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Naturally Better? A Review of the Natural-is-Better Bias

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Abstract

People are frequently exposed to products and services that are labeled natural (e.g., Nature Made Vitamins or GoJo Natural Orange Hand Cleaner). The frequency with which this label is used suggests that it delivers an advantage in marketing and sales. Our review examines the preference for and perception of naturalness and reveals that people have a bias for items described as natural in many domains including foods, medicine, beauty products, cigarettes, and lighting. These preferences abound even when the natural item is identical or not objectively better than the non-natural or synthetic item. We believe this bias may be driven by a natural-is-better default belief as well as the belief that natural items are safer than non-natural items. Although a bias for natural items is apparent, this literature is in its infancy, and we suggest three areas that will help build and refine the empirical research base and theory: the measurement of behavior, the examination of individual differences, and the development of methods for reducing the bias. A better understanding of the naturalness bias relevant to these areas will lead to a more comprehensive understanding of the area, including factors that may cause and reduce it.

Keywords

naturalness bias, natural is better bias, natural, bias

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Naturally Better? A Review of the Natural-is-Better Bias

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Abstract

People are frequently exposed to products and services that are labeled natural (e.g., Nature Made Vitamins or GoJo Natural Orange Hand Cleaner). The frequency with which this label is used suggests that it delivers an advantage in marketing and sales. Our review examines the preference for and perception of naturalness, and reveals that people have a bias for items described as natural in many domains including foods, medicine, beauty products, cigarettes, and lighting. These preferences abound even when the natural item is identical or not objectively better than the non-natural or synthetic item. We believe this bias may be driven by a natural-is-better default belief as well as the belief that natural items are safer than non-natural items. Although a bias for natural items is apparent, this literature is in its infancy and we suggest three areas that will help build and refine the empirical research base and theory: the measurement of behavior, the examination of individual differences, and the development of methods for reducing the bias. A better understanding of the naturalness bias relevant to these areas will lead to a more comprehensive understanding of the area, including factors that may cause and reduce it.

Naturally Better? A Review of the Natural-is-Better Bias

People who prefer items labeled natural are living in a heyday considering the abundance of natural products and services that exist. On a summer day, people could sit on their deck cleaned with Seventh Generation Natural Cleaner and enjoy an Applegate's Natural Beef Hot Dog in a Vermont Bread Company All-Natural Bun smothered in Nature's Promise Ketchup and Mustard. They could pair the hot dog with Natural Lays Potato Chips and then wash it all down with a Hansen's Natural Soda. They may even later choose to smoke a Natural American Spirit cigarette while they watch technicians from NaturaLawn of America take care of their lawn. That evening, if they have indigestion, they can take a Naturight Natural Antacid.

The above examples are just a few of the diverse ways in which the term natural is used in the names of products and services. The U.S. Food and Drug Administration ("Natural" on food labeling, 2017) does not currently regulate the term, but research has shown that people generally consider items to be natural when they lack additives and processing (Rozin, Fischler, & Shields-Argeles, 2012; Scott & Rozin, 2017). The wide-spread use of the term, even without a universal definition, suggests that it provides an advantage from the perspective of marketing and sales of products and services. Indeed, research has shown that people are willing to pay a premium for natural items (Migliore, Borrello, Lombardi, & Schifani, 2018).

Although natural foods, supplements, or cleaners can be beneficial, it would be unwise to assume that anything labeled natural is always better than anything that is synthetic or human-made. For example, botulinum toxin and arsenic are natural items or exist in nature, but they are highly deadly. Alternatively, many anti-cancer drugs are synthetic items yet they have important benefits to humanity.

The purpose of this review is to offer readers an overview of the existing research about the bias for natural items. Additionally, a main goal of the review is to provide guidance for future researchers in this area. Thus, this review paper is meant to inform readers as well as facilitate the development of new ideas. Our coverage of research is illustrative rather than exhaustive. We examine three broad areas surrounding a naturalness bias. First, we discuss the ways in which the use of the term natural biases people's preferences and perceptions in several different areas. Second, we provide two reasons people show a bias for natural items, focusing extensively on a natural-is-better default belief and the perception that natural items are safer than synthetic items. Finally, we propose three areas that we believe need to be addressed in future research on the naturalness bias: the measurement of behavior, the examination of individual differences, and the development of methods for reducing the bias.

