Marketing Science Institute Working Paper Series 2014
Report No. 14-117

“Ten Million Readers Can’t Be Wrong!” or Can They? The Role of Information about Initial Adoption in New Product Trial

Coby Morvinski, and On Amir, and Eitan Muller

Report Summary

Marketers have long held that a large "stock" of initial sales of a new product increases the likelihood of subsequent adoption, presumably because of its positive signal to potential customers. Coby Morvinski, On Amir, and Eitan Muller examine the underlying mechanisms and the conditions under which this assumption holds. They explore when and whether information about a large adoption stock (e.g., "over 19 billion served") increases the adoption likelihood of a new product, as well as its interaction with the clarity of new product information (e.g., degree of uncertainty about the product quality) and information about the adoption stock identity (e.g., the degree of similarity to the customer).

In controlled choice experiments and a field experiment, the authors demonstrate that the influence of information on product diffusion is complex. In order to increase the new product's purchase likelihood, the large stock of adoption needs to be of similar others *and* be coupled with low product uncertainty (e.g., an informative product description). Otherwise, information about a large stock of adoption may be insignificant to or even reduce purchase likelihood.

For example, in a field experiment, potential customers approached on the street who were told that a new performance drink was consumed by thousands of others "like them" were more inclined to buy a trial product than those who did not receive such information. Importantly, however, this positive influence on sales held only if these individuals also received a clear product description. When the description of the new drink was vague, including a statement about thousands of similar adopters *decreased* the likelihood that a potential customer would buy a trial product.

Implications

These findings should allow marketers to more effectively communicate information about adoption stock and better understand the scope in which such information would be beneficial. For example, marketers might prefer to avoid using such information if they cannot clearly communicate their product's characteristics (e.g., due to limited ad space or media choice) or when product quality uncertainty might be high (e.g., due to product category). When information about stock of adoption can be coupled with a clear product description, information about adoption by a large stock of similar others might be effective in increasing the likelihood of subsequent adoption.

Coby Morvinski is a doctoral student and On Amir is Associate Professor of Marketing, both at the Rady School of Management, University of California, San Diego. Eitan Muller is Professor of Marketing, Stern School of Business, New York University and the Arison School of Business at Interdisciplinary Center (IDC) Herzliya.

Introduction

Most if not all new product frameworks in economics and marketing as well as practitioners' beliefs hold that a large stock of initial sales of a new product increases the likelihood of subsequent adoption, presumably because of its positive signal to potential customers (e.g., Bass 1969; Mahajan, Muller & Bass 1990). Evidently, advertisers use statements like "Ten million housewives can't be wrong", "8 out of 10 cats prefer Whiskas", "Over 19 Billion served", and "Number-one seller" to attract additional customers. However, it is less clear *why* should such information provide a positive signal, or, better yet, *when* should a customer make a positive inference from information about a large initial sales volume if at all. On the one hand, such information may be associated with high product quality: When people realize many others have adopted a product they may infer it must be of a good quality. On the other hand, such information might convey appropriate fit to address idiosyncratic needs and preferences (Wernerfelt 1994), particularly when the information refers to a group with which the individual is affiliated. Using this incomplete information framework (Tirole 1988), we investigate the effect of such information on the purchase likelihood of new products.

In this work we challenge the over-arching assumption that the larger the current stock of adoption of a new product, the greater the likelihood of additional adoption. We explore when and whether does information about a large stock increase the adoption likelihood of new product. In particular, we study whether information about a large stock of adoption decreases uncertainty about the new product quality or its fit. Employing both consequential purchase and field experiments examining customer choices of new and unfamiliar products, we explore the effect of information about a large-stock of adoption on people's purchasing decisions, as well as

its interaction with both the clarity of information about new product (e.g. degree of uncertainty about the product quality) and the stock identity (e.g. degree of similarity to the customer).

Our main results reject the lay notion that information about a large stock of adoption uniformly increases adoption likelihood. In particular, we find an interactive effect of whether the stock is of similar others or not and the degree of product quality uncertainty: While information about a large stock of adoption of similar others has a positive effect on adoption, a stock of dissimilar others has a negative one; Moreover, we find that this positive effect depends on the degree of product quality uncertainty, such that it is only positive when the uncertainty about the product quality is low, but is actually negative when this uncertainty is high. We discuss this complex relationship in the context of social influence and information credence, and conclude with implications for marketing practitioners.

Quality and Fit in New Product Adoption

New Product Adoption

The current work falls into a growing stream of research about new product diffusion; in their monograph about innovation diffusion, Muller, Peres & Mahajan (2009) define diffusion of innovation as: "*The process of the market penetration of new products and services driven by social influences. Such influences include all the interdependencies among consumers that affect various market players, with and without their explicit knowledge*". This definition emphasizes the central role played by the information about a new product in determining consumers' tendencies to adopt new products. This research field seeks to understand the spread of innovations and product life cycle from the perspective of communications and consumer interactions. Since Frank Bass introduced the first diffusion model in the late 60's, scholars have been striving to extend our knowledge about the spread of innovations and adjust the model to

contemporary markets, as well as propose new models. In general, individuals can adopt innovation as a result of two types of influences: exogenous influences like advertising and other communications by the firm, and endogenous influences resulting from peer interactions in the social system, based on word-of-month (WOM) and other interpersonal communications (Peres, Muller & Mahajan 2010; Mayzlin 2006). Unlike the scenario envisioned by the Bass model, diffusion processes have become more complex than ever, challenging the validity of the many basic assumptions of the original diffusion model. For example, while in the past most endogenous influences were due to WOM and direct communication mechanisms, higher information and media availability these days enable individuals to be influenced by others without direct communications. These types of effects fall broadly under the term social influence.

Social influence has been a central area of research across the social sciences. Employing a variety of related theories such as *Social Proof, Social Comparison*, *Conformity* and *Social Norms*, psychologists demonstrated how people behaviors (and emotions) are affected by others (see appendix C for selected social influence examples). Social influence is most effective under two conditions. The first is uncertainty and the second is similarity: People are most inclined to follow the lead of similar others (Cialdini 2001, p.140). We discuss this point further below.

While there are many potential sources of influence, researchers found that individuals are mostly influenced when observing the behavior of similar others (Festinger 1954) and are less influenced by behavior of individuals with whom they perceive to share less in common. Moreover, self-categorization, or the extent of how close an individual perceives herself to the influencing group, appears to determine the power of social influence (Abrams, Wetherell, Cochrane, Hogg & Turner 1990; Burn 1991). This suggests that the nature of the stock of

adoption in the diffusion process, and in particular, its perceived similarity to the potential customer, should play a major role in its influence on potential adoption.

However, influence need not happen via communication alone. Indeed, much of diffusion has been attributed to customers merely imitating others. In some situations, imitation can be intuitive, driven either by an innate physical mimicry (Bernieri & Rosenthal 1991) or behavioral mimicry which is below conscious awareness (Bargh & Chartrand 1999). In the context of product diffusion consumers are most likely to be free to choose whether to adopt new innovations[1]. One way to reduce uncertainty about the product's potential value is to examine how the product is already evaluated by others as information from early adopters reduces uncertainty about the product (e.g. Kalish 1985). For this reason, social influence is most powerful when uncertainty and information ambiguity are large (Wooten & Reed 1998).

Our main focus in this work is the signaling value of the size and type of the current adoption stock, as opposed to other types of influences such as word-of-mouth communications or network externalities, and the effect of the interactions between different signal types. In particular, we focus on the role of signals in reducing quality and fit uncertainties inherent in the new product adoption process (Simester 1995; Shin 2005). While we use both similarity and fit terms in this paper, we refer to similarity to describe the relation between people and to fit to describe the relation between a product and a customer.

Dimensions of Product Uncertainty

When the characteristics of the product are not known or are not directly evident upon inspection, customer may face uncertainty about both the product quality and fit. We define

[1] See Kim & Park, 2011 for example of social influence on consumers' innovation adoption in the context of non-voluntary adoption.

product quality as the objective measure of how the product performance such as durability, reliability, power, ease-of-use, is ranked within its category, i.e., its position on the vertically differentiated market. We define ***product fit*** as a subjective evaluation of how compatible the product is with the customer's values and needs (e.g., size, color, shape etc.). When considering a new product, customers consider both quality and fit to form their evaluation when deciding whether to adopt a new product. Since the effect of the current stock of adoption on the purchase likelihood of new product can be conceptualized as its ability to convey information that may reduce quality and fit uncertainties, it is important to analyze the manner in which such uncertainties influence the adoption decision.

Reducing Uncertainty about product quality: In order to reduce uncertainty about product quality, customers use various informational cues. The straightforward ones are the direct attributes of the product itself, but some indirect attributes such as brand, seller reputation, or price are also used (Monroe 1973; Gabor & Granger 1966; Gerstner 1985; Tellis & Wernerfelt 1987; Bagwell & Riordan 1991). Another well studied source of information is advertising (Nelson, 1970; Milgram & Roberts1986). Even uninformative advertising for an experience good could be a signal for product quality (Shin 2005). However, as discussed above, social cues also contribute to uncertainty reduction, either explicitly such as word-of-mouth communications, or implicitly such as imitation.

