

# The Complex Role of Complexity: How Service Providers Can Mitigate Negative Effects of Perceived Service Complexity When Selling Professional Services

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## Abstract

During professional service encounters, integrating customers into the process of service provision is both important and challenging, as the complexity of professional services can impair value creation at the service provider–customer interface. This study addresses this problem by examining how service complexity impacts customer cognitive capacity and finally important marketing outcomes. Through an examination of 310 interactions between service providers and customers of a retail bank, this study shows that customers' cognitive capacity is drastically reduced at moderate levels of perceived complexity. Subsequently, a lack of cognitive capacity decreases customer satisfaction with the encounter and loyalty intentions toward the company, two important drivers of company profitability. Results further show that service providers' ability to adapt to the specific nature of the encounter helps customers to conserve cognitive capacity. This study hence contributes to service literature by emphasizing the central role of perceived service complexity and establishing the importance of customers' cognitive capacity in professional service encounters. From a managerial perspective, this study underlines the importance of decreasing service complexity to avoid the negative consequences of mentally overtaxing customers and shows how service providers can effectively use adaptive selling to manage customers' cognitive capacity at the service provider–customer interface.

Despite the economic importance of professional services (e.g., financial, insurance, or legal services), marketing scholars still know little about how to successfully sell these services at the service provider–customer interface. In this regard, a key feature of professional services is particularly relevant, that is, professional services are typically perceived as highly complex by customers (Hausman 2003; Johnson, Nader, and Fornell 1996; Reid 2008; Thakor and Kumar 2000). Although scholars agree that high perceived complexity is a core feature of professional services (Reid 2008; Thakor and Kumar 2000), its impact on the encounter between customer and service provider remains largely unexplored. This void deserves close attention because at the service provider–customer interface, perceived service complexity is far more than an incidental feature. Professional services typically involve a high degree of personal interaction between customer and service provider before being purchased because they are highly customized (Chan, Yim, and Lam 2010). This high degree of personal interaction implies that customers do not passively receive professional services. Rather, customers need to collaborate with the service provider to identify effective solutions to their needs. High perceived complexity of a professional service can hamper this dyadic coordination because customers’ endeavors to understand the service reduce their cognitive resources. Cognitively depleted customers face difficulties in judging the service properly and in effectively engaging in collaboration with the service provider. As an important consequence, they may evaluate the interaction less favorably and experience lowered satisfaction with the encounter. Furthermore, unfavorable interactions with the service provider can generalize to the company level and adversely affect important marketing outcomes, such as customer loyalty toward the service firm. A relevant question, then, is how service providers can manage customers’ cognitive resources at the service provider–customer interface to successfully sell professional services and avoid detrimental effects on important marketing outcomes. Our study is a first attempt to address this question. To this end, we derive a theoretical model situating professional services in a nomological framework of customers’ perceived service complexity, customers’ cognitive capacity,<sup>1</sup> and service providers’ adaptive selling. In so doing, we explore how adaptive selling can help to manage customers’ cognitive capacity. In turn, we link customers’ cognitive capacity to two important outcomes of sales encounters in service retailing contexts: customer satisfaction with the encounter and customer loyalty intentions to the service firm. We test our multilevel model using data from 310 interactions between service providers and customers of a retail bank. Overall, this investigation makes three novel and unique contributions to services marketing literature. First, this study is the first to disentangle how customers’ perceived service complexity erodes their cognitive resources at the service provider–customer interface. To foreshadow, our findings uncover an incompletely U-shaped effect of perceived service complexity on cognitive capacity. More specifically, cognitive capacity is drastically reduced at moderate levels of perceived complexity, but relatively high at low and high levels of perceived complexity. This particularly novel finding debunks the assumption of a linear relationship. Therefore, our work extends previous investigations in service research by demonstrating that if complexity is too high, complete comprehension no longer warrants the reduction of cognitive resources (cf. Hobfoll 2002). Second, this study establishes the importance of customers’ cognitive capacity in professional service encounters. Although prior literature mentions that cognitive effort plays a role in selling professional services (e.g., Patterson 2000), the direct consequences of high cognitive effort have hitherto been neglected. This study is the first to empirically investigate cognitive capacity in the selling of professional services and to reveal a direct impact of cognitive capacity on customer satisfaction with the encounter and on customers’ loyalty intentions toward the service firm. This study thus demonstrates that for professional service providers, handling customers’ cognitive capacity at the service provider–customer interface is a key managerial task. Third, this study introduces a previously unknown way in which professional service firms can use adaptive selling—a sales rep’s general predisposition to adapt the sales strategy to the specific needs of a customer (cf. Weitz, Sujan, and Sujan 1986, p. 175). This discovery is important, because in response to a dynamic and competitive environment professional service firms are increasingly instituting strategies that encourage and reward selling behaviors among their frontline employees (Evans, Arnold, and Grant 1999). Reflecting this managerial importance, scholars have called for the application of sales strategies in service settings (Evans, Arnold, and Grant 1999). We respond to this request by showing that adaptive selling helps to conserve customers’ cognitive capacity. Adaptive selling thus prevents the detrimental effects of a lack of cognitive capacity on customer satisfaction and loyalty intentions. Finding the right strategy in dealing with the customer will hence improve the customer’s mental receptiveness during the encounter despite the complexity of a service. For instance, some customers might find a visual sketch of how capital builds up over time easier to understand than verbal explanations. Thus, our study reveals how and when adaptive selling, as a sales strategy, can effectively help service providers to integrate customers’ resources into the value creation process.

## Theoretical Background

### Professional Services and Customers’ Perceived Service Complexity

Services generally considered to be professional are legal, medical, and financial services, but also architectural services, psychological counseling, and management consulting (Hausman 2003; Patterson, Johnson, and Spreng 1997; Thakor and Kumar 2000). A key feature of professional services is that customers tend to perceive them as complex (Hausman 2003; Johnson, Nader, and Fornell 1996; Reid 2008; Thakor and Kumar 2000), as professional services typically include a large number of features that interact in a nonsimple way (cf. Simon 1969). For instance, monthly premiums for liability insurance vary according to coverage amount, insured activities, and other factors, which customers need to consider before buying the insurance. On this basis, perceived service complexity can be defined as subjectively perceived difficulty in making sense of a service. Since we focus on customers' perceived service complexity rather than complexity as a technical feature, individual differences among customers are important. Owing to variations in cognitive abilities (Malhotra 1982) and level of knowledge (Alba 1983; von Nordenflycht 2010), individuals differ with regard to what they perceive as complex. Expert customers can more efficiently process relevant information, which facilitates understanding of the service (Alba 1983; Alba and Hutchinson 1987). For instance, customers who are savvy about finances know how interest rates work and better understand how an investment might develop than novice customers. Likewise, experts can handle large amounts of information better than novices (Lines and Denstadli 2004). Consequently, customers lacking technical skills and knowledge will perceive a given service as more complex than expert customers (Patterson, Johnson, and Spreng 1997).