This review is focused on how naturalness can bias preferences and perceptions. Therefore, we cover research that has examined questions using the specific term natural, but not research that has examined concepts like organic (see Roman, Sanchez-Siles, & Siegrist, 2017, for a review of this work). While natural and organic items are related, they are not the same. Indeed, organic practices (Organic standards, 2018) move beyond the general definition of naturalness (e.g., lack of additives and processing).

Research on the Naturalness Bias

Much of the research on the preferences for and perceptions of natural items has taken place in the food and medicine domains. Early work examined people's preferences for foods and medicines described as either natural or processed (Rozin et al., 2004). Participants in two studies were asked whether they prefer a natural or processed version of several food and medicine items (e.g., peaches, lettuce, peanut butter, antacids, or antibiotics). Researchers found

that on average, participants preferred both natural foods and medicines, but this preference was greater for foods than for medicines (Rozin et al., 2004). In related work, participants rated various food products (e.g., soda, smoothies, or bean dip) to be healthier and lower in calories when labeled as natural versus labeled with a typical front-of-package brand, even though calorie content was the same regardless of the label (unbeknownst to participants; Skubisz, 2017). Other research has found that participants rated foods, vitamins, and allergens more favorably when they were described as natural versus made in a laboratory (Li & Chapman, 2012). Research has also shown that participants are more likely to choose drugs for hypothetical medical conditions when the drugs were described as natural versus synthetic (DiBonaventura & Chapman, 2008; Meier & Lappas, 2016).

The naturalness bias appears to hold even when people are given additional information that equates natural items with synthetic items (Meier & Lappas, 2016; also see DiBonaventura & Chapman, 2008, & Rozin et al., 2004, Study 2). For example, multiple studies have shown that a majority of participants (approximately 80%) preferred to take a natural versus a synthetic drug for a hypothetical medical condition even though the drugs were described as *equally* effective and safe (Meier & Lappas, 2016). Some participants (approximately 20%) even preferred a natural drug when it was described as less safe or less effective than a synthetic drug. Such findings may not be limited to the general population. For example, in a sample of 328 obstetricians and gynecologists, approximately 31% stated that they would prefer to use a natural hormone replacement therapy compared to a human-made one even when they were described as identical (3% preferred the human made one & 66% had no preference; Baron, Holzman, & Schulkin, 1998).

A naturalness bias also appears to have an impact on perceptions of unhealthy behaviors like cigarette smoking. Multiple studies have shown that people on average tend to believe that cigarettes labeled natural are not as harmful as regular cigarettes (e.g., Agaku, Omaduvie, Filippidis, & Vardavas, 2015; Baig, Byron, Lazard, & Brewer, in press; Byron, Baig, Moracco, & Brewer, 2015). Of course, the former are no less harmful than the latter (Baig et al., in press). This bias could have serious consequences such as delaying quitting or rationalizing continued smoking behavior. Additionally, it is conceivable that some people may be more willing to try cigarettes if they are labeled natural. In fact, when it comes to cigarettes the term natural might elicit the same response as the term light, which has long been perceived by smokers as meaning the cigarettes are safer (even though this is not the case); the light term is now prohibited in many countries (U.S. Department of Health and Human Services, 2012).

Other research has examined the naturalness bias outside the food and drug domains and has found comparable effects. Participants in one study were asked questions about 10 injury types (e.g., an electrical burn) that could be caused by natural (e.g., lightening) or artificial (e.g., power line) sources (Rudski, Osei, Jacobson, & Lynch, 2011). Participants rated each natural and artificial source on various dimensions such as preference, danger, and scariness. Overall, across injury type, participants' average ratings showed that they preferred the natural source compared to the artificial source and also that they perceived the natural source to be less dangerous and scary. Other work has found a biased preference for items described as natural in such diverse domains as perfumes (Apaolaza, Hartmann, Lopez, Barrutia, &, Echebarria, 2014), physical environments (McMahan & Josh, 2017), and lighting (Haans, 2014).

Some Reasons for a Naturalness Bias

In sum, research reveals a multitude of ways a naturalness bias is apparent in people's preferences for and perceptions of many different things from food to medicine to causes of injuries. In the next section, we examine some reasons for this bias. We limit our focus to two factors that frequently appear in the literature, a natural-is-better default belief and the perception that natural items are safer than non-natural items. Although we focus on these two factors, we recognize that other factors likely play a role.

A Natural-is-Better Default Belief

The diversity of items that are preferred when they are defined as natural suggests that there may be an inherent positive association with the term. Given that natural items are thought to be inherently better in several domains, people may be operating on a general natural-is-better default belief. In other words, when making judgements or evaluating items such as food, drugs, or beauty items, people may rely on a fundamental cognitive shortcut in which a natural item is preferred to anything that is non-natural, synthetic, or human-made. In direct support of this idea, research has shown that participants rate the term natural as more positive than the term synthetic (Meier, Osorio, Dillard, & Lappas, in press). In this study, 105 participants rated the valence (1 = very negative to 5 = neutral to 9 = very positive) of 17 words including natural and synthetic as well as filler words unrelated to these domains (e.g., region, horror, or fireworks). Participants rated natural (M = 6.79) as much more positive than synthetic (M = 4.50). These results suggest that people may have a default natural-is-better belief when making judgments and decisions in some situations especially when additional information is unavailable (also see Rozin et al., 2012, for related findings).

The idea that people have a natural-is-better belief is consistent with the argument that a preference for naturalness is partially driven by evolutionary processes (Rozin, 2005). It has been theorized that because our ancestors lived in and depended upon nature for survival, humans have developed an inherent preference for it. Wilson (1984) used the term biophilia to describe this view of humanity's connection to nature, and some work supports this general idea. For example, multiple studies have shown that people are happier and more attentive when in natural (e.g., a park) versus artificial (e.g., a city street) environments (Berman, Jonides, & Kaplan, 2008; Berman et al., 2012). These findings suggest that some of the most negative occurrences for humanity might be perceived to be more positive when described as natural versus human made (e.g., a natural death is better than just death).

Perceived Safety

Although a natural-is-better default belief is a broad explanatory factor for the naturalness bias, there may be additional specific reasons. A careful reading of the literature discussed in this paper suggests that perceptions of safety might be another underlying reason for a bias for natural items. That is, people might perceive natural items as safer than non-natural items. For example, in studies involving cigarettes (Baig et al., in press), other drugs (Li & Chapman, 2012; Meier & Lappas, 2016), and injuries (Rudski et al., 2011), participants rated the natural version of each item as safer or less harmful than the non-natural version. Other work has provided evidence for perceived safety as a mechanism for the naturalness bias. In two studies, Meier et al. (in press) asked participants if they would prefer a similarly effective and safe natural or synthetic drug for a hypothetical medical condition. In the control condition, participants were simply given this question and were asked for a choice. In the experimental

condition, after the question was posed and before making a choice, participants were given a rational appeal that highlighted the naturalness bias:

> "Some people think natural substances are better than synthetic substances. However, many scientists would agree that it is inaccurate to make this assumption. For example, natural substances such as Botulinum Toxin and Arsenic are poisons that can cause death when people are exposed to small amounts. Furthermore, synthetic substances are not inherently bad. Tylenol and many Anti-Cancer Drugs are synthetic substances and are beneficial for humanity. Overall, sometimes natural substances are good or bad and sometimes synthetic substances are good or bad."

Along with reducing the bias, these researchers found that safety ratings mediated the link between the manipulation (rational appeal or control) and the choice for natural drugs versus synthetic drugs. Simply stated, participants in the rational appeal condition gave lower safety ratings for the natural drug versus the synthetic drug compared to participants in the control condition, which thereby reduced their bias for the natural drug. Thus, safety perceptions appeared to partially account for the naturalness bias.

We are unaware of similar studies that have examined safety as a mediator or moderator. Such future work will be able to provide further evidence for or against this potential cause. Yet, it might be difficult to disentangle safety beliefs from a natural-is-better default belief because safety is a valanced construct and therefore it may be a component of the natural-is-better belief. However, some work has shown that participants still preferred a natural drug over a synthetic drug even when the drug was described as less safe (Meier & Lappas, 2016). This finding suggests that a natural-is-better default belief might be stronger than beliefs about safety at least

for some individuals and therefore these factors may be unrelated in some cases. More research is needed to further examine these ideas.

