

# When Intelligence Is (Dys)Functional for Achieving Sales Performance

Using two samples of salespeople, the authors investigate how a combination of general mental ability (GMA) and specific skills and capabilities (social competence and thinking styles) enables salespeople to reach their sales goals. The study finds evidence for an interaction between GMA and social competence. When combined with high social competence, high GMA leads to the highest sales performance; when combined with low social competence, high GMA leads to the lowest sales performance. In addition, the authors find interaction effects between GMA and a judicial thinking style. Salespeople with a high GMA have the most potential for attaining high levels of sales performance when combined with specific skills; when salespeople with a high GMA lack these skills, they may become the firm's worst performers.

*Keywords:* sales, knowledge-based marketing, general mental ability, social competence, shaping

**A**s the economy becomes increasingly knowledge intensive, salespeople are tending to sell knowledge-based solutions to customers (Bettencourt et al. 2002). An essential part of selling knowledge-based solutions is transferring knowledge to customers; therefore, salespeople need to act as knowledge brokers (Sarvary 1999). During the sales interaction, both the salesperson and the customer play an active role and, together, cocreate a solution (Vargo and Lusch 2004). This cocreation process takes place through conversations between the customer and the salesperson. For example, salespeople share analogies and cases they previously experienced with other customers to substantiate their solutions (Wierenga and Van Bruggen 1997), and such cases help customers (re)frame and better understand their own needs and conceive of possible solutions that fit those needs (Wotruba 1991). As a consequence, customers may make smarter buying choices that (ideally) conform to the salesperson's solutions and sales propositions (shaping) (e.g., Cross and Sproull 2004). Shaping refers to a cognitive process by which customers, instilled by the salesperson, develop a new representation or concept of their business environment; this results in the development of a new product space (see Rosa et al. 1999).

During this social construction of knowledge-based solutions, customers constantly challenge salespeople's

absorptive capacity (Cohen and Levinthal 1990). Intuitively, it might be argued that cognitive ability, g-factor, or general mental ability (GMA), which reflects a person's innate ability to think flexibly and reason abstractly (Sternberg 2003, p. 20), should play a prominent role. Although this argument may seem straightforward, a closer examination of the literature reveals a debate about this issue. Many researchers argue that GMA is a predictor of job performance (e.g., Kuncel, Hezlett, and Ones 2004; Schmidt and Hunter 2004). Indeed, in their meta-analytic study, Hunter and Hunter (1984) show that GMA predicts salespeople's performance particularly well. However, others report non-significant and close-to-zero correlations between GMA and job performance (e.g., Ceci and Liker 1986; Wagner and Sternberg 1985). Furthermore, Vinchur and colleagues (1998) and Schmitt and colleagues (1984) show only marginal correlations between GMA test scores and sales performance in their meta-analytic studies. Thus, the evidence regarding the relationship between GMA and job performance is mixed.

How can these conflicting findings be explained or integrated? Sujan, Weitz, and Kumar (1994) and Cron and colleagues (2005) propose that traditional views of intelligence assessed through GMA tests are too narrow and should be replaced by a contextual perspective. Contextual intelligence refers to specific applications of a person's intelligence, which, in the context of personal selling, are captured, for example, by the concepts of social competence and thinking styles (Sternberg 1997). As Sujan, Weitz, and Kumar (1994, p. 40) note, "contextual intelligence requires planning or mental preparing, being confident in one's ability to alter behavior, and making situationally appropriate adjustments to behavior." Consistently, we propose that GMA in itself does not predict job performance. Only in interaction with other aspects of intelligence will it have a significant predictive value in explaining job performance. Such a perspective is called the "factorial view" of intelligence. Metaphorically speaking, GMA "is to psychology as

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carbon is to chemistry” (Kuncel, Hezlett, and Ones 2004, p. 148) because it needs to be combined with specific skills, such as social competence, to show its effects. For example, salespeople not only should possess a thorough understanding of the ideas behind the solutions/services they sell to customers (conceptual product space; see Rosa et al. 1999) but also should be able to present that knowledge in relevant and timely ways to customers so that they understand the service’s or product’s value for their firm. Similarly, although abilities such as GMA may be important for executing cognitively taxing tasks, this abstract ability must be applied in concrete situations; being highly intelligent is of no value to a salesperson if he or she does not use this intelligence for specific purposes—for example, to analyze the customer’s situation, judge it, find an appropriate solution that satisfies the customer’s needs, and communicate the solution in clear terms. As Sternberg (1997, p. 9) notes, “How people prefer to think might just be as important as how well they think.”

The goal of this article is to present and test the hypothesis that the relationship between GMA and job performance is moderated by other capacities and skills of the employee. Specifically, we test our predictions in a sales setting. We present a factorial view on intelligence that incorporates two main dimensions: GMA as a person’s cognitive “hardware” and social competence and thinking styles as the corresponding “software.” We hypothesize that the effect of salespeople’s GMA on their performance is contingent on the way they apply and use their cognitive software during customer interactions. We test this hypothesis in two samples. In a first study, we investigate a sample of salespeople in one specific company who sell advertising space to business customers. In a second study, we try to validate the findings of the first study and test their generalizability in a sample covering different industries and involving complex, knowledge-intensive sales tasks.

## The Role of Knowledge in Sales

Authors in sales (e.g., Weitz and Bradford 1999; Wotruba 1991) note that salespeople’s role has changed from order taking to partnering/procreation. They distinguish among the provider/production stage (e.g., informing customers about the firm’s offerings), the persuader stage (e.g., influencing customers by using hard-selling techniques), the problem-solver/marketing stage (e.g., influencing customers by practicing adaptive selling), and the procreation/partnering stage (e.g., coproducing business solutions with customers). As Vargo and Lusch (2004) argue, according to a goods-centered dominant logic, knowledge is treated largely as an exogenous factor, whereas according to a service-centered dominant logic, a salesperson’s skills and knowledge are key resources that render services or produce effects. Thus, knowledge is an endogenous factor in today’s knowledge-based economy (Romer 1986). Vargo and Lusch’s distinction shows similarities with the sales stages that Wotruba (1991) and Weitz and Bradford (1999) introduce. Whereas the first three stages may be viewed as indicators of a goods-centered economy, the procreation/partnering stage can be linked to a service-centered econ-

omy in which knowledge takes a prominent role in explaining exchanges between firms.