## The Reduction of Cognitive Capacity

Psychological literature distinguishes between an individual's innate maximum working memory capacity (Cowan 2005) and cognitive capacity as that part of working memory available to an individual in a given situation. While the innate, absolute capacity of working memory is fixed, cognitive capacity is the currently available processing capacity. In line with this, we define a customer's cognitive capacity as the amount of working memory capacity available to a customer at the service provider–customer interface. Cognitive capacity is not innate but depends on the cognitive demands of the encounter. We now briefly review relevant social psychological literature on cognitive capacity and then apply the concept to the context of professional services. The human ability to process information has long been acknowledged as limited (Bettman 1979). Performing cognitive tasks reduces the amount of working memory capacity available, and the more complex or difficult the task, the higher its capacity demands (Gaillard 2001; Kahneman 1973). When faced with a complex task with multiple components, these separate components have to compete for attention in order not to be neglected. For example, while a customer is thinking about interest rates, he or she finds considering the risk of an investment at the same time to be difficult. Working memory capacity can thus be consumed and exhausted. Consequently, depending on the situation, only a part of an individual's working memory capacity remains available for working on mental tasks. Examples of factors decreasing cognitive capacity include conflicts (Cass-Beggs and Emery 1965), stress, and difficulty of work (Schellekens et al. 2000; Schönflug 1983). When cognitive capacity is nearly exhausted, individuals show specific reactions and behaviors, often unconsciously. For example, they become careless and demotivated to continue a task, invest less effort (Boksem, Meijman, and Lorist 2005; Holding 1983; van der Linden and Eling 2006), and commit more errors (Hockey 1997). Also, cognitive exhaustion deteriorates attention (Boksem, Meijman, and Lorist 2005), manifesting in distraction and difficulties in concentrating (van der Linden and Eling 2006) as well as changes in information processing, such as being unable to think and using simple, less effortful heuristics (Lalwani 2009; van der Linden and Eling 2006).

## Selling Professional Services—The Role of Cognitive Capacity

A customer's perception of a professional service as complex will have important consequences for the service provider–customer interface, which can ultimately generalize to the firm level (e.g., Bitner 1995; Butcher, Sparks, and O'Callaghan 2001). Since for professional services customer value is created through dyadic coordination with the service provider (Vargo and Lusch 2004), the customer will try to understand and evaluate the professional service to gain more control of his or her decisions (Mattila 1999). In this effort, the customer's cognitive capacity will be reduced. When cognitive resources are reduced, exerting further mental effort is hard because little, if any, processing capacity is left (Schmeichel, Vohs, and Baumeister 2003). In this case, people are not only simply unwilling but also unable to try harder (Miller 1956; Schmeichel 2007). During an encounter with a service provider, customers feeling overtaxed by the complexity of the professional service will hence exert less effort in trying to understand it. The tendency to exert less effort is reflected in changes in information processing and the decision strategies used. Decision and information processing strategies differ widely in terms of the amount of cognitive resources they require (Bettman, Johnson, and Payne 1990). Thus,

given their limited resources, customers confronted with a complex task resort to the use of simpler heuristics (Bettman 1979; Hadjimarcou and Hu 1999; Lalwani 2009). These heuristics can take the form of selectivity (Jacoby 1984; Swait and Adamowicz 2001), for example, by focusing on the rate of return of an investment fund but ignoring its risk, or not even choosing at all (Swait and Adamowicz 2001). Applied to the present context, this suggests that customers have to exert strong cognitive effort to comprehend professional services, which decreases their cognitive capacity. Customers approaching their individual cognitive limit during the encounter with the service provider will resort to the use of simpler decision strategies.

## Conceptual Framework and Hypotheses

Figure 1 depicts our conceptual framework, focusing on the influence of perceived service complexity on customer cognitive capacity. We propose that adaptive selling moderates this relationship. As outcomes of customer cognitive capacity we have included customer satisfaction with the sales encounter and loyalty intentions toward the service firm, which are important determinants of companies' financial performance and future success (e.g., Anderson, Fornell, and Mazvancheryl 2004). Satisfaction with the encounter is critical, because customers find evaluating the quality of professional services difficult (Geigenmuller and Greschuchna 2011) and therefore rely at least partly on the quality of the service encounter to infer overall service quality. Loyalty intentions toward the service firm rather than toward the individual employee are also critical, because (a) experiences during service encounters generalize to the firm level and thus shape loyalty to the firm (e.g., Bitner 1995) and (b) loyalty to the firm is of high managerial relevance for professional service firms (Palmatier, Scheer, and Steenkamp 2007). If the contact employee leaves the service firm, employee-centered loyalty will evaporate (Palmatier, Scheer, and Steenkamp 2007).

--- Insert Figure 1 about here ---

## Perceived Service Complexity and Cognitive Capacity

To understand and evaluate a professional service, customers need to exert strong mental effort, as complex mental tasks require large amounts of information processing capacity (Gaillard 2001; Schellekens et al. 2000). When confronted with a complex task, people do not immediately give up, but initially exert even more effort through eagerness to accomplish the task (Schonpflug 1983). In line with the prior reasoning, this additional effort will lead to even greater cognitive demands, and customers' cognitive capacity will decrease further (Vohs et al. 2008). Conservation of resources theory posits that individuals try to avoid losing resources and only expend cognitive resources if the expenditure is worth the effort (Hobfoll 2002).

Accordingly, upon approaching their cognitive limit, people will not completely use up their processing capacity but will switch to less effortful processing methods (Jacoby 1984). Using these simpler heuristics helps to save cognitive resources and recover (Hadjimarcou and Hu 1999; Hockey 1997). For instance, individuals in complex choice situations may not even try to compare alternatives (Hendrick, Mills, and Kiesler 1968) or may ignore information by "tuning it out" (Jacoby, Speller, and Kohn Berning 1974, p. 40), as when they focus on the size of monthly installments and ignore interest rates when deciding on a mortgage. This evidence suggests that the relationship between perceived service complexity and customer cognitive capacity will not be steadily negative and linear. Rather, a reasonable assumption is that it takes a curvilinear relationship. According to the theorizing on limited processing capacity and resource depletion, increasing levels of perceived service complexity should initially lead to a decrease of cognitive capacity. Customers who perceive service complexity to be relatively low will not have to exert much cognitive effort. Customers perceiving moderate levels of service complexity will exert much effort to understand the service, which decreases their cognitive capacity. Customers perceiving service complexity to be relatively high, however, will feel mentally overtaxed and that "it is too much." As a consequence, they will not try as hard to comprehend everything about the service. Their cognitive capacity will therefore be higher than at moderate levels of perceived complexity. However, although customers might reduce their cognitive activities, they will still face the need to make a decision in the sales encounter, and thus not be able to completely recover from the cognitive demands. In other words, at high levels of perceived service complexity, cognitive capacity will still be lower than at low levels of complexity. We therefore propose:

Hypothesis 1: The effect of perceived service complexity on customer cognitive capacity will be of an incomplete U-shape. At lower degrees of complexity, perceived complexity will have a decreasing (negative) effect on customer cognitive capacity; at higher degrees of complexity, perceived complexity will have an increasing (positive) effect on customer cognitive capacity.

