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ABSTRACT

Business valuations of the same company made by different valuators frequently diverge, resulting in lengthy and costly disputes. This paper takes a novel approach in explaining inconsistencies in business valuations by adopting a psychological perspective and offering a first investigation into the role of cognitive biases in valuations. In two experimental studies (N = 331) we show that valuators can be affected by both anchoring bias and engagement bias (i.e., being affected by a client's interests). These findings cast doubt on the notion of fair value and demonstrate the importance of recognizing the psychology of business valuations. Our contribution is timely considering the current COVID-19 pandemic and its aftermath in which accurate valuations will be paramount, but also extremely complex due to the high degree of uncertainty in the economy and underlying industries.

Introduction

Business valuations are a key component of many business transactions. Consider for example a company that wants to acquire another company or sell a subsidiary. In both instances the value of the target company needs to be determined. Or consider a dispute between shareholders who decide to separate as a result. It is then necessary to determine the value of the shares to allow for these to be transferred. Likewise, when a company experiences financial distress and is facing bankruptcy, a valuator may need to determine whether the company's going-concern value – after a restructuring and/or turnaround – is higher than its liquidation value, as such that a comparison is used to assess whether it makes economic sense to rescue the company (e.g., through debt restructuring). As many businesses are currently on the edge of bankruptcy or have already entered insolvency proceedings, this last example will become increasingly prevalent in the aftermath of the COVID-19 pandemic. It will be of utmost importance that liquidation value and going-concern value after restructuring and/or turnaround are accurately assessed, to ensure for all

stakeholders that the unnecessary further loss of economic value is minimized.

A company's or asset's value is derived from expectations regarding its future earnings. Therefore, valuation theory is predominately focused on the concept of capitalizing or discounting future earnings (Edwards and Warman 1981; Fisher 1930; Parker 1968; Rutterford 2004). Although there are different valuation methods (see for example Brealey, Myers, and Allen 2008; Damodaran 2006; Koller, Goedhart, and Wessels 2015), a widely accepted and common valuation method is the Discounted Cash Flow method (i.e., DCF; Dittmann, Maug, and Kemper 2004; Fernández 2007; Mukherjee, Kiymaz, and Baker 2004; Pereiro 2002). The DCF-method knows different variants[1] and consists of two main variables. The first variable concerns the company's estimated future earnings, predominately expressed in the free cash flows (i.e., cash that is not required for operations or reinvestments; Brealey, Myers, and Allen 2008; Jensen 1986).[2] The second variable concerns the 'discount rate' that reflects the riskiness of the estimated free cash flows. When these two variables are known, the

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application of a relatively simple equation calculates the present value of a company.

The DCF-valuation methodology is, at first sight, a simple and elegant solution to calculate the future value of a company discounted to its present value. However, practice demonstrates that when two or more business valuators value the same company (and assuming all things are equal), different valuation outcomes can emerge. Minor differences in valuation outcomes are to some extent inevitable due to the application of different assumptions in the valuation framework and are generally accepted as an inherent consequence of using the DCF-method. However, large differences are problematic and difficult to explain. For example, in 2016 the Delaware Court of Chancery in the US published its opinion in the Dell Inc. statutory appraisal action (Memorandum Opinion: Apprisal of Dell Inc., 2016)' which arose out of the 2013 management buyout led by the company's founder, Michael Dell. He and an investor acquired Dell for USD 13,96 per share. Some shareholders did not agree with the defined price and started an appraisal proceeding. The petitioners' expert used a DCF-analysis to opine that the company had a fair value of USD 28,61 per share on the closing date, while the respondents' expert used a DCF-analysis to opine that the company had a fair value of USD 12,68 per share on the closing date. Hence, two highly respected valuation experts, applying the same valuation principles, generated opinions that differed by 126%, or approximately USD 28 billion.

Extensive disputes around valuation outcomes are detrimental as ultimately the valuation object's value can be affected by the time and attention a dispute demands. Additionally, strong deviations in assumptions may result in an under- or overvaluation of a company, especially in times of high uncertainty, which influences the quality and soundness of investment decisions (i.e., buy or sell), as well as contribute to potential capital destruction. More pressingly at the moment, unsound business valuations in the context of insolvency risks further destroy economic value if inherently viable companies are unnecessarily liquidated, or, contrastingly, when significant resources are allocated to saving companies with limited prospects to survive. Hence, in order minimize differences in valuation outcomes and thus prevent or at least limit valuation disputes and economic loss of value, the ultimate question is: what causes differences in valuation outcomes?

One cause that has been put forward is that valuators disagree on how to estimate the parameters and inputs when using the DCF-method, in part due to a lack of clear guidelines (Bancel and Mittoo 2014). On top of that, consistency in the valuation process appears to be lacking (Dukes 2001). However, it is unlikely that large differences in valuation outcomes (such as in the Dell case) can solely be accounted for by these issues, which is why we consider the further exploration of potential causes of large differences in valuation outcomes a worthwhile pursuit. We do this by adopting a novel approach, focusing on the psychological processes surrounding business valuations. More specifically, the key focus of the current article is the potential influence cognitive biases might have on business valuations and the evaluations thereof.

Considering the inherent complexity of valuations, the lack of clear guidelines, as well as the time-pressure under which valuations are usually conducted (conditions that allow for biases to emerge; Tversky and Kahneman 1974), it could be that valuations are vulnerable to the influence of cognitive biases (e.g., Damodaran 2009, 2017). Surprisingly, however, despite the numerous studies that have been conducted investigating the role of heuristics and biases in judgment and decision making in a wide range of (financial) contexts, the valuation domain has unfortunately (and to our knowledge) not yet been subjected to this type of research. The current research aims to fill this gap in the literature and provide the first empirical investigation into the potential influence of cognitive biases in business valuations, thereby possibly offering an explanation for the significant differences in valuation outcomes.

Heuristics and biases

Already in the early seventies of the last century, research of Tversky and Kahneman (1974) revealed the powerful effects of heuristics and biases on human judgments, particularly in situations characterized by high degrees of complexity and uncertainty. Since then, ample research has firmly established the persuasive influence of biases on human judgment, also in a financial context. For example, it has been established that financial decisions are plagued by overconfidence on behalf of decision makers (e.g., Ferris, Jayaraman, and Sabherwal 2013; Ho et al. 2016), that investment strategies are typically affected by overoptimism (e.g., Wang, Sheng, and Yang 2013), and that the similarity between startup teams and venture capitalists can affect the latter's investment decisions, such that teams that are perceived as more similar are more likely to receive funding (Franke et al. 2006;

Murnieks et al. 2011). Importantly, however, to our knowledge no empirical research has been conducted investigating the influence of biases on business valuations. This lacuna is surprising considering (1) the vast amount of research conducted on biases in other areas of financial decision making, and (2) the central role that the concept of economic value plays in corporate disputes, mergers and acquisitions, other investment decisions, and in insolvency proceedings. The current research investigates the potential influence of two biases. The first is the anchoring and adjustment bias, which entails the tendency to use an initial piece of information as an anchor and subsequently adjust insufficiently away from that (largely irrelevant) anchor. The second bias under investigation in this study is a bias we call "engagement bias", which entails the possibility that valuators (or any professional for that matter) are affected by their clients' interests. We will now elaborate further on both biases and end each section with our hypothesis of how the particular bias might affect valuators.

Anchoring and adjustment bias

The anchoring and adjustment bias, also called the anchoring effect or anchoring bias, is usually conceptualized as the intuitive tendency of humans to use an initial piece of, predominately insufficient and irrelevant, information in formulating their final judgment (Tversky and Kahneman 1974). In their seminal paper, Tversky and Kahneman (1974) asked participants in an experiment to estimate (among other things) the percentage of African countries in the United Nations (UN). By spinning a wheel of fortune, participants were first presented with a number between 0 and 100 and were asked to indicate whether or not the number determined by spinning the wheel was higher or lower than their estimate of the percentage of African countries in the UN. Next, the partakers were requested to adjust the number generated by the wheel of fortune upwards or downwards to arrive at their estimate of the percentage of African countries in the UN. The results showed that the arbitrary numbers (from spinning the wheel) had an effect on the participants estimates, such that if the wheel landed on 10 the average estimate was 25% while if the wheel landed on 60 the average was 45%. Hence, even with full awareness of the randomness and irrelevance of the numbers generated by the wheel of fortune, participants' estimates were still affected by these anchors. Once an anchor is presented, humans tend to adjust insufficiently away from that anchor, resulting in judgments that are closer

to the anchor than in the absence of that anchor (Heywood-Smith, Welsh, and Begg 2008; Russo and Schoemaker 1992; Tversky and Kahneman 1992).

Anchoring bias poses a particularly great risk in the context of business valuation, as valuators are frequently confronted which numerical estimates of a company's value that may serve as an anchor and subsequently bias the valuator's own estimates. For example, when a business valuator is requested to value a company that his/her client wants to acquire and informs the valuator about the maximum price he is willing to pay, that maximum prize as mentioned by the valuator's client can serve as an anchor. When a court requests a business valuator to determine the economic damages as a result of an unlawful act by one of the parties and the valuator is informed on the amount the claimant had requested earlier, that initial amount can serve as an anchor. Also, when a business owner on the brink of bankruptcy engages a valuator to determine the company's going-concern (in most cases after restructuring and/or turnaround) or liquidation value, the current owner might be convinced that the company is still worth at least a certain amount. Hence, business valuators frequently operate under conditions in which they are confronted with anchors, which may then affect their judgment, ultimately risking poor and costly financial decisions.

To what extent business valuator might indeed be affected by anchoring bias currently remains an open question. On the one hand, extensive research has been conducted on anchoring bias since the original research by Tversky and Kahneman (1974), and the vast amount of evidence across different contexts suggests it is one of the most robust biases (for a review, see Furnham and Boo 2011). Moreover, the anchoring bias appears not to be limited to lay-people's judgments, as research has shown that professionals (e.g., financial market experts, auditors, legal professionals) can be affected by anchoring bias as well when making judgments relevant to their respective fields (Englich 2006; Kaustia, Alho, and Puttonen 2008; Kinney Jr. and Uecker 1982; Liao, Chou, and Chiu 2013).

On the other hand, however, there is some research that suggests professionals in settings that are familiar to them rely less on anchors in their judgments. For example, Kaustia, Alho, and Puttonen (2008) found that financial professionals were less affected by the initial value of stocks (i.e., the anchor) when estimating long-term stock returns than students were. Likewise, Wilson et al. (1996) found that people with more knowledge of a particular subject matter were

less susceptible to anchoring bias. Thus, although the vast majority of research suggests being an expert in a certain field is insufficient to be protected from anchoring effects, there is some evidence that suggests otherwise.

Notwithstanding the discussed research pointing toward an 'expert effect' that might protect experts (to an extent) against anchoring effects, based on the robustness of the anchoring bias and its presence in a variety of domains, we suspect that valuators are affected in their judgments by the anchoring bias. Therefore, we formulated the following hypothesis:

> Hypothesis 1: Valuators are affected by anchoring bias when judging the value of a company, such that they will determine a higher value following a high anchor and a lower value following a low anchor.

We believe it is important to investigate the possible risk of anchoring bias in valuators' judgments because of the particularly dire consequences of this bias in this context. If evidence for anchoring bias is indeed found among valuators, stakeholders of business valuations (e.g., entrepreneurs, valuators, courts) ought to take note of this, take this risk seriously, and devote attention to mitigating the risk this bias poses. Hence, the contribution of investigating this hypothesis lies predominantly in increasing awareness among practitioners of how anchoring bias might be an important factor in causing valuation disputes and economic and societal damage.

Engagement bias

When business valuators (or any professionals for that matter) are (consciously or unconsciously) affected in their judgments such that these favor their clients' interests, we call this engagement bias. Business valuators support a variety of clients for different purposes and are exposed to the demands, wishes, and desires of their clients. Competition between professionals to attract and retain clients can be fierce, and consequently, in order to sustain good relationships with their clients the continuous pursuit by professionals to achieve their clients' satisfaction is not unusual. We therefore ask the question whether in professional engagements the drive to satisfy clients jeopardizes professional autonomy and unconsciously affects supposedly unbiased and objective judgments. Acknowledging the risk that valuators might be susceptible to engagement bias is important, as the possibility exists that clients' interests are somehow factored into business valuations at the expense of focusing solely on valuation theories and the

principles of the profession. Moreover, engagement bias risks obfuscating important valuation judgments, which can ultimately lead to lengthy and costly disputes, as well as significant economic and societal damage.

Even though there is no empirical evidence for the existence of engagement bias in the important context of business valuation, there is reason to believe that professionals weigh their clients' interests at the expense of their professional judgment. For example, following from, among other things, the public debate about the dependence of auditors on their clients, auditors are nowadays monitored more closely by supervising bodies and regulatory authorities to prevent them from taking their clients' interests too much into account. This increased monitoring and the mandatory rotation of audit firms is a consequence of a sequence of auditing scandals where auditors were blamed for tarnishing their responsibilities and their role in society and business by weighing the interests of their clients too much in audits. Such measures suggest there is a concern that professionals are biased in their judgments following from the focus on achieving customer satisfaction. Indeed, in an impactful paper, Bazerman, Morgan, and Loewenstein (1997) argue that complete auditor independence is actually impossible due to the many unconscious psychological processes that bias even the most sincere auditors.

Since then, this notion has been put to the test and research has demonstrated that auditors' judgments can be impacted by pressure stemming from client management. For example, Kadous, Kennedy, and Peecher (2003) find that auditors are more likely to defend and advocate for a particular (aggressive) accounting method when doing so is in line with their clients' preferences, and this congruency is amplified when auditors have to assess and discuss the quality of the used method with an external committee (see also Hackenbrack and Nelson 1996; Koch and Salterio 2017). Their work draws from the theory of motivated reasoning, which in essence entails that people can be unconsciously motivated to arrive at a certain conclusion, all the while being under the illusion of acting objectively (e.g., Hughes and Zaki 2015; Kunda 1990; Sood 2013; Sood and Darley 2012). Once a certain goal outcome is activated, people will subsequently interpret and analyze information in a way that is consistent with this desired outcome, particularly when the situation at hand is rather ambiguous and thus allows for multiple interpretations. It is important to emphasize that such a biased sense-making

process is not an intentional or conscious process, and can therefore affect even those with the most sincere intentions.

Based on the same notion of motivated reasoning, Moore et al. (2003) find that when they ask participants to adopt the role of an auditor, the participants' judgments of a company's value are affected by whether they are representing the seller in a transaction or the buyer. In an attempt to mitigate the observed effects, they motivated participants (using financial incentives) to not be affected by their affiliation with either the buyer or the seller, but this did not have any effect, highlighting the automaticity and pervasiveness of such motivated reasoning processes (see also Church et al. 2015; Koch, Weber, and Wüstemann 2012; Moore, Tanlu, and Bazerman 2010).

In addition to the evidence for engagement bias among auditors, there is also evidence for this bias in other financial judgments. A recent study investigated whether business relations between mutual funds and brokerage firms influences sell-side analyst recommendations, and found that brokerage firm analysts' stock recommendations are in fact higher if the stock is held by mutual fund clients of the brokerage firm (Firth et al. 2013). Interestingly, this phenomenon strengthened when the weight of the stock in the mutual fund clients' portfolio increased and also when the amount of trading commissions paid by the mutual fund clients increased.

Thus, there is evidence that suggests that financial professionals can be biased in their judgments resulting from the dependent relationships with their clients. Whether this also holds true within the context of business valuation however remains an open question. That is, some of the research on auditor independence thus far has not involved professional auditors as participants and there is evidence that auditors with higher levels of expertise are actually less seduced by conflicts of interest in their decision-making (Guiral et al. 2015). Moreover, there is evidence that bias stemming from client pressure is neutralized when auditors experience social pressure to conform to norms set by professionals groups they belong to (King 2002). Combined, these findings indicate that experienced valuators with strong ties to their professional affiliations may be able to resist pressure stemming from clients. Nonetheless, based on the review of the extant literature, we formulated the following hypothesis:

> Hypothesis 2: Valuators are affected by engagement bias when judging the value of a company, such that they will value a valuation object in accordance with their clients' interests.

We consider this to be an important hypothesis to investigate, in particular because of the potential implications for practitioners. Whereas the auditing landscape is being relatively tightly regulated and is under continuous scrutiny of policy makers, the domain of business valuation has not yet seen similar regulatory efforts. In fact, the field currently remains unregulated and apart from some independent and professional association's standard setting, to our knowledge there is no commonly accepted and regulated code of conduct, especially in the arena of small and midsized companies. Hence, evidence for engagement bias among valuators should trigger the attention of policy makers as well as professional associations, with ensuing efforts to mitigate the risk of engagement bias in this area. Such efforts will be particularly timely considering the widespread distress among business in the aftermath of the COVID-19 pandemic and the important role that business valuations play in determining whether a company still represents sufficient value after a restructuring and/or turnaround.

The present studies

To investigate the extent to which business valuators are affected by engagement bias and anchoring bias we designed two experimental studies. In study 1 participants were assigned to the condition in which they represented either the buyer or the seller in a transaction, and in which they were presented with either a high or low anchor. Hence, there were four different conditions (i.e., buyer/low anchor, buyer/high anchor, seller/low anchor, seller/high anchor). In the study, participants were asked to provide a second opinion on an existing valuation report that was presented in a compressed manner. We asked for a second opinion on a compressed valuation report as it was unfeasible to ask participants to conduct a full valuation or to assess a full valuation report considering the time constraints imposed by limitations in participants' availability. Conducting second opinions, nonetheless, is common practice in the valuation industry and often a first step of an in-depth valuation analysis. In study 2 we replicated the first study to verify whether the original findings hold true when the valuation report is created by an independent valuator, rather than by a valuator who represents the interests of the opposing party, ultimately providing further evidence for the robustness of the observed effects.

Study 1 - method

Participants

For this study, 203 business valuation specialists were recruited via e-mail. We targeted the world's leading valuation and corporate finance firms to ensure a sample of highly experienced business valuation experts. For 17 participants, no data was recorded as they failed to pass an attention check, leaving a final sample of 186 participants. Of the final sample, 165 were male (81.3%), the average age was 46.4 ($SD = 13.2$), and the average years of experience in their profession was 17.9 ($SD = 10.70$). Further, 85 (45.7%) had a post-master degree in accounting, 160 (86.0%) were enrolled or had been enrolled in a specialized business valuation course, and 123 (66.1%) had a post-master degree in business valuation. When asked about their primary focus in their work, 113 (60.8%) indicated that business valuation was the primary focus, 57 participants (30.6%) answered M&A, and 16 participants (8.6%) answered accounting; 175 participants (94.1%) indicated that they conduct or are involved in business valuations on a regular basis.

In total, 28 different nationalities are represented in the sample. The five countries with the most participants are the USA with 58 participants (31.4%), the Netherlands with 43 (23.3%), Canada with 23 (12.4%), Italy with 10 (5.4%), and South Africa with 8 participants (4.3%). A complete overview of the participants' nationalities can be found in Section 1 of the supplementary materials available online. For 107 participants (52.7%), English was their native language. The non-native English speakers indicated on a 7-point Likert scale whether they understood the questions and experienced no difficulties in answering the questions, ranging from "Strongly disagree" (1) to "Strongly agree" (7)($M = 6.32$, $SD = 0.97$).

Experimental design

All participants were presented with the same business case (apart from the manipulated variations) and summary of the corresponding valuation report. The current study used a 2×2 between subjects factorial design, with Anchor (low value anchor vs. high value anchor) and Client (seller vs. buyer) as factors. Participants were randomly assigned to either the role of the valuator representing the buyer in the transaction, or of the valuator representing the seller. The value of the company as determined by a DCF analysis was presented as EUR 4.435 million in the low value anchor condition and EUR 14.324 million in the high value anchor condition.

Procedure

Participants were first presented with a brief introduction stating that the purpose of the survey was to investigate judgment and decision-making processes in the context of business valuation. Next, participants were asked to answer questions aimed to measure their locus of strategic control, which is the extent to which participants believe the success of a company is a matter of luck or the result of factors beyond an entrepreneur's control (i.e., external locus) or rather that success is a matter of careful strategic planning and that luck has nothing to do with it (i.e., internal locus). The locus of strategic control scale was incorporated because previous research has shown that this factor is correlated with perceived decline (Musteen, Liang, and Barker 2011) and we wanted to control for this.

Next participants were presented with the business case, followed by an attention check to make sure sufficient time was spent going through the case and the instructions. If the attention check was completed successfully, participants were then presented with the assignment as well as a summary of the valuation report. Before participants were asked about their opinion on the valuation report, several questions were asked to measure the perceived decline of the business. Next, participants were asked to give their opinion on the valuation outcome and to indicate whether they would adjust the valuation upwards or downwards (measured on a 7-point Likert scale) and in which range they believed the true value of the company laid. These three variables (i.e., degree of adjustment, lower bound of the range, upper bound of the range) served as the key dependent variables.

Participants were asked to indicate which elements of the valuation report they believed needed to be adjusted and to motivate their decisions regarding the adjustment of the valuation outcome. Next, participants were asked whether or not they would recommend their client to do the transaction at the value indicated in the valuation report. The final two questions regarding the case aimed to measure 'bias blind spot', which is the tendency to recognize and acknowledge biases affecting other people's judgments, while failing to recognize the potential influence of biases in one's own judgments (Pronin, Lin, and Ross 2002). After the questions pertaining to the case, participants indicated whether English was their native language and, if not, to what extent they understood the case and subsequent questions. Finally, participants were presented with several demographic questions as well as questions about their professional background.

Materials and measurements

Business case

Participants were first presented with a brief introduction of the case and their role in it. For all participants these instructions stated they would be presented with a real-life case of a company (hereafter: 'the Company') in decline that required new capital to perform a turnaround, and for which a private equity firm (hereafter: 'PE firm') was interested in investing in this company. For participants in the "seller" condition, the instructions then stated that the PE firm hired a valuator to determine the value of the Company, but that the management of the Company believed the resulting valuation to be way too low and suspected the PE firm wanted to buy new shares cheap and was too skeptical about the Company's future. Therefore, the Company wanted to hire a valuator themselves for a quick, high level review. Participants were asked to adopt the perspective of the valuator hired by the Company to conduct that high-level review and to have a critical look at the forecast and assumptions made by the PE Firm.

In contrast, participants in the "buyer" condition received instruction stating that the Company hired a valuator and that the PE-firm considered the resulting valuation to be way too high and suspected the management of the Company was too optimistic about the Company's future. Consequently, the PE-firm wanted to hire a valuator themselves for a quick, high level review and participants were asked to adopt the perspective of that valuator. For all participants it was emphasized that the case was described in a somewhat concise manner and was aimed toward simulating a situation in which they are approached last minute for a quick, high level review and have limited time and information. Please find the full instructions in Section 2 of the supplementary material available online.

Next, participants were presented with the full case. The case described a Dutch advertisement and marketing agency ("Flagship") that created large scale marketing campaigns for reputable brands. As a result of declining sales and increasing costs, both the operating result and net income of the company were negative. The company struggled to make the transition toward online and technology driven product offerings, for a large part due to its outdated image. As a result, the company would soon face bankruptcy. The company required new capital to finance a turnaround, but the shareholders had already invested a lot in the past and their funds had now dried up. Therefore, alternative financing options were explored and through a reputable M&A advisor a private equity

firm expressed interest in investing in the company. Both parties (i.e., the company and the PE firm) agreed that a strong turnaround plan needed to be developed. The CEO and his team defined a roadmap to profitability by increasing sales, reducing costs, efficient management of working capital, and making (catch-up) investments (i.e. operational expenditures).

Here, the first part of the case ended. The details of the turnaround plan as well as the full case can be found in Section 3 of the supplementary materials.

Attention check

Considering the importance for the current study that participants knew exactly who their client was and what their client's opinion was regarding the valuation outcome, we incorporated an attention check. Three simple multiple-choice questions were posed: (1) Who is your client, (2) In what industry does the Company operate, (3) What is your client's opinion toward the valuation outcome? If the participant answered one or more questions incorrectly, they were offered a second chance to read the case. After the second reading of the case, participants were again presented with the same three questions. If all three were answered correctly, participants could continue with the survey. If one or more of the questions was again answered incorrectly, participants were informed they could not continue.

Assignment and valuation report

After having read the case and successfully completed the attention check, participants were presented with the second part of the case, which contained the assignment and the valuation report. For participants in both conditions, the position of their client regarding the valuation outcome (i.e., too low or too high) was reiterated and they were again asked to provide a quick, high level review of the valuation conducted by the opposing party. We chose to only include the key elements of the valuation (rather than a full report) and to frame the assignment as a "quick, high level review" primarily due to the time-constraints of the participants. That is, it would not have been feasible to ask participants to generate or asses a complete valuation report from scratch as this would require a large commitment. Nonetheless, the current set-up of a high-level review based on an existing valuation report represents a realistic scenario that professional business valuators are frequently faced with. The generalizability of the current context to a situation in which a valuator conducts a full valuation from scratch are addressed in the general discussion.

The valuation resulted in either EUR 4.435 M (in the low value anchor condition) or EUR 14.324 M (in the high value anchor condition). Each report included (1) a P&L statement, (2) an overview of net working capital, and (3) an overview of tangible fixed assets and investments. All three were provided for the past four years (2014–2017) and forecasted for the next seven years (2018–2024). Additionally, a balance sheet was included, an overview of the cost of capital, the main valuation assumptions, a graph depicting the net sales and EBITDA over the 2014–2024 period, and the final DCF analysis. The graph of the low value anchor report depicted a moderate increase in sales and EBITDA, whereas the graph for the high value anchor report showed the typical hockey stick projection with steep increases in sales and EBITDA. The full valuation reports as presented to the participants can be found in Section 4 (low value anchor) and Section 5 (high value anchor) of the supplementary materials available online.

Primary dependent variables

Valuation adjustment
Participants were asked to indicate on a 7-point Likert scale to what extend they would adjust the valuation outcome upwards, downwards, or keep the outcome as it is. The scale ranged from "Adjust heavily downwards" (1) to "Adjust heavily upwards" (7), with the midpoint (4) labeled as "Remain as it is".

Valuation range
Realizing it is difficult to provide a specific adjustment of the valuation, we asked participants to indicate a range within which they believed the enterprise value of the Company laid. Participants used two sliders to indicate what they believed the minimum value should be (slider 1) and what the maximum valuation should be (slider 2). Both sliders had a maximum range of EUR 0-20 M and were presented on the same screen. The lower bound of the range (i.e., the minimum value) and the upper bound of the range (i.e., the maximum value) each served as a separate dependent variable.

Secondary dependent variables

Valuation components
Below the sliders used the indicate the valuation range, participants were presented with a list of eight components of the valuation report and were asked to indicate which elements they believed needed to be adjusted. Participants had to indicate at least one but could choose more than one option. The eight elements were: (1) net sales, (2) EBITDA, (3) CAPEX, (4) net working capital, (5) cost of capital, (6) the length of the forecast period, (7) residual value, and (8) "other". The answers were subjected to descriptive analyses only and will for brevity purposes not be discussed in this paper. The results can be found in Section 6 of the supplementary materials online.

Adjustment motivation
Participants were asked to motivate their answers to the questions pertaining to the adjustment of the valuation outcome and the elements of the valuation. This allowed us to observe whether some participants were possibly aware of the influence a client might have on their judgment (i.e., engagement bias) as well as the potential anchoring effect of being presented with a figure prior to evaluating a valuation object. In other words, were participants consciously aware of the potential anchoring effects and engagement bias (albeit unlikely to be defined as such) or do these biases affect a valuator's judgments largely in an unconscious manner?

Perceived decline
Seven questions together aimed to capture the perceived decline of the business and included items such as "Despite the poor performance of the last few years, Flagship has the means to resolve the challenges presented by its environment" and "Flagship will likely fail any day and declare bankruptcy". The complete list of all seven items can be found in Section 7 of the supplementary materials. Participants answered on a 7-point Likert scale ranging from "Strongly disagree" (1) to "Strongly agree" (7). Items were recoded such that a higher score indicated the participants perceived the decline as more severe. The seven items were derived from the 18-item scale used by Musteen, Liang, and Barker (2011), which the authors largely based on the work of Jackson and Dutton (1988). The Cronbach's alpha in the Musteen, Liang, and Barker (2011) study for all 18 items was .75. In the current study the Cronbach's alpha for the seven items was .74.

Recommendation
Participants were asked to what extent they would recommend their client to do the transaction at the value as listed in the valuation report. Participants answered on a 7-point Likert scale ranging from "Definitely not" (1) to "Definitely yes" (7).

Bias blind spot

Participants were asked whether they believed the valuator hired by the opposing party was affected in her/his judgments because of the interests of their client and whether they believed they themselves were affected in their judgment because of the interests of their client.

Control variables

Gender

Considering the unequal distribution of males and females in the current sample (165 men, 21 females), gender was entered as a control variable to account for any differences that might arise as a result.

Locus of strategic control

The locus of control strategic scale was incorporated because previous research has shown that this factor predicts perceived decline (Musteen, Liang, and Barker 2011) and we wanted to control for this. Similar to the Musteen, Liang, and Barker (2011) study, we based the locus of strategic control items on the work of Hodgkinson (1992) who created and validated this scale (see also Ritchie, Anthony, and Rubens 2004; Ritchie and Sherlock 2009). However, instead of the 16 items used in these previous studies, who only incorporated 10 of the items in our scale (which were selected based on the fit with the current context) to reduce the time required to complete the scale. The scale included items such as "Market opportunities in an industry are largely determined by factors beyond a company's control", or "Many of the problems experienced by businesses can be avoided through careful planning and analysis". Please see Section 8 of the supplementary materials for the complete scale. Participants answered on a 7-point Likert scale ranging from "Strongly disagree" (1) to "Strongly agree" (7). Items were recoded such that a higher score indicated a more external locus of strategic control.

Musteen, Liang, and Barker (2011) obtained a Cronbach's alpha of .72, whereas within our sample the internal consistency was .51. An exploratory factor analysis identified three factors based on Eigenvalues above 1. Combined these three factors explained 34% of the variance. However, the items belonging to the three factors did not clearly represent subcomponents of locus of strategic control, which is why we averaged all the items as a single scale. Still, given the low internal consistency it remains uncertain whether combined the items measured a single construct.

Hence, the results pertaining to this control variable should be interpreted with caution.

Maturity

Another variable that has been shown to be associated with perceived decline is maturity, in previous research defined as a combination of age, experience and whether or not someone was pursuing an executive MBA (Musteen, Liang, and Barker 2011). In the current research we included both age and experience as separate control variables.

Results

Data preparation

Considering the importance of reading the case thoroughly and having a good understanding of the business' current situation and future prospects, participants who spent less than 45 seconds reading the case were excluded from analyses. Reading the case consisting of 648 words within 45 seconds would require a reading speed of 21.2 standard deviations (1 $SD = 30$ words/minute) above the average reading speed ($M = 228$ words/minute) in the English language (Trauzettel-Klosinski and Dietz 2012). As a result of this criterion, 7 participants were excluded from further analyses, leaving a final sample size of 179.[3]

Anchoring and engagement bias

First, we conducted a Multivariate Analysis of Covariance (MANCOVA). The variables anchor (low vs. high value) and client (seller vs. buyer) were entered as independent variables, and gender, age, years of experience, and locus of strategic control as control variables. For the dependent variables we included the valuation adjustment, valuation range (lower bound and upper bound as separate variables), perceived decline, and the final recommendation.

Results showed that there were significant main effects for anchor, $F(5, 167) = 72.30$, $p < .001$, $\eta_p^2 = .68$, and client, $F(5, 167) = 56.87$, $p < .001$, $\eta_p^2 = .63$, as well as a non-hypothesized interaction effect between these two variables, $F(5, 167) = 2.97$, $p = .014$, $\eta_p^2 = .08$. Table 1 shows the Pearson correlations for the included variables and Table 2 shows the results of the MANCOVA. This table also contains the results of the model without the covariates.

Subsequent univariate analyses showed that the main effect for anchor was only significant for the variables measuring the lower bound of the value

Table 1. Pearson correlations for the independent variables, dependent variables, and control variables of study 1.

	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Anchor (0 = Low, 1 = High)			–	−.01	−.07	.48**	.67**	.02	.04	.06	.00	−.04	.03
2. Client (0 = GEP, 1 = Company)				–	.50**	.30**	.31*	−.07	.75**	.17*	−.06	−.06	−.08
3. Adjustment	2.53	1.29			–	.50**	.49**	−.23**	.32**	.14	−.07	−.07	.04
4. Value lower bound	4.04	3.72				–	.78**	−.23**	.28**	.13	−.10	−.08	−.07
5. Value upper bound	6.92	4.65					–	−.16*	.28**	.13	−.09	−.11	.06
6. Perceived Decline	4.48	.82						–	−.06	−.14	.12	.10	.08
7. Recommendation	3.62	2.09							–	.15*	−.10	−.07	−.06
8. Gender (0 = M, 1 = F)										–	−.13	−.11	−.07
9. Age	46.17	12.86									–	.84**	.03
10. Experience	18.09	10.65										–	−.00
11. Locus of Strategic Control	3.15	.58											–

Table 2. Results of the MANOVA and MANCOVA of Study 1 (i.e., with and without the control variables entered in the model).

Independent Variables	$F(5, 171)$	p	η_p^2	$F(5, 167)$	p	η_p^2
Anchor	73.83	<.001	.68	72.30	<.001	.68
Client	60.08	<.001	.64	56.87	<.001	.63
Anchor * Client	2.72	.022	.07	2.97	.014	.08
Control variables						
Gender				0.61	.69	.02
Age				0.63	.67	.02
Experience				0.43	.83	.01
Locus of Strategic Control				1.73	.13	.05

range, $F(1, 171) = 60.62$, $p < .001$, $\eta_p^2 = .26$, and the upper bound of the value range, $F(1, 171) = 181.19$, $p < .001$, $\eta_p^2 = .51$. Specifically, participants in the low value anchor condition gave a lower value for the lower bound of the value range ($M = 2.26$, $SD = 1.48$) than participants in the high value condition did ($M = 5.83$, $SD = 4.40$). For the upper bound the same pattern emerged, as the average value for the upper bound indicated by participants in the low value anchor condition was lower ($M = 3.82$, $SD = 1.66$) than the value indicated by participants in the high value anchor condition. ($M = 10.06$, $SD = 4.59$). No such anchoring bias in valuators' judgments was found for the variable measuring the valuation adjustment in qualitative terms ($F = 1.14$), perceived decline ($F < 1$), or the final recommendation ($F < 1$).

The main effect for client was significant for the variables measuring the adjustment of the valuation qualitatively, $F(1, 171) = 53.74$, $p < .001$, $\eta_p^2 = .24$, the lower bound of the value range, $F(1, 171) = 20.85$, $p < .001$, $\eta_p^2 = .11$, the upper bound of the value range, $F(1, 171) = 37.71$, $p < .001$, $\eta_p^2 = .18$, and for the final recommendation, $F(1, 171) = 212.74$, $p < .001$, $\eta_p^2 = .55$. For the valuation adjustment, participants representing the buyer believed the valuation should be adjusted downwards more heavily ($M = 1.89$, $SD = 0.79$), than participants representing the seller (the Company) ($M = 3.17$, $SD = 1.38$), as can be seen in Figure 1. Likewise, those representing the buyer indicated a lower value for the lower bound of the valuation range ($M = 2.93$, $SD = 3.03$) than those
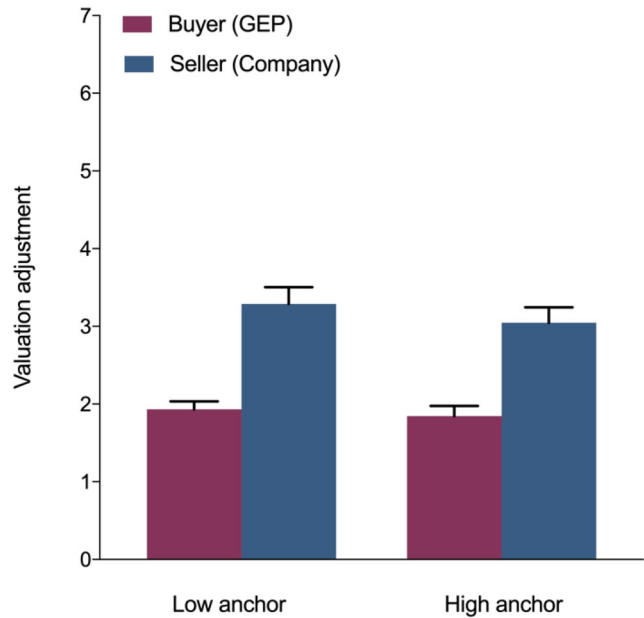

Figure 1. Average valuation adjustment for participants of Study 1 in the low value and high value anchor condition, separated by client (buyer vs. seller).
Note: Scores below to midpoint (4) indicate adjustments downwards and scores above the midpoint indicate adjustments upwards.

representing the seller ($M = 5.16$, $SD = 4.03$). The same was true for the upper bound, where those representing the buyer gave a lower value for the upper bound ($M = 5.49$, $SD = 3.75$) than those representing the seller ($M = 8.36$, $SD = 4.59$).

The interaction effect between anchor and client was significant for the lower and upper bounds of the valuation range. Analyses decomposing these interaction effects showed that for the lower bound of the valuation range, the effect of client was significant both for the low value anchor, $F(1, 88) = 36.08$, $p < .001$, $\eta_p^2 = .29$, and for the high value anchor, $F(1, 87) = 10.84$, $p = .001$, $\eta_p^2 = .11$, but that the effect was significantly larger for the former (although both effect sizes can be considered large in magnitude; Cohen 1988). For the upper bound of the valuation
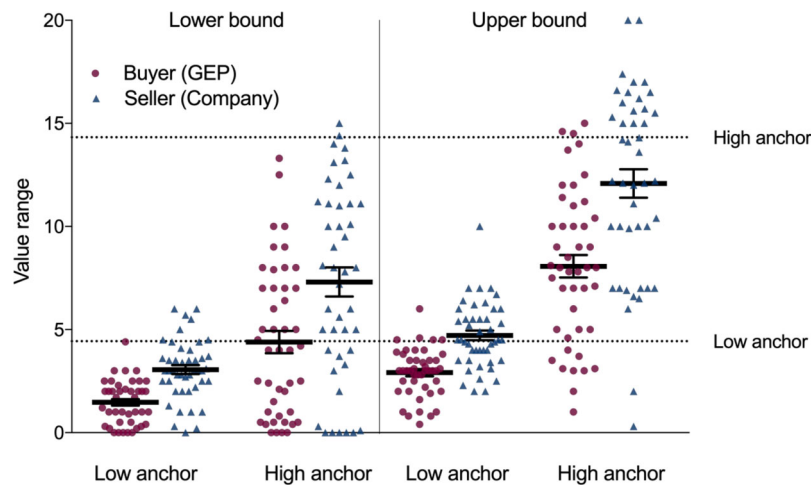
Figure 2. Individual data points of Study 1 for the dependent variables measuring the lower bound (left pane) and upper bound (right pane) of the indicated valuation range, for participants in the buyer condition (purple circles) and seller condition (blue triangles), separated by the value of the anchor (low value vs. high value).
Note: The two horizontal dotted lines represent the value of the high anchor (14.324M) and the low anchor (4.435M) as presented in the valuation report.
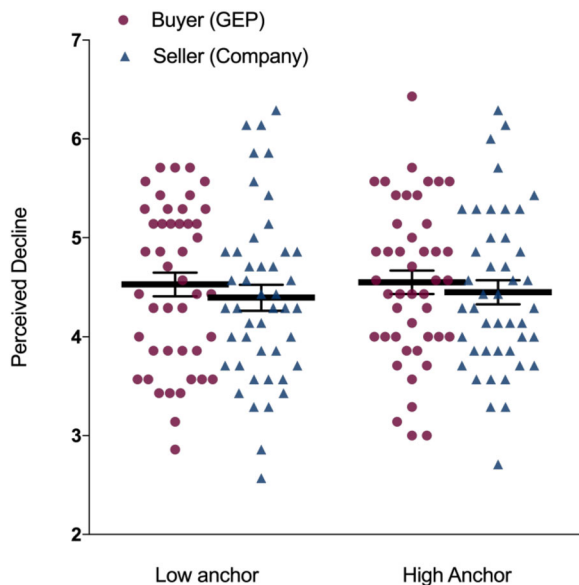
Figure 3. Individual data points of perceived decline for participants representing the buyer (purple circles) or seller (blue triangles) with the averages and error bars per anchor and condition indicated by the horizontal black lines.

range, the same pattern emerged. That is, the effect of client was significant both for the low value anchor, $F(1, 88) = 37.82$, $p < .001$, $\eta_p^2 = .30$, and for the high value anchor, $F(1, 87) = 20.84$, $p < .001$, $\eta_p^2 = .19$, but again the effect was larger for the former. The observation that the effect size was larger for the low value anchor in both the lower bound and upper bound was largely driven by the smaller amount of variance in the low value anchor relative to the high value anchor. The mean

differences were actually larger for the high value anchors (2.90 for the lower bound and 4.02 for the upper bound) than for the low value anchors (1.59 for the lower bound and 1.81 for the upper bound). The reduced amount of variance in the low value anchor condition can perhaps be explained by a floor effect, given that the anchor was at the bottom end of the scale and the responses clustered around that anchor, which can clearly be seen in Figure 2 that depicts the average values for both the upper and lower bound, and for both levels of the anchor and client variable.

Notably, no effects of anchor or client were found for perceived decline. Rather, it appears that all participants converged with respect to the perceived decline of the business (see Figure 4). This is noteworthy as it suggests that the observed biases exist despite the fact that participants across the conditions viewed the economic state of the company roughly the same.

With respect to the final recommendation, as can be seen in Figure 3, the data show that participants representing the buyer generally recommended their client to not go forward with the transaction as indicated by an average score below the midpoint of the scale ($M = 2.02$, $SD = 1.25$). Participants representing the seller, however, generally recommended their client to do the deal at the initial value (i.e., the anchor) ($M = 5.22$, $SD = 1.50$). The level of the anchor (i.e., low vs. high value) did not interact with the client variable ($F < 1$), suggesting that irrespective of the value presented in the valuation report, participants believed the deal was an attractive one for the seller but much less so for the buyer.
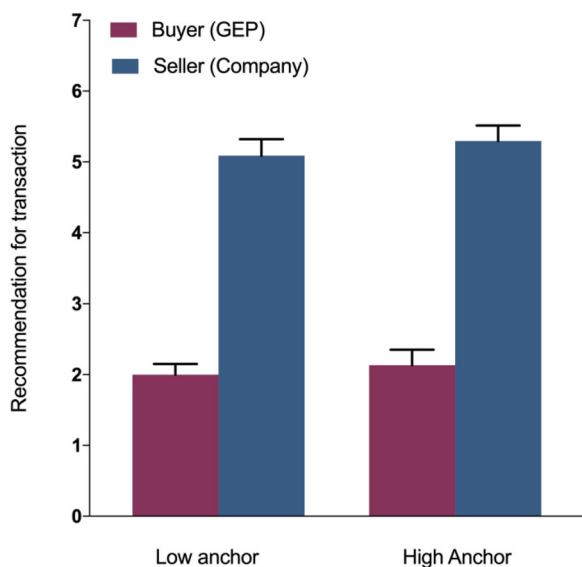
Figure 4. Average recommendations scores in Study 1 for each anchor, separated by client condition.
Note: Scores below the midpoint (4) indicate the participants would not recommend their client to go forward with the transaction, and scores above the midpoint indicate the participants would recommend their client to do the deal.

Bias blind spot

Whereas 58.7% believed the valuator representing the opposing party was biased, only 25.1% believed they themselves were biased. Interestingly, when decomposing these figures based on who the valuators represented, 78.9% of the participants representing the buyer (i.e., GEP, the PE-firm) believed the valuator hired by the seller (the Company) was biased, whereas 'only' 38.2% of the participants representing the seller believed the valuator hired by the buyer was biased. When reflecting on their own potential biases, 32.2% of the participants representing the buyer indicated they suspected they were affected by their client's interests, whereas only 18.0% of the participants representing the seller believed they were biased as a result of their client's interests. Hence, the data provide evidence for the existence of a bias blind spot, meaning participants recognized the potential biasing effect that representing the interests of a certain client might have on others, while generally failing to acknowledge the potential bias in their own judgments.

Discussion study 1

Study 1 set out to examine whether valuators can be influenced by factors that should not have any bearing on their assessment of a company's value or of other valuations. We found clear evidence for the existence of both anchoring bias and engagement bias. That is,

when valuators are confronted with a valuation report and are asked to indicate in what range they believe the true value of the company lays, they use the initial value as an anchor and indicate a higher range in case of a higher anchor, and a lower range in case of a lower anchor. Also, valuators appear to be affected by their clients' interests, such that they indicate that a valuation should be adjusted in accordance with their clients' interests. Specifically, when they represent a buyer and therefore have an incentive to lower the value of the shares, they also indicate the valuation should be adjusted downwards more heavily and also indicate a lower value range for the true value of the company. The opposite is the case when they represented the seller. Combined, these data show that participants did not so much disagree on the fact that the forecasts were too optimistic and that it needed to be adjusted downwards, but rather by how much. The question by how much the valuation needed to be adjusted downwards appeared to be largely determined by the anchor and the interests of the client that the valuator represented. These effects seem to be unrelated to the valuators' perceptions regarding the degree of decline of the company. Hence, despite converging views on the economic state of the valuation object, valuators still suggest adjusting the valuation in accordance with their client's interest and they stay relatively close to the initial value (i.e., the anchor).

Importantly, however, an alternative explanation can be put forward for the observed engagement bias. Rather than being affected by their clients' interests, it could be that the valuators in Study 1 distrusted the accuracy of the valuation report since they believed the valuator hired by the opposing party was biased as a result of their client's interest, and that they therefore adjusted the valuation accordingly to compensate for this fact. Such a process is called reactive devaluation, which entails that proposals or arguments are devalued by a party due to the mere fact that they were put forward by an opposing party (Ross, et al. 1995; Ross and Stillinger 1991). This alternative explanation would be in line with the finding that the majority of the respondents indeed believed the valuator representing the opposing party was biased, particularly when this other valuator represented the company. Hence, it is important to investigate whether the findings of Study 1 hold true when the valuation report was created by an independent valuator, rather than by a valuator who represents the interests of the opposing party. If the same effects are found, this would rule out the possibility that the valuators in Study 1 were distrustful toward the valuation

Table 3. Pearson correlations for the independent variables, dependent variables, and control variables of study 2.

	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Anchor (0 = Low, 1 = High)			–	.03	−.29**	.41**	.66**	.18*	−.04	−.20*	.08	.04	−.02
2. Client (0 = GEP, 1 = Company)				–	.41**	.23**	.23*	.10	.69**	.06	−.02	.01	.07
3. Adjustment	2.64	1.24			–	.44**	.26**	−.22*	.36**	.09	−.15	−.14	.27**
4. Value lower bound	4.11	3.62				–	.70**	−.18*	.20*	.01	−.07	−.10	.11
5. Value upper bound	7.68	4.50					–	−.02	.22*	−.10	−.01	−.15	.12
6. Perceived Decline	4.28	.83						–	.05	−.06	.17*	.12	.08
7. Recommendation	3.63	1.81							–	.06	−.06	−.08	.09
8. Gender (0 = M, 1 = F)										–	−.21*	−.20*	−.09
9. Age	43.43	14.06									–	.85**	−.00
10. Experience	16.29	10.81										–	.03
11. Locus of Strategic Control	3.20	.66											–

report due to the fact that it was made by someone representing the opposing party, thereby providing further evidence that engagement bias can account for the observed findings in Study 1.

Study 2 aimed to do exactly that and had two specific goals. First, Study 2 aimed to replicate the findings of Study 1 to provide more robust evidence for the observed findings. Second, it aimