests from the maternal side of the brides and grooms offered larger sums of money than their paternal counterparts as a result of the genetic assuredness effect. This constitutes the first set of marketing studies that utilize principles of kin selection and genealogy in a consumer setting.

Note that the obtained findings (leaf nodes of the right-hand side of Figure 6) were based on specific hypotheses that are perfectly falsifiable. The proximate–ultimate distinction that drove this research, coupled with the nomological network of cumulative evidence (for brevity, I have offered only a partial network here, which could be expanded by including innumerable cross-species examples of kin selection) and the relevant tree of knowledge (Figure 6), highlight the manner by which scientifically sound evolutionary-based questions

are tackled. Examples of weak and speculative evolutionary "explanations" are typically those that merely generate fanciful accounts that are not rooted in any of the three elements that constitute the method of evolutionary psychology. Hypothetical examples might include the following:

- People prefer to receive Apple products as a gift more so than Samsung products because humans have evolved a preference for fruits (based on a facetious example shared by Robert Meyer, personal communication).
- Because humans have an innate love of nature (biophilia), people prefer blue gift wrap because it reminds them of the sky.
- Gift wrap reminds people of the process of undressing during the act of mating. Taking off the gift wrap primes the mating drive, so it is advisable to wrap gifts that are offered to one's mate.

No scientific framework is fully protected from shoddy theorizing. That said, the method of evolutionary psychology greatly reduces this possibility. Next, I discuss a full list of benefits reaped from adopting an evolutionary perspective and offer some concluding remarks.

ADVANTAGES OF ADOPTING AN EVOLUTIONARY LENS IN CONSUMER RESEARCH

Evolutionary psychology is a meta-framework applicable to the study of human affairs in general and consumer phenomena in particular. The method of evolutionary psychology is not rooted in any particular methodology. Rather, it is a form of epistemological thinking that recognizes the importance of proximate and ultimate causes as well as the consilience afforded by the building of cumulative networks of cumulative evidence, which constitute the building blocks of trees of knowledge. Marketing scholars should construe evolutionary explanations not as threatening but rather as complementary to their own research agendas. Just as there are phenomena that can be tackled only with the appropriate methodological apparatuses (e.g., the electron microscope and the telescope for issues at the nanoscopic and cosmological scales, respectively), there are some marketing questions that can be elucidated (or more fully explained) solely with the evolutionary lens. Consumer scholars have produced methodologically sound works shedding light on proximate issues dealing with our cognitive, perceptual, affective, and behavioral systems, all of which evolved through clearly established evolutionary processes. A full understanding of consumer behavior, however, necessitates the recognition that our bodies and minds are products of evolution.

It is incorrect to pit the method of evolutionary psychology against competing frameworks within the marketing literature. This would be akin to pitting evolutionary biology against competing frameworks within the biology literature. Not all biologists are evolutionary biologists, but all recognize the value of having a meta-framework that unifies the discipline across the various units of analyses (e.g., at the molecular, cellular, genetic, physiological, anatomical, organismic, species, population, ecological, or phylogenetic levels). The same holds true in the behavioral sciences. Most marketing scholars will continue to produce exciting and important works at the nonevolutionary, proximate level; however, the method of evolutionary psychology offers them a distinct set of epistemological tools should they choose to use these.

Consumer research stands to benefit from a widening of its theoretical, epistemological, and methodological approaches. Each of the latter goals, as well as several other advantages, could be reaped by incorporating evolutionary psychology within the purview of consumer research. First, by recognizing the distinction between proximate and ultimate causes, consumer researchers will generate more complete explanations. It is crucial to reiterate that the two realms do not compete with one another; rather, both levels of explanations are needed to fully understand a phenomenon involving biological beings (consumers). Most scientific pursuits are conducted at the proximate level, and this will continue to be the case for marketing scholars. Thus, evolutionary psychology should be viewed not as threatening to existing paradigms but rather as a complementary companion to most research streams involving biological beings. Take consumer culture theory (Arnould and Thompson 2005), which recognizes the importance of investigating consumer phenomena at the cultural level. Suppose that a scholar wants to examine the cross-cultural use of spices in local cuisines. A consumer culture theory researcher might conduct an ethnographic study of consumers' behaviors in spice stores in the Middle East and in India, whereas an evolutionary scientist might show that the distribution of spice use across global cuisines is an adaptive response to foodborne pathogens in hotter climates (Billing and Sherman 1998; Sherman and Hash 2001). Establishing that the use of spices (proximate cause) is a cultural solution to an adaptive biological problem (ultimate cause) requires an evolutionary lens.