## Outcomes of Customer Cognitive Capacity

Influence on customer satisfaction with the sales encounter. The influence of customer cognitive capacity on customer satisfaction with the encounter can be explained using equity theory (Adams 1963). In its original sense, equity theory posits that individuals in an exchange situation make two comparisons to derive satisfaction judgments about the relationship. First, they compare their individual input to the outcomes they receive. Second, they compare this input/outcome ratio to that of the exchange partner. Generally, individuals strive for equity, which is the case if both ratios are the same. Inequity, in the form of unequal ratios, is accompanied by tension, anger, and cognitive dissonance (Adams 1963; Carell and Dittrich 1978), and individuals will try to restore equity, for example, by reducing inputs. Equity theory can also be applied to the service encounter between service provider and customer to explain a positive effect of cognitive capacity on satisfaction with the encounter. The encounter between service provider and customer plays a central role in customers' assessment of equity, as the encounter encompasses the actual process of exchanging inputs and outcomes. During the encounter, customers contribute their inputs to the process of service provision (cf. Barnes, Beauchamp, and Webster 2010) and are integrated into this process (cf. Vargo and Lusch 2004). It is therefore evident "that this input versus output or perceived equity is evaluated as the service unfolds" (Olsen and Johnson 2003, p. 186). The encounter is thus the specific reference object on which concrete perceptions of equity are based. In equity theory, central input factors include effort (Adams 1963; Barnes, Beauchamp, and Webster 2010; Oliver and Swan 1989) and energy expenditure (Yang and Peterson 2004). As mentioned previously, exerting mental effort during the encounter with the service provider reduces customers' cognitive capacity. Customers who feel overtaxed because their cognitive capacity has been reduced will thus perceive their own input contributed to the exchange during the encounter as exceptionally high. At the same time, customers feeling mentally overtaxed might attribute this feeling to low input on the side of the service provider. They might feel that the service provider does not exert enough effort during the encounter (Oliver and Swan 1989), because otherwise they would not have to put such a great amount of cognitive resources into this process of service provision. Customers with lower cognitive capacity will hence perceive their own input in the service encounter as comparably high and the service provider's input as rather low. Altogether, a low level of available cognitive capacity leads to a distortion of the respective input/outcome ratios, which decreases customer satisfaction with the encounter. This response is also in line with prior research finding perceived fairness in the sense of equity theory to be positively related to satisfaction with professional services (Patterson, Johnson, and Spreng 1997). Vice versa, if customers feel their cognitive capacity is still large in spite of facing a complex decision, they will not have exerted much cognitive effort in the course of the encounter with the service provider. Customers will therefore perceive their own input as comparably low and the effort put in by the service provider as high. The input/outcome ratio will be more balanced or even distorted in favor of the customer. This case of overcompensation has been shown to be judged more favorably (Barnes, Beauchamp, and Webster 2010). Therefore, the more cognitive capacity the customer has available, the more favorable the perceived input/outcome ratio will be from the customer's perspective, leading to higher satisfaction with the encounter.

Hypothesis 2a: Customer cognitive capacity has a continuously positive influence on customer satisfaction with the sales encounter. The more cognitive capacity is available to the customer, the greater the customer's satisfaction with the sales encounter.

The influence on customer loyalty intentions toward the service firm.

Customer loyalty to the firm is an important determinant of service firms' financial success (e.g., Loveman 1998). If customers are loyal, repeat purchases and referrals increase a company's market share and revenues, while the costs of acquiring new customers decline, so that in the end company profits increase (Reichheld, Markey, and Hopton 2000). This effect renders customer loyalty one of the main objectives of companies. We hypothesize that perceptions of inequity, as described previously, will also affect customers' loyalty intentions toward the service firm. Customers use their experiences from specific encounters as cues to make inferences about the company (Bitner 1995; Butcher, Sparks, and O'Callaghan 2001). This application results from evaluative conditioning: in customers' minds, an associative link is established between the encounter and the company, which causes a transfer of perceived inequity from the encounter to the company level (cf. Brexendorf et al. 2010). The unfavorable input/outcome ratio perceived by mentally overtaxed customers during service encounters will hence generalize to the company, and customers will also strive to lessen inequity on the firm level. They can accomplish this reduction by lowering their loyalty intentions, as these constitute an input in the sense of equity theory. At the same time, customer loyalty is an outcome on the side of the company (Barnes, Beauchamp, and Webster 2010). Accordingly, decreasing loyalty-related behaviors equates to a lower customer input and a lower outcome for the company, and is an appropriate means to re-establish perceived equity. Vice

versa, equity has been shown to increase loyalty intentions (Johnson, Hermann, and Huber 2006). Customers' loyalty intentions toward the service firm will hence decrease with decreasing cognitive capacity. In accordance with the above-mentioned reasoning, we propose the following hypothesis:

Hypothesis 2b: Customer cognitive capacity has a continuously positive influence on loyalty intentions toward the service firm. The higher the customer's cognitive capacity, the higher the customer's loyalty intentions toward the service firm.

## Adaptive Selling as a Remedy Strategy for Cognitive Capacity Reduction

The role of adaptive selling in sales encounters.

Adaptive selling reflects a general predisposition to use different sales tactics, depending on the type of customer or the specific situation of a sales encounter (Weitz, Sujun, and Sujun 1986). The ability to use varied tactics "enables salespeople to tailor messages to fit individual customers' needs and preferences" (Franke and Park 2006, p. 693) and translates into actual adaptive selling behaviors in sales encounters (Roman and Iacobucci 2010). These behaviors include, for example, trying different selling approaches or influence techniques (McFarland, Challagalla, and Shervani 2006; Weitz 1981), changing the content of the sales presentation (Tanner 1994), or adapting the communication style (Predmore and Bonnice 1994; Williams and Spiro 1985).

The relevance of adaptive selling for selling professional services.

Adaptive selling can be especially successful in complex buying situations (Weitz 1981). For instance, while it is important that salespeople explain that a certain risk is attached to an investment fund, they should refrain from explaining how this risk is calculated in order to avoid overwhelming novice customers with technical specifications (cf. Roman and Iacobucci 2010). When used for selling professional services, adaptive selling can help to tailor the sales presentation to the respective customer's cognitive resources. This approach helps to successfully integrate the customer into the sales encounter, facilitating collaboration with the service provider and allowing the development of effective solutions that create value for the customer. Thus, adaptive selling seems promising in selling situations that involve complex professional services.

The moderating role of adaptive selling.