To understand and predict the performance of salespeople who operate in the first three stages, researchers have primarily focused on salespeople’s social skills and abilities and have ignored the role of knowledge (e.g., a good understanding of the product space or the customer’s industry; see Weitz and Bradford 1999). Prominent examples are boundary role theory, which concentrates on how salespeople enact a set of activities or behaviors that are determined by the expectations and demands communicated by the salesperson’s role set members (e.g., customers, managers) (Churchill, Ford, and Walker 1990), or adaptive selling, which refers to salespeople’s ability to fashion different sales presentations for different (segments of) customers (Spiro and Weitz 1990). However, as the current-day marketplace enters the partnering/procreation stage, salespeople determine the “buyer’s problems or needs and the solutions to those problems or needs through active buyer–seller collaboration and then [cocreate] a market offering uniquely tailored to match those specific needs of each individual customer” (Wotruba 1991, p. 4). Thus, it might be expected that researchers on sales should focus on the acquisition and transfer of knowledge as a key variable. However, much of the research on sales in the partnering/procreation stage has focused on salespeople’s ability to attain customers’ trust (e.g., Morgan and Hunt 1994) and to establish long-term relationships with them (e.g., Anderson and Weitz 1992). Again, these research questions are mainly centered on social skills and neglect the role of knowledge and related cognitive abilities. In this study, we perceive salespeople as knowledge brokers (e.g., Sarvary 1999); thus, we add a focus on cognitive abilities—that is, GMA—to the research agenda.

## GMA and Its Relevance to the Sales Domain

General mental ability refers to a person’s aptitude to engage in complex tasks that require mental manipulation; this manipulation of information includes discerning similarities and inconsistencies, drawing inferences, and grasping new concepts, and it reflects intelligence in action (Gottfredson 1999). Compared with salespeople with low GMA, salespeople with high GMA are better able to learn to analyze and describe solutions related to, for example, logistics, to distinguish between different features of technology-based solutions and/or products, and to express clearly how their solutions differ from those of the competitors. However, GMA has created a debate on its content validity, especially with the publication of Herrnstein and Murray’s (1994) book, *The Bell Curve*. For example, some authors argue that the source of variation in IQ test scores is not cognitive but rather arises from a “nexus of sociocognitive-affective factors determining individuals’ relative preparedness for the demands of the GMA test” (Richardson 2002, p. 288). Critics of GMA also focus on the predictive validity of GMA test results for job performance. They argue that GMA is merely one element in a factorial (modular) system of intelligence, which, in some

views, consists of dozens of separate abilities that are needed to be successful in everyday life and in professional life (Mackintosh 1998; Neisser et al. 1996). Whereas the unitarian view argues that a general factor of intelligence (GMA) holds predictive validity for job performance, scholars taking a “factorial approach” propose that a broader conception of intelligence (beyond GMA) that encompasses capabilities to cope with tasks of everyday life (i.e., software, such as social competence) results in better predictions of job performance (Carroll 1993; Sternberg et al. 1981). These conclusions have been supported by recent meta-analytic studies on the relationship between GMA and sales performance, which show that GMA is unrelated to (objective) sales performance (see Farrell and Hakstian 2001; Vinchur et al. 1998). As Bertua, Anderson, and Salgado (2005, p. 399) argue, “in the case of sales occupations, additional moderators may impact on the validity of GMA tests.” Research on GMA and job performance has mostly investigated the main effects of GMA in terms of additional explanatory value compared with other factors, such as personality (Barrick, Mount, and Strauss 1994). To date, only a few studies have investigated the interaction between GMA and other variables for predicting job performance in general (social competence: Ferris, Witt, and Hochwarter 2001; emotional intelligence: Cote and Miners 2006) or sales performance in particular (conscientiousness: Mount, Barrick, and Strauss 1999; attributional style: Corr and Gray 1995).

Consistent with the factorial approach of intelligence, authors in sales argue that salespeople need GMA as hardware, for example, to understand the concepts behind the products and solutions they sell, which may be complex. However, in addition, they need software, such as specific skills that allow them to apply their GMA in effective ways and to achieve high contextual intelligence (Cron et al. 2005; Sujan, Weitz, and Kumar 1994). In what follows, we investigate the role of two specific types of software for the area of personal selling: social competence and thinking styles. Social competence is a crucial factor in selling because the personal interaction with people inside and outside the firm is a key aspect of sales. At the same time, salespeople also act as knowledge brokers who need to manage different sources of knowledge (e.g., create new knowledge and help customers integrate it into their existing knowledge; see Weitz and Bradford 1999); key activities of this knowledge-brokering role are captured by the concept of thinking styles. To our knowledge, the effects of these variables (and, in particular, their interaction with GMA) have not been investigated in a sales context to date.

## Social Competence

Social competence is reflected in salespeople’s interpersonal perceptiveness and the capacity to adjust their cognitive abilities to different situational demands to influence and control (if needed) the response of others—predominantly, their customers (see Goleman 2006; Wright 2002). The concept of social competence resembles the construct of adaptive selling in the sales literature (i.e., salespeople’s capacity to alter their sales approaches during or across customer interactions on the basis of their perceptions of the

nature of the selling situations; see Spiro and Weitz 1990, p. 62). However, social competence is broader than adaptive selling; social competence enables salespeople to observe customers’ behaviors within their own social context and to interpret their intentions, goals, and needs. This is the basis for interacting in ways that are mutually beneficial to both the customer and the salesperson. Examples are giving thoughtful explanations of a product/service at the right time to the right person or realizing and correctly understanding a customer’s needs or unexpressed resistances so as to explain properly what a solution means for the customer (perspective taking) (e.g., Zaltman 2003). Similarly, Gardner (1993) notes that people with good social skills not only are more successful in understanding and reading social interactions but also are more adept at evaluating others’ opinions of their own capacities (Goleman 2006). Some authors use the term “social intelligence” (e.g., Goleman 2006); however, as other researchers argue (e.g., Ferris, Witt, and Hochwarter 2001; Hogan and Shelton 1998), social competence may be a more appropriate label for the construct because it is not a stable personal ability, such as GMA, but rather is learned through training and personal experiences.

## Thinking Styles

Sternberg (1997) introduces the concept of thinking styles, defined as a person’s preferred way of using his or her cognitive information-processing abilities. Thus, thinking styles are part of a person’s software and do not correspond to cognitive abilities as GMA does. Thinking styles reflect different ways that people organize or govern themselves, and in this sense, they refer to a theory of self-government (Sternberg 1997). Salespeople need to learn constantly from new and different sources in their sales job (customers, new products and technologies) (Vargo and Lusch 2004) such that they acquire heterogeneous knowledge (Rodan and Galunic 1999) or strategic knowledge (Weitz and Bradford 1999). In this sense, Weitz and Bradford (1999, p. 249) note that that ideal candidates for a sales position in a partnering era are those that have worked in various functional areas of the firm and have experience with the buying firm to which they will be assigned as well as the buying firm’s industry. Salespeople who can integrate different sources of knowledge experience increasing returns in their absorptive capacity because the more heterogeneous knowledge they integrate, the more they can absorb new knowledge from different sources, and ultimately, the better they can shape their customers (Dickson, Farris, and Verbeke 2001; Romer 1986). Thinking styles reflect the way salespeople integrate and transfer that knowledge (e.g., by developing creative new solutions, by strictly following existing sales scripts). Indeed, thinking styles offer a way to analyze the relationship between intelligence and performance. As Sternberg (1997, p. 9) notes, thinking styles may be a powerful source of unexplained variation in job performance. Research has shown that by adding thinking styles, the predictive validity of intelligence for academic achievement could be increased (Grigorenko and Sternberg 1997; Zhang 2001). Therefore, we elaborate on three thinking styles that repre-

sent the functions of self-government: executive, judicial, and legislative (Sternberg 1997).