A second benefit of the evolutionary lens is that it serves as a powerful heuristic for generating new research questions and novel predictions, all of which would have otherwise likely remained invisible. Many findings included in this article would have been impossible to uncover without the evolutionary framework. A third advantage implicit to evolutionary psychology is that it provides a heuristic for ruling out hypotheses, research questions, and theoretical frameworks that violate foundational evolutionary tenets (Kanazawa 2004). An obvious example would be the dogged insistence by some social scientists that nearly all sex differences are due to social construction. Humans possess evolved sex differences, and any theoretical framework that rejects this core knowledge is building its foundational base on untenable grounds. The selectivity hypothesis is a somewhat more subtle case of an evolutionarily untenable premise (Saad 2007). It posits that women are more comprehensive information processors than men regardless of the decisional domain. This hypothesis is indefensible from an evolutionary perspective because some domains are differentially important to each sex (e.g., mate choice) and, as such, would yield corresponding sex differences in information processing. Saad, Eba, and Sejean (2009) used parental investment theory to predict the extent of information search that both sexes would engage in before choosing versus rejecting mates (see the second-left-most leaf node in Figure 6). Women sampled less information before rejecting mates (quicker to reject) but sampled more information before making a final choice (slower to accept). Ultimately, the empirical falsification of the selectivity hypothesis was assured given that it violates a foundational evolutionary principle.

By its commitment to building nomological networks of cumulative evidence, evolutionary psychology stimulates interdisciplinarity. This was confirmed in a study that examined the departmental affiliations of first authors who had published articles in leading evolutionary psychology journals versus various nonevolutionary counterparts (Garcia et al. 2011). A much broader representation of disciplines was evident in

works that were evolutionary based. In building multimethod nomological networks of cumulative evidence, evolutionary psychology also fosters methodological pluralism. In the current article, I have described convergent lines of evidence for several phenomena stemming from multiple data collection procedures and data sources. As such, those operating through an evolutionary lens are much less likely to succumb to methodological and field fixation (Sternberg and Grigorenko 2001) and methods myopia (Davis et al. 2013).

One of the hallmarks of the scientific method is the ability to replicate a finding sufficiently that it becomes part of that field's core knowledge. Yet the marketing discipline possesses very low replication rates (Evanschitzky et al. 2007). By definition, the building of nomological networks of cumulative evidence, as practiced by evolutionary behavioral scientists, engenders direct and conceptual replications (for a detailed discussion of various forms of replication, see Schmidt 2009). Direct replications might be carried out cross-culturally to establish the universality of a phenomenon, whereas conceptual replications aim to establish the robustness of a general phenomenon using multiple methodologies and dependent measures.

Finally, the behavioral disciplines have been criticized for their heavy reliance on participants stemming from so-called Western, Educated, Industrialized, Rich, and Democratic (WEIRD) societies (Arnett 2008; Henrich, Heine, and Norenzayan 2010). This concern is highly relevant to consumer scholars, as the majority of our studies are conducted using WEIRD samples. Because of their explicit focus on identifying evolutionary-based human universals or adaptive reasons for cross-cultural differences, evolutionary psychologists are much less likely to succumb to this convenience sampling bias. Kurzban (2013) contrasts the number of articles that utilized only WEIRD participants, only non-WEIRD participants, or a combination of both from the 2012 volumes of the top journals in social psychology (*Journal of Personality and Social Psychology*) and evolutionary psychology (*Evolution and Human Behavior*). Works in evolutionary psychology are nearly nine times more likely to not exclusively rely on WEIRD participants (35% vs. approximately 4%).

In their 50-year topical analysis of articles published in *Journal of Marketing Research*, Huber, Kamakura, and Mela (2014, p. 85) remark, "In general, we find that major topics appear at a decreasing rate over time, suggesting that it is increasingly difficult to add new paradigms as the field matures." Clearly, paradigmatic inertia is a recurring feature of the sociology of science, but hopefully this could be overcome once marketing scholars recognize the epistemological, theoretical, and methodological benefits afforded by the evolutionary lens.

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