Going one step further there are several ways through which adaptive selling can conserve customers' cognitive resources during professional service encounters. Upon realizing that the customer is mentally overtaxed, the service provider can change the sales tactic accordingly, such as by using concrete examples or sketching developments instead of presenting abstract calculations. Moreover, sales messages can be adjusted to focus customers' attention on goals and rewards and distract them from the cognitive demands made on their finite cognitive resources (Agrawal and Wan 2009; Baumeister et al. 2005). For example, if a home finance loan is being discussed, a reference can be made to the future reward of owning a home. Providing information in these ways should render the encounter more understandable and thus prevent customers' cognitive capacity from declining (Cass-Beggs and Emery 1965; Kaplan 2001). We thus propose that adaptive selling acts as a moderator that affects the influence of perceived service complexity on customer cognitive capacity. Specifically, we expect that higher levels of adaptive selling will change the relationship between perceived service complexity and customer cognitive capacity from an incomplete U-shape to a more steadily negative linear relationship. We expect this change because adaptive selling helps to save cognitive capacity and customers will therefore be less inclined to employ heuristic processing methods if served by a highly adaptive service provider. In such situations of highly adaptive service providers, customers' cognitive capacity does not decrease as much, so that customers experience no need to "switch off" and conserve cognitive energy. Accordingly, without the use of energy-saving heuristics, less cognitive capacity will be available at high levels than at moderate levels of perceived complexity. Instead, cognitive capacity will decrease more slowly, but steadily. Thus, the relationship between perceived complexity and cognitive capacity will change its form and be steadily negative at high levels of adaptive selling. We therefore propose more formally:

Hypothesis 3: Adaptive selling moderates the curvilinear relationship between perceived service complexity and customer cognitive capacity: The higher adaptive selling, the more the curvature of the relationship between perceived service complexity and customer cognitive capacity will change from a U-shape to a continuously negative linear relationship.

## Method

### Collection of a Multilevel Data Set

#### Research setting.

We collected data from a large national retail bank. Financial services have a long tradition of serving as the subject of research on professional services (Chan, Yim, and Lam 2010; Johnson, Nader, and Fornell 1996; Yim, Chan, and Lam 2012), and many customers perceive them as complex and difficult to understand (Devlin 2001). For instance, investment accounts involve several features, such as tax deductibility and level of risk, that must be coordinated and considered thoroughly.

#### Sample.

We collected a dyadic multilevel data set comprising data on two levels, namely from customers and service providers of the retail bank. Customers provided information about their perceived service complexity, their cognitive capacity during the sales encounter as well as their satisfaction with the encounter, their loyalty intentions toward the retail bank, and some control variables. The employee questionnaire assessed service providers' adaptive selling as another focal variable of our model as well as some control variables. The service providers, who primarily serve private clients and sell financial services, were contacted by mail and were sent the questionnaires. They also returned the completed questionnaires by mail. We collected customer data immediately after the interaction between the customer and the service provider. Members of our research team, who were trained prior to data collection, personally gave the questionnaires to customers, and customers who agreed to participate completed it immediately. Customers participated for incentives in the study, and responses from service providers and customers were matched using code numbers. Measuring customers' cognitive capacity directly after the encounter enabled us to capture the effect of perceived service complexity on cognitive capacity during the interaction. This approach ensures that customers' answers relate to the specific encounter and avoids biases due to fading memory or other influences. Moreover, this approach allows for matching the responses of customers and service providers, so that conclusions can be drawn regarding the effects of service providers' behavior on customer variables.

The final dataset yielded data from 310 interactions (310 customers, response rate 33.7%; 108 employees, response rate 68.7%). The average cluster size is 2.87, with cluster size ranging from one to 13 customers. Customers' mean age is 49.04 years ( $SD = 17.71$ ) and 47.1% are female. Employees' mean age is 38.38 years ( $SD = 9.87$ ) and 53.8% are female.

### Measures

An overview of all focal scales appears in the appendix. Adaptive selling was assessed with the short version of the well-established adaptive selling scale (ADAPTS; Robinson et al. 2002; Spiro and Weitz 1990). The measures for customer satisfaction with the encounter and customer loyalty intentions toward the service firm are based on Homburg and Furst (2005) and Homburg, Wieseke, and Hoyer (2009). Cognitive capacity was measured with a scale developed following Smets et al. (1995). Perceived complexity was measured on a semantic differential scale following Holbrook et al. (1984).

### Control Variables

To rule out alternative explanations for our findings, we included several control variables. We controlled for the effects of various theoretically meaningful variables on cognitive capacity and perceived complexity. Time on task usually reduces cognitive alertness (Holding 1983), in our questionnaire this is captured by duration and waiting time. Cognitive capacity is also probably influenced by customers' knowledge, in that more savvy customers have to exert less cognitive effort to understand and evaluate financial services. We hence controlled for the effect of customer knowledge of financial products on both cognitive capacity and perceived complexity. We measured customer knowledge with two items developed by Sharma and Patterson (2000). Prior literature has also linked cognitive capacity to self-control and negative mood states (Muraven, Tice, and Baumeister 1998) and has shown that age influences individuals' cognitive abilities (Cowan 2005). We therefore controlled for the effects of a lack of self-control (measured with items developed by Tangney, Baumeister, and Boone 2004), negative mood state (measured with items of the Positive and Negative Affect Schedule scale by Watson, Clark, and Tellegen 1988), and customer age on perceived complexity and cognitive capacity. Finally, we

controlled for the effects of service providers' product knowledge and age on cognitive capacity. We assessed service providers' product knowledge with a single item on a 7-point scale ranging from 1 (very low) to 7 (very high). For predicting customer satisfaction with the encounter and customer loyalty intentions, we controlled for customer trust in the service provider (using three items developed by Komiak and Benbasat 2006), since trust plays an important role in shaping these outcomes (e.g., Raimondo, Miceli, and Costabile 2008). We also added customer knowledge, duration of the relationship with the service provider (measured in months), and perceived service complexity as control variables. Finally, we controlled for the impact of service providers' adaptive selling on the outcomes (Williams and Spiro 1985). We also empirically tested the effect of satisfaction with the encounter on loyalty intentions, since specific encounters are important in shaping customers' loyalty to the firm (Bitner 1995). Finally, one determinant of service providers' successful use of selling techniques at the service provider–customer interface is the ability to accurately perceive the encounter from the customer's perspective (Evans, Arnold, and Grant 1999). Therefore, using four items from the well-established scale by McBane (1995), we tested whether service providers' perspective taking affects adaptive selling.

## Measure Assessment

All values for coefficient alpha are sufficiently high ( $\geq .84$ ; Nunnally 1978), indicating reliability of the scales. Results of exploratory and confirmatory factor analyses provide support for the factor structure and a good overall model fit ( $\chi^2/df = 2.013$ , CFI = .976, TLI = .968, SRMR = .040). Table 1 presents the psychometric properties and correlations of the focal variables. Composite reliability (CR) and average variance extracted (AVE) exceed the critical values for each factor (Bagozzi and Yi 1988) and thus further support the measurement model. As the highest squared correlation (.12) is below the lowest AVE (.67), the scales possess sufficient discriminant validity (Fornell and Larcker 1981).

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## Analytical Approach

Our data set comprises two levels, with customers nested within service providers. Nested data often violates the independence of observations assumption, which can result in underestimated standard errors (Hox 2010). This specific data structure therefore requires a multilevel approach. To substantiate our approach, we calculated the intraclass correlation  $r$  for cognitive capacity, which captures the proportion of total variance of the construct attributable to the cluster structure. It exceeds the value of  $r \geq .05$ , which is large enough to cause substantial underestimation of standard errors (Hox 2010). We tested our hypotheses in a multilevel path model using the statistical software Mplus 7 (Muthen and Muthen 2012). Multilevel path models allow researchers to test all hypothesized relationships simultaneously and are therefore suited to test more complex relationships than traditional multilevel regression models.