Reducing Uncertainty about product fit: The 'fit' of a product can be thought of as the match between customer needs and the product features, as pertaining to non-vertical aspects. While customers may have an accurate view of the product's quality, they may still be uncertain as to whether it matches their taste or situation. Moreover, the degree of such uncertainty may vary based on customer heterogeneity (Wernerfelt 1994; Hong & Pavlou 2010). We argue that

much of the uncertainty that consumers seek to resolve relates to product fit. As a result, firms use marketing signals such as advertising, placement, packaging, or even use sales people in order to improve the match between their products and appropriate customers. For a consumer, sales assistants should help improve the product match by tailoring the right product to her needs (Wernerfelt 1994; but see Harris et al. 1997). Some products allow customers to reduce fit uncertainty through sampling: A short interaction with the product before purchase. When sampling is not an option, fit uncertainty can be reduced via other communication-channels like personal or non-personal recommendations, or product reviews. Based on the above mentioned findings from research on social influence, we would expect a much larger reduction of fit uncertainty the larger the similarity between the information source and the customer. Needless to say, the better the description of the product, the lesser the potential uncertainty about fit is (more on this point below).

Uncertainties of a second-degree: the case of noisy signals

The uncertainty reduction ability of a signal depends not only on its information content, but also on its perceived quality. A vague signal, or one that lacks credibility might lead to very little updating of customer prior beliefs. In other words, such signals would be perceived as non-diagnostic (Mitra & Lynch 1995). We call a non- (or weak-) diagnostic signal a 2nd degree uncertainty. Uncertainties of a second-degree usually arise as a result of information asymmetry between customers and sellers, and are somewhat at the control of the firm. Below we briefly discuss two common sources of such further uncertainty.

Product description is the product information provided by the seller and can be either textual or visual. Description uncertainty is defined as the degree to which a consumer does not

have complete information of the product characteristics (Hong & Pavlou 2010). Description uncertainty can arise when a seller potentially misrepresents the product, or does not fully disclose its characteristics. Description uncertainty could also arise from the seller's inability to perfectly describe the product due to communication limitations or even seller's lack of expertise (Dimoka et al. 2012). In the current treatment we examine how the extent of product description uncertainty interacts with other uncertainties. In particular, how detailed vs. vague description of the product characteristics affects both uncertainty about the perceived fit and quality. Conversely, the lack of sufficient product description may not only increase quality and fit uncertainties, but it can also increase seller uncertainty if the customer expects the seller to disclose more information than was actually provided. If this is the case, the customer might suspect the credibility of the seller, and discount any other signal from this seller.

The seminal work of Akerlof (1970) on markets with asymmetric information underscored the importance of credibility in the market. Firms can choose what information to reveal and it is usually harder for customers to fully evaluate its quality and reliability. Indeed, reputation and trust are the most common variables in the literature on seller credibility (for a review, see Pavlou et al 2007). Most important to our context is that seller credibility – the degree of which the customers find the firms' signal informative – may influence both quality and fit uncertainties because a customer may discount the information received from a less credible firm. Even for well-established firms, new products often reach the market without sufficient brand reputation. As such, new firms are even more likely to attempt to reduce customer uncertainty using information about current adopters of the new product.

Current Stock of Adoption: Signal about Quality or Fit?

Current stock of adoptions (CSOA), i.e., the number of customers who already adopted the product, stands at the base of all diffusion models. As originally hypothesized by Bass (1969) and shown empirically to hold, the rate of which new innovation penetrates the market depends on the number of current adopters in each period. Current adopters are assumed to interact with potential adopters and affect their adoption rate by some constant probability (usually denoted as *q*, the coefficient of imitation). CSOA information is also widely used by practitioners and deemed to be a major driver behind accelerating product diffusion [e.g., "Ten million housewives can't be wrong"]. Less is known, however, about why CSOA information should increase adoption. Marketers tend to believe that the more customers adopt a new product (large CSOA), the stronger the signal about (higher) product quality is. However, the underlying process, and when this assumption in fact might not hold is poorly explored. Moreover, it is even less clear how the effect of CSOA information provided by the firm (as opposed to observation or 3rd party sources) interacts with other types of information. This distinction is important because as discussed earlier, seller credibility might mitigate the effect of a CSOA signal on adoption (as well as the effect of other signaling actions taken by the firm).

We argue that the mechanism behind the effect of CSOA information is more complicated than commonly assumed, as it interacts with other factors related to uncertainty reduction regarding the new product offering. While drawing a complete picture of the interactions effects of CSOA information with the full spectrum of signaling actions is beyond the scope of a single study, we analyze how CSOA information affects adoption in the presence (or absence) of product quality information and similarity between the CSOA and the potential customer.

First, drawing on existing marketing and social influence literature, we expect the identity of the current adopters to mediate the effect of CSOA information. That is the extent to which the current adopters are similar [vs. non-similar] to the potential customer mediates this effect. However, we suspect that decreasing uncertainty about product quality does not necessarily have to be the main mechanism driving this effect. CSOA information may actually reduce uncertainty about product-fit. This customer heterogeneity extension to the conventional wisdom that CSOA information mitigates uncertainty about product quality is particularly important when quality uncertainty is low. On the other hand, information about dissimilar CSOA may not serve to resolve uncertainty because of the lack of relevance information coming from individuals who are perceived to share little in common with the receiver. Notwithstanding, such information may serve to reduce uncertainty about fit after all: by informing the customer that the product is a good fit for dissimilar others, the firm might decrease the likelihood of adoption via a process of divergence (White & Dahl 2007; Berger & Heath 2007).

More formally, we hypothesize that:

H1: *Information about large and similar current stock of adoption increases the likelihood of product adoption.*

H2: *Information about large and dissimilar current stock of adoption has a detrimental effect on the likelihood of product adoption.*

As mentioned earlier, CSOA information may influence adoption even when product quality uncertainty is low. However we implicitly assumed that other factors are held constant. Specifically, we assumed that uncertainties of a second degree did not interact with the signal quality of CSOA information. A customer might use seller-provided CSOA information as long as credibility concerns are minimal. Lack of seller credibility may lead the customer to either

discount or ignore the information coming from the seller. Moreover, if the large CSOA claim is sufficiently suspicious, the customer might experience reactance, and be even less likely to try the new product (Laurin, Kay & Fitzsimons2012). This is especially likely when the firm provides only vague product information and thus does not alleviate quality uncertainty. For example, a marketing message that claims a large stock of adoption but at the same time provides very little information about the product characteristics is more likely to be perceived untrustworthy. This is because the large CSOA claim may be perceived to substitute factual claims when those may lead to a negative assessment. Therefore, the source of a muddled message will be labeled as unreliable.

Therefore, we predict that:

H3: *Information about large current stock of adoption reduces adoption likelihood when product quality information is vague, but not when it is clear.*

Combining our hypotheses above we suggest not only that in the right context CSOA information may help customers resolve uncertainties about product fit, but we also propose the novel idea that CSOA information can have a negative impact on product diffusion in certain contexts. To test these hypotheses we designed a consequential choice experiment with newly released books and a field experiment with a brand new energy supplement product for surfers. The structure of the experiments confirmed to the above analyses and is described below. We then follow with experiment specifics and a discussion of the results and their implications.

Online and Field Experiments

General design of experiments

The experiments were designed to explore the customer's adoption decision of a new product. Our main dependent measure is choice (i.e., the percentage of participants who adopt the product of those who had the opportunity to do so). To study the effect of CSOA information and its interactions with stock-identity and the quality of product information, we employ a 2(large stock vs. no stock size information) x 2(stock identity: similar vs. non similar others) x 2(product information quality: high vs. low) between participants design. In each of the eight treatment conditions, participants first receive information about the CSOA size, its identity, as well as product description, and then decide whether to buy. In both experiments participants make real consequential decisions. We manipulate *stock size* information by including a statement about how many other individuals have already adopted the product. We manipulate *stock identity* by describing the CSOA as a high or low fit with the current respondent. We then match the identity of the described current adopters to the participants' self-reported information (ex-post) to derive the CSOA similarity set. Lastly, we manipulate product *information quality* by including either a detailed or a vague description of the product. We then follow with a short survey administered to all participants, regardless of their purchase decision.

Experiment 1 (Online):

In study 1 we offer one of two newly released books to online participants and measure their willingness to obtain the books as a function of the information they are provided with. We use two different books that were published shortly before we conducted the study as two versions of the same study, between subjects, as a conceptual replication. The first book: "The

why Axis", is a book about recent findings from behavioral studies and was written by behavioral economics researchers. The second book: "Talent Wants to Be Free" discusses drivers for successful innovation and was written by a law professor. The two versions of the study share the same design: Individuals in the online panel participate in studies and enter a lottery for a chance to win an Amazon gift certificate. As an alternative, we offered respondents to participate in a lottery that offered up to 50 copies of the book. Although the value of the book was similar to the alternative gift certificate, the book lottery offered much better winning odds than the gift certificate lottery.