The executive style can be found among people who prefer to implement and carry out procedures. They like to follow rules, figure out which of already existing ways they should use to get things done, and prefer problems that are prefabricated or prestructured. People characterized by an executive thinking style are particularly valuable for companies that have codified procedures for sales campaigns. People who like to evaluate rules and procedures score high on a judicial thinking style. They enjoy making judgments and prefer problems that require analyzing and evaluating existing ideas. An example is a salesperson who tries to investigate the benefit of a certain solution he or she has used previously in one industry for a new customer in another industry. A legislative style characterizes people who enjoy creating and formulating new solutions to problems (creative play). They prefer problems that are not prestructured or prefabricated; rather, they prefer to structure the problem themselves. Thus, legislative salespeople try to be creative and find new solutions for customer problems, treating every customer as a new case that requires a new, unique solution.

## Hypotheses

In today's increasingly knowledge-based economy, salespeople must constantly assimilate and combine heterogeneous knowledge of solutions and markets (Rodan and Galunic 2004; Weitz and Bradford 1999). Consequently, they also need to transfer this knowledge to customers and stimulate a learning process; customers then may frame their own business situation in new ways, thus enabling salespeople and customers to create a tailored solution jointly (Cross and Sproull 2004; Wotruba 1991). This knowledge-based cocreation process requires salespeople to have elevated cognitive abilities (GMA), which need to be used in social situations and applied to specific practical problems. Therefore, we discuss possible interactions between a salesperson's GMA (hardware) and his or her different skills and abilities (software)—specifically, social competence and the three previously mentioned thinking styles.

### **GMA and Social Competence**

Salespeople with a high social competence and a high GMA will be able to use the essential concepts of their solutions/services (GMA) (product spaces) and to explain them in a language that fits their customers' concerns. Not only are they able to break down complex aspects of the product (space) into specific parts, but they also do so in ways that are relevant to a customer; they can ask the right questions such that they gain insights into the customer's needs and problems. In turn, such an understanding enables them to develop and communicate tailored solutions for customers. They can also compare their solutions with their competitors' offers and express them in clear terms such that customers can absorb the information, imagine what a proposed solution means for them, and then make informed choices. Specifically, in such situations, customers feel psy-

chological safety (e.g., Edmondson 1999) to structure and explore new ways to formulate their business problems and needs and to validate their own intuitions and observations (Cross and Sproull 2004). In addition, salespeople with high GMA and social competence can provide arguments such that people at the customer's firm (e.g., other members of a buying center) become enthusiastic about the presented solution, thus creating an emergent platform within the buying firm that is in favor of the salesperson and supports his or her sales propositions (e.g., Dawes, Lee, and Dowling 1998).

Conversely, salespeople with high social competence but low GMA may be able to understand the social environment in which their customers operate, but they may have a lower understanding of the concepts of their products/services (product space). Therefore, they may be less able to explain and/or codify clearly how their solutions fit the customer's needs or how their offer differs from those of their competitors. Thus, although they may have a good understanding of the customer's concerns or political coalitions within a buying center, they will likely not be able to analyze the customer's business correctly or to develop matching solutions that fit the customer's long-term goals. As a consequence, stimulating and fruitful conversations as the source of the cocreation of a successful business solution cannot emerge (Ferris, Witt, and Hochwarter 2001). Customers who are well informed may even be embarrassed to talk to salespeople that act socially competent but are unable to express the concepts on which their solutions are based. Therefore, we posit the following:

- H<sub>1</sub>: Social competence and GMA have a multiplicative impact on sales performance. Specifically, salespeople's GMA has a positive effect on their sales performance when combined with high social competence.

### **GMA and Thinking Styles**

An executive thinking style is particularly conducive to handling problems that are well structured and for which the organization has a set of rules or guidelines (Sternberg 1997; Zollo and Winter 2002). Salespeople who often use an executive thinking style but score low on GMA may prefer to enter sales conversations while relying on sales presentations or elaborating on solutions that colleagues have already codified (Hansen, Nohria, and Tierney 1999; Walker, Kapelianis, and Hutt 2005). Clear codification of solutions can improve the knowledge transfer to their customers (Kogut and Zander 1996) and may help customers structure their own perceptions and intuitions (Leigh and Rethans 1984). However, salespeople with high GMA who make strong use of an executive thinking style will perform relatively better using this codified knowledge and may have an advantage in these situations. For example, although salespeople may go through a scripted sales presentation (Leigh and Rethans 1984), they need to respond to new and unanticipated questions by quickly analyzing the situation and finding an appropriate, nonscripted answer or solution. Therefore, salespeople who score high on both GMA and an executive thinking style will perform better. Thus, we hypothesize the following:

H<sub>2</sub>: Executive thinking style and GMA have a multiplicative impact on sales performance. Specifically, salespeople's GMA has a positive effect on their sales performance when combined with a high use of an executive thinking style.

Salespeople are perceived as trusted advisers when they are capable of making relevant judgments and recommendations (based on their experiences of similar cases for other customers) about whether the products/services they sell fit the customer's state of affairs before making a concrete sales proposal. This enables the customer to reformulate his or her own business problems and to validate his or her own intuitions about potential solutions (Cross and Sproull 2004). This judging occurs through analogical reasoning; that is, by thoroughly investigating the customer's situation by asking questions, salespeople can transfer useful wisdom to the customer from similar settings (source) they have experienced in the past or from previous business cases stored in their memories (e.g., Gavetti, Levinthal, and Rivkin 2005; Wierenga and Van Bruggen 1997; Zaltman 2003). Salespeople with high GMA who make strong use of a judicial thinking style will be able to manage this analogical reasoning process better; that is, they will more effectively attend to meaningful or deep features of a customer's business problems and then look for similar patterns in cases they have experienced themselves or learned through colleagues or the business literature. This enables them to isolate relevant causes and effects when evaluating similar business situations and to avoid analogies that may be used frequently but share only superficial communalities between target (customer) and source (business case) (e.g., Gavetti and Rivkin 2005; Holyoak and Thagard 1995). The better the analogies the salesperson uses, the better customers can (re)structure and (re)frame their own business situation (and, thus, their needs), which enables them to make better informed choices regarding the salesperson's concrete solution; in turn, this enhances the salesperson's status as a trusted adviser. Conversely, salespeople with low GMA who strongly use a judicial thinking style may enjoy making analogies, but their analogies may only be superficial; that is, their low understanding of both the customer and the business case makes them prone to select only the most obvious features from both target and source, leading to analogies that are not meaningful to customers (Gavetti and Rivkin 2005). Therefore, we predict the following:

H<sub>3</sub>: Judicial thinking style and GMA have a multiplicative impact on sales performance. Specifically, salespeople's GMA has a positive effect on their sales performance when combined with a high use of a judicial thinking style.