## Results

### Model Development

We estimated three different models. Model 1 contained all linear main effects on both levels and all control variables. For Model 2, the quadratic effect of complexity was added. For Model 3, the linear and the quadratic-by-linear interaction were included. Because standard fit indices are not available with the procedure used by Mplus to estimate cross-level interactions, we compared models using a likelihood-ratio test. As the models were estimated using maximum likelihood estimation with robust standard errors, we relied on the Satorra-Bentler scaled likelihood-ratio test (Satorra and Bentler 2010, 2001). As Table 2 displays, entering the quadratic effect in Model 2 significantly improves model fit ( $p \leq .05$ ). Adding the linear and quadratic-by-linear interaction terms (Model 3) again yields a significant increase in model fit ( $p \leq .05$ ).

--- Insert Table 2 about here ---

### Hypotheses Testing

Following suggestions of Aiken and West (1993) and Cohen et al. (2003) for testing quadratic-by-linear interactions, we regressed cognitive capacity on the linear and quadratic terms for perceived complexity, adaptive selling, and the respective interaction terms in our multilevel path model:



$$\begin{aligned} \text{Cognitive Capacity} = & \gamma_{00} + (\gamma_{10} + u_{1j}) * (\text{Perceived Complexity})_{ij} + \\ & (\gamma_{20} + u_{2j}) * (\text{Perceived Complexity}^2)_{ij} + \gamma_{01} * (\text{Adaptive Selling})_j + \\ & \gamma_{11} * (\text{Perceived Complexity})_{ij} * (\text{Adaptive Selling})_j + \\ & \gamma_{21} * (\text{Perceived Complexity}^2)_{ij} * (\text{Adaptive Selling})_j + u_{0j} + e_{ij} \end{aligned}$$

This approach is also in line with prior research investigating quadratic effects and quadratic-by-linear interactions (e.g., Agustin and Singh 2005; Homburg, Muller, and Klarmann 2011; Singh 1998). Table 2 presents the unstandardized path coefficients for the estimated models. We tested our hypotheses on the basis of the best-fitting model (Model 3). The relationship between perceived service complexity and customer cognitive capacity was hypothesized to be quadratic. According to Cohen et al. (2003), the linear effect of complexity on the dependent variable must also be controlled for. Additionally, its coefficient will cast light on the overall linear trend inherent in the data (Aiken and West 1993). The coefficient of the quadratic term will indicate a U-shaped relationship if it is significantly positive. Our results confirm the proposed relationship, supporting H<sub>1</sub>. The linear effect of complexity on cognitive capacity is significantly negative ( $b = -.17; p \leq .01$ ), while the quadratic effect of complexity on cognitive capacity is significantly positive ( $b = .18; p \leq .01$ ). Thus, as perceived service complexity increases, customer cognitive capacity first declines. However, after a minimum has been reached, cognitive capacity increases again as complexity increases further. Furthermore, the direct effect of adaptive selling on cognitive capacity ( $b = .27; p \leq .01$ ) is significantly positive, which is visible in an upward shift of the incompletely U-shaped curve. Support was also found for H<sub>2a</sub> and H<sub>2b</sub>. Results show a significantly positive effect of cognitive capacity on customer satisfaction with the sales encounter ( $b = .29; p \leq .01$ ) and on loyalty intentions toward the service firm ( $b = .19; p \leq .05$ ). Finally, we proposed that adaptive selling moderates the quadratic relationship between perceived complexity and cognitive capacity (H<sub>3</sub>). Again, the linear interaction between perceived service complexity and adaptive selling has to be controlled for (Aiken and West 1993). However, it does not reach significance ( $b = -.01; p = .91$ ), whereas the quadratic-by-linear interaction term yields a significant path coefficient ( $b = -.19; p \leq .05$ ). These results provide support for H<sub>3</sub>. Figure 2 shows that the quadratic nature of the effect of complexity on cognitive capacity depends on the level of adaptive selling. Two aspects are to be considered here: First, since we uncovered a direct effect of adaptive selling on cognitive capacity ( $b = .27; p \leq .01$ ), adaptive selling leads to an upward shift of the incompletely U-shaped curve. Second, the moderating effect of adaptive selling leads to a change in the curvature: for higher levels of the moderator, the relationship between complexity and cognitive capacity is continuously negative. Figure 2 also reveals that the remedial effect of adaptive selling is not equally strong at all levels of perceived service complexity, but is rather small at very high and very low levels of perceived complexity. We discuss this finding in more detail in the discussion section.

--- Insert Figure 2 about here ---

## Analysis of Indirect Effects

Results indicate a significant direct effect of perceived service complexity on loyalty intentions toward the service firm. To test for indirect effects of perceived complexity on loyalty intentions and satisfaction with the encounter via cognitive capacity, we conducted a mediation analysis (Sobel 1982). Note that we controlled for stratification and non-independence of standard errors due to cluster sampling for the within-level mediation (Hox 2010). Results of this additional analysis revealed a significantly negative indirect effect of perceived complexity on loyalty intentions ( $b = -.03; p \leq .05$ ) and on satisfaction with the encounter ( $b = -.05; p \leq .05$ ). As the indirect effects of complexity on our outcome variables (via customer cognitive capacity) are significant, our path model is further supported.

## Discussion

Knowledge of how to successfully sell professional services in light of their high perceived complexity has so far been limited. This article investigates the effect of customers' perceived service complexity on customer cognitive capacity in professional service encounters. To this end, a model was developed that establishes an incompletely U-shaped relationship between perceived service complexity and cognitive capacity, as well as the influence of cognitive capacity on two important marketing outcomes, namely customer satisfaction with the encounter and customers' loyalty intentions toward the service firm. Additionally, adaptive selling was included as a moderator that gradually changes the relationship between perceived complexity and cognitive capacity.