Method

Seven hundred participants belonging to an online panel participated in a 2 (stock information: large-stock vs. no stock-size) x 2 (stock fit: high vs. low) x 2 (product information quality: high vs. low) between subject design. Three hundred and fifty four participants were offered one book, while the others the other book. The design of the two book experiments was identical: In each of the eight conditions participants saw a picture of the book cover and information about the book. Each treatment condition carried a different information script. After reading the text, participants reported whether they would like to participate in the book lottery instead of the default gift certificate lottery. We interpret a decision to select the book lottery as a representation of participants' willingness to purchase the new book[2]. Participants in the large-stock condition read that the book had already attracted "*thousands of individuals*," while those in the no stock-size condition had no information about the number of current adopters. Half of the participants read that the book was "*attracting mid-class curious readers"* while the other

[2] Participants' decisions were consequential. Whether they opted to risk their sure payment for the book lottery was a function of the lottery attractiveness compared to the participation fee. While different factors play a role in assessing the attractiveness of the lottery, some were controlled for (e.g., education, age) and others are assumed to distribute randomly across conditions. Therefore, any differences in participants' willingness to convert their payment to a lottery ticket are due to the manipulated condition.

half that the book was "*attracting graduate-degree holding, highbrow individuals*." Finally, half the participants read a detailed description of the book and its author/s (high quality information), while the other half a vague single-sentence description of the book's main idea (low quality information). After choosing between a lottery for a book or a gift card, all participants reported their level of education on an 8-point scale ranging from 'Less than High School' to 'Professional Degree' and their annual income range. Participants also indicated the extent of which they agree with the sentence: "I had sufficient information about [book title] book to decide whether to participate in the lottery" (on a 7-point scale) as well as how often do you read books for pleasure (on a 5-point scale). Lastly, participants reported the extent of which they agree with the statement "I am a risk taker" on a 7-point scale ranging from 'Not at all like me' to 'Just like me'.

As an example, below is the scripted information from the "The why Axis" book study of the condition in which large stock, high fit, and high quality information is provided (The full text appears in Appendix A):

> *As an ALTERNATIVE to participating in the lottery for a cash reward, you may choose to participate in a different lottery that awards a copy of the "The Why Axis". The book is currently offered on Amazon for $17 (hard cover) and is rated 4.7 out of 5 stars. This alternative lottery affords a much higher chance of winning. A total of 50 books will be raffled among participants in this study who chose the alternative lottery.*
>
> *Here is some more information about the book: "The Why Axis" has been released only few weeks ago* ***but already attracted thousands of graduate-degree holding, highbrow individuals*** *who are interested in a better understanding of the motives underlying human behavior…*
>
> *Please indicate below if you are willing to participate in the lottery for "The Why Axis" Book IN EXCHANGE FOR the lottery for a cash reward.*

Results

Participants' distribution across the two versions of the study was nearly even, and the results were similar. Therefore, we only discuss the analysis of the consolidated data henceforth. The results of the consolidated data as well as of each study version are plotted in Figure 1.

Manipulation check

Participants who received detailed information about the book were more confident of having sufficient information to make their choice, than those who read a vague description of the book ($M_{clear\ desc.} = 4.59$, $M_{vague\ desc.} = 3.98$; Mann-Whitney one-tailed test: $p < 0.001$). This observation suggests that participants in the quality information conditions took a more informative decision and thus experienced less uncertainty.

Similarity

To correctly assign participants into appropriate similarity status, we used their stated level of education as a proxy for fit with the description of the books' current stock identity. We assume that those who report having a 4-year collage degree or more are more likely to be affiliated with a stock described as "*graduate-degree holding highbrow individuals"* and those who report having 2-year collage degree or less are more likely to be affiliated with a stock described as "*mid-class curious readers."* We consider the stock to be *similar* to a participant whenever there was a match between the participant's (self-reported) level of education and the information embedded in the treatment condition. Otherwise, we consider the condition to be of a *non-similar* stock. This resulted in categorizing 344 participants as similar (49.1%) and 356 participants as dissimilar.

Table 1: Experiment 1- Book lottery choice

Predictor	**β no controls**	**β full model**
Intercept	-1.86 *** (0.31)	-4.98 *** (0.55)
CSOA Size (CS)	0.55 (0.40)	0.38 (0.43)
Similarity (SIM)	0.49 (0.41)	0.46 (0.43)
Information Quality (IQ)	0.28 (0.41)	-0.05 (0.43)
CS x SIM	-1.31 * (0.60)	-1.37 * (0.64)
CS x IQ	-0.60 (0.57)	-0.31 (0.61)
SIM x IQ	-0.81 (0.60)	-0.71 (0.63)
CS x SIM x IQ	2.25 ** (0.83)	2.34 ** (0.89)
Education		0.19 * (0.07)
Risk Taking		0.58 *** (0.08)
χ^2[d.f.]	700[692]	693.3[690]
AIC	655.05	580.85
BIC	691.46	626.36

NOTES. Standard errors are presented in parentheses below parameter estimates. Significant codes: *** p < .001 ** p < .01 * p < .05

Choice

How often participants reported they read books for pleasure significantly predicts their education level ($\beta = .31$, $t[698] = 7.39$, $p < .001$) and therefore we did not include the former measure in the regression analysis of choice. We ran a logit regression of participants' lottery choice (book vs. gift certificate) on the three treatment conditions: stock-size, stock-similarity and product information quality as well as their 2-way and 3-way interactions. We also controlled for participants' self-reported education and risk attitude. Although the latter two explanatory variables significantly predicted participants' choice, excluding them from the

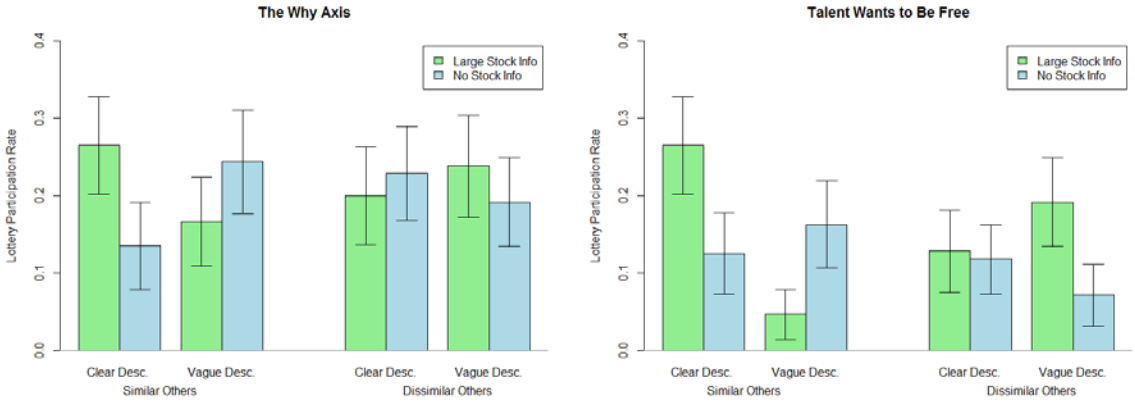
regression did not change the results. We summarize the regression results of both the uncontrolled as well as the full model in Table 1.