When salespeople engage in legislative thinking, they come up with new ideas and problem formulations through divergent thinking (sourcing and understanding of knowledge from various situations) and convergent thinking (combining these ideas into a meaningful and relevant solution) (Perry-Smith and Shalley 2003). These new insights may help salespeople and their customers view their situation and problems from a new and fresh perspective ("thinking outside the box"). However, prior meta-analyses

of sales could not provide evidence for any significant effect of salespeople's creativity on their sales performance (e.g., Barrick and Mount 1991; Vinchur et al. 1998). Salespeople with high GMA who make strong use of a legislative thinking style will likely source knowledge from a wide range of industries and disciplines such that complex, elaborated metaphors are created. Their high GMA and creative thinking styles may produce business solutions (creations) that only experts in the field understand (e.g., Moreau, Lehmann, and Markman 2001). This ability to create new concepts may become a handicap for the salesperson because customers may view these new concepts as too far-fetched, elaborated, and detailed (e.g., metaphors that have a clear scientific foundation). Consequently, such concepts may prohibit customers from structuring their own ideas and intuitions during encounters with the salesperson. In addition, highly innovative ideas may provoke conflict and resistance in customers who are averse to change (e.g., Janssen, Van de Vliert, and West 2004). Salespeople with lower GMA who engage in legislative thinking will likely develop concepts of lower complexity that may be easier to understand for customers and, therefore, are more attractive and appealing. Consequently, creative salespeople with low GMA may be perceived as original and within comprehensible limits. Thus, we propose the following:

H<sub>4</sub>: Legislative thinking style and GMA have a multiplicative impact on sales performance. Specifically, salespeople's GMA has a negative effect on their sales performance when combined with a high use of a legislative thinking style.

## Study 1

### Method

*Procedure and respondents.* A Dutch company selling print advertising provided its cooperation, and all its 171 salespeople participated in the study. Selling advertising space requires a thorough knowledge of different advertisement media and involves communicating how, within a rapid changing cross-media environment, advertisements can reinforce the other messages of firms. Moreover, media research companies provide support material for salespeople in terms of tools that enable them to calculate and communicate concrete advertisement information to customers (e.g., terms such as "gross rating points" or the amount of exposure to a specific target audience are most commonly used); in this sense, the sales task is rather well structured.

The questionnaire consisted of a test for measuring GMA, followed by several scales that assessed participants' social competence and thinking styles. In addition, the company provided objective one-year sales performance figures (sales volumes) for each salesperson. Respondents filled in the questionnaire in groups of ten in the presence of one of the researchers. The sample can be described as follows: Two-thirds (67%) of the participants were men; 25% were younger than age 30, 40% were between the ages of 30 and 40, 20% were between the ages of 40 and 50, and 15% were older than age 50; and the majority had completed the

equivalent of high school (31%) or vocational training (34%), 29% had graduated from college, and 6% held a university degree.

**Measures.** We measured GMA with the Dutch version (Drenth 1965) of the test of nonverbal reasoning. The test consists of 40 exercises. Each exercise consists of ten figures. The first four figures are somewhat similar to one another, and two of the remaining six figures fit with these four. The respondent needed to determine which two of the remaining six figures fit. The test also comprises a time component; the maximum time span available for finding the correct solutions is 20 minutes. The test is nonverbal in character and captures a person's ability to abstract, referring to the perception of relationships between abstract patterns between figures. Such ability corresponds to Spearman's (1904) *g*-factor and Thurstone's general factor (see Gottfredson 1999). The test correlates significantly with the Raven's progressive matrices (Drenth, Van Wieringen, and Hoolwerf 2001).

We measured social competence with Shafer's (1999) social competence scale. The instrument is based on Sternberg and colleagues' (1981) social competence scale and consists of ten items, including "I deal effectively with people." We measured the three thinking styles with three items (executive and judicial style) and four items (legislative style) taken from the work of Sternberg (1997). Responses were given on a seven-point scale ranging from "completely disagree" to "completely agree." Example items are "I enjoy working on things that I can do by following directions" (executive style); "I like situations where I can compare and rate different ways of doing things" (judicial style); and "When facing a problem, I use my own ideas and strategies to solve it" (legislative style).

To test whether the three thinking styles can be differentiated empirically, we conducted a confirmatory factor analysis. Satisfactory model fits are indicated by nonsignificant chi-square tests, root mean square error of approximation (RMSEA) values less than .08, and comparative fit index (CFI) and Tucker-Lewis index (TLI) values greater than or equal to .90 (e.g., Marsh, Balla, and Hau 1996). The results show that the proposed three-factor model provides a satisfactory fit to the data ( $\chi^2(32) = 62.70$ , CFI = .92, TLI = .90, goodness-of-fit index [GFI] = .93, and RMSEA = .07). Because all three thinking styles reflect a person's cognitive style of using his or her GMA, we also tested the fit of a one-factor model for the three thinking

styles. The results indicate that this one-factor model provides an unsatisfactory fit ( $\chi^2(35) = 245.54$ , CFI = .50, TLI = .36, GFI = .76, and RMSEA = .19) and a significantly worse fit than the three-factor model ( $\Delta\chi^2(3) = 182.84$ ,  $p < .01$ ).

We measured sales performance using the net sales volumes (in euros) of the participating salespeople in the year preceding this study. That is, we subtracted the person's sales target from his or her total sales volume to correct for prize and regional influences. In Study 1, we used the objective data as recorded by the company. The descriptives, intercorrelations, and reliabilities of the measures appear in Table 1.

## Results

To test the hypotheses, we carried out a hierarchical linear regression analysis with sales performance as the dependent variable. In the first step, we included the three thinking styles, social competence, and GMA as the independent variables. In the second step, we added the interaction between GMA and social competence. In the final step, we included the interaction terms of GMA on the one hand and the three thinking styles on the other hand. We included interaction terms in the analysis by adding the multiplicative products of the scores of the interacting variables (Aiken and West 1991). All variables in the analysis were centered around their means. Table 2 summarizes the results of the regression analysis.

General mental ability, social competence, and the three thinking styles explained 6% of the variance in salespeople's net sales volume. Adding the GMA  $\times$  social competence interaction term explained an additional 2% of the variance (F-change = 4.35,  $p < .05$ ). When we added the interaction effects between GMA and thinking styles, another 6% of the variance in net sales volume was explained (F-change = 3.16,  $p < .05$ ), resulting in a final explained variance of 14%.

Specifically, both an executive and a judicial thinking style had a significant main effect on salespeople's performance ( $\beta = .26$ ,  $p < .01$ , and  $\beta = -.19$ ,  $p < .05$ , respectively). Salespeople achieved a higher sales volume to the extent that they made use of an executive thinking style and avoided making use of a judicial thinking style. More relevant for the current study, a legislative thinking style in interaction with GMA produced a significant, negative effect on performance ( $\beta = -.23$ ,  $p < .01$ ), as we hypothe-

**TABLE 1**  
Means, Standard Deviations, Intercorrelations, and Reliabilities of the Variables in Study 1 (N = 171)

	M	SD	1	2	3	4	5	6
1. GMA	49.32	12.75	(.87)					
2. Social competence	5.62	.68	.03	(.76)				
3. Legislative thinking style	5.53	.76	-.01	.33**	(.76)			
4. Executive thinking style	4.66	.95	-.08	.08	.34**	(.74)		
5. Judicial thinking style	4.84	.89	-.02	.27**	.19*	.30**	(.70)	
6. Sales performance	-1554.17	25,845.45	-.16*	-.01	.03	.14	-.08	(N.A.)