Proposed Future Research Directions

The extent of the research literature on the naturalness bias is small. In order to develop a better understanding of this bias as well as to uncover additional mechanisms and moderators, we believe researchers should focus on three keys areas: the measurement of behavior, the examination of individual differences, and the development of methods for reducing the bias. The examination of these three factors will strengthen the literature base and allow researchers to further build theory and apply findings to everyday life. We broaden our discussion of these three themes below.

The Measurement of Behavior

The literature reviewed almost exclusively relies upon self-report and hypothetical scenarios. These methods are understandable given that much of the existing research in this domain is relatively new and measuring actual behavior is often challenging. However, designs that rely only on self-report or hypothetical scenarios do not allow for the determination of whether or not people's behavior would match their intentions because we know that intentions do not always equal behavior (Webb & Sheeran, 2006). A naturalness bias is less interesting if it only occurs with intentions.

As far as we can tell, only three studies have examined the naturalness bias with behavior, or at the least, with a dependent variable that is close to behavior. Meier et al. (in press) conducted two studies that involved a research assistant approaching people walking on a small college campus in the Northeast U.S. (Study 1) or a large public university in the Midwest U.S. (Study 2). The research assistant asked people walking alone if they would participate in a 5-

minute psychology study that involved completing a personality questionnaire in exchange for a candy bar. If participants agreed and once they completed the personality questionnaire, the research assistant said:

> "Thanks for completing the questionnaire. Here is the candy bar (research assistant reached in a bag). Ahh, actually I forgot to tell you that our department has received several free samples of new non-prescription pain relievers. We decided to give them away to participants. We have two types, and we can give you one today for participating. One is a synthetic drug created in the laboratory by scientists and the other is a natural drug taken from a common plant. Which one would you like?"

The personality questionnaire was a cover for the true purpose of the study, which was to examine the extent to which participants chose the natural or synthetic pain reliever (participants were eventually told the true purpose of the study and that the pain relievers did not exist). Researchers found that for participants who chose a pain reliever, 86% in Study 1 and 94% in Study 2 chose a natural pain reliever. These large effects are telling and support the naturalness bias found in self-reports and hypothetical scenarios. However, it is important to be cautious in interpreting these results because although participants made a behavioral choice, they did not actually consume anything.

In another study that measured behavior, DiBonaventura and Chapman (2008) found that on average, study participants would prefer taking a natural versus synthetic anti-influenza drug. Later in that year, participants were contacted and asked if they ended up getting an influenza vaccination. The authors found that the more people preferred the natural versus the synthetic anti-influenza drug in their self-reports, the less likely they were to obtain an influenza

vaccination. These results show that a naturalness bias was related to people's unwillingness to be vaccinated with a vaccine that is synthesized.

These studies (DiBonaventura & Chapman, 2008; Meier et al., in press) present two ways to measure behavior or at least self-reported behavior. These studies also illustrate the potential negative consequences that could occur from a naturalness preference - possibly taking a drug without knowledge of its ingredients, and a reduced likelihood of getting a vaccination against influenza, which kills thousands of people every year. Future researchers should use these designs and others to examine behavior. Additionally, research could examine archival data when natural items versus synthetic items are pitted against one another. If a naturalness bias is consistently confirmed at the behavioral level, the findings would lend considerable credibility to past research involving self-reports and hypothetical situations. Additionally, such work will help pave the way for developing methods for reducing the bias (see more below).

The Examination of Individual Differences

The research reviewed has focused on the examination of a naturalness bias in general and has not considered if particular individuals are more versus less susceptible to the bias. Personality psychology has taught us that people's thoughts and behaviors vary in ways predicted by traits and other individual differences. We suggest that individual differences should be integrated into the study of the preference for natural items for at least two reasons. One, the examination of individual differences will help shed light on the boundary conditions involved in the naturalness bias and such work could help identify ways to reduce the bias. Two, the identification of individual differences that moderate the naturalness bias could help support or refine existing theories or viewpoints, which could eventually lead to a more accurate understanding of the bias.

The research reviewed here allows us to speculate about some potentially influential individual differences. For example, safety concerns appear to be one reason why people have a bias for natural things and it could be that people who are especially concerned about safety would be more likely to commit the bias. Neuroticism is a personality trait characterized by worry, concern, and a vigilance for danger (McCrae & John, 1992) and prevention focus is a motivational state in which people are cautious and focused on safety (Higgins, 1998). People high in neuroticism or those with a prevention focus might be more likely to prefer natural items, especially in the health domain, because they worry about the risks or hazards associated with non-natural items. If confirmed, this finding would support the idea that safety is a significant mechanism involved in the naturalness bias. Another personality trait, conscientiousness, which is characterized by responsible and organized behavior, has been consistently linked to health and mortality (e.g., Bogg & Roberts, 2004) and also may play a role in people's preferences for naturalness and perceptions of safety.