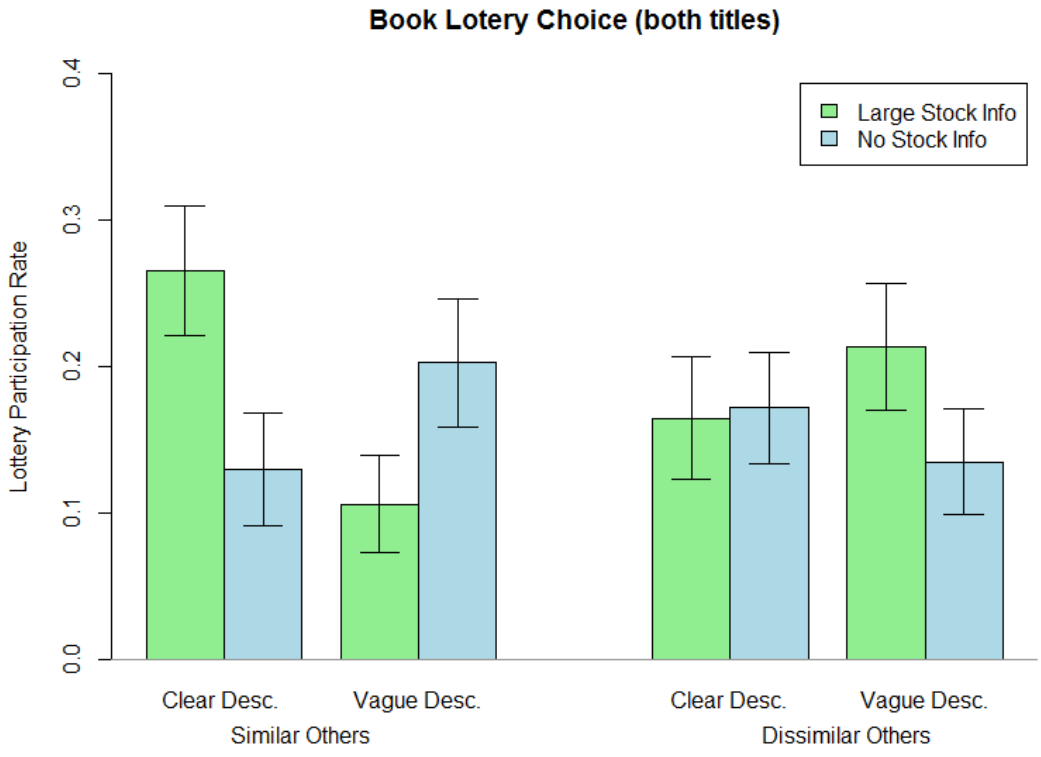
Does merely providing information about a large CSOA increases the book attractiveness in our study? Apparently not. There was no main effect of any of the three treatment conditions. In particular, providing subjects with information about others who have already purchased the book did not increase (on average) the attractiveness of the book lottery ($\beta = .38$, $Z[691] = 0.89$, $p = 0.38$). Likewise, neither a clear description of the book nor the similarity of the current adopters significantly influenced participants' lottery choice ($\beta = -.05$, $Z[691] = -0.12$, $p = .90$ and $\beta = .46$, $Z[691] = 1.06$ $p = .29$ respectively). As one would expect, education significantly predicts lottery choice ($\beta = .19$, $Z[691] = 3.6$, $p = 0.01$). The more educated participants were, the greater their tendency to select the book lottery. Additionally, participants who perceived themselves as more risk takers were also more inclined to choose the book lottery ($\beta = .58$, $Z[691] = 7.37$, $p < 0.001$). This observation supports the idea that new product adoption involves the management of both risk and uncertainty (e.g., Shimp & Beardern 1982; Grewal, Gotlieb & Marmorstein 1994). However, since risk attitude is a post decisional measure, the reported effect can be biased by the decision taken.

More importantly, we observed a 2-way interaction between CSOA size and similarity ($\beta = 1.3$, $Z[691] = 2.15$, $p = 0.03$) as well as a 3-way interaction ($\beta = 2.29$, $Z[691] = 2.72$, $p < 0.01$). The former suggests that providing participants with information about large CSOA does in fact increases the attractiveness of the book lottery, but only when the stock comprises of similar others. That is, participants are most likely to be influenced by information about large CSOA of similar others (H1), but not when the large CSOA is of dissimilar customers (H2). This

observation supports the social influence account: the invocation of a large group of adopters as a reference group is only effective when said group is similar to the customer (Figure 1).

Figure 1: Participation rate in the book lotteries in each treatment condition





Probably the most intriguing result is the 3-way interaction: While stock similarity mediated the effect of large CSOA information on participants' lottery choice, the effect varies as a function of the book description (clear vs. vague description). As Figure 1 shows, when

CSOA information is associated with similar others, large stock information positively affected the book choice likelihood when coupled with a clear description of the book [columns 1-2], but negatively affected adoption when the book description was vague [columns 3-4]. Therefore, not only that large CSOA is mostly influencing when referring to similar others (H1 & H2), our results further suggest that information about large CSOA reduces adoption likelihood when the product description is vague and uncertainty is higher (H3). Conversely, when CSOA is not similar to the participant [columns 5-8], we find no effect of CSOA information on purchase likelihood.

Discussion

The results clearly demonstrate that the effect of CSOA on the likelihood of purchasing a new product is complex. Let us first examine the situation in which a clear product description is provided. Detailed description of the book decreases uncertainty (quality and fit), and thus increases adoption. The provision of additional information about large number of similar others who have already adopted the book helps participants resolve more uncertainty which should further increase adoption [columns 1-2]. However, when the stock is of dissimilar people, information about a large CSOA did not influence participants' lottery choice in this study [columns 5-8].

We propose two potential alternatives to explain these results. First, customers may completely discount the signal value of an irrelevant reference group. Second, the null effect could be the result of two opposing forces. Adoption by a large group of customers may signal a high quality product, yet large stock of individuals who are different than the self may signal low product fit. It thus follows that when the current adopters are not of a similar group, the effect of information about large CSOA balances out. The analysis above holds as long as the product

description is clear. Why does information about a large CSOA negatively affect adoption when the book description is vague? We suspect that this is where uncertainty of a second degree comes into play and particularly the credibility of the information provided. Specifically, providing participants in our study with information that many others like them already adopted the book, coupled with a vague (e.g., less informative) description of the book, could lead them to have less trust in the information provided as a whole and thus avoid the book all together.

Although participants in Experiment 1 made a consequential choice, they may have considered the lottery choice to be part of the study and behaved differently than they would normally. In Experiment 2 we attempted to validate the fickle role of CSOA information in a field setting, where participants were not aware they were taking part in a study. Additionally, participants in Experiment 2 purchased the product using their own money. In Experiment 2, we extended our examination to a different product category – energy drinks. In addition to further generalizing our results, this product category more naturally lend itself to the manipulation of product information using more objective product attributes than books: Describing the ingredients and benefits of a drink is more straightforward and in line with common consumer experiences in the market. Moreover, participants were able to hold the product in their hand and verify some of the information they received by reading the product label. The energy drink we used was originally designed for surfers, a fact that allowed us to define the construct of similarity in the target population with greater precision. Finally, people may make decisions regarding new products very differently when in a virtual environment as compared to when employing personal communications with sales people in the field.

Experiment 2 (Field):

Working with an innovative new brand, we designed an experiment in which we attempt to sell a new (and unfamiliar) product to the public at different locations. The product was a new 'Performance Supplement' drink that comes in a small 2oz. energy-shot like bottle. The drink was designed for surfers and has not been released to the market at the time the study took place. Conducting our study in a southern California's beach city where surfing is extremely popular, we were likely to have a fair amount of surfing enthusiasts in our data. Research assistants who were dressed in the product related wear from the company and served as sales people, offered passersby the opportunity to buy the product at an introductory discount price. During the interaction with potential buyers, the "sellers" provided different scripted information according to treatment conditions similar to those in Experiment 1. After announcing their decision whether to buy the drink in the promotional offering, we asked 'participants' to complete a short 'marketing research' survey. We collected post-decision information regardless of individuals' purchase decision and all individuals agreed to take the survey.

Method

Four hundred nineteen passersby were approached at on- and off- campus locations and were offered the drink at an introductory promotional price. Similar to Experiment 1, we employed a 2 (stock information: large-stock vs. no stock-size) x 2 (stock fit: high vs. low) x 2 (product information quality: high vs. low) between subject design. In each engagement, the sales-person communicated to a passerby one of the eight scripts selected at random. After hearing information about the new performance drink, individuals were offered to buy it for $.5, described as a promotional discount price. Purchasing more than one bottle was not allowed.

Individuals in the large-stock condition were told that *thousands* of customers are already using the product, and those in the no-stock-size had no information about the number of current

adopters. In the stock-fit conditions, some individuals were told that the performance drink was "*specifically formulated for Surfers"* while others were told that it was "*formulated for water men and women and for everyone who is enthusiastic about sport"*. Also, either the word *surfer* (high fit) or *people* (low fit) were used to identify the current customers in the large stock condition (e.g., *"Thousands of surfers [people] already use [Product Name] every day.")* Finally, those who were assigned to the quality information conditions received a detailed description of the product's ingredients and their benefits, while others only received a vague product description that says: "[Product Name] *is an all-around performance supplement that scores a whole lot more than just plain energy*."

As mentioned above, passersby were also asked to complete a post-decision questionnaire masked under a cover of a company market research. In this survey we asked responders to indicate how much they agree with the statement: "*I am a Surfer*" by choosing one of the following options: Agree, Neither agree nor disagree, or Disagree. Additionally responders indicated how often they surf on a 7-point scale ranging from 'Never' to 'Daily'. Responders were also asked to indicate on a 5-point scale how good a fit for their needs they would expect our drink to be (scale ranged from 'Definitely will not fit' to 'Definitely will fit'), as well as to answer the question "*how often do you consume performance/energy drinks*" by selecting one of the following answers: Not at all, Occasionally or Frequently. Eventually, responders reported the extent to which they agree with the statement: "*I am a risk taker*" on a 7-point scale ranging from 'Not at all like me' to 'Just like me'. Demographic information concluded the survey.