## Theoretical Implications

Although prior literature mentions that cognitive effort plays a role in selling professional services (e.g., Patterson 2000), the direct consequences of high cognitive effort and the resulting reduction of cognitive capacity for professional service encounters have hitherto been neglected. By empirically establishing a quadratic relationship between perceived service complexity and customer cognitive capacity, this study enhances understanding of the consequences of perceived complexity for the availability of customers' cognitive resources and makes important contributions to service literature. First, we provide an initial insight into the subtle and intricate link between perceived service complexity and cognitive capacity. Specifically, customer cognitive capacity is considerably lower at moderate levels of perceived service complexity, while both low and high levels of complexity lead to the availability of more cognitive capacity. This effect reflects the interplay between two countervailing forces: While customers wish to understand the service to make an informed decision (Saleh and Sarkar 1973), individuals approaching their cognitive limit want to conserve cognitive resources (Hobfoll 2002). When the influence of cognitive capacity on important outcome variables is considered, this effect implies that moderate levels of complexity should be avoided. Importantly, however, as Figure 2 displays, at high levels of complexity cognitive capacity is lower than at low levels of complexity. Hence, simply raising complexity with the aim of inducing the customer to switch off and consequently conserve cognitive capacity is not an option for increasing satisfaction and loyalty. As cognitive capacity is considerably lower at low levels of perceived complexity, both satisfaction with the encounter and loyalty intentions will also be lower. Additionally, controlling for the effects of perceived complexity on customer outcomes yields a significantly negative effect of perceived complexity on loyalty intentions. Thus, above and beyond its indirect effect via cognitive capacity, perceived complexity directly decreases loyalty intentions. This finding again stresses the importance of avoiding high levels of perceived service complexity. Second, previous research on services marketing has merely hinted at the possible role of cognitive effort in professional service encounters (Patterson 2000). By contrast, this study is the first that explicitly models customers' cognitive capacity and establishes its importance for professional service encounters. Focusing our model on customers' cognitive capacity adds an important insight to service literature: cognitive capacity affects key marketing outcomes for service firms, such as customer satisfaction and loyalty intentions. Third, we introduce service providers' adaptive selling as a strategy to remedy the reduction of customers' cognitive capacity when selling professional services. Irrespective of the level of complexity, adaptive selling leads to the availability of more cognitive capacity. That is, while merely presenting more information can overwhelm the customer, presenting information in a way that fits the customer's predispositions helps to save cognitive capacity. For example, customers with high expertise in financial services might prefer straightforward facts and figures, whereas novice customers might better understand explanations that rely on adjectives instead of numbers (cf. Scammon 1977). Furthermore, we reveal that adaptive selling as a solution does not work in a simple way. Rather, its remedial effect is comparatively weak at low and high levels of perceived service complexity, whereas its impact is considerably greater at moderate levels of complexity. This finding blends well with our finding that cognitive capacity is lowest at moderate degrees of perceived complexity, so that a remedy strategy is indeed most needed when perceived service complexity is moderate. In addition, this finding underlines that adaptive selling has generally positive effects, but is not equally effective in every situation. We therefore also provide an answer to the question of under which circumstances to use adaptive selling, which prior research has discussed (cf. Giacobbe et al. 2006).

## Managerial Implications

The insights gained in this study are vital for managerial practice. Our results emphasize the importance of managerial strategies in decreasing perceived complexity, as regardless of the effect of adaptive selling, the general trend is that less cognitive capacity is available with higher complexity. Even if adaptive selling can be used as a remedy, companies should try to make their service offerings appear not too complex in the eyes of their customers. Although managing customers' cognitive capacity is not a goal in itself, its managerial significance becomes apparent in light of its effects on customers' satisfaction with the encounter and on customers' loyalty intentions. These outcomes are vital because they directly affect companies' sales and profits (Anderson, Fornell, and Mazvancheryl 2004; Reichheld, Markey, and Hopton 2000). Given that the level of complexity is largely determined by the service itself, our results emphasize that managers should try to influence customers' subjectively perceived level of service complexity. For instance, professional services are often highly customized and heterogeneous (Dawes, Dowling, and Patterson 1992). In this regard, optimizing the number of features that can be configured to customize the service and offering more standardized services should reduce perceived complexity for the customer. Scholars have also repeatedly pointed to customers' lack of knowledge about professional services, so educating customers to enable them to judge professional services more accurately will be an important step toward decreasing perceived service complexity. To enable service providers to effectively use adaptive selling to sell professional services, firms should train service providers to

look for signs of fatigue and high mental load when interacting with customers. These may be physical signs like increased blinking (Recarte et al. 2008) or signs of nervous tension like squirming and fidgeting (Bills 1943). Furthermore, service providers should have a broad repertoire of selling approaches and means of conveying information so as to be able to adapt to the specific customer. For instance, to help render the service more understandable, they should be able to use illustrative explanations, to avoid too specific contents, and to use simple language to explain complex relationships. Likewise, managers can provide service providers with materials that convey information in an easily understandable way instead of overwhelming the customer with too much and too specific information, for example, using simple and concrete examples versus more technical language and hard figures. Having different brochures for different types of customers would be one possibility. Importantly, managers should be aware that adaptive selling is more than simply providing more information and should sensitize their service providers to this aspect. As Figure 2 reveals, the remedial effect of adaptive selling is greatest at moderate levels of service complexity. Even though adaptive selling increases the general level of cognitive capacity, this effect is not very strong at low and high levels of perceived complexity. At low levels of service complexity, cognitive capacity is high irrespective of whether adaptive selling is used. As perceived complexity increases to medium levels, the remedial effect of adaptive selling gains in strength. If perceived complexity is very high, however, cognitive capacity will be low regardless of adaptive selling, which can at best marginally increase cognitive capacity. This phenomenon imposes high demands on the service provider, as assessing the degree of perceived complexity from the perspective of the customer and reacting accordingly is crucial. As the level of complexity increases, the service provider should adapt to this situation and change his or her approach in dealing with the customer, adapting by responding precisely to customer needs. In so doing, the service provider can help the customer save cognitive resources by bringing in more of his or her own resources. That adaptive selling is not equally effective in every situation raises questions regarding its efficiency, as adaptive selling can only be used efficiently if its benefits outweigh its costs, such as the time spent on gathering information about customers (Franke and Park 2006; Weitz, Sujan, and Sujan 1986). In cases of very low and very high perceived complexity, the benefits of adaptive selling probably do not outweigh its costs, and adaptive selling can be inefficient. In these instances, managers should thus use caution in encouraging their service providers to use adaptive selling techniques.

## Limitations and Future Research

This study has some limitations, which at the same time provide avenues for future research. Perceived service complexity and customer cognitive capacity are both constructs that are relatively new to service research. They thus have only a few well-established linkages to other constructs, and the nomological net presented here must be gradually enlarged by future research, so that an encompassing theory can be built. On the one hand, other potential determinants of cognitive capacity should be investigated. On the other hand, other variables besides cognitive capacity may influence customers' loyalty intentions and satisfaction with the encounter, and these should be identified by future research. This study provides a first step toward creating an encompassing theory of perceived service complexity. As the results of this study underline the importance of customer cognitive capacity for professional service encounters, scholars may also wish to investigate this concept more deeply. From a theoretical perspective, it paves the way for new approaches to explaining customer phenomena such as the use of decision heuristics, the delegation of decision responsibility to the sales representative, an increasing brand orientation (Swait and Adamowicz 2001), or decisions turning out to be suboptimal, leading to long-term dissatisfaction. Likewise, the relationships between cognitive capacity and other outcomes, such as purchase behavior, behavioral loyalty, or profits, deserve close attention. Another important topic for future research in this context is encounter-specific adaptive selling. Although we looked at adaptive selling as a general trait, future investigations could assess the degree to which it is practiced during each specific encounter. Although research has shown that more adaptive salespeople also exhibit more adaptive behaviors during specific encounters (e.g., Roman and Iacobucci 2010), using an encounter-specific measure would yield insights with greater detail. Finally, future research should examine whether the relationships that have been observed in the present context also apply to other than professional services, especially those high in credence qualities, like repair or home maintenance services. Future research might investigate whether similar effects can be observed in these contexts, as these services are still very hard for laymen to comprehend.

