

Suspecting service overprovisions: how market signals help restore personal control and reduce decision deferrals

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Abstract

Purpose – Service providers often recommend unnecessary and expensive services to unsuspecting consumers, such as recommending a new part when a simple fix to the old will do, a phenomenon known as overprovisioning. The purpose of this paper is to examine to what extent consumers tend to defer their decisions should they suspect that sellers are overproviding services to them and they cannot prevent the sellers from doing so (they lack personal control); and how proper market signals can mitigate such suspicions, restore personal control and reduce deferrals.

Design/methodology/approach – The paper conducts three laboratory experiments. The experiments expose the participants to hypothetical repair scenarios and measure to what extent they suspect that sellers might be overproviding services to them and they feel that they lack the personal control to prevent the sellers from doing so. Thereafter, the experiments expose them to two different market signals, one conveying that the seller is providing quality services (a repair warranty; quality signal) and the other conveying that the seller is taking away any incentives their agents (technicians) may have to overprovide services (the technicians are paid a flat salary; quantity signal). The paper examines how these quality/quantity signals are able to reduce overprovisioning suspicions, restore personal control and reduce decision deferrals.

Findings – The paper has two main findings. First, the paper shows a mediation process at work i.e. suspecting potential overprovisioning by sellers leads consumers to defer their decisions indirectly because they feel that they lack personal control to prevent the sellers from doing so. Second, the paper shows that the quantity signal (flat salary disclosure), but not the quality signal (warranty), is able to mitigate suspicions of overprovisioning, restore personal control and reduce decision deferrals.

Practical implications – The paper suggests that although buyers may rely on quality signals to assure them of superior service, these signals do not guarantee that the quantity of service they are receiving is appropriate. Therefore, sellers will have to send a credible quality signal and a credible quantity signal to the consumers if they wish to tackle suspicions about service overprovision and service quality.

Originality/value – The paper is original in two ways. First, the paper theorizes and tests a mediation process model whereby quality/quantity signals differentially mitigate overprovisioning suspicions, restore personal control and reduce decision deferrals. Second, the paper speaks to the necessity of expanding the traditional signaling literature, designed primarily to detect poor quality hidden in the products/services of lower-quality sellers, to include detecting/solving overprovisioning often hidden in the services provided by higher-quality sellers.

Keywords Personal control, Decision deferral, Market signals, Seller overprovisioning

Paper type Research paper

1. Introduction

Consumers depend upon an efficient market, where prices are commensurate with quality, to shop with confidence. However, sellers typically possess more information about their products and services than consumers do and often behave opportunistically to disrupt efficient markets. A common example is the so-called lemons problem, where lower-quality sellers hide the true quality of their products/services by disguising themselves as

higher-quality sellers (Akerlof, 1970; Benner and Zenger, 2016). The primary theory addressing this type of market inefficiency is the information asymmetry theory (agency and signaling) that identifies the causes of market disruption and offers solutions from the sellers' perspective (Bergh *et al.*, 2019; Connelly *et al.*, 2011). For example, as per signaling theory, (Bergh *et al.*, 2014; Kirmani and Rao, 2000; Steigenberger and Wilhelm, 2018), true higher-quality sellers may use *quality signals*, such as warranties and third-party certifications that the lower-quality sellers cannot imitate, to help consumers separate lower-quality sellers from the higher quality ones.

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However, as we discuss subsequently, opportunism does not emanate from lower-quality sellers alone. Some higher-quality sellers, too, may contribute to market inefficiencies by exploiting their quality reputation and recommending expensive (and often unnecessary) services to unsuspecting buyers. In contrast to the conventional quality problem espoused in the information asymmetry literature, higher-quality sellers' opportunism creates a new and different problem for the consumers – they now have to unravel if the sellers also harbor hidden motives to overprovide services to them (Lukas *et al.*, 2013). In such circumstances, the true higher-quality sellers can use *quantity signals* to convince the consumers that they do not harbor such hidden motives. An example of a quantity signal in an automobile service context is a disclosure by sellers that they compensate their agents (e.g. the mechanics doing the diagnostics and repairs) with fixed salaries instead of commissions. The assumption is that fixed salaries, unlike commissions, will take away the agents' motivation to overprovide services to consumers (Lal and Staelin, 1986; Xiao and Xiao, 2020).

Despite the intuitive logic for the use of quantity signals, two notable gaps are evident in the extant literature. First, this research has adopted a narrow view focusing on sellers' use of quality signals (Bergh *et al.*, 2014; Connelly *et al.*, 2011) and excluded the sellers' use of quantity signals. Second, and more importantly, absent from this literature is an interactional perspective that considers how buyers actively receive, process and evaluate sellers' quality and quantity signals. Market inefficiency theories (Akerlof, 1970; Bergh *et al.*, 2014; Connelly *et al.*, 2011) look at the consumer as a mere black box, completely devoid of any emotions, and just passively computing/infering signaling costs to distinguish between higher and lower-quality sellers. Such a black-box approach is surprising given that past research in consumer behavior has recognized that buyers, suspecting that sellers are trying to take advantage of them, often try to mentally picture the sellers'

motives and actions (the so-called schemer's schema; Wright, 1986).

The current research addresses the two aforementioned gaps in the literature by linking sellers' signaling tactics to consumer decision-making (Table 1). Specifically, we address two questions. First, do consumers' suspicions of overprovisioning by higher-quality sellers incline them to defer their decisions (e.g. defer repairing) because they feel that they lack personal control to prevent the sellers from doing so? Second, what roles do quality and quantity signals play in mitigating such overprovisioning suspicions and help reduce decision deferrals? To reiterate, and as described in Table 1, our research adopts an interactional perspective that considers the interplay between the perspectives of both buyers (theories of personal control and decision deferrals) and sellers (theories of signaling/information asymmetry).

We conduct three laboratory experiments. In Study 1, we show that overprovisioning suspicions increase customers' decision deferrals because the customers feel that they do not have personal control to prevent the sellers from doing so (a mediation process). In Study 2, we show that quality and quantity signals have different effects on overprovisioning suspicions and decision deferrals, namely, quantity signals (but not quality signals) can reduce overprovisioning suspicions. Finally, Study 3 provides evidence for the robustness and generalizability of our results using a different scenario and a different measure of deferral.

Our research contributes to theory and practice in three ways. First, we expand upon traditional signaling theory's sole focus on the hidden quality problem instigated by the lower-quality sellers to address a more insidious hidden quantity (overprovisioning) problem instigated by the higher-quality sellers. Focusing on the hidden quantity problem is important from a managerial perspective, as seller overprovisioning is a prevalent marketplace phenomenon, particularly in the market of credence products/services. For example, in their review of overprovisioning, Kerschbamer and Sutter (2017) point to two domains that are incubators of overprovisioning. First, in the

Table 1 Theoretical contribution and relationship to past literature

Focus/Theme	Previous research (Product/service quality related) Non-interactive (mainly seller oriented)	Current research (Product/service quantity related) Interactive (both buyer and seller oriented)
Problem	<ul style="list-style-type: none"> Given information asymmetry, sellers may provide low <i>quality</i> service and claim high <i>quality</i>, but buyers are unsure of true <i>quality</i> levels due to sellers' endogenously endowed opportunism 	<ul style="list-style-type: none"> Given information asymmetry, sellers may overprovide services while claiming optimal <i>quantity</i>, but buyers are unsure of true <i>quantity</i> levels due to sellers' endogenously endowed opportunism
Signaling solution	<ul style="list-style-type: none"> In asymmetric situations, high quality sellers achieve separating equilibrium through costly signals, for example, warranties that cannot be easily mimicked by low quality sellers leaving the <i>quantity</i> issue unaddressed 	<ul style="list-style-type: none"> In asymmetric situations, vulnerable buyers scan the environment to identify and evaluate quantity signals, for example, sellers' use of fixed compensation (salary) that restore buyers' equilibrium by reducing decision deferral and reinstating personal control
Relevant theories	<ul style="list-style-type: none"> Theories of information asymmetry (agency and signaling perspectives) Bergh <i>et al.</i> (2019) Mishra <i>et al.</i> (1998) Steigenberger and Wilhelm (2018) 	<ul style="list-style-type: none"> Theories of personal control and decision deferral Li <i>et al.</i> (2017) Mourali <i>et al.</i> (2018)

area of medical treatments, the patients do not know the most cost-effective treatment and/or they may not have the courage to question the doctor, giving the prescribing physicians a huge informational advantage. Second, in the area of car repairs, a significant proportion of the work done in both the European Union and the USA are often unnecessary and emanate because the mechanics exploit their superior information about the appropriate service (Wolinsky, 1993, 1995; Hubbard, 1998). One must note, however, that the two contexts are quite different to the extent that they affect decision deferrals. In the medical context, the patient's choice of deferring is somewhat limited, so we might have a situation where there is high information asymmetry and little deferral. In the car-repairs context, however, consumers have higher freedom to choose, and we are likely to see a stronger link between deferrals and information asymmetry.