In addition to personality-related individual differences, other individual differences that may relate to people's preference for natural items could include information processing tendencies. For example, when processing information and making decisions, some individuals are more likely to rely upon a rational system, in which they are analytical, rely on logic, and process information extensively and carefully (Epstein, Pacini, Denes-Raj & Heier, 1996; Novak & Hoffman, 2009). Other individuals may rely upon an experiential system, in which they are driven by their emotions and experiences, tending to rely on heuristics such as "does this information make me feel good or bad" (Epstein, et al., 1996; Novak & Hoffman, 2009). It is conceivable that individuals who are more analytical, relative to those who are more experiential, would be less susceptible to choosing something simply because of is naturalness. In sum, as this

discussion highlights, an examination of individual differences, broadly construed, will add to the understanding of the naturalness bias.

Developing Methods for Reducing the Naturalness Bias

A bias is generally not a good thing. Yet, sometimes a preference for naturalness may not necessarily be a bias because natural items are in fact sometimes better than non-natural items. For example, natural light may actually be better than artificial light. However, maintaining a preference for natural items even when they are clearly identical or worse than synthetic or human-made equivalents could pose a problem. For example, smokers may think they can continue to smoke as long as they smoke natural cigarettes, some individuals might choose a natural versus synthetic drug or treatment even if it has not been tested for safety and efficacy (Giveon, Liberman, Klang, & Kahan, 2004; Meier & Lappas, 2016), and some people may resist getting vaccinated against deadly viruses because they fear synthetic ingredients (DiBonaventura & Chapman, 2008).

We are aware of only two studies that have examined a method for reducing a bias for naturalness. Meier et al. (in press) examined the impact of a rational appeal in reducing the naturalness bias. Participants were asked if they would prefer a similarly effective and safe natural drug or synthetic drug for a hypothetical medical condition. In the first study, participants in the control condition were simply given this question and were asked for a choice. In the experimental condition, after the question was posed and before making a choice, participants were given a rational appeal that pointed out the naturalness bias and presented a discussion of how natural drugs can be bad and synthetic drugs can be good. Researchers found the typical naturalness bias in the control condition (70.50% of 173 participants chose the natural drug), but this effect was eliminated in the experimental condition (43.30% of 164 participants chose the

natural drug). The rational appeal reduced the naturalness bias. A second study used a different rational appeal that was more neutral in terms of the benefits of natural and synthetic drugs. In that study, the bias was also reduced (Meier et al., in press).

We suggest that researchers examine ways to reduce the naturalness bias particularly in situations in which the bias could be harmful. Rational appeals may be one way to reduce the bias, but there likely are others. There is a rich literature on persuasion and health-related decision making focused on combatting biased thinking that could be applied. For example, factors such as authority experts or encouraging elaboration (i.e., thoughtful processing of information) have been shown to enhance a message's acceptance (Petty & Brinol, 2008). Furthermore, factors that affect health-related decisions such as the use of narratives or stories, or first-hand accounts of others' experiences (Dillard, Fagerlin, Dal Cin, Zikmund-Fisher, & Ubel, 2010), self-affirmation manipulations (Sherman & Cohen, 2002), or increasing risk perceptions (Brewer et al., 2007) may also be effective. We believe that the study of ways to reduce the naturalness bias is critical considering the frequency with which health-related products are touted as naturally derived and the fact that regulations for the definition of natural do not currently exist.

Summary and Conclusions

We outlined the many domains in which people have a bias for items described as natural. For example, people prefer natural foods, drugs, and other items even in situations in which a natural item is identical or not objectively better than a synthetic item. This bias is likely caused by many factors and we addressed two of them, a natural-is-better default belief and a belief that natural items are safer than non-natural items. We concluded by suggesting that this literature is in its infancy and that future work should focus on the measurement of behavior, the

examination of individual differences, and the development of methods for reducing the bias. These three factors are important for creating a comprehensive understanding of the naturalness bias.

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