\* $p < .05$ .

\*\* $p < .01$ .

Notes: Cronbach's alphas are on the diagonal. N.A. = not applicable.

**TABLE 2**  
**Findings of the Regression Analysis in Study 1 (Standardized Regression Coefficients)**

Independent Variables	Dependent Variable: Sales Volume		
	Step 1	Step 2	Step 3
<b>Main Effects</b>			
GMA	-.15	-.12	-.06
Social competence	.02	.01	.01
Legislative thinking style	-.01	-.01	-.01
Executive thinking style	.17	.20*	.26**
Judicial thinking style	-.15	-.15*	-.19*
<b>Interaction Effects</b>			
GMA × social competence		.17*	.24**
GMA × legislative style			-.23**
GMA × executive style			-.05
GMA × judicial style			.19*
F-value ( <i>p</i> -value)	1.80 (n.s.)	2.26 ( <i>p</i> < .05)	2.63 ( <i>p</i> < .05)
R <sup>2</sup>	.06	.08	.14

\**p* < .05.

\*\**p* < .01.

Notes: n.s. = not significant.

sized. The direction of the effect changes in the interaction between a judicial thinking style and GMA ( $\beta = .19$ ,  $p < .05$ ), resulting in a significant, positive effect on sales performance. In addition, as we predicted, the interaction between GMA and social competence had a significant, positive impact on sales performance ( $\beta = .24$ ,  $p < .01$ ). The GMA × executive thinking style interaction was not significant ( $\beta = -.05$ ).

As several authors (e.g., Aiken and West 1991) recommend, we plotted the interaction effects for full interpretation of the results: We fixed the contingent variable (i.e., the software: social competence and thinking styles) at high versus low levels, defined as one standard deviation above or below the mean score. The corresponding plots appear in Figure 1. Here, we similarly defined high and low values of GMA as one standard deviation above or below the mean value.

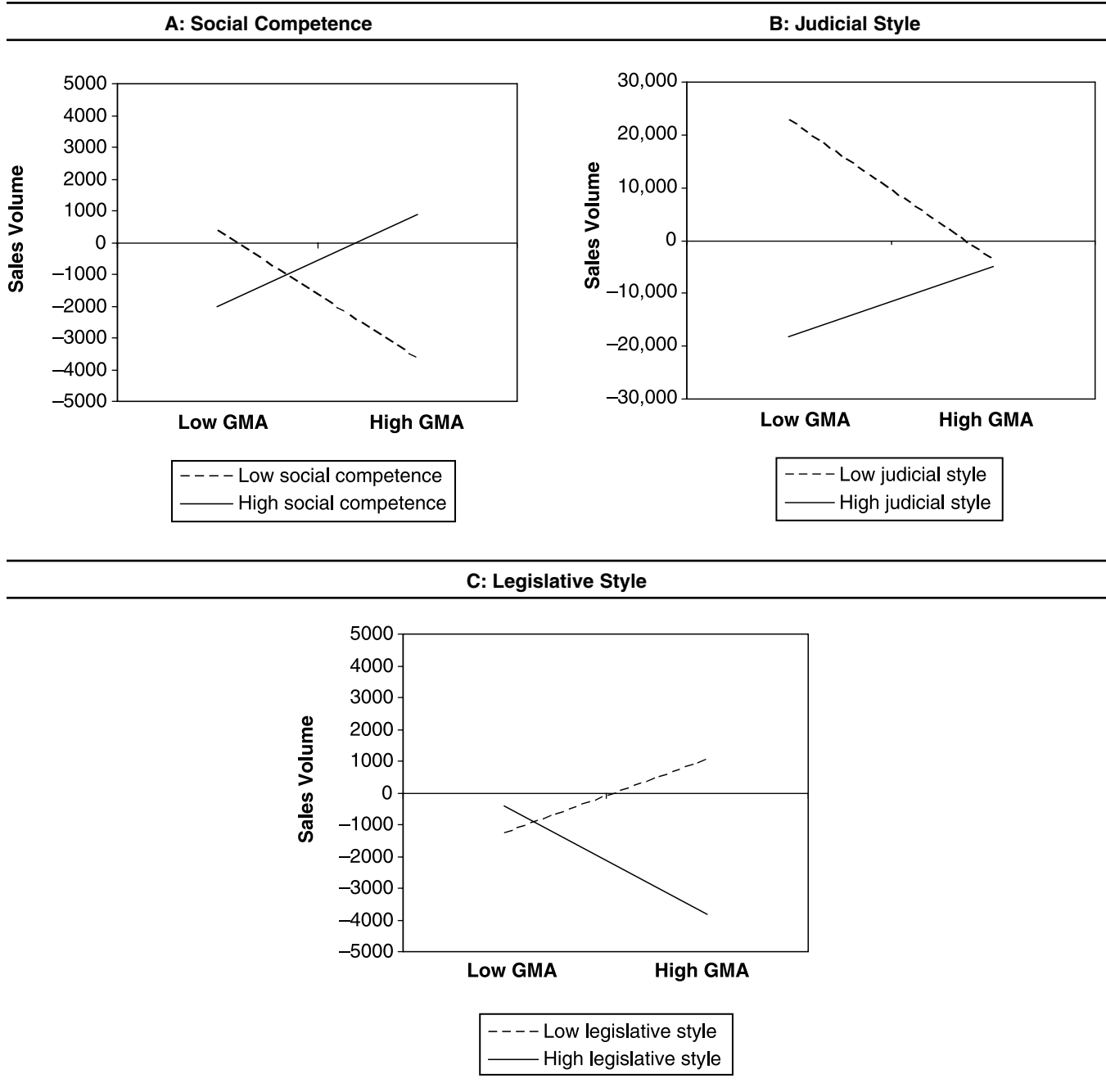
Consistent with H<sub>1</sub>, Figure 1, Panel A, shows that GMA has a positive relationship to sales volume but only when salespeople are high in social competence. Salespeople with low social competence attain lower sales volume with increasing GMA. We find a similar pattern for the interaction between a judicial thinking style and GMA (see Figure 1, Panel B). General mental ability is positively related to sales performance for people who make strong use of a judicial thinking style. In contrast, for salespeople who do not use a judicial thinking style, GMA is negatively related to performance. This means that H<sub>3</sub> is also substantiated. Finally, Figure 1, Panel C, shows the opposite effect for GMA and a legislative thinking style. Here, GMA is negatively (positively) related to sales volume when legislative thinking style is high (low), in support of H<sub>4</sub>. All slopes are significantly different from zero at  $p < .05$ , with the exception of the regression of GMA on performance for a high judicial thinking style; here, the slope is only marginally significant ( $p < .10$ ).