Second, we distinguish between quality and quantity signals and argue that they are conceptually distinct and meant to solve different problems. For example, managers can use quality signals (e.g. warranties) to solve the hidden quality problem, but these signals cannot solve the hidden quantity or overprovisioning problem. Conversely, managers can use quantity signals (e.g. a fixed salary disclosure) to solve the hidden quantity problem but these signals cannot solve the hidden quality problem.

Third, to the best of our knowledge, we are among the very few to describe and test behavioral processes linking signaling tactics to consumer decision-making. Testing a process explanation is important since most research on signals overlooks the buyer side of the seller-buyer dyad and assumes that buyers will process signals congruent with sellers' expectations. We adopt a more consumer-centric focus to show how signals work on the consumers' psychology, for example, quantity signals restore personal control to the consumers so that they no longer feel compelled to defer their decisions.

2. The overprovisioning problem

2.1 Distinguishing between hidden quality and hidden quantity

An exchange relationship, where a consumer wishes to buy a product or service from a seller, provides at least two opportunities for sellers to take advantage of consumers. First, given that the consumers face considerable ambiguity in evaluating quality, especially when they involve credence or experiential qualities, lower-quality sellers can misrepresent quality claims, hide their true quality and disguise themselves as higher-quality sellers. At the extreme, this may result in the honest (higher-quality) sellers exiting the market, creating an adverse selection/lemon's market problem where only lower-quality sellers peddle lower-quality products (Akerlof, 1970; Bergh et al., 2019).

Second, and even if the consumers somehow manage to identify the true higher-quality sellers, the latter can exploit their quality advantage by overproviding and overcharging for their products/services. For example, if sellers provide both diagnosis (e.g. what is wrong with your car) and cure services (e.g. how much it will cost to fix these problems), they may have an incentive to overprovide by prescribing higher quantities of expensive services (Dulleck and Kerschbamer, 2006; Dulleck et al., 2011; Jiang et al., 2014; Lantzy and Anderson, 2020).

Notice that the motive to overprovide services is conceptually distinct from the motive to underprovide quality. While the latter focuses on opportunism by unqualified/lower-quality sellers hiding quality information, overprovisioning refers to opportunism exhibited by qualified/higher-quality sellers hiding motives to provide unnecessary services (Beck et al., 2014; Lambertini and Orsini, 2001).

2.2 Signals solving the hidden quantity problem

How can sellers convince consumers that they do not intend to overprovide services to them? We suggest that they can do so by using proper signaling tactics. To be convincing, the signals will have to:

- assuage buyers' concerns that the seller will not overprovide services to them; and
- impose mimicking costs on others so that sellers who harbor hidden motives to overprovide services cannot easily copy them.

Consider, for example, the market for automobile repairs. We propose that how the principals (owners of the repair shops) pay their agents (their mechanics/technicians) may serve as a signal that directly tells if a shop's motive is to overprovide services to consumers. For instance, if the shops compensate their technicians with sizable commissions, the technicians will have every incentive to maximize the quantity or the output of service delivered leading to overprovisioning (Bergh et al., 2014; Bergen et al., 1992; Connelly et al., 2011; Mishra et al., 1998). On the contrary, if the shops pay their technicians a fixed salary with little or no commissions, the technicians will have little incentive to do so (Bergen et al., 1992; Mishra et al., 1998).

A large literature on salesforce compensation supports the idea that salary and commissions address different seller motives. While salaries put less focus on the quantity and more focus on the quality of the services provided to the customers, commissions do the reverse (Basu et al., 1985; Dai and Jerath, 2019; John and Weitz, 1989; Lal and Staelin, 1986; Xiao and Xiao, 2020). Notice, also, that paying a fixed salary imposes a high fixed cost on the sellers that is unconnected to sales, and the fixed nature of such investments makes this signal harder to mimic for other sellers who lack the deep pockets for doing so (Kalra et al., 2003).

2.3 Customer reactions to the hidden quantity problem

So far, we have addressed the hidden quantity or overprovisioning problem and a potential solution thereof from the seller's perspective in the form of a quantity signal disclosing how principals compensate their agents. Next, we turn to a consumer's perspective and explore how the seller's signal might affect the consumer's decision-making process.

In the presence of information asymmetry, consumers are uninformed principals who are relatively powerless in agency relationships with sellers (agents). From a behavioral standpoint, such customers are vulnerable to seller opportunism. They may suspect that the sellers are trying to take advantage of them but they are unable to prevent the sellers from doing so, i.e. they lack control over the focal purchase. This feeling of helplessness can come about because they are unable to ascertain the correct or *ex-post* quantity (if the seller is overproviding services; Dulleck et al., 2011; Jiang et al., 2014; Lantzy and Anderson, 2020). In the next

two sections, we provide an overview of the personal control literature, and how the lack thereof encourages decision deferrals.

2.3.1 Loss of personal control

Personal control, or the extent to which consumers can deliberately produce desired outcomes and prevent undesirable ones in their environment (Skinner *et al.*, 1988), is a basic human need (Kelly, 1955; White, 1959; Lefcourt, 1973). The thought that they lack control and the environment is random and chaotic arouses stress, fear and anxiety among consumers (Glass *et al.*, 1969; Laurin *et al.*, 2008; Kay *et al.*, 2008). Alternatively, believing that they control their own lives makes consumers confident, optimistic and comfortable (Glass *et al.*, 1973; Rothbaum *et al.*, 1982; Rutjens, 2012).

Personal control is different from *locus* of control (Rotter, 1966; Weiner, 1979). Locus of control is a chronic sense of personal control where consumers think that a focal situation is either contingent on what they do (e.g. *I can always find a good technician*; internal *locus* of control) or what someone else does (e.g. *finding a good technician is a matter of luck*; external *locus* of control). Personal control, on the other hand, is situationally malleable. This means that there is no single chronic level of perception of control under all conditions, but it varies from one situation to the next. For example, a consumer may feel more in control within a familiar product category (e.g. *I know what needs fixing in my car*) than in an unfamiliar product category (e.g. *I have no idea what needs fixing in my furnace*).

There are other constructs, such as self-efficacy and power, which are closely related but conceptually different from personal control (Mourali *et al.*, 2018). For example, whereas personal control refers to what extent consumers believe that desirable outcomes are contingent upon how their actions (Rotter, 1966), self-efficacy refers to the extent consumers believe that they can make those desirable outcomes happen (Bandura, 1977). In other words, consumers can feel that they can control what happens to them, but at the same time feel that they do not have the ability to do so. Similarly, power is a social construct and reflects how much consumers feel that they have “power over” others, i.e. they have enough monetary or social resources to reward or punish others around them (Cartwright, 1965; Fiske and Berdahl, 2007). Personal control (and self-efficacy), on the other hand, is self-focused and refers to how much consumers believe that they have “power to” affect what is happening around them (Overbeck and Park, 2001).

When consumers sense that they are losing control of what is happening around them, they often try to restore the loss in different ways (Langer, 1975; Rothbaum *et al.*, 1982; Kay *et al.*, 2010a; Inesi *et al.*, 2011). In their personal lives, some turn to supporting strong governments/political leaders (Kay *et al.*, 2008; Kay *et al.*, 2010a, 2010b; Shepherd *et al.*, 2011) while others turn to God (Laurin *et al.*, 2008; Kay *et al.*, 2010a; Sasaki and Kim, 2011) and/or engage in superstitious rituals (Keinan, 2002). In their consumption behavior, some consumers seek out brand extensions that strongly fit with the parent brand (conveying structure; Cutright *et al.*, 2013). Others turn to products that require personal effort to assemble (e.g. assembling a treadmill restores feelings of control; Cutright and Samper, 2014) and/or buy status products such as fast/powerful cars that symbolize power and control (Inesi *et al.*, 2011).

2.3.2 Overprovisioning, loss of personal control and decision deferrals

When consumers suspect that sellers may be harboring hidden motives to overprovide services to them, say in a shopping context (e.g. shopping around for repair services), they might experience a lack of control on three dimensions (Averill, 1973). They may not know what to do to prevent the sellers from overproviding services to them (the behavioral dimension; *should I contact the manager, should I threaten to go somewhere else*). They may not know how to interpret the seller’s offer in a way that can help them decipher if the seller intends to overprovide services to them (the cognitive dimension; *does the price suggest that the shop is overproviding services to me*). Finally, they are likely to feel the lack of control more acutely if they do not have other options (the decisional dimension; *I have to select this shop, as this is the only one within a 100-mile radius*).