As an example, below is the scripted information for the condition in which large stock, high fit and, high quality information is provided (the information script of each condition, as well as the post-decision survey, is presented as Appendix B):

[Product Name] is a new innovative performance supplement.
It is an ***All-Natural*** *performance drink* ***specifically formulated for Surfers****.*
Thousands of Surfers *already use [Product Name] every day.*
As part of onetime market study, I'd like to offer you to join ***all the local surfers*** *already using [Product Name] and see how [Product Name] can boost your performance, for only a fraction of its actual cost.*
[Product Name] is free of artificial sweeteners, and ***contains Super-Fruits*** *like Acai berry, Goji berry, Noni fruit and Pomegranate that provide a boatload of healthy antioxidants.*
[Product Name] is designed to provide surfers with:

1. ***High-Performance and Natural Energy****.*
2. ***Better Hydration*** *by incorporating a blend of electrolytes.*
3. ***Better Metabolism*** *that lowers body fat by incorporating botanicals like Garcinia Cambogia and Green tea.*
4. ***Better Muscle Recovery*** *by incorporating nutrients like l-carnitine l-tartrate, l-tyrosine and magnesium.*
5. ***Enhanced Immunity*** *by incorporating vitamins C and D and other nutrition's like alpha lipoic acid.*

Results

Similarity

The two measures of surfing intensity were highly but not perfectly correlated ($r_{Pearson}$=.73, $p < .001$). Some individuals indicated they have never surfed while still perceive themselves as surfers whereas others reported participating in surfing activity but were not sure they would describe themselves as surfers. We regard both measures to be a justifiable affiliation with the surfers' consumer segment. Therefore, we define a *Surfer* to be anyone who either reported participating in surfing activities or did not disagree with the statement about him/her being a surer. We consider *similarity* to hold whenever a *Surfer* individual was assigned to a high fit condition (e.g., "…*designed for surfer"*) or when a *non-Surfer* individual was assigned to a low-fit condition (e.g., *thousands of people* already using the product). This resulted in

categorizing 190 individuals as similar (47%) and 215 individuals as dissimilar[3]. As we expected, individuals who fell into the *similar* category reported a higher pre-consumption perceived product fit than those who belong to the *dissimilar* category ($M_{similar}$ = 3.15, $M_{dissimilar}$ = 2.95; Mann-Whitney one-tailed test: p = .018).

Table 2: Experiment 2 – Performance drink sales

Predictor	**β no controls**	**β full model**
Intercept	-3.03 *** (0.91)	-8.88 (1.95)
CSOA Size (CS)	0.63 (0.89)	0.52 (1.02)
Information Quality (IQ)	2.06 * (0.81)	1.95 * (0.91)
Similarity (SIM)	1.41 † (0.81)	1.73 † (0.98)
CS x SIM	-7.51 † (1.22)	-2.79 † (1.60)
CS x IQ	-1.41 (1.01)	-0.28 (1.16)
SIM x IQ	2.85 ** (1.05)	2.61 * (1.23)
CS x SIM x IQ	3.69 * (1.46)	3.57 † (1.84)
Energy Drink Consumption		1.53 *** (0.33)
Risk Taking		0.37 * (0.16)
Age		0.15 *** (0.04)
Gender		-1.43 ** (0.49)
Salesperson Fixed-effect	√	√
χ^2[d.f.]	378.9[386]	400.2[359]
AIC	327.52	255.3
BIC	403.59	346.05

NOTES: Standard errors are presented in parentheses below parameter estimates. Significant codes: *** p < .001 ** p < .01 * p < .05 † p < 0.1

[3] 14 individuals failed to report both measures of surfing affiliation and could not be categorized as either similar or dissimilar.

Thirty seven individuals failed to fully complete the post-decisional questionnaire and could not be included in the regression[4]. We ran a Logit regression of the purchase decision on the three conditions: stock size, stock similarity, and product information quality, as well as all their 2-way and 3-way interactions. In the full model we also controlled for individuals' self-reported energy drink consumption, perceived risk taking behavior, gender, and age. Finally, we added a fixed effect to each 'sales representative' to account for seller heterogeneity (e.g., communication skills etc.). Table 2 summarizes our results of both the controlled and the uncontrolled models.

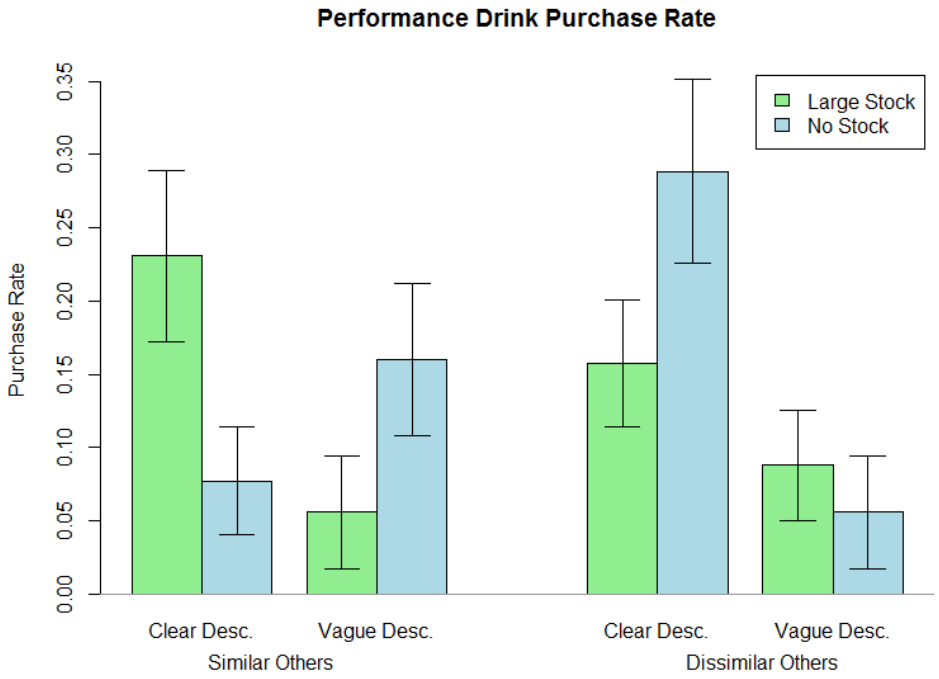
As Table 2 reveals, adding the control variables did not significantly change the results. However, the control variables were all significant predictors of choice, further supporting the robustness and validity of the results. As one would expect, energy drink consumption clearly predicts individuals' purchase decision ($\beta = 1.53$, $Z[357] = 4.59$, $p < .001$) indicating that energy drinks consumers were much more likely to buy our new performance drink. Those who perceived themselves as risk takers showed a greater tendency to buy ($\beta = .37$, $Z[357] = 2.26$, $p = .024$). Additionally, males tended to buy the new product more than females ($\beta = 1.43$, $Z[357] = 2.9$, $p = .004$), and older individuals purchased more than younger ($\beta = 1.51$, $Z[357] = 3.56$, $p < .001$).

Unlike Experiment 1, we observe a main effect of product information quality: Providing customers with a clear product description significantly increases their purchase likelihood ($\beta = 1.95$, $Z[357] = 2.15$, $p = .031$). More importantly, once again our data suggests no main effect of large CSOA information. Merely telling potential customers that many others are already using the product did not lead them to be more likely to buy ($\beta = .52$, $Z[357] = .512$, $p = .609$),

[4] After excluding incomplete observations, the distribution of individuals across the similarity categorization did not change. In the new dataset 176 individuals categorized as similar and 206 categorized as dissimilar.

supporting the notion that the effect of large CSOA depends on the context in which it is presented. Although stock similarity had a positive impact on purchase decision, it was only marginally significant ($\beta = 1.73$, $Z[357] = 1.77$, $p = .076$). Replicating Experiment 1, we observe no interaction between stock-size and information quality. This is to say that the quality of the product description alone does not mediate the effect of information about large CSOA in our experiments (Figure 2).

Figure 2: Purchase rate of performance Drink in each treatment condition.



Note the similarity between Figure 1 and Figure 2: The signal of large stock works well in the clear information condition ***and*** when the stock is of similar individuals. It has negative value if the stock is of dissimilar individuals or in the vague description condition. In the current experiment, however, the interaction between stock size and stock similarity was only marginally

significant, although in same direction as in Experiment 1 (β = -2.79, Z[357] = 1.75, p = .081). This is probably because as we note form Table 2, stock-size did not significantly affect choice in the similar and in the dissimilar conditions. Moreover, the interaction between information quality and stock similarity was significant (β = 2.61, Z[357] = 2.11, p = .034). Specifically, although clear product description led to a higher purchase rate irrespective of stock-similarity, its influence was stronger when the CSOA information referred to dissimilar (columns 5-8) than when CSOA information referred to similar others (columns 1-4). Broadly speaking, although we did not fully replicate the 2-way interactions, all the interactions in both studies are in the same directions (see Figure 2). Most interestingly is the replication of the 3-way interaction (β = 3.57, Z[357] = 1.95, p = .052): Experiment 2 supports our third hypothesis proposing that Information about large CSOA reduces adoption likelihood when product quality information is vague, but not when it is clear.