## Discussion

The findings show that salespeople scoring high on both social competence and GMA achieved the highest sales performance. Salespeople might need the ability both to analyze and express the strengths of their own solutions (product space) and to understand customers' needs and issues such that customers and salespeople both can cocreate a solution. Notably, we found that salespeople who scored high on GMA and low on social competence achieved the lowest sales performance. Imagine a salesperson who is good at analyzing, codifying, and expressing information about complex business issues but is not aware, for example, that this information exceeds the customer's ability (absorptive capacity) or is insensitive to the political issues involved in the customer's buying decision process. Such a salesperson might make customers feel uncomfortable, which in turn restrains them from reframing their own problems or issues, causing their actual needs to remain unexpressed. Casciaro and Lobo (2005) label such salespeople as "competent jerks." In other cases, some customers may feel insulted that they cannot easily follow the high-GMA salesperson's arguments and propositions, and as an excuse, they may categorize the salesperson as abstract, aloof, and even politically inappropriate, causing them to communicate in defensive ways.

We also found that salespeople with a low judicial thinking style but a high GMA may be at a disadvantage. The higher the GMA of the salesperson, the more he or she may provide abstract and complex solutions to a customer's business problem without placing them in a specific context. Consequently, it becomes difficult for the customer to understand the salesperson. Instead, the customer may need concrete and solid business cases or analogies to imagine how solutions apply to his or her own business situations

**FIGURE 1**  
**Interaction Effects of GMA on Sales Performance (Study 1)**



(cf. Cross and Sproull 2004; Wierenga and Van Bruggen 1997), which salespeople with low judicial thinking and high GMA may not be able to provide.

Surprisingly, we found that regardless of the salesperson’s GMA, a low use of a judicial thinking style led to higher sales performance than a high use of a judicial thinking style. This finding can perhaps be explained by the nature of the specific sales task we investigated in this study. Selling advertisement space, though it may require judging how a specific advertisement reinforces other media messages from a firm within a larger media space, may be conceived of as a well-structured task. Specifically, sales scripts were available, and salespeople had only a lim-

ited number of potential sales options. In this respect, successful salespeople did not (need to) refer to analogical reasoning and illustrative cases. This is consistent with two other findings: First, the application of an executive thinking style (i.e., following sales scripts) has a positive (main) effect on sales performance. Second, a combination of a high legislative thinking style and a high GMA led to the lowest sales performance; salespeople who are too creative seem to overchallenge their customers, who may not appreciate (or even understand) their associations at all, may experience them as “mental exercises,” and/or may perceive them as too far-fetched and beyond the actual business problem at hand.



## Study 2

Because the findings in Study 1 were based on a sample that was collected within a single company and covered one specific sales task, in Study 2, we investigated whether the findings would hold in a more diverse sales sample that covers different industries and more complex sales tasks. In addition, we included several control variables, such as self-esteem and adaptive selling, to allow for a clearer interpretation of the findings.

### Method

*Procedure and respondents.* We asked 50 Dutch firms to participate in Study 2. Initial contact with the companies was established through some of their employees (salespeople) who attended an executive education program in personal selling at the Institute for Sales and Account Management, Rotterdam. Thirty-one firms agreed to participate (for a response rate of 62%), and they randomly asked up to four of their salespeople to participate in the study ( $N = 107$ ). The sample covered a wide range of industries, such as banking, consultancy, pharmaceuticals, human resource management services, and information technology. Sales tasks were all business-to-business and involved the selling of complex business solutions (products and services). On an Internet site, participants filled in both the GMA test and the questions about their thinking styles and social competence. We also sent a short questionnaire to their sales managers, who provided an evaluation of their sales performance. The sample can be described as follows: Two-thirds (66%) of the participants were men; 33% were younger than age 30, 46% were between the ages of 30 and 40, 16% were between the ages of 40 and 50, and 5% were older than age 50; and 50% had completed the equivalent of high school or vocational training, 35% had graduated from college, and 15% held a university degree.

*Measures.* The measures used were identical to the ones used in Study 1, with one exception. Specifically, we used the same measures for the three thinking styles and social competence. To assess GMA, we used the short version of the test of nonverbal reasoning (see Drenth 1965), which includes 20 exercises and needed to be accomplished within ten minutes.

Unfortunately, it was not possible to get access to objective sales performance data, because some companies were reluctant to give away this information to academic researchers for both privacy and strategic reasons. Therefore, we asked the corresponding sales manager to evaluate the sales performance of his or her salespeople in the preceding year. Specifically, we asked the managers to rate their salespeople's sales performance compared with the average salesperson in their company (on a scale from 1 = "way below average performance" to 7 = "way above average performance"); we did this to ensure a standardized approach that would yield comparable results across industries and sales tasks. Furthermore, we explicitly instructed the managers on the evaluation form to base their ratings on the objective sales data of their salespeople. In our sales performance measure, we focused on sales ratings (i.e., attainment of sales quotas); we used a similar objective performance measure in Study 1. In addition, managers had objective data for their salespeople on this factor, and thus the measure should be less susceptible to individual, subjective rating biases of the manager.

Finally, we included several control variables to test whether sales performance was actually affected by the variables mentioned previously or by other variables from the sales literature that may be related to them (see, e.g., Boorum, Goolsby, and Ramsey 1998). Specifically, we included measures of adaptive selling (16 items taken from Spiro and Weitz 1990), self-esteem (ten items taken from Rosenberg 1965), (dispositional) optimism (six items taken from Scheier, Carver, and Bridges 1994), and conscientiousness (five items taken from John and Srivastava 1999). The reliabilities, descriptives, and correlations of all variables in Study 2 appear in Table 3.

### Results

To validate the findings of Study 1, we conducted a hierarchical linear regression analysis that is comparable to the analysis carried out in Study 1, with sales performance as the dependent variable. The main difference is that we now added adaptive selling, optimism, self-esteem, and conscientiousness as control variables in the analysis. Again, we included interaction terms in the analysis by adding the multiplicative products of the scores of the (mean-centered)

**TABLE 3**  
Means, Standard Deviations, Intercorrelations, and Reliabilities of the Variables in Study 2 ( $N = 107$ )

	M	SD	1	2	3	4	5	6	7	8	9	10
1. GMA	30.24	4.89	(.84)									
2. Social competence	5.65	.63	.04	(.71)								
3. Legislative thinking style	5.24	.93	.12	.30**	(.72)							
4. Executive thinking style	3.57	1.24	.01	-.11	.01	(.69)						
5. Judicial thinking style	5.30	1.00	.09	.19*	.19*	-.15	(.76)					
6. Adaptive selling	5.34	.71	-.03	.48**	.26**	-.05	.29**	(.85)				
7. Conscientiousness	5.36	.59	-.01	.19*	.20*	-.02	.28**	.28**	(.82)			
8. Optimism	5.42	.79	.07	.48**	.35**	-.01	.15	.55**	.19*	(.80)		
9. Self-esteem	5.92	.78	-.09	.45**	.19*	-.18	.10	.42**	.29**	.66**	(.84)	
10. Sales performance	4.57	1.06	.01	.11	.18	-.07	.18	.17	.28**	.23*	.30**	(N.A.)