We propose that when consumers experience a lack of control on any or all of these dimensions, their first reaction is to defer making the decision (e.g. *not decide right now*). The primary support for this proposal comes from the or pleasure-arousal-dominance framework (Mehrabian and Russell, 1974) that has strong links with the personal control literature. According to this framework, the following three dimensions capture all emotional reactions to physical and social environments: pleasure (e.g. happiness/unhappiness), arousal (e.g. sleepy/frantic) and dominance (e.g. dominant/submissive). The third dimension, dominance/submission, captures feelings of being able or unable to influence one’s surroundings (Mehrabian, 1995) and parallels feelings of being or not being in control of the situation. To be clear, there could be many reasons why consumers tend to defer their decisions that are unrelated to our context, such as their inability to decide between two equally desirable alternatives (Bhatia and Mullett, 2016). Here, we focus on deferral situations arising out of feelings of submissiveness.

Several sources correlate feelings of submission with decision postponement or deferral. Mehrabian and Blum (1997) align the submissive state, or the feeling of lack of control, with selection difficulty and indecision while Yani-de-Soriano and Foxall (2006) correlate lack of dominance with avoidance behavior. Li *et al.* (2017) conduct an experiment where they manipulate preference uncertainty (selecting between two equally attractive alternatives versus selecting a dominating alternative over the dominated alternative), measure the emotional reactions the task generates (ranging from displeasure/non-arousal/submissiveness to pleasure/arousal/dominance) and then investigate if the participants select one of the alternatives or defer their decision. They find that only dominance (and not pleasure or arousal) mediates the link between preference uncertainty and decision deferral, i.e. the closer the two alternatives are in their attractiveness, the less dominant (or more submissive) the participants feel about themselves, and the more likely they are to defer their choice. Mourali *et al.* (2018) prime situational power in their participants by exposing them to ads that make them feel either powerful (ad tagline *we all feel powerful sometimes*) or powerless (ad tagline *we all feel powerless sometimes*) and measure how frequently they choose to defer choosing between two cameras. The authors find a strong negative correlation between feeling powerful and decision deferral (36% versus

17% deferrals in the lower and higher power groups in their Study 1a).

In our research, we examine a similar link between lack of control and decision deferral, where the lack of control stems from the suspicion that sellers are overproviding services and the consumers are helpless to prevent the sellers from doing so. We propose a mediation process [Figure 1(A)] such that:

- H1a.* Consumers, suspecting that sellers are likely to overprovide services to them, will feel that they lack control to prevent sellers from doing so.
- H1b.* The more consumers feel that they lack control to prevent sellers from overproviding services to them, the more likely they are to defer their decisions.
- H1c.* The perceived lack of control mediates the effect of overprovisioning suspicions on decision deferral.

2.3.3 The role of market signals

Decision deferral (or avoidance) is an initial, perhaps instinctive, reaction on the consumer's part should they suspect that sellers harbor hidden motives to overprovide services to them. However, deferrals merely postpone and do not solve the consumer's ultimate problem (e.g. how to get the repairs done). This implies that consumers are likely to pay attention to any signals conveying that the sellers do not intend to overprovide services to them. For example, [Lembregts and Pandelaere \(2019\)](#) propose that if consumers experience a threat to their personal control, they will be sensitive to information or signals that can bring back predictability to the environment. Similarly, [Chaxel \(2016\)](#) argues that if consumers wish to regain control of the environment, they will carefully process any information that comes their way and leave as little as possible to chance.

The heightened sensitivity of consumers to external information that, they believe, will help them to regain personal control of the situation implies two things. First, they will be on the lookout for any information (signal) that might help them to decipher the sellers' motives. Second, they will carefully assess the contents of the information or signal before acting. Consider, for example, what happens when consumers searching for a shop to fix their car find out that the shop offers a warranty. Although the warranty may assure them that the shop will fix the car should something go wrong in the future, it will not guarantee that the shop is not providing just the right amount of services at the

present and not compelling them to make unnecessary/expensive repairs in the process. In other words, a thorough assessment should reveal that a warranty (quality signal) does not prevent overprovisioning, and therefore, does not solve the hidden quantity problem for the consumers.

On the contrary, suppose that the principals (shop managers) disclose that they pay their agents (technicians who diagnose and perform the services) a fixed salary and no commissions. If consumers think about the implications of this disclosure, they should be able to figure out that fixed-salaried technicians have little incentive to recommend unnecessary services. Such careful processing implicates that consumers will be able to tell apart a quality from a quantity signal in that only a quantity signal (such as a flat-salary disclosure), and not a quality signal (warranty), ensures that the sellers are not going to overprovide services.

Three things merit note here. First, we are not saying that warranties have no role to play in making decisions easier for consumers. Warranties, particularly strong warranties (e.g. five-year labor and parts compared to three-year labor and parts) may provide peace of mind to consumers and reduce decision deferrals, that is, warranties may *directly* reduce deferrals. Our focus is to test to what extent quality and quantity signals help in *indirectly* reducing decision deferral by restoring personal control to the consumers.

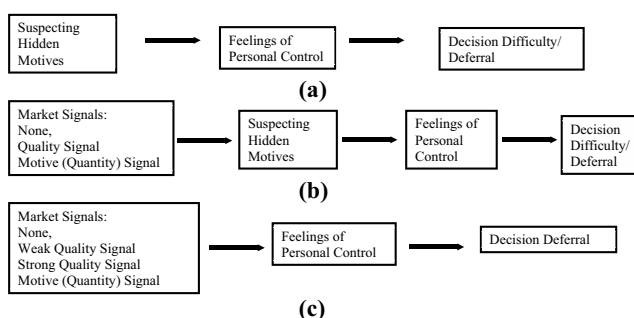
Second, consumers may intentionally defer decisions to shop around for lower prices and/or negotiate the price down. Such strategic behavior is possible but costly, and ultimately does not solve the consumer's problem. For example, no amount of searching can guarantee that the next seller will not also overprovide services, but every added search will just increase the transaction costs. Moreover, if the consumer happens to find a lower price, there is no guarantee that the lower-priced seller is not underproviding services (underprovisioning), in which case, the consumer is back to the hidden quality problem (a lower-quality seller, lacking the skills, is only doing a patch-up job). We discuss this situation in more detail in the General Discussion section.

Third, we acknowledge that there could be other types of compensations at play (such as a free vacation for the best employer) tied to sales or the amount of services recommended. Our hypotheses assume that no such added incentives are at play (and we explicitly rule them out experimentally in Study 3)

Accordingly, we propose:

- H2.* Compared to a quality signal or no signal, introducing a quantity signal will reduce suspicions of seller overprovisioning, restore personal control and, consequently, reduce decision deferral.

Figure 1 Process models: (A) Study 1; (B) Study 2; (C) Study 3



4. Pretest

4.1 Objective

We conduct a pretest prior to running our main studies. The objectives of the pretest are to ascertain the product/service domains where consumers generally have repairs done; and to gather some preliminary indications if they feel being victims of overprovisioning by sellers in those situations.

4.2 Measures and participants

In the pretest, we asked the participants to write the names of three items that they have had repaired in the past few years, starting with the most recent.

Once they had indicated the focal repairs, we asked them to indicate to what extent they agreed or disagreed with several statements describing how they felt about these repairs (nine-point, agree/disagree scale). Three items measured to what extent they felt being victims of overprovisioning (*I suspect that the recommended repairs were, often times, far more than what I actually needed; Often times I could not figure out if the recommended repairs were excessive or if they were truly needed; Often times I thought that I was paying much more than what was necessary for the repairs*).

Seventy-six M-Turk participants (28 females and 48 males, average age 37.84 years) took part in the pretest.

4.3 Analysis and results

4.3.1 Repair categories

We divided the reported repairs into four categories: automobiles (e.g. engine, transmission, brake), small personal items (computer/laptops, phones, watches), household powered appliances (e.g. AC, washer, dryer) and household non-powered items (e.g. faucet, floor). When we looked at the most recent repairs, we found the breakups to be small personal items (34%), automobiles (26%), household powered appliances (22%) and household non-powered items (18%).

The three overprovisioning items were correlated sufficiently to merit creating an aggregate average score ($M = 5.65$, $\alpha = 0.86$). The mean score was significantly greater than 5.0 or the scale's mid-point (5.0, neither agree nor disagree; $t(75) = 2.82$, $p < 0.01$) suggesting that the participants were concerned about seller overprovisioning in the matter of their repairs.

4.4 Discussion

The pretest enables us to select the product/service categories to use in our main studies. We selected computers from their list of small personal items (Studies 1 and 2) and transmission repairs from the automobile repairs category (Study 3). The pretest also gives preliminary evidence that consumers feel that they may be victims of overprovisioning by sellers. Next, we conduct three studies to test our hypotheses.

5. Study 1

5.1 Objective

The objective of Study 1 is to test $H1$, i.e. a perceived lack of control mediates the effect of overprovisioning suspicions on decision deferral.

5.2 Design, stimuli and participants

Study 1 begins by describing the following scenario to all participants:

Imagine that you are looking for a technician to fix your computer that is not working properly. After talking to various shops/technicians, you find a reputable technician who says that s/he can fix the problem and that the repairs will cost you about \$350.