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**TABLE 1**  
**Psychometric Properties and Correlations of Key Variables**

	M	SD	$\alpha$	AVE	1	2	3	4	5
1 Perceived service complexity	3.02	1.32	.85	.68	1 <sup>a</sup>				
2 Customer cognitive capacity	6.41	1.18	.86	.75	-.17*	1			
3 Adaptive selling <sup>b</sup>	5.29	1.16	.84	.67	-.06	.15	1		
4 Satisfaction with the encounter	6.44	1.04	.93	.81	-.11	.29*	.10	1	
5 Loyalty intentions toward the service firm	6.10	1.05	.85	.74	-.35*	.31*	.14	.33*	1

<sup>a</sup>Correlations between the respective constructs.

<sup>b</sup>Correlations between adaptive selling and the other variables are calculated at the between level.

\* $p \leq .01$ .

**TABLE 2**  
**Estimated Path Coefficients<sup>a</sup>**

Independent Variable	Dependent Variable	Model 1	Model 2	Model 3
<b>Controls</b>				
<b>→ Within-level</b>				
Duration	→ Cognitive capacity <sup>b</sup>	-.03 (.07)	-.03 (.07)	.01 (.07)
Waiting Time		.04 (.06)	.05 (.06)	.07 (.05)
Customer Knowledge		-.02 (.05)	-.03 (.06)	-.04 (.05)
Lack of self-control		-.15 (.07)**	-.16 (.07)**	-.14 (.06)**
Negative mood state		-.04 (.05)	-.05 (.06)	-.05 (.05)
Customer age		.01 (.07)	-.02 (.08)	-.01 (.06)
Customer age <sup>2</sup>		.10 (.05)*	.10 (.06)*	.09 (.05)*
Perceived service complexity	→ Loyalty intentions <sup>c</sup>	-.31 (.08)***	-.31 (.08)***	-.31 (.08)***
Trust		.10 (.05)**	.10 (.05)**	.10 (.05)**
Customer knowledge		.07 (.05)	.07 (.05)	.07 (.05)
Satisfaction		.27 (.08)***	.27 (.08)***	.27 (.08)***
Duration relationship		.09 (.05)*	.09 (.05)*	.09 (.05)*
Perceived service complexity	→ Encounter satisfaction	.05 (.07)	.05 (.07)	.04 (.06)
Trust		.16 (.05)***	.16 (.05)***	.16 (.06)***
Customer knowledge		-.01 (.05)	-.01 (.05)	-.01 (.05)
Duration relationship		.08 (.05)	.08 (.05)	.08 (.05)
Duration	→ Perceived complexity	.01 (.07)	.01 (.07)	.01 (.07)
Waiting time		.03 (.06)	.03 (.06)	.03 (.06)
Customer knowledge		-.20 (.07)***	-.20 (.07)***	-.20 (.07)***
Negative mood state		-.04 (.06)	-.04 (.06)	-.04 (.06)
Customer age		-.22 (.08)***	-.22 (.08)***	-.22 (.08)***
Customer age <sup>2</sup>		-.11 (.06)*	-.11 (.06)*	-.11 (.06)*
<b>→ Between-level</b>				
Adaptive selling	→ Loyalty intentions	.13 (.11)	.13 (.11)	.18 (.18)
Adaptive selling	→ Encounter satisfaction	-.02 (.17)	-.01 (.17)	-.07 (.36)
Salesperson knowledge	→ Cognitive capacity	-.11 (.05)**	-.11 (.06)*	-.11 (.05)**
Salesperson age	→ Cognitive capacity	-.06 (.12)	-.07 (.12)	-.07 (.12)
Perspective taking	→ Adaptive selling	.23 (.09)**	.23 (.09)**	.23 (.09)**
<b>Main Effects</b>				
<b>→ Within-level</b>				
Perceived service complexity	→ Cognitive capacity	-.17 (.06)***	-.20 (.06)***	-.17 (.06)***
Perceived service complexity <sup>2</sup>	→ Cognitive capacity (H1) <sup>d</sup>		.13 (.06)**	.18 (.06)***
Cognitive capacity	→ Encounter satisfaction (H2a)	.30 (.11)***	.30 (.12)**	.29 (.11)***
Cognitive capacity	→ Loyalty intentions (H2b)	.18 (.09)**	.18 (.10)*	.19 (.09)**
<b>→ Between-level</b>				
Adaptive selling	→ Cognitive capacity	.12 (.07)*	.11 (.07)*	.27 (.10)***
<b>Cross-Level-Interactions</b>				
Perceived service complexity X Adaptive selling	→ Cognitive capacity			-.01 (.06)
Perceived service complexity <sup>2</sup> X adaptive selling	→ Cognitive capacity (H3)			-.19 (.10)**
<b>Likelihood-Ratio Test</b>				
LL		-2,231.19	-2,227.82	-2,223.41
Scaling correction factor		2.057	2.0509	1.970
Number of free parameters		54	55	59
Increase in model fit	– Satorra and Bentler (2001)		3.91**	10.28**
	– Satorra and Bentler (2010)		10.74***	9.48*

<sup>a</sup>Unstandardized path coefficients; standard errors in parentheses.

<sup>b</sup>For all control variables with an effect on cognitive capacity, quadratic effects were tested to rule out that quadratic effects of the controls are shifted to perceived complexity. Only one significant effect emerged, which is included in the model (customer age<sup>2</sup>).

<sup>c</sup>Loyalty intentions toward the service firm.

<sup>d</sup>An additional non-linear estimation and an additional ANOVA substantiated these findings. The main effect of perceived complexity on cognitive capacity is significant ( $F = 10.191$ ;  $df = 2$ ;  $p \leq .01$ ). Cognitive capacity is significantly higher for low ( $M_{low} = 6.69$ ;  $p \leq .01$ ) and high ( $M_{high} = -6.32$ ;  $p \leq .03$ ) than moderate levels of complexity ( $M_{mod} = 5.91$ ).

\*\*\*  $p \leq .01$ , \*\*  $p \leq .05$ , \*  $p \leq .10$  (two-tailed).