Discussion

The results of Experiment 2 support our previous findings. While information about large CSOA did not have a main effect on sales, it simultaneously interacted with the stock similarity and the product description quality. As Figure 2 shows (as well as Figure 1), when the CSOA information refers to similar others, large stock information had opposite effects on sales, depending on the quality of the product description provided. In line with H3, large stock information had a negative effect on sales when individuals received vague product information, and positive effect on sale when the information was clear. As discussed earlier, lack of information credibility may negatively affect customers' decisions in the vague product description condition. What is more, the results of Experiment 2 support H1 and H2 by showing

that large stock information plays a significant role when it refers to similar others , but less so when it refers in the case of low fit[5].

The field results of Experiment 2 revealed two additional significant effects not observed in Experiment 1. First, providing a clear product description significantly increased sales. Differences in the experiments setting may account for some of the different results: The social nature of the sales interaction in the current experiment could play a role, by making potential customers feel more obligated to pay attention to the communicated information. Moreover, in the current field settings customers were also allowed to physically scrutinize the product and compare the information with the products' label (e.g., ingredient list). Therefore, verbose product information in the current experiment might be more salient and seem more valid. In addition, a longer interaction with the sales representative in the clear product description conditions might have lead individuals to feel more obligated to buy the product. Second, the interaction between information quality and stock similarity was significant. As Figure 2 suggests, information quality had a significant effect on sales when the stock information referred to low fit[6]. This was driven by the low purchase rate of individuals who received a clear product description coupled with large CSOA information [columns 4-5].

Recall that we found no significant difference between these conditions in Experiment 1, and two alternatives were considered: The null effect was either the case of customers completely discounting the signal value of an irrelevant reference group or the result of two opposing forces cancelling each other. The results of Experiment 2 support the latter, suggesting that high product quality and low product fit may have contradicting influences. If customers in

[5] Running our regression on the similar and dissimilar conditions separately reveals that the CSOA size interaction with information quality was marginally significant in the similar conditions ($\beta = 2.81$, $Z[187] = 1.83$, $p = .067$) and insignificant in the dissimilar conditions ($\beta = -.301$, $Z[187] = 2.42$, $p = .808$).

[6] Running our regression on the four dissimilar conditions alone confirmed the effect of information quality on sales ($\beta = 2.07$, $Z[187] = 2.06$, $p = .04$)

Experiment 2 completely discounted the signal we would again expect an overall null. However, the current results reveal that telling customers that the performance drink was largely adopted by low fit customers had an overall negative effect on sales, suggesting that customers in this study did not discount the signal even when it was associated with low fit. Moreover, if information about a large stock increased the perceived product quality but stock dissimilarity reduced the perceived product fit, the latter effect had a greater impact on the potential consumers for the performance drink in our experiment, decreasing sales.

Put together, we conclude that when the product information quality plays a significant role in a new product adoption decision, customers do not ignore CSOA signal even if it refers to low fit adopters. However, the effect size and direction may vary as a function of the product category and the manner in which information is provided. While some product domains are more quality centric, other domains may be more identity relevant, where product-social-group association is more likely to influence customers' choice (Berger & Heath 2007).

General Discussion

By and large, most if not all new product frameworks in economics and marketing as well as lay beliefs hold that the larger the current stock of adoption of a new product, the greater the likelihood of additional adoption. Employing both controlled consequential experiments online and a field experiment we show that the influence of information about large current stock of adoption on product diffusion is more complicated than the commonplace assumption. That is, not only does information about a large stock of adoption need to refer to similar others in order to increase purchase likelihood, consistent with social influence theories, it only does so when

coupled with an informative product description. Otherwise, information about a large current stock of adoption may be insignificant or even harm marketing efforts.

Participants in Experiment 1 were more inclined to choose a lottery that offered a newly released book when they received information that thousands of other, similarly-educated, already adopted the book. Such positive influence on the book selection occurred as long as participants also received diagnostic information about the book. When the book description was vague, the influence of large stock information reversed, decreasing the attractiveness of the book. When the information about current readers referred to dissimilar others (e.g., thousands of other dissimilarly-educated book readers) participants did not find this information informative, regardless to the quality of the book description.

In our field experiment (Experiment 2) potential customers approached on the street who were told that a new performance drink is already consumed by thousands of other individuals like them (regardless of group affiliation), were more inclined to buy a trial product than those who did not receive such information. Similar to Experiment 1, information about large current stock of adoption had a positive influence on sales as long as individuals also received a clear description of the product. When the description of the new drink was vague, including a statement about thousands of other similar adopters decreased the likelihood that a potential customer would buy a trial product.

Marketers have long documented the idea that large stock information can increase sales, and recently scholars and practitioners are increasingly investigating the influence of social networks and contagion among customers, on new products adoption (e.g., Godes & Mayzlin 2009; Hartmann et al. 2008). Recent studies also acknowledge the fact that uncertainty about the product characteristics plays a major role in determining customers' product evaluation (Hong &

Pavlou 2010). What is less known, however, is how these signals interact, and in particular, how information about a large stock of adoption influences people to try new products in conjunction with (or lack of) other signals. Testing this broadly held assumption, the main contribution in the current work is in refining the conditions (e.g. marketing information) in which customers are, in fact, influenced by information about current adopters, as well as the directions of these effects. This is the first direct test and demonstration of the fickle role of information about a large current stock of adoption. The findings reported here demonstrate the positive, negative, or sometimes lack of influence of information about a current large stock of adoption on the sales of a new product. The results are of interest both to researchers seeking to better understand the relationships between marketing signals of large stock and different product uncertainty types, and to practitioners seeking to identify the conditions under which large stock information aids product adoption.

Our results stress the relationship between the identity of the adopting stock and its signal value (and sign) to potential customers. From the firm perspective, the identity of the adopting customer stock may be critical to the assessment of success of the new product launched. On the one hand, lead users can serve as opinion leaders, fueling the diffusion process of new innovations (Urban & Von hoppel 1988; Morrison el al. 2003). On the other hand, large initial adoption by certain customer types may at times actually be a negative signal of success (Anderson et al. 2014). Additionally, popularity information has been recently found to be of a greater benefit to products that serve a niche of the market ("narrow-appeal") than it is to products that suit mainstream tastes (Tucker & Zhang 2011). Together, these complementary works significantly challenge the ubiquity of reliance on the large stock assumption.

Finally, one can interpret our results as providing an additional layer above and beyond that of a large stock of adoption being a proxy for internal market influences, e.g., word of mouth (e.g., Bass 1969; Mahajan, Muller, & Bass 1990). Our results stress the informational role or the signal value inherent in a large stock of adoption. As such, existing models of new product diffusion may be enhanced by including this endogenous informational effect.

Implications for Marketers

Our findings should allow marketers to more effectively communicate information about stock of adoption and to better understand the scope in which such information would be beneficial. For example, marketers who cannot clearly communicate their product's characteristics (e.g. limited ad space, media choice) or when product quality uncertainty might be high because of the nature of the product category, might prefer to avoid using information about large stock of adoption. On the other hand, when information about stock of adoption can be coupled with a clear product description, information about adoption by a large stock of similar others might be an effective. Therefore information about large stock of adoption is a marketing tool that should be used with caution. Our findings also help scholars better understand the mechanism underlying product diffusion in the context of information about stock of adoption. Finally, we believe that both practitioners and scholars of marketing should now be able to refine models of new product adoption, and potentially improve diffusion forecasts.

Limitation and Future Research

The first potential limitation of any experimental study lies in the specificity of its design. We attempted to tackle this by using consequential choices of real new-to-the-market products,

as well as by employing a field experiment. Despite the converging results in two distinctly different product domains supporting generality, signal effects may still be contingent on the nature of the product, the customer, and the information source; more evidence from the field would thus help paint the overall picture.

The current work investigates the effect of large stock information while taking into account the interactions with stock identity and product information quality. Although stock identity and complementary product description are some of the most common signals coinciding with information about current stock of adoption, other types of signals may also interact and could be further investigated. For example, the effect of a large stock can be mediated by the price (e.g., Grewal, Gotlieb & Marmorstein 1994), seller reputation, communication channel, warranty coverage (Shimp & Beardern 1982), customer or culture heterogeneity and even temporal moods or feelings. Although we offered several alternative accounts for our results, we could not include all potential effects within the scope of our experiments. For example, while low seller credibility could potentially account for the negative effect of large stock information in some of the conditions, we did not directly measure this credibility. We leave this deeper investigation to subsequent research.

The current research uses the similarity of the adopting stock as a proxy for reduction on uncertainty regarding product fit. There may potentially be many other ways for customers to reduce this uncertainty, such as role-models, experts, geographic and/or group membership (Godes & Ofek 2004; Bell & Song 2007; Grinblatt et al. 2008; Manchanda et al. 2008; Duflo & Saez 2003; Gleaser & Sacerdote 2010). Any of these may influence customer perceptions of product fit, and may potentially lead to somewhat different interactions. Since we base our

predictions on broad rather than specific theories of social influence, our best guess is that the same results would hold, but this remains an empirical question.

Finally, it is worth nothing that stock identity can in itself also serve as a signal of high product quality irrespective of stock size or level of similarity. This is because early adopters, less loyal, and heavy users have been shown to have greater impact on subsequent adoption (Iyengar, Van den Butle & Valente 2011; Godes & Mayzlin 2009; Li & Hitt 2008), and thus information about a small set of the right type of customers may be perceived as very valuable. While we attempted to design the stimuli to reduce such dual effects, and check the robustness of our results to particular similarity formulations, we cannot be certain to fully control for this potential confound. If it is indeed still present in our results, our findings should be read as relative as opposed to absolute (e.g., when greater quality uncertainty is reduced relative to fit uncertainty, and so forth). The qualitative nature of our findings, however, remains the same.

References

Abrams, D., Wetherell, M., Cochrane, S., Hogg, M. A., & Turner, J. C. (1990). Knowing what to think by knowing who you are: Self-categorization and the nature of norm formation, conformity and group polarization*. *British Journal of Social Psychology*, *29*(2), 97-119.

Akerlof, G. A. (1970). The market for 'lemons': quality uncertainty and the market mechanism. *Aug*, *84*(3), 488-500.

Anderson, E., Lin, S., Simester, D., & Tucker, C. (2014). Harbingers of Failure. *Working paper.*

Asch, S. E. (1951). Effects of group pressure upon the modification and distortion of judgments. *Groups, Leadership, and Men. S*, 222-236.

Bagwell, K., & Riordan, M. H. (1991). High and declining prices signal product quality. *The American Economic Review*, 224-239.

Bandura, A., & Menlove, F. L. (1968). Factors determining vicarious extinction of avoidance behavior through symbolic modeling. *Journal of Personality and Social Psychology*, *8*(2p1), 99.

Bass, Frank M. (1969). A New Product Growth Model for Consumer Durables. *Management Science*, 15 (January), 215-27.

Bargh, J. A., & Chartrand, T. L. (1999). The unbearable automaticity of being. *American psychologist*, *54*(7), 462.

Bell, D. R., & Song, S. (2007). Neighborhood effects and trial on the Internet: Evidence from online grocery retailing. *Quantitative Marketing and Economics*,*5*(4), 361-400.

Berger, J., & Heath, C. (2007). Where consumers diverge from others: Identity signaling and product domains. *Journal of Consumer Research*, *34*(2), 121-134.

Bernieri, F. J., & Rosenthal, R. (1991). Interpersonal coordination: Behavior matching and interactional synchrony. *Fundamentals of nonverbal behavior*, 401.

Burn, S. M. (1991). Social psychology and the stimulation of recycling behaviors: The block leader approach. *Journal of applied social psychology*, *21*(8), 611-629.

Cialdini, R. B. (2001). Influence: Science and practice. *Boston: Allyn & Bacon*.

Craig, K. D., & Prkachin, K. M. (1978). Social modeling influences on sensory decision theory and psychophysiological indexes of pain. *Journal of personality and social psychology*, *36*(8), 805.

Duflo, E., & Saez, E. (2003). The role of information and social interactions in retirement plan decisions: Evidence from a randomized experiment. *The Quarterly Journal of Economics*, *118*(3), 815-842.

Grinblatt, M., Keloharju, M., & Ikäheimo, S. (2008). Social influence and consumption: evidence from the automobile purchases of neighbors. *The review of Economics and Statistics*, *90*(4), 735-753.

Darley, J. M., & Latane, B. (1968). Bystander intervention in emergencies: diffusion of responsibility. *Journal of personality and social psychology*, *8*(4p1), 377.

Dimoka, A., Hong, Y., & Pavlou, P. A. (2012). On Product Uncertainty in Online Markets: Theory and Evidence. *MIS Quarterly*, *36*(2).

Festinger, L. (1954). A theory of social comparison processes. *Human relations*,*7*(2), 117-140.

Fuller, R. G., & Sheehy-Skeffington, A. (1974). Effects of group laughter on responses to humourous material, a replication and extension. *Psychological Reports*, *35*(1), 531-534.

Gabor, A., & Granger, C. W. (1966). Price as an Indicator of Quality: Report on an Enquiry. *Economica*, 43-70.

Gerstner, E. (1985). Do higher prices signal higher quality? *Journal of Marketing Research*, *22*(2).

Glaeser, E. L., Sacerdote, B. I., & Scheinkman, J. A. (2003). The social multiplier. *Journal of the European Economic Association*, *1*(2-3), 345-353.

Godes, D., & Mayzlin, D. (2009). Firm-created word-of-mouth communication: Evidence from a field test. *Marketing Science*, *28*(4), 721-739.

Godes, D. & Ofek E. (2004). Case Study: Hasbro Games - POX, Harvard Business School Publishing, Boston, MA.

Grewal, D., Gotlieb, J., & Marmorstein, H. (1994). The moderating effects of message framing and source credibility on the price-perceived risk relationship.*Journal of Consumer Research*, 145-153.

Hartmann, W. R., Manchanda, P., Nair, H., Bothner, M., Dodds, P., Godes, D., Hosanagar, K., & Tucker, C. (2008). Modeling social interactions: Identification, empirical methods and policy implications. *Marketing Letters*, *19*(3-4), 287-304.

Harris, K., Davies, B. J., & Baron, S. (1997). Conversations during purchase consideration: sales assistants and customers. *The International Review of Retail, Distribution and Consumer Research*, *7*(3), 173-190.

Hong, Y., & Pavlou, P. A. (2010, May). Fit Does Matter! An Empirical Study on Product Fit Uncertainty in Online Marketplaces. In *ICIS* (p. 218).

Iyengar, R., Van den Bulte, C., & Valente, T. W. (2011). Opinion leadership and social contagion in new product diffusion. *Marketing Science*, *30*(2), 195-212.

Kalish, S. (1985). A new product adoption model with price, advertising, and uncertainty. *Management science*, *31*(12), 1569-1585.

Laurin, K., Kay A.C. & Fitzsimons G. J. (2012). Reactance versus Rationalization: Divergent Responses to Policies that Constrain Freedom. *Psychological Science*, 23(2), 205-209.

Li, X., & Hitt, L. M. (2008). Self-selection and information role of online product reviews. *Information Systems Research*, *19*(4), 456-474.

Manchanda, P., Xie, Y., & Youn, N. (2008). The role of targeted communication and contagion in product adoption. *Marketing Science*, *27*(6), 961-976.

Mayzlin, D. (2006). Promotional Chat on the Internet. *Marketing Science*, 25 (2), 155-

163.

Milgram, P. & Roberts J. (1986), Prices and Advertising Signals of Product Quality, Journal of Political Economy, 94, August, pp. 796-821

Mitra, A., & Lynch Jr, J. G. (1995). Toward a reconciliation of market power and information theories of advertising effects on price elasticity. *Journal of Consumer Research*, 644-659.

Monroe, K. B. (1973). Buyers' Subjective Perceptions of Price. *Journal of Marketing Research, 10*(1).

Mahajan, V., Muller, E., & Bass, F. M. (1990). New product diffusion models in marketing: A review and directions for research. *The Journal of Marketing*, 1-26.

Morrison, P. D., Roberts, J. H., & Midgley, D. F. (2004). The nature of lead users and measurement of leading edge status. *Research policy*, 33(2), 351-362.

Muller, E., Peres, R., & Mahajan, V. (2009). Innovation diffusion and new product growth. *Marketing Science Institute.*

Nelson, P. (1970). Information and consumer behavior. *The Journal of Political Economy*, 311-329.

O'Connor, R. D. (1972). Relative efficacy of modeling, shaping, and the combined procedures for modification of social withdrawal. *Journal of Abnormal Psychology, 79*(3), 327.

Pavlou, P. A., Liang, H., & Xue, Y. (2007). Understanding and mitigating uncertainty in online exchange relationships: A principal-agent perspective. *MIS quarterly*, *31*(1), 105-136.

Peres, R., Muller, E., & Mahajan, V. (2010). Innovation diffusion and new product growth models: A critical review and research directions. *International Journal of Research in Marketing*, *27*(2), 91-106.

Sherif, M. (1935). A study of some social factors in perception. *Archives of Psychology (Columbia University)*.

Shimp, T. A., & Bearden, W. O. (1982). Warranty and other extrinsic cue effects on consumers' risk perceptions. *Journal of Consumer research* 9(1), 38.

Simester, D. (1995). Signaling Price Image Using Advertised Prices. *Marketing Science*, 14(2), 166-188.

Shin, J. (2005). The role of selling costs in signaling price image. *Journal of Marketing Research*, *42*(3), 302-312.

Smyth, M. M., & Fuller, R. G. (1972). Effects of group laughter on responses to humorous material. *Psychological Reports*, *30*(1), 132-134.

Tellis, G. J., & Wernerfelt, B. (1987). Competitive price and quality under asymmetric information. *Marketing science*, *6*(3), 240-253.

Tirole, J. (1988). The theory of industrial organization. MIT press.