\* $p < .05$ .

\*\* $p < .01$ .

Notes: Cronbach's alphas are on the diagonal. N.A. = not applicable.

**TABLE 4**  
**Findings of the Regression Analysis (Standardized Regression Coefficients) in Study 2**

Independent Variables	Dependent Variable: Sales Volume		
	Step 1	Step 2	Step 3
<b>Control Variables</b>			
Adaptive selling	-.01	-.09	-.09
Conscientiousness	.20*	.26**	.25**
Optimism	.05	.10	.08
Self-esteem	.25*	.20	.21
<b>Main Effects</b>			
GMA	-.04	-.01	-.01
Social competence	.12	.24*	.17
Legislative thinking style	.08	.07	.07
Executive thinking style	-.03	-.01	-.09
Judicial thinking style	.11	.15	.11
<b>Interaction Effects</b>			
GMA × social competence		.32**	.23*
GMA × legislative style			.07
GMA × executive style			.15
GMA × judicial style			.24*
F-value ( <i>p</i> -value)	1.90 ( <i>p</i> < .05)	2.63 ( <i>p</i> < .01)	2.51 ( <i>p</i> < .01)
R <sup>2</sup>	.18	.25	.30

\**p* < .05.  
\*\**p* < .01.

interacting variables. Table 4 summarizes the results of the regression analysis for Study 2.

General mental ability, social competence, the three thinking styles, and the control variables explained 18% of the variance in salespeople's sales volume. Adding the GMA × social competence interaction term explained an additional 7% of the variance (*F*-change = 8.86, *p* < .01). Adding the interaction effects between GMA and the three thinking styles explained another 5% of the variance in sales volume (*F*-change = 2.18, *p* < .05), resulting in a final explained variance of 30%. Only conscientiousness had a significant main effect on salespeople's performance ( $\beta = .25$ , *p* < .01). Consistent with Study 1, a judicial thinking style in interaction with GMA produced a significant, positive effect on performance ( $\beta = .24$ , *p* < .05), as *H*<sub>3</sub> predicted. Next, as we predicted and in line with Study 1, the interaction between GMA and social competence had a significant, positive impact on sales performance ( $\beta = .23$ , *p* < .05). Thus, *H*<sub>1</sub> is supported. Finally, the interactions between GMA and the other two thinking styles were not significant. Therefore, *H*<sub>2</sub> and *H*<sub>4</sub> are rejected.

As in Study 1, we plotted the two interaction effects for full interpretation of the results by fixing the contingent variable (i.e., social competence and thinking styles) at high versus low levels, defined as one standard deviation above or below the mean score. As in Figure 2, we similarly defined high and low values for GMA as one standard deviation above or below the mean value.

Consistent with *H*<sub>1</sub>, GMA has a positive relationship to sales volume but only when salespeople are high in social competence (see Figure 2, Panel A). Salespeople with low social competence attain lower sales volume with increas-

ing GMA. A similar pattern emerged for the interaction between a judicial thinking style and GMA. Specifically, GMA is positively related to sales performance for people who make strong use of a judicial thinking style (see Figure 2, Panel B). In contrast, for salespeople who do not use a judicial thinking style, GMA is negatively related to performance. This means that *H*<sub>3</sub> is also substantiated. All slopes of the regression lines are significantly different from zero at *p* < .05, with the exception of the regression of GMA on performance for a high judicial thinking style: Similar to Study 1, the slope is only marginally significant at *p* < .10.

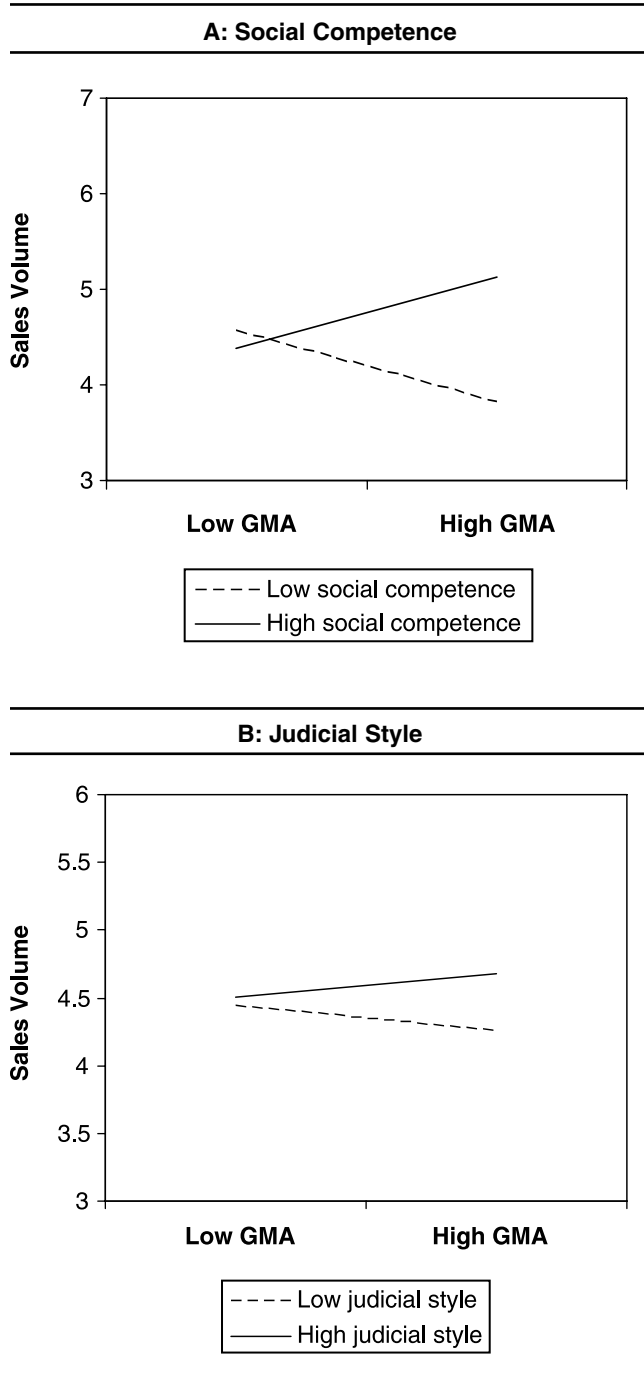
### Discussion

The results of Study 2, which draws on a more diverse sample of salespeople involved in complex sales tasks, replicate two of the findings of Study 1. First, salespeople with high social competence and high GMA achieved the highest sales performance. Second, the interaction between a judicial thinking style and GMA had a (marginally) significant, positive effect on salespeople's performance. Specifically, salespeople with high GMA who exhibited a high judicial thinking style performed best. However, *H*<sub>2</sub> and *H*<sub>4</sub> were not substantiated. In the next section, we further elaborate on the commonalities and differences of the findings of our two samples.