**FIGURE 1**  
**The Conceptual Framework**

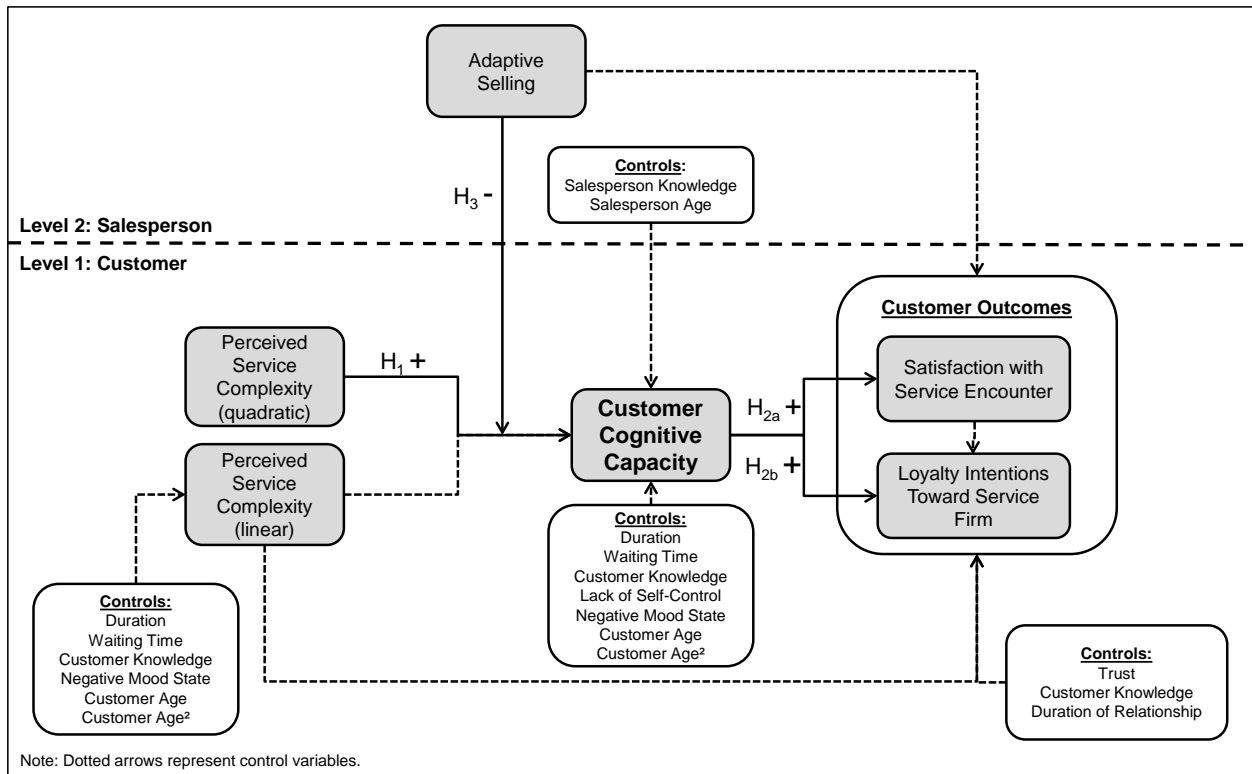
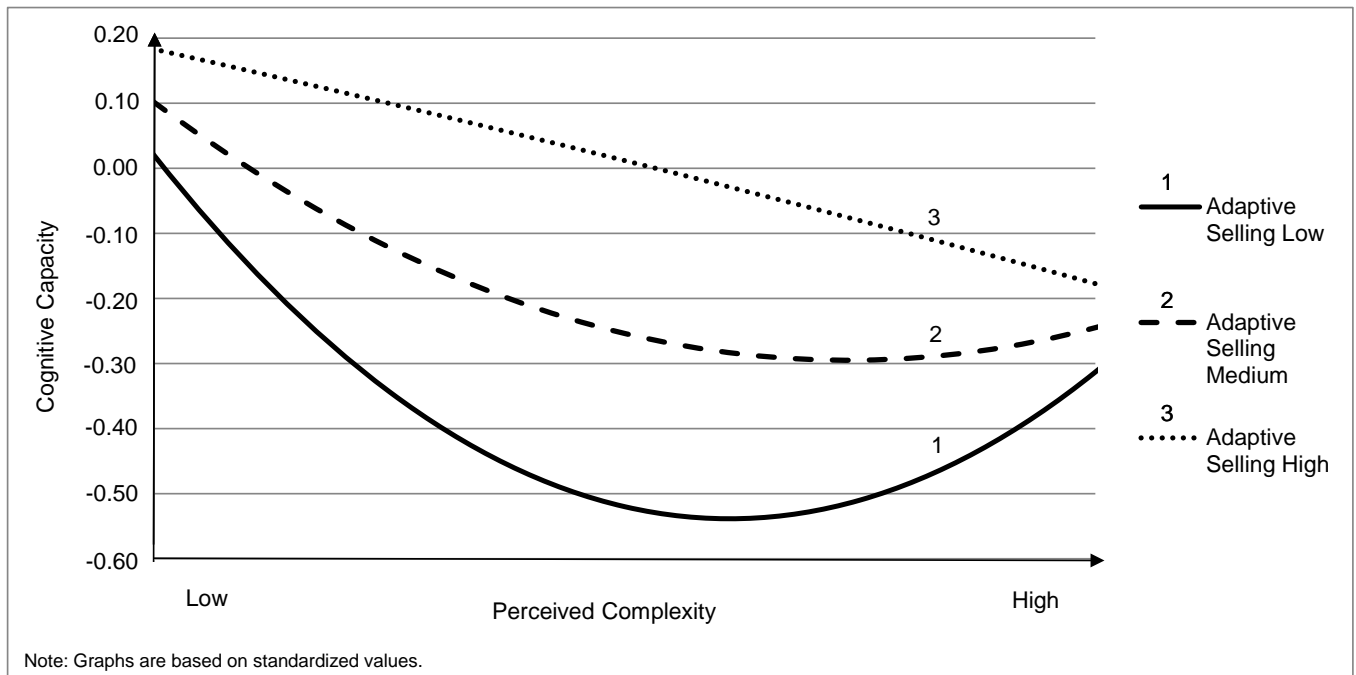


FIGURE 2  
The Moderating Effect of Adaptive Selling



## APPENDIX

### Measurement Scales<sup>a</sup>

Construct (Source)	Items
<b>Perceived service complexity<sup>b</sup></b> (following Holbrook et al. 1984)	7-point semantic differential: The services offered by the bank XXX are... <ul style="list-style-type: none"> <li>• complicated vs. uncomplicated</li> <li>• complex vs. simple</li> <li>• novel vs. familiar</li> </ul>
<b>Customer cognitive capacity<sup>b</sup></b> (following Smets et al. 1995)	Toward the end of the consultation... <ul style="list-style-type: none"> <li>• ... I felt nothing but a kind of emptiness in my head.</li> <li>• ... thinking became really difficult for me.</li> <li>• ... I was distracted and could not concentrate on its contents anymore.</li> </ul>
<b>Customer satisfaction with service encounter</b> (Homburg, Wieseke, and Hoyer 2009)	<ul style="list-style-type: none"> <li>• All in all I am satisfied with the specific service experience today.</li> <li>• The visit today met my expectations of ideal visits in a bank.</li> <li>• The visit in the bank XXX today has fulfilled my expectations.</li> </ul>
<b>Loyalty intentions toward the service firm</b> (based on Homburg and Fürst 2005; Homburg, Wieseke, and Hoyer 2009)	<ul style="list-style-type: none"> <li>• The likelihood of my buying products at/concluding contracts with this bank in the future is high.</li> <li>• I would generally recommend the bank XXX.</li> <li>• I would recommend the bank XXX to friends and family.</li> </ul>
<b>Adaptive selling</b> (Robinson et al. 2002; Spiro and Weitz 1990)	<ul style="list-style-type: none"> <li>• I like to experiment with different sales approaches.</li> <li>• I am very flexible in the selling approach I use.</li> <li>• I can easily use a wide variety of selling approaches.</li> </ul>

<sup>a</sup>If not indicated differently, all scales were measured on a 7-point scale from "totally disagree" to "totally agree".

<sup>b</sup>Reverse coded.