Tucker, C., & Zhang, J. (2011). How does popularity information affect choices? A field experiment. *Management Science,* 57(5), 828-842.

Urban, G. L., & Von Hippel, E. (1988). Lead user analyses for the development of new industrial products. *Management science*, 34(5), 569-582.

Wernerfelt, B. (1994). On the function of sales assistance. *Marketing Science,13*(1), 68-82.

White, K., & Dahl, D. W. (2007). Are All Out-Groups Created Equal? Consumer Identity and Dissociative Influence. *Journal of Consumer Research*, *34*(4), 525-536.

Wooten, D. B., & Reed II, A. (1998). Informational influence and the ambiguity of product experience: Order effects on the weighting of evidence. *Journal of consumer psychology*, *7*(1), 79-99.

Appendix A: Scripted information from the "The why Axis" book study of the condition of large stock, high fit, and high quality information

As an ALTERNATIVE to participating in the lottery for a cash reward, you may choose to participate in a different lottery that awards a copy of the "The Why Axis". The book is currently offered on Amazon for $17 (hard cover) and is rated 4.7 out of 5 stars. This alternative lottery affords a much higher chance of winning. A total of 50 books will be raffled among participants in this study who chose the alternative lottery.

Here is some more information about the book: "The Why Axis" has been released only few weeks ago ***but already attracted thousands of graduate-degree holding, highbrow individuals*** *who are interested in a better understanding of the motives underlying human behavior. The authors' ideas and methods for revealing what really works in addressing big social, business, and economic problems give the readers new understanding of what drives people's behavior. Gneezy and List's pioneering approach is to embed themselves in the factories, schools, communities, and offices where people work, live, and play. Then, through large-scale field experiments conducted "in the wild," Gneezy and List observe people in their natural environments without them being aware that they are observed. To get the answers to their questions, Gneezy and List boarded planes, helicopters, trains, and automobiles to embark on journeys from the foothills of Kilimanjaro to California wineries; from sultry northern India to the chilly streets of Chicago; from the playgrounds of schools in Israel to the boardrooms of some of the world's largest corporations. In "The Why Axis" the authors take us along for the ride, and through engaging and colorful stories, present lessons with big payoffs.*

Please indicate below if you are willing to participate in the lottery for "The Why Axis" Book IN EXCHANGE FOR the lottery for a cash reward.

Appendix B: Field Experiment information scripts for a new supplement drink

Clear Product Description - High Fit -Large Stock

[Product Name] is a new innovative performance supplement.
It is an All-Natural performance drink specifically formulated for Surfers.
Thousands of Surfers already use [Product Name] every day.
As part of onetime market study, I'd like to offer you to join all the local surfers already using [Product Name] and see how [Product Name] can boost your performance, for only a fraction of its actual cost.
[Product Name] is free of artificial sweeteners, and contains Super-Fruits like Acai berry, Goji berry, Noni fruit and Pomegranate that provide a boatload of healthy antioxidants.
[Product Name] is designed to provide surfers with:

1. High-Performance and Natural Energy.
2. Better Hydration by incorporating a blend of electrolytes.
3. Better Metabolism that lowers body fat by incorporating botanicals like Garcinia Cambogia and Green tea.
4. Better Muscle Recovery by incorporating nutrients like l-carnitine l-tartrate, l-tyrosine and magnesium.
5. Enhanced Immunity by incorporating vitamins C and D and other nutrition's like alpha lipoic acid.

Clear Product Description - Low Fit - Large Stock

[Product Name] is a new innovative performance supplement.
It is an All-Natural performance drink formulated for water men and women and for everyone who is enthusiastic about sport.
Thousands of people already use [Product Name] every day.
As part of onetime market study, I'd like to offer you to join all the people already using [Product Name] and see how [Product Name] can boost your performance, for only a fraction of its actual cost.
[Product Name] is free of artificial sweeteners, and contains Super-Fruits like Acai berry, Goji berry, Noni fruit and Pomegranate that provide a boatload of healthy antioxidants.
[Product Name] is designed to provide surfers with:

1. High-Performance and Natural Energy.
2. Better Hydration by incorporating a blend of electrolytes.
3. Better Metabolism that lowers body fat by incorporating botanicals like Garcinia Cambogia and Green tea.
4. Better Muscle Recovery by incorporating nutrients like l-carnitine l-tartrate, l-tyrosine and magnesium.
5. Enhanced Immunity by incorporating vitamins C and D and other nutrition's like alpha lipoic acid.

Clear Product Description - High Fit -No Stock Size

[Product Name] is a new innovative performance supplement.
It is an All-Natural performance drink specifically formulated for Surfers.
As part of onetime market study, I'd like to offer you to be one of the first to try [Product Name] and see how [Product Name] can boost your performance, for only a fraction of its actual cost.
[Product Name] is free of artificial sweeteners, and contains Super-Fruits like Acai berry, Goji berry, Noni fruit and Pomegranate that provide a boatload of healthy antioxidants.
[Product Name] is designed to provide surfers with:

1. High-Performance and Natural Energy.
2. Better Hydration by incorporating a blend of electrolytes.
3. Better Metabolism that lowers body fat by incorporating botanicals like Garcinia Cambogia and Green tea.
4. Better Muscle Recovery by incorporating nutrients like l-carnitine l-tartrate, l-tyrosine and magnesium.
5. Enhanced Immunity by incorporating vitamins C and D and other nutrition's like alpha lipoic acid.

Clear Product Description - Low Fit - No Stock Size

[Product Name] is a new innovative performance supplement.
It is an All-Natural performance drink formulated for water men and women and for everyone who is enthusiastic about sport.
As part of onetime market study, I'd like to offer you to be one of the first to try [Product Name] and see how [Product Name] can boost your performance, for only a fraction of its actual cost.
[Product Name] is free of artificial sweeteners, and contains Super-Fruits like Acai berry, Goji berry, Noni fruit and Pomegranate that provide a boatload of healthy antioxidants.
[Product Name] is designed to provide surfers with:

1. High-Performance and Natural Energy.
2. Better Hydration by incorporating a blend of electrolytes.
3. Better Metabolism that lowers body fat by incorporating botanicals like Garcinia Cambogia and Green tea.
4. Better Muscle Recovery by incorporating nutrients like l-carnitine l-tartrate, l-tyrosine and magnesium.
5. Enhanced Immunity by incorporating vitamins C and D and other nutrition's like alpha lipoic acid.

Vague Product Description - High Fit -Large Stock

[Product Name] is a new innovative performance supplement.
It is an All-Natural performance drink specifically formulated for Surfers.
Thousands of Surfers already use [Product Name] every day.
As part of onetime market study, I'd like to offer you to join all the local surfers already using [Product Name] and see how [Product Name] can boost your performance, for only a fraction of its actual cost.
[Product Name] is all-around performance supplement that scores a whole lot more than just plain energy.

Vague Product Description - Low Fit - Large Stock

[Product Name] is a new innovative performance supplement.
It is an All-Natural performance drink formulated for water men and women and for everyone who is enthusiastic about sport.
Thousands of people already use [Product Name] every day.
As part of onetime market study, I'd like to offer you to join all the people already using [Product Name] and see how [Product Name] can boost your performance, for only a fraction of its actual cost.
[Product Name] is all-around performance supplement that scores a whole lot more than just plain energy.

Vague Product Description - High Fit -No Stock Size

[Product Name] is a new innovative performance supplement.
It is an All-Natural performance drink specifically formulated for Surfers.
As part of onetime market study, I'd like to offer you to be one of the first to try [Product Name] and see how [Product Name] can boost your performance, for only a fraction of its actual cost.
[Product Name] is all-around performance supplement that scores a whole lot more than just plain energy.

Vague Product Description - Low Fit - No Stock Size

[Product Name] is a new innovative performance supplement.
It is an All-Natural performance drink formulated for water men and women and for everyone who is enthusiastic about sport.
As part of onetime market study, I'd like to offer you to be one of the first to try [Product Name] and see how [Product Name] can boost your performance, for only a fraction of its actual cost.
[Product Name] is all-around performance supplement that scores a whole lot more than just plain energy.

Appendix C: Selected Social Influence Examples

Social influence has been a central area of research across the social sciences. Employing a variety of related theories such as *Social Proof, Social Comparison*, *Conformity* and *Social Norms*, psychologists demonstrated how people conform to the obviously erroneous answers given by the other group members (Sherif 1935; Asch 1951), laugh longer and more in the present of canned merriment (Fuller & Sheehy-Skeffington 1974; Smyth & Fuller 1972; Cialdini, 2001), Feel less pain from electrical shocks in the present of other subjects behaving as if the shocks were not painful (Craig & Prkachin 1978) and ignore emergency situations when observing others doing so (Darley & Latanè 1968). Social influence has even been shown to help rid people of extreme fears simply by observing others who behave in similar situations but with no fear at all (Bandura & Menlove 1968; O'Connor, 1972). The latter effect might have some similarities to the reduction of uncertainty assumed in many diffusion processes.