## General Discussion

As salespeople mostly sell knowledge-based solutions in today's marketplace (e.g., Bettencourt et al. 2002; Vargo and Lusch 2004), we suggested that salespeople should possess high GMA, which allows for quick learning and

**FIGURE 2**  
**Interaction Effects of GMA on Sales Performance**  
**(Study 2)**



abstract thinking. The findings of our studies indicate that salespeople with high GMA may indeed have an advantage. To the extent that salespeople act as knowledge brokers, cognitive efforts are also required on the side of the customer; specifically, the salesperson and the customer cocreate a business solution by developing a joint understanding of the shared information and integrating it into a workable solution. Salespeople must be able to manage this sociocognitive process so as to make viable sales propositions to customers. We proposed that salespeople's GMA (cognitive

hardware) interacts with specific skills, such as social competence and thinking styles (software), and we argued that these interactions can help predict sales performance. Such a perspective draws on research that argues for a contextual perspective on intelligence (e.g., Cron et al. 2005; Sujan, Weitz, and Kumar 1994).

The results of our study indicate two main challenges that salespeople with high GMA face if they want to involve the customer in the solution cocreation process. First, salespeople must be able to translate their solutions to customers and phrase the content of the solutions such that customers can express their own business issues and experience psychological safety (Edmondson 1999). The more customers feel comfortable (safe) with the salesperson, the better they can (re)frame their own business problems and absorb how the developed solutions fit their needs. In combination with GMA, salespeople's social competence facilitates this sociocognitive learning process. Second, Axelrod and Cohen (1999) note that the more complex the solutions being offered, the more people rely on others to make informed choices. In a knowledge-based economy, customers seek to source different opinions and/or experiences with others. When salespeople can express the content of their business solutions, customers may (re)formulate their business issues better (Cross and Sproull 2004). Salespeople's judicial thinking style and GMA help them in this endeavor.

A shared pattern of the findings of both studies is that the relationship between salespeople's GMA and their sales performance has a Janus face; that is, salespeople with high GMA became top performers when they also showed high degrees of social competence or a high judicial thinking style, but they also became the worst performers when they did not apply the software sufficiently (i.e., only to a low extent). The main reason for this finding may be that selling knowledge involves the cocreation of knowledge as one of the main aspects. Customers must be able to structure their thoughts during sales interactions. Thus, salespeople need to create a social comfort zone that allows customers to express their needs, ideas, and objections without fear of embarrassment. In this sense, avoiding embarrassing customers by acting as a competent jerk may be one of the most important challenges for salespeople with high GMA (Casciaro and Lobo 2005).

Notably, the combination of low GMA and low social competence came with relatively high sales performance in Study 1. An explanation for this finding may be that to participate in the knowledge cocreation process, customers need to feel psychologically safe (Edmondson 1999). Salespeople with low GMA and low social competence are likely to be perceived as neither intellectually threatening (not overchallenging customers' absorptive capacity) nor socially threatening (e.g., not engaging in micropolitics in buying centers). Especially in well-structured sales situations, such as that of Study 1, in which the input of salespeople may be less needed, this may enable customers to explore and express their actual needs comfortably, which in turn facilitates a successful sales interaction.

Although we could substantiate two of our hypotheses in both samples, the data did not support two other initial

hypotheses. First, we found that the interaction between GMA and an executive thinking style did not affect salespeople's performance significantly. Rather, we found a significant main effect of an executive thinking style in Study 1 that indicates that the role of GMA may be less crucial in well-structured sales tasks. Here, it may be more efficient to develop sales scripts that salespeople should follow. In cases of more complex sales tasks that ask for the absorption of new knowledge (Study 2), it may be more difficult to create valid sales scripts because every customer asks for a unique solution cocreation process that challenges the absorptive capacity of the salesperson (Cohen and Levinthal 1990).

Second, we found that the interaction between GMA and a legislative thinking style was related only to sales performance in Study 1. Again, the specifics of the sales situation may play a role here. Selling advertising space (Study 1) is a relatively well-structured task. Therefore, customers may perceive the development of highly complex and creative business solutions as inadequate, and this may be detrimental to salespeople's performance. This seemed not to be the case for more knowledge-intensive firms and sales tasks (Study 2). Because of the high complexity of the task, customers may not find complex and creative solutions to be inappropriate in such cases.

In summary, the findings of our two studies illustrate that the interaction between salespeople's GMA (cognitive hardware) and specific skills and capacities (software) adds value to explaining sales performance and provides a potentially fruitful avenue for further research. The studies also indicate that the GMA–performance relationship may be contingent on the type of sales task under investigation (well structured versus complex).

What lessons can practitioners learn from these findings? First, selection procedures for sales positions should encompass an IQ test because, depending on their GMA, salespeople should use their software differently to improve their sales performance. Because salespeople with high GMA formed the group of top performers, firms should hire these types of salespeople. Knowledge-based economies are innovative, and the speed by which knowledge needs to be combined constantly increases. For this reason, smart conversations between salespeople and customers will become all the more important. Second, in both samples, salespeople with high GMA and low social competence achieved the lowest sales performance. In Casciaro and Lobo's (2005) terms, they may appear as competent jerks; customers who interact with salespeople with high GMA may intuitively expect them to be socially competent too; such a halo effect of intelligence is a well-known phenomenon in

social psychology. Therefore, salespeople should be assessed and tested for their social competence in addition to their GMA. Because social competence can be learned, social competence training (especially for salespeople with high GMA) is also advisable. From a methodological perspective, role-play training would seem most adequate to fit these needs.

Third, for more complex sales tasks, using business cases proved to be a successful sales strategy. Therefore, salespeople with high GMA should learn to listen to colleagues' business experiences and should remember their own concrete business cases so as to include them in stories to which customers can relate (Zaltman 2003). Salespeople should learn to share their stories (success/failure) with colleagues such that more people in the firm can use them. Similarly, salespeople should be encouraged to publish in trade journals or write internal "white papers" in which they express lessons learned.

## Further Research

The degree of knowledge intensity varies across different sales functions. Weitz and Bradford (1999) distinguish between different stages in selling and different degrees of sales task complexity (from provider stage to procreator stage). Researchers should explore different sales samples that reflect these different complexities of sales tasks to specify further how and when GMA interacts with other skills and capabilities.

Another prominent contextual skill that has received attention during the past years and might interact with GMA is emotional competence (e.g., Goleman 1998). Researchers note that a person's ability to regulate his or her emotions is (e.g., Morris and Feldman 1996) and should be (e.g., Homburg and Stock 2004) an important part of work, especially for customer boundary spanners, such as salespeople. Emotional competence helps people be aware of, regulate, and use their (and others') emotions successfully (Goleman 1998; Saarni 1999). In line with the arguments put forth for social competence, it may be expected that emotional competence interacts with GMA to predict salespeople's performance. Cote and Miners (2006) find evidence that high emotional competence may compensate for a lower GMA; we ask researchers to elaborate on whether this finding also holds for salespeople. Similarly, research has found that the combination of integrity and GMA is more valid as selection criteria than relying on GMA alone (Robertson and Smith 2001). Therefore, further research should also investigate integrity as a potential moderator of the GMA–performance relationship.

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