Thereafter, in one condition, we prime the participants to suspect overprovisioning (*you suspect that the technician might be recommending major repairs when a simple fix would do*), while in

another condition we inserted a neutral statement (*you feel that the technician has given you all the information about the repairs*). One-hundred-eighteen M-Turk participants (48 females and 70 males, average age 30.92 years) took part in Study 1 in exchange for monetary compensation, and we randomly assigned them to the two conditions of the study. As priming did not affect the results, we do not discuss this issue further.

5.3 Measures

We measured overprovisioning concerns/suspicions with two nine-point disagree/agree items (*I suspect that only the technician knows if the repairs are necessary or unnecessary; I suspect that the technicians are overcharging me for unnecessary repairs*). We created a composite "overprovisioning suspicion" measure by averaging the two items ($\alpha = 0.76$). We measured personal control with two nine-point disagree/agree items (*I am in complete control of getting my computer fixed without being overcharged; I can definitely prevent being overcharged for the repairs*). We created a composite "personal-control" measure by averaging the two items ($\alpha = 0.83$). Finally, we measured decision difficulty/deferral with three nine-point disagree/agree items (*I cannot decide right now; this is a difficult decision for me; If I decide now, I am not sure if I will be making the right choice*). We created a composite "difficulty/deferral" measure by averaging the three items ($\alpha = 0.90$).

In Study 1, we control for two variables that could potentially contaminate our results. First, the more knowledgeable consumers may feel that they have the expertise to figure out what is wrong with their computers (compared to their less knowledgeable counterparts) and, therefore, be less likely to defer their decision. Hence, we measured subjective knowledge with two items (*I know quite a lot about diagnosing computer problems, my friends think that I am an expert in finding out what is wrong with their computers*). We created a composite "self-reported knowledge" measure by aggregating the two items ($\alpha = 0.88$). Second, the high price tag (\$350) itself may deter consumers from completing the repairs, independent of any suspicions about overprovisioning by sellers. Therefore, we measured price perception with two items (*I think the price is too much, I think the price is very expensive*). We created a composite "price-perception" measure by aggregating the two items ($\alpha = 0.70$).

5.4 Analysis and results

We ran a mediation model (Hayes, 2018) to test $H1$. In our analyses, overprovisioning suspicions is the predictor, the mediator is feelings of personal control and the outcome variable is decision difficulty/deferral. We ran the model with and without the two covariates (self-reported knowledge and price perception) and found the results were unchanged at $p < 0.05$. Table 2 reports the results of the raw/unadjusted model.

The results support $H1$ or a mediation model. As indicated in Table 2's top panel, suspecting seller overprovisioning reduces personal control ($\beta = -0.27$, $t = -2.67$, $p < 0.01$), confirming $H1a$, or the link between the predictor and the mediator. As shown in the middle panel, the lack of control increases decision difficulty/deferral after factoring in any effect of suspicion ($\beta = -0.43$, $t = -4.43$, $p < 0.0001$), confirming $H1b$, or the mediator to outcome link. Finally, as shown in Table 2's bottom panel, the 95% bootstrapped confidence interval for

Table 2 Process test results: Study 1

Dependent variable: personal control						
	Coefficient	SE	<i>t</i>	<i>p</i>	LLCI	ULCI
Constant	6.6239	0.6167	10.7406	0.0000	5.4025	7.8454
Suspicion (Overprovisioning)	-0.2679	0.1003	-2.6706	0.0087	-0.4667	-0.0692
Dependent variable: decision deferral						
	Coefficient	SE	<i>t</i>	<i>p</i>	LLCI	ULCI
Constant	5.9019	0.9102	6.4841	0.0000	4.0990	7.7049
Suspicion (Overprovisioning)	0.1755	0.1080	1.6241	0.1071	-0.0385	0.3894
Personal control	-0.4296	0.0970	-4.4278	0.0000	-0.6218	-0.2374
Indirect effect of overprovisioning suspicions on decision deferral						
	Effect	Boot SE	Boot LLCI	Boot ULCI		
Personal control	0.1151	0.0563	0.0196	0.2399		

the indirect effect (-0.27×-0.43) is entirely positive and does not include zero (0.02, 0.23), confirming *H1c* that personal control indirectly affects decision difficulty/deferrals stemming from overprovisioning suspicions.

5.5 Discussion

Study 1 shows that suspecting overprovisioning increases decision deferrals by taking away personal control from the consumer. In Study 2, we test if market signals can help consumers to restore their feelings of lost control and if, as a result, they are less inclined to defer their decisions.

6. Study 2

6.1 Objective

The objective of Study 2 is to test *H2*, i.e. clarify the role played by quality and quantity signals in reducing consumer suspicions that sellers may be harboring hidden motives to overprovide services to them.

6.2 Design, stimuli and participants

We begin by describing the computer repair scenario, which was identical to Study 1, to all participants. Thereafter, we randomly assigned the participants to three conditions. In the first, or quantity-signal, condition, we informed the participants that the shop paid their technicians fixed salaries instead of commissions. Specifically, we describe that:

The manager, supervising the technician, informs you that unlike other stores that pay their technicians a commission on the amount charged for repairs, they pay their technicians a fixed salary every month.

In the second, or quality-signal, condition, we informed the participants that the shop offered a warranty on all repairs. Specifically, we describe that:

The manager, supervising the technician, informs you that they offer a three-year performance warranty on all repairs, and, should anything go wrong in that time, the shop will repair the computer at no cost to you.

In the third, or no-signal/control, condition, we informed the participants that they could not get any further information about the repairs. Specifically, we describe that:

The manager, supervising the technician, is unable to add anything more to what the technician has already told you about the repairs.

Two-hundred-seventy-eight M-Turk participants (143 females and 135 males, average age 36.8 years) took part in Study 2 in

exchange for monetary compensation, and we randomly assigned them to the three conditions of the study.

6.3 Measures

The items/measures are identical to Study 1. As before, we have average measures of overprovisioning suspicions ($\alpha = 0.76$), personal control ($\alpha = 0.90$), decision difficulty/deferral ($\alpha = 0.86$), self-reported knowledge ($\alpha = 0.92$) and price perception ($\alpha = 0.77$). In addition, in Study 2, we check for signal-problem alignment – specifically, we ask participants in the quality signal (quantity signal) condition to what extent the warranty (the fixed salary disclosure) assures them that the shop would not overcharge them for unnecessary repairs (nine-point scale; 9 = very assured, 1 = very doubtful).

6.4 Analysis and results

6.4.1 Checking signal-problem alignment

To check if the participants had more confidence in the quantity signal to solve overprovisioning relative to the quality signal, we ran an ANOVA comparing their assurance ratings across the two signal conditions, controlling for self-reported knowledge and price perception. There was a significant signal effect ($F(1, 183) = 7.24, p < 0.01$) indicating that the participants found the quantity signal to be more reassuring than the quality signal in assuaging overprovisioning concerns (M 's of 5.97 and 5.11). We followed up by comparing the means to the scale's mid-point (5.0, neither doubtful nor assured) and found the mean to be significantly greater than 5.0 for the quantity signal ($t(92) = 4.50, p < 0.0001$) but indistinguishable from 5.0 for the quality signal ($t(90) < 1$).

6.4.2 Suspicion, personal control and decision deferrals across different signal conditions

For our next analysis, we conducted ANOVAs comparing changes in suspicion, personal control and decision difficulty/deferrals across the three between-subject conditions (control/no signal, quality signal, quantity signal). In all cases, we controlled for self-reported knowledge and price perception. We found a significant signal effect on suspicion ($F(2, 277) = 4.59, p = 0.01$), personal control ($F(2, 277) = 3.84, p = 0.02$) and decision difficulty/deferral ($F(2, 277) = 3.04, p = 0.05$). Table 3 reports the cell means and standard deviations.

As shown in Table 3, overprovisioning suspicions were the least when we used a quantity signal ($M = 5.35$) compared to a

Table 3 Cell means, standard deviations and Dunnett's comparisons: Study 2

Condition	n	Suspicion (hidden motive)		Personal control		Decision deferral	
		Mean	SD	Mean	SD	Mean	SD
Control	94	6.08	1.52	5.15	2.26	5.02	2.14
Quantity	93	5.35	1.84	5.82	2.02	4.20	2.06
Quality	91	5.98	1.71	4.95	2.17	4.74	2.20
Dependent variable		Signal comparison	Difference between means	Simultaneous 95% confidence limits			
Suspicion (Overprovisioning)		Quality - control	-0.1016	-0.6436	0.4404		
		Quantity - control	-0.7303	-1.2693	-0.1912 ***		
Personal control		Quality - control	-0.2037	-0.7895	0.3821		
		Quantity - control	0.6629	0.0803	1.2456 ***		
Decision deferral		Quality - control	-0.2813	-0.9125	0.3498		
		Quantity - control	-0.8206	-1.4483	-0.1928 ***		

Note: ***Comparisons are significant at 0.05 level

quality signal ($M = 5.98$) or no signal at all ($M = 6.08$). Likewise, feelings of personal control were highest when we used a quantity signal ($M = 5.82$) compared to a quality signal ($M = 4.95$) or no signal at all ($M = 5.15$). Finally, the decision difficulty/deferral was the least when we used a quantity signal ($M = 4.20$) compared to a quality signal ($M = 4.74$) or no signal at all ($M = 5.02$). We conducted follow-up Dunnett's t-tests that control for the Type 1 experiment wise error for multiple comparisons of the two signals (quantity, quality) with a single control (no-signal) condition (see Table 3, bottom panel). We found significant differences on all three measures of suspicion, personal control and decision difficulty/deferrals between the control and quantity-signal conditions, but not between the control and the quality-signal conditions.

6.4.3 Testing H2: the serial mediation model

We ran a serial mediation model (Hayes, 2018) to test H2 [Figure 1(B)]. In our analyses, the predictor is the type of signal (three levels: no signal, quality, quantity), with the no-signal condition serving as the default or comparator level. The serial mediators are, in order, suspicions of overprovisioning by sellers and personal control. The outcome variable is decision difficulty/deferral. We ran the model with and without the two covariates (self-reported knowledge and price perception) and found the results were unchanged at $p < 0.05$. Table 4 reports the results of the raw/unadjusted model.

Table 4 confirms H2. First, the quantity signal significantly reduces overprovisioning suspicions relative to the no-signal condition ($\beta = -0.73$, $t = -2.95$, $p < 0.01$) but not the quality signal ($\beta = -0.10$, $t < 1$). Second, overprovisioning suspicions significantly reduce personal control irrespective of the type of signal encountered ($\beta = -0.33$, $t = -4.52$, $p < 0.0001$). Finally, the lack of personal control significantly increases decision difficulty/deferral independent of the type of signal encountered and overprovisioning suspicions ($\beta = -0.41$, $t = -7.75$, $p < 0.0001$), confirming the link between the second mediator and the outcome.

Table 4's bottom panel directly tests H2 by comparing the indirect effects separately across the two signal conditions ($-0.73 \times -0.33 \times -0.41$ or 0.10 for the quantity signal and $-0.10 \times -0.33 \times -0.41$ or -0.01 for the quality signal). As expected, the 95% bootstrapped confidence interval for the

indirect effect is entirely negative and does not include zero when we use a quantity signal (-0.22 , -0.02) but it straddles zero when we use a quality signal (-0.08 , 0.06).

6.5 Discussion

Study 2 has two findings. First, Study 2 shows that consumers can correctly identify the signal that solves the overprovisioning problem (quantity signal) and which signal does not (quality signal). Second, Study 2 qualifies Study 1's finding by showing that introducing quantity signals can significantly reduce overprovisioning suspicions and give back personal control to the consumers so that they have lesser need to defer their decision.

7. Study 3

7.1 Objective

Study 3 has several objectives. First, in Study 3 we investigate a different repair category (automobile transmissions/gear) to improve the generalizability of the results. Transmission repair is a good context to test seller overprovisioning because the costs can vary greatly (from \$300 to \$3,500) depending upon whether the diagnosis is to rebuild, repair or replace (see *The Transmission Repair Cost guide*, www.transmissionrepaircostguide.com/). For our stimuli, we focus on reverse gear repairs where, once again, the costs can vary (e.g. \$300 to fix an externally mounted control module solenoid versus \$1,050 to fix a bad transmission torque converter; www.mytransmissionexperts.com/how-much-does-transmission-repair-cost/). We select the high-end \$1,000 price as the focal price point in our stimuli to trigger overprovisioning suspicions and then test to what extent quantity/quality signals assuage overprovisioning concerns.

Second, Study 3 uses a categorical measure of decision deferral and does not mix measures of difficulty and deferral as in the previous studies. Specifically, in Study 3, we ask the participants if they would accept the \$1,000 quote and get the repairs done at the store or opt-out of the quote and go elsewhere (we are grateful to the AE for suggesting this measure).

Third, we recognize that paying the technician a fixed salary instead of commission may not fully disincentivize

Table 4 Process test results: Study 2

Dependent variable: suspicion (overprovisioning)						
	Coefficient	SE	<i>t</i>	<i>p</i>	LLCI	ULCI
Constant	6.0851	0.1745	34.8673	0.0000	5.7415	6.4287
Quality signal	-0.1016	0.2488	-0.4083	0.6834	-0.5915	0.3883
Quantity signal	-0.7303	0.2475	-2.9509	0.0034	-1.2175	-0.2431
Dependent variable: personal control						
	Coefficient	SE	<i>t</i>	<i>p</i>	LLCI	ULCI
Constant	7.1929	0.4997	14.3935	0.0000	6.2091	8.1767
Quality signal	-0.2377	0.3061	-0.7766	0.4381	-0.8404	0.3649
Quantity signal	0.4183	0.3091	1.3531	0.1771	-0.1903	1.0269
Suspicion (Overprovisioning)	-0.3350	0.0742	-4.5174	0.0000	-0.4810	-0.1890
Dependent variable: decision deferral						
	Coefficient	SE	<i>t</i>	<i>p</i>	LLCI	ULCI
Constant	5.5713	0.5850	9.5242	0.0000	4.4197	6.7229
Quality signal	-0.3392	0.2707	-1.2531	0.2112	-0.8722	0.1937
Quantity signal	-0.3562	0.2740	-1.3002	0.1946	-0.8956	0.1831
Suspicion (overprovisioning)	0.2601	0.0679	3.8311	0.0002	0.1265	0.3938
Personal control	-0.4138	0.0534	-7.7552	0.0000	-0.5189	-0.3088
Relative serial mediation effects for quality and motive signals						
	Effect	Boot SE	Boot LLCI	Boot ULCI		
Quality signal	-0.0141	0.0344	-0.0829	0.0584		
Quantity signal	-0.1012	0.0501	-0.2191	-0.0257		

overprovisioning should the technicians be compensated in other ways for the sales they generate (e.g. free vacations). Therefore, in Study 3, we make this information explicit to the participants (we are grateful to an anonymous reviewer for suggesting this addition).

Fourth, the participants may not think that a three-year warranty is a sufficiently strong signal of quality (Study 2). Hence, in Study 3, we add a new condition (a five-year warranty) to check if a stronger quality signal can (mistakenly) assuage overprovisioning concerns. Once again, we are grateful to the AE for this suggestion.

7.2 Design, stimuli and participants

In Study 1, we begin by describing the following scenario to all participants:

Imagine that your car has been giving you some problems, and you take it to a repair shop. The mechanic examines the car and informs you that there are some problems with the reverse gear and your car will need some transmission repairs. The store manager, based on the mechanic's diagnosis, quotes a price of \$1,000.

Thereafter, we randomly assigned the participants to four conditions. In the first, or quantity-signal, condition, we inform the participants that the shop pays their technicians fixed salaries instead of commissions. Specifically, we describe that:

The manager assures you that the shop pays a fixed salary to their mechanics and that their mechanics do not get any commissions or other incentives based on the sales they generate.

In the second, or weaker quality-signal, condition, we inform the participants that the shop offers a three-year warranty on all repairs. Specifically, we describe that:

The manager assures you that the shop offers a three-year, no questions asked, warranty on parts and labor.

In the third, or stronger quality-signal, condition, we inform the participants that the shop offers a five-year warranty on all repairs. Specifically, we describe that:

The manager assures you that the shop offers a five-year, no questions asked, warranty on parts and labor.

In the fourth, or no-signal/control, condition, we inform the participants that they could not get any further information about the repairs. Specifically, we describe that:

The manager assures you that the shop will do a good job on the repairs but they cannot offer any warranty on parts and labor.

Four hundred M-Turk participants (173 females, 226 males: average age 39.4 years) took part in Study 3 in exchange for monetary compensation, and we randomly assigned them to the four conditions of the study.

7.3 Measures

Study 3 measures include decision deferral, loss of personal control and subjective knowledge.

We measured decision deferral using a categorical measure with two levels:

- 1 Accept the quote and get the work done here.
- 2 Opt-out of the quote and go elsewhere.

Three nine-point agree/disagree items measured personal control and we aggregated them to an average control score ($\alpha = 0.88$). They were, *after listening to the store manager, I feel that I can control getting my car fixed with just what is needed; paying for just what is necessary; not paying more than what I need*. Finally, as before, we controlled for subjective knowledge with two nine-point agree/disagree items measuring self-reported subjective knowledge of the participants in the matter of car repairs and aggregating them

to an average knowledge score (*I know quite a lot about car repairs, among my circle of friends, I am regarded as the expert in car repairs*; $\alpha = 0.92$).

7.4 Analysis and results

7.4.1 Decision deferrals

We first check how decision deferrals are distributed across the four different experimental conditions. Deferrals were most frequent in the control (no-signal) condition (68.00%), followed by the low-warranty and high-warranty conditions (62.24% and 51.49%) and least in the flat-salary signal conditions (43.56%, $\chi^2_3 = 14.58$, $p = 0.002$). We conducted binomial tests against 50% for each of these proportions. The deferrals were significantly above 50% in the control ($z = 3.6$, $p < 0.005$) and the low-warranty ($z = 2.42$, $p = 0.01$) conditions. They were indistinguishable from 50% in the high-warranty condition ($z = 0.30$, $p = 0.38$) and below 50% in the flat-salary condition at $p < 0.10$ ($z = -1.29$, $p = 0.09$).

7.4.2 The mediation model

We ran a mediation model (Hayes, 2018) to test $H2$ [Figure 1(C)]. In our analyses, the predictor is the type of signal (four levels: no signal, weak quality, strong quality and quantity), with the no-signal condition serving as the default or comparator level. The mediator is personal control and the outcome variable is decision deferral (categorical). We ran the model with and without the covariate (self-reported knowledge) and found the results were unchanged at $p < 0.05$. Table 5 reports the results of the raw/unadjusted model.

Table 5 confirms $H2$. As shown in the top panel (predictor to mediator link), only the quantity (flat-salary) signal significantly restores personal control ($\beta = 0.63$, $t = 2.41$, $p = 0.02$) relative to the no-signal condition. Neither the weak nor strong quality signals can restore control (β 's of -0.02 and 0.12 , all t 's < 1). As shown in the middle panel (mediator to outcome link), restoring control significantly reduces deferrals after controlling for any signaling effects ($\beta = -0.26$, $z = -4.42$, $p < 0.0001$). Finally, Table 5's bottom panel directly tests $H2$ by

comparing the indirect effects separately across the three signal conditions. As expected, the 95% bootstrapped confidence interval for the indirect effect is entirely negative and does not include zero when we use a quantity signal (-0.34 , -0.04) but it straddles zero when we use a strong quality signal (-0.18 , 0.12) or a weak quality signal (-0.13 , 0.15).

Table 5 also shows a significant direct effect of the strong quality signal (along with the quantity signal) on decision deferral (i.e. after we have accounted for the effects of personal control on deferrals). For example, the odds of deferral following a strong quality signal relative to the deferral odds following no signal is roughly 0.5 ($e^{-0.69}$), suggesting that a strong warranty has a direct effect on deferrals. However, the quantity (flat-salary) signal has an even stronger effect; the odds of deferral following a quantity (flat salary) signal relative to the odds following no signal is roughly 0.4 ($e^{-0.89}$).

7.5 Discussion

Study 3 generalizes the result of the first two studies by using a different repair context (automobile repairs), using a direct (categorical) measure of decision deferral and contrasting the quantity (flat salary) signal to a stronger quality signal (five-year warranty, instead of a three-year warranty). We find that only a quantity signal is able to reduce deferrals by restoring control of the situation to the consumers. Between the two quality signals, only the stronger quality signal (five-year warranty) is able to directly reduce deferrals. We speculate that consumers might feel that a five-year warranty is above what is normally offered and they are mentally assigning a price to such a premium warranty. Consequently, they might be willing to pay a higher price upfront thinking that the sellers are bundling the price of the warranty into their quotes.

8. General discussion

8.1 Summary

The paper reports three experiments investigating how consumers behave in markets where they suspect that sellers

Table 5 Process test results: Study 3

Dependent variable: personal control						
	Coefficient	SE	<i>t</i>	<i>p</i>	LLCI	ULCI
Constant	4.9533	0.1865	26.5568	0.0000	4.5866	5.3200
Weak quality signal	-0.0214	0.2651	-0.0806	0.9358	-0.5426	0.4999
Strong quality signal	0.1160	0.2631	0.4408	0.6596	-0.4013	0.6333
Quantity (motive) signal	0.6341	0.2631	2.4100	0.0164	0.1168	1.1514
Dependent variable: choice deferral (results expressed in log-odds metric)						
	Coefficient	SE	<i>t</i>	<i>p</i>	LLCI	ULCI
Constant	2.0881	0.3784	5.5188	0.0000	1.3465	2.8296
Weak quality signal	-0.2625	0.3065	-0.8564	0.3918	-0.8632	0.3383
Strong quality signal	-0.6921	0.3007	-2.3013	0.0214	-1.2815	-0.1026
Quantity (motive) signal	-0.8929	0.3009	-2.9676	0.0030	-1.4826	-0.3032
Personal control	-0.2625	0.0593	-4.4244	0.0000	-0.3788	-0.1462
Relative indirect effects of quality and quantity signals on decision deferral						
	Effect	Boot SE	Boot LLCI	Boot ULCI		
Weak quality signal	0.0056	0.0728	-0.1389	0.1521		
Strong quality signal	-0.0304	0.0750	-0.1874	0.1148		
Quantity (motive) signal	-0.1665	0.0782	-0.3371	-0.0352		

harbor hidden motives to overprovide services. We propose and find support for a process model where these suspicions engender feelings of helplessness (the consumers cannot control what the seller is doing) and indirectly leads them to defer their decisions. Furthermore, we show that only a quantity signal, such as a flat-salary disclosure, but not quality signals, can assuage such feelings of helplessness and help restore personal control to the consumers.

8.2 The need for a new signaling regime

Our research highlights why we need to expand the conventional conceptualization of signaling and incorporate a new regime that addresses insidious motivations of both lower- and higher-quality sellers. The traditional signaling literature addresses the hidden-quality problem where opportunistic (lower-quality) sellers deliberately misrepresent true product quality, drive out the higher-quality sellers and create an adverse selection problem for the buyers. However, higher-quality sellers fight back by sending quality signals to lessen buyers' adverse selection problems (Backus et al., 2019; Connelly et al., 2011; Kirmani and Rao, 2000). Our research points to a more insidious problem for buyers arising from opportunistic tendencies of higher-quality sellers themselves. Higher-quality sellers, combining the diagnosis and cure functions for a particular problem, may deliberately overprovide customers with unnecessary services. Thus, in the automobile repair situation, expert mechanics (agents) working in high-quality firms (principals) may diagnose a problem correctly but overprovide service for pecuniary gain. Hence, what causes the second type of adverse selection is not the *quality*, but the *quantity* of service provided. Such overprovisioning concerns, as our pretest shows, are quite real. For example, Schneider (2012) undertook 91 undercover garage visits seeking repair diagnosis for a car with a prearranged set of defects (loose battery cable, low level of coolant, missing taillight) and found that the mechanics recommended unnecessary repairs for about 30% of cases. Indeed, Consumer Reports routinely warns consumers to be wary of "build the ticket" repair shops that recommend extra and unnecessary procedures and/or "parts replacers" repair shops that routinely recommend new and expensive parts without diagnosing the problem with the old (5-Tip offs to Mechanic Rip-offs, 2017).

Thus, there is a new market asymmetry created mostly by the higher-quality sellers – the buyers cannot tell apart the higher-quality seller who intends to overprovide services from the higher-quality seller who does not. Although the traditional quality signals can bring about a separating equilibrium between higher- and lower-quality sellers, they cannot bring about a separating equilibrium between higher-quality sellers harboring (versus not harboring) overprovisioning motives. Therefore, it is imperative for sellers to design and deploy signals to tackle suspicions about overprovisioning independent of suspicions about quality.

8.3 The need for a consumer decision-making process perspective

Why is a process perspective, like the one we adopt in this paper, important? To answer this question, we turn to the solutions recommended in the rational economics literature. For example, the information economics literature suggests that consumers can minimize overprovisioning by separating

the diagnosis and cure functions (Wolinsky, 1993, 1995). Thus, customers can seek a diagnosis of their car problem at one outlet, get a second opinion at another outlet and get repairs done at a third outlet. However, not only is this multistage shopping exercise expensive and impractical for the average customer to implement, it is quite likely that sellers may refuse to separate these functions because doing so sacrifices their economies of scope (Emons, 1997). Similarly, charging customers with the responsibility for verifying the quantity of service may not always be feasible. As Dulleck and Kerschbamer (2006) note, "If a mechanic tells you that he has to replace a part in your car, do not forget to ask him to put the replaced part into the trunk of your car" (p. 5). This aspect of verifiability can fail for various reasons. For example, installing a new part often entails labor costs that customers cannot easily judge and/or asking for the replaced part may also not be feasible for complex services such as health care.

One might also make the case of using a purely cost-benefit approach to study overprovisioning-related decision deferrals without any accompanying psychological nuances. For example, a consumer suspecting overprovisioning (because of the higher quoted price) might look for a better quote, in which case the deferral decision is not driven by any forms of helplessness but rather a cold calculation that the honest and correctly priced seller can be found with the right amount of search. This is untenable for two reasons. First, even if consumers find a lower price, there is no guarantee that this is the correct price. In fact, consumers could suspect that the lower price is a quality problem (underprovisioning by a lower-quality seller who is incapable of doing what is required and just doing a patch up). Second and more broadly speaking, detecting overprovisioning is akin to reading the seller's mind to figure out the seller's motive. We surmise that the consumer will realize that no amount of search can unravel the true motives of the seller (either to overprovide which is a quantity problem or to underprovide which is a quality problem), and the latter will only aggravate the feeling that the consumer does not control the situation.

8.4 Limitations and future research directions

We conclude by addressing some limitations of our study and suggest avenues for future research.

First, from a methodological perspective, we use scenario-based laboratory experiments. Although such an approach provides high internal validity, they lack the external validity of the real marketplace. Field surveys of actual sellers and buyers transacting in the marketplace may provide for a more realistic approach. Although such an approach will not allow for the random assignment of the respondents to different treatment conditions, it would nevertheless allow us to find out to what extent sellers use a combination of quality and quantity signals, what motivates them to do so, and how consumers react to a two-signal regime.

Second, our studies do not manipulate seller quality, i.e. whether the quality/quantity signals are sent by higher/lower-quality sellers. Manipulating seller quality is important given that one can think of a situation where a quantity signal from a lower-quality or unknown seller does not restore personal control as much as the same signal from a higher-quality seller. In other words, we might expect an interaction between

seller-type (higher-quality seller versus lower-quality seller) and signal-type (quality signal versus quantity signal) in mitigating the overprovisioning problem. Thus, future research could investigate if the faith that consumers put in the quantity signal is conditional on seller quality.

Third, we investigate the effects of one type of quantity signal, which relies on the agent's (e.g. the mechanics or technicians) compensation structure, to separate two types of principals (e.g. franchiser) – one that intends to overprovide services and the other that does not. We could think of other signals that may provide the same functions – for example, a seller may create a separate facility for their diagnosing functions (responsible for diagnosing what repairs are necessary) and a separate facility for their repair functions (responsible for performing the repairs). The separate facilities may give the impression that the two functions are independent of each other (that is, there is no collusion going on between the two groups) and could give consumers faith that the seller will not overprovide services. Testing the effects of different types of quantity signals on the overprovision problem would be a rich avenue for future research.

Fourth, our studies assume that consumers have the ability, opportunity and motivation to reason through the different implications of the quality and quantity signals. Although our results suggest that our participants could correctly identify that the quantity signal, but not the quality signal, could solve the overprovisioning problem, they made these assessments in an undistracted laboratory setting that encouraged deliberations. However, consumers vary in how they process information and make decisions with some consumers preferring an instinctive and perhaps more feelings-based approach, while others preferring a more deliberate and more cognitive-based approach (Kahneman, 2011). We could hypothesize that these two groups would evaluate quality/quantity signals in different ways wherein the so-called feelers might be less sensitive to signaling nuances compared to the thinkers.

Finally, and fifth, Study 3 suggests that signals work directly, as well as indirectly in reducing decision deferrals. For example, a quantity signal (flat salary) reduces deferrals directly, as well as indirectly by restoring personal control to consumers. A strong quality signal (five-year warranty) reduces deferrals directly but has no indirect effect presumably because the signal is unable to assure consumers that the seller does not intend to overprovide services. Thus, there is a rich opportunity for future research to identify the importance/unimportance of the two effects, and in doing so draw a clearer picture of the consumer's mindset. For example, what troubles consumers more in their decision-making process, the fear of hidden quality (the mechanic will do a poor job and yet charge more, the so-called underproviding and overcharging) and/or the fear of hidden quantity (the mechanic will do a good job but will do much more than what is required, overproviding and overcharging). Answering this question is a promising area for future research.

References

5-Tip offs to Mechanic Rip-offs (2017), "5-Tip offs to mechanic rip-offs: take control of your car repair without being taken for

- a ride", 9 May, available at: www.consumerreports.org/car-repair-maintenance/5-tip-offs-to-mechanic-rip-offs/
- Akerlof, G.A. (1970), "The market for 'lemons': quality uncertainty and the market mechanism", *The Quarterly Journal of Economics*, Vol. 84 No. 3, pp. 488-500.
- Averill, J.R. (1973), "Personal control over aversive stimuli and its relationship to stress", *Psychological Bulletin*, Vol. 80 No. 4, p. 286.
- Backus, M., Blake, T. and Tadelis, S. (2019), "On the empirical content of cheap-talk signaling: an application to bargaining", *Journal of Political Economy*, Vol. 127 No. 4, pp. 1599-1628.
- Bandura, A. (1977), "Self-efficacy: toward a unifying theory of behavioral change", *Psychological Review*, Vol. 84 No. 2, p. 191.
- Basu, A.K., Lal, R., Srinivasan, V. and Staelin, R. (1985), "Salesforce compensation plans: an agency theoretic perspective", *Marketing Science*, Vol. 4 No. 4, pp. 267-291.
- Beck, A., Kerschbamer, R., Qiu, J. and Sutter, M. (2014), "Car mechanics in the lab – investigating the behavior of real experts on experimental markets for credence goods", *Journal of Economic Behavior & Organization*, Vol. 108, pp. 166-173.
- Benner, M.J. and Zenger, T. (2016), "The lemons problem in markets for strategy", *Strategy Science*, Vol. 1 No. 2, pp. 71-89.
- Bergen, M., Dutta, S. and Walker, O.C. Jr (1992), "Agency relationships in marketing: a review of the implications and applications of agency and related theories", *Journal of Marketing*, Vol. 56 No. 3, pp. 1-24.
- Bergh, D.D., Connelly, B.L., Ketchen, D.J., Jr. and Shannon, L.M. (2014), "Signaling theory and equilibrium in strategic management research: an assessment and a research agenda", *Journal of Management Studies*, Vol. 51 No. 8, pp. 1334-1360.
- Bergh, D.D., Ketchen, D.J., Jr, Orlandi, I., Heugens, P.P. and Boyd, B.K. (2019), "Information asymmetry in management research: past accomplishments and future opportunities", *Journal of Management*, Vol. 45 No. 1, pp. 122-158.
- Bhatia, S. and Mullett, T.L. (2016), "The dynamics of deferred decision", *Cognitive Psychology*, Vol. 86 No. 5, pp. 112-151.
- Cartwright, D. (1965), "Influence, leadership, control", University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship.
- Chaxel, A.S. (2016), "Why, when, and how personal control impacts information processing: a framework", *Journal of Consumer Research*, Vol. 43 No. 1, pp. 179-197.
- Connelly, B.L., Certo, S.T., Ireland, R.D. and Reutzel, C.R. (2011), "Signaling theory: a review and assessment", *Journal of Management*, Vol. 37 No. 1, pp. 39-67.
- Cutright, K.M. and Samper, A. (2014), "Doing it the hard way: how low control drives preferences for high-effort products and services", *Journal of Consumer Research*, Vol. 41 No. 3, pp. 730-745.
- Cutright, K.M., Bettman, J.R. and Fitzsimons, G.J. (2013), "Putting brands in their place: how a lack of control keeps

- brands contained”, *Journal of Marketing Research*, Vol. 50 No. 3, pp. 365-377.
- Dai, T. and Jerath, K. (2019), “Salesforce contracting under uncertain demand and supply: double moral hazard and optimality of smooth contracts”, *Marketing Science*, Vol. 38 No. 5, pp. 852-870.
- Dulleck, U. and Kerschbamer, R. (2006), “On doctors, mechanics, and computer specialists: the economics of credence goods”, *Journal of Economic Literature*, Vol. 44 No. 1, pp. 5-42.
- Dulleck, U., Kerschbamer, R. and Sutter, M. (2011), “The economics of credence goods: an experiment on the role of liability, verifiability, reputation, and competition”, *American Economic Review*, Vol. 101 No. 2, pp. 526-555.
- Emons, W. (1997), “Credence goods and fraudulent experts”, *The RAND Journal of Economics*, Vol. 28 No. 1, pp. 107-119.
- Fiske, S.T. and Berdahl, J. (2007), “Social power”, in Kruglanski A.W. and Higgins E.T. (Eds), *Social Psychology: Handbook of Basic Principles*, The Guilford Press New York, NY, pp. 678-692.
- Glass, D.C., Singer, J.E. and Friedman, L.N. (1969), “Psychic cost of adaptation to an environmental stressor”, *Journal of Personality and Social Psychology*, Vol. 12 No. 3, pp. 200-210.
- Glass, D.C., Singer, J.E., Leonard, H.S., Krantz, D., Cohen, S. and Cummings, H. (1973), “Perceived control of aversive stimulation and the reduction of stress responses”, *Journal of Personality*, Vol. 41 No. 4, pp. 577-595.
- Hayes, A.F. (2018), *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*, The Guilford Press. New York, NY.
- Hubbard, T. (1998), “An empirical examination of moral hazard in the vehicle inspection market”, *The Rand Journal of Economics*, Vol. 29 No. 2, pp. 406-426.
- Inesi, M.E., Botti, S., Dubois, D., Rucker, D.D. and Galinsky, A.D. (2011), “Power and choice: their dynamic interplay in quenching the thirst for personal control”, *Psychological Science*, Vol. 22 No. 8, pp. 1042-1048.
- Jiang, B., Ni, J. and Srinivasan, K. (2014), “Signaling through pricing by service providers with social preferences”, *Marketing Science*, Vol. 33 No. 5, pp. 641-654.
- John, G. and Weitz, B. (1989), “Salesforce compensation: an empirical investigation of factors related to use of salary versus incentive compensation”, *Journal of Marketing Research*, Vol. 26 No. 1, pp. 1-14.
- Kahneman, D. (2011), *Thinking, Fast and Slow*, Farrar, Straus And Giroux. New York, NY.
- Kalra, A., Shi, M. and Srinivasan, K. (2003), “Salesforce compensation scheme and consumer inferences”, *Management Science*, Vol. 49 No. 5, pp. 655-672.
- Kay, A.C., Moscovitch, D.A. and Laurin, K. (2010a), “Randomness, attributions of arousal, and belief in god”, *Psychological Science*, Vol. 21 No. 2, pp. 216-218.
- Kay, A.C., Gaucher, D., Napier, J.L., Callan, M.J. and Laurin, K. (2008), “God and the government: testing a compensatory control mechanism for the support of external systems”, *Journal of Personality and Social Psychology*, Vol. 95 No. 1, pp. 18-35.
- Kay, A.C., Shepherd, S., Blatz, C.W., Chua, S.N. and Galinsky, A.D. (2010b), “For god (or) country: the hydraulic relation between government instability and belief in religious sources of control”, *Journal of Personality and Social Psychology*, Vol. 99 No. 5, pp. 725-739.
- Keinan, G. (2002), “The effects of stress and desire for control on superstitious behavior”, *Personality and Social Psychology Bulletin*, Vol. 28 No. 1, pp. 102-108.
- Kelly, G.A. (1955), “The psychology of personal constructs”, *Volume 1: A Theory of Personality*, WW Norton and Company. New York, NY.
- Kerschbamer, R. and Sutter, M. (2017), “The economics of credence goods – a survey of recent lab and field experiments”, *CESifo Economic Studies*, Vol. 63 No. 1, pp. 1-23.
- Kirmani, A. and Rao, A.R. (2000), “No pain, no gain: a critical review of the literature on signaling unobservable product quality”, *Journal of Marketing*, Vol. 64 No. 2, pp. 66-79.
- Lal, R. and Staelin, R. (1986), “Salesforce compensation plans in environments with asymmetric information”, *Marketing Science*, Vol. 5 No. 3, pp. 179-198.
- Lambertini, L. and Orsini, R. (2001), “Network externalities and the overprovision of quality by a monopolist”, *Southern Economic Journal*, Vol. 67 No. 4, pp. 969-982.
- Langer, E.J. (1975), “The illusion of control”, *Journal of Personality and Social Psychology*, Vol. 32 No. 2, pp. 311-328.
- Lantzy, S. and Anderson, D. (2020), “Can consumers use online reviews to avoid unsuitable doctors? Evidence from RateMDs.com and the federation of state medical boards”, *Decision Sciences*, Vol. 51 No. 4.
- Laurin, K., Kay, A.C. and Moscovitch, D.A. (2008), “On the belief in god: towards an understanding of the emotional substrates of compensatory control”, *Journal of Experimental Social Psychology*, Vol. 44 No. 6, pp. 1559-1562.
- Lefcourt, H.M. (1973), “The function of the illusions of control and freedom”, *American Psychologist*, Vol. 28 No. 5, pp. 417-425.
- Lembregts, C. and Pandelaere, M. (2019), “Falling back on numbers: when preference for numerical product information increases after a personal control threat”, *Journal of Marketing Research*, Vol. 56 No. 1, pp. 104-122.
- Li, X., Ye, Q. and Yang, G. (2017), “The lack of dominance and choice deferral: choosing to defer to cope with the feeling of being out of control”, *The Journal of Social Psychology*, Vol. 157 No. 6, pp. 754-765.
- Lukas, B.A., Whitwell, G.J. and Heide, J.B. (2013), “Why do customers get more than they need? How organizational culture shapes product capability decisions”, *Journal of Marketing*, Vol. 77 No. 1, pp. 1-12.
- Mehrabian, A. (1995), “Framework for a comprehensive description and measurement of emotional states”, *Genetic, Social, and General Psychology Monographs*, Vol. 121 No. 3, pp. 341-361.
- Mehrabian, A. and Blum, J.S. (1997), “Physical appearance, attractiveness, and the mediating role of emotions”, *Current Psychology*, Vol. 16 No. 1, pp. 20-42.
- Mehrabian, A. and Russell, J.A. (1974), *An Approach to Environmental Psychology*, MIT Press. Cambridge, MA.
- Mishra, D.P., Heide, J.B. and Cort, S.G. (1998), “Information asymmetry and levels of agency relationships”, *Journal of Marketing Research*, Vol. 35 No. 3, pp. 277-295.
- Mourali, M., Yang, Z., Pons, F. and Hassay, D. (2018), “Consumer power and choice deferral: the role of

- anticipated regret”, *International Journal of Research in Marketing*, Vol. 35 No. 1, pp. 81-99.
- Overbeck, J.R. and Park, B. (2001), “When power does not corrupt: superior individuation processes among powerful perceivers”, *Journal of Personality and Social Psychology*, Vol. 81 No. 4, p. 549.
- Rothbaum, F., Weisz, J.R. and Snyder, S.S. (1982), “Changing the world and changing the self: a two-process model of perceived control”, *Journal of Personality and Social Psychology*, Vol. 42 No. 1, pp. 5-37.
- Rotter, J.B. (1966), “Generalized expectancies for internal versus external control of reinforcement”, *Psychological Monographs: General and Applied*, Vol. 80 No. 1, pp. 1-28.
- Rutjens, B.T. (2012), “Start making sense: compensatory responses to control-and meaning threats”, *Regulation*, Vol. 13, pp. 241-250.
- Sasaki, J.Y. and Kim, H.S. (2011), “At the intersection of culture and religion: a cultural analysis of religion’s implications for secondary control and social affiliation”, *Journal of Personality and Social Psychology*, Vol. 101 No. 2, pp. 401-414.
- Schneider, H.S. (2012), “Agency problems and reputation in expert services: evidence from auto repair”, *The Journal of Industrial Economics*, Vol. 60 No. 3, pp. 406-433.
- Shepherd, S., Kay, A.C., Landau, M.J. and Keefer, L.A. (2011), “Evidence for the specificity of control motivations in worldview defense: distinguishing compensatory control from uncertainty management and terror management processes”, *Journal of Experimental Social Psychology*, Vol. 47 No. 5, pp. 949-958.
- Skinner, E.A., Chapman, M. and Baltes, P.B. (1988), “Control, means-ends, and agency beliefs: a new conceptualization and its measurement during childhood”,

- Journal of Personality and Social Psychology*, Vol. 54 No. 1, pp. 117-133.
- Steigenberger, N. and Wilhelm, H. (2018), “Extending signaling theory to rhetorical signals: evidence from crowdfunding”, *Organization Science*, Vol. 29 No. 3, pp. 529-546.
- Weiner, B. (1979), “A theory of motivation for some classroom experiences”, *Journal of Educational Psychology*, Vol. 71 No. 1, p. 3.
- White, R.W. (1959), “Motivation reconsidered: the concept of competence”, *Psychological Review*, Vol. 66 No. 5, pp. 297-333.
- Wolinsky, A. (1993), “Competition in a market for informed experts’ services”, *The Rand Journal of Economics*, Vol. 24 No. 3, pp. 380-398.
- Wolinsky, A. (1995), “Competition in markets for credence goods”, *Journal of Institutional and Theoretical Economics*, Vol. 151 No. 1, pp. 117-131.
- Wright, P. (1986), “Presidential address-Schemer schema: consumers’ intuitive theories about marketers’ influence tactics”, *ACR North American Advances*.
- Xiao, B. and Xiao, W. (2020), “Optimal salesforce compensation with supply-demand mismatch costs”, *Production and Operations Management*, Vol. 29 No. 1, pp. 62-71.
- Yani-de-Soriano, M.M. and Foxall, G.R. (2006), “The emotional power of place: the fall and rise of dominance in retail research”, *Journal of Retailing and Consumer Services*, Vol. 13 No. 6, pp. 403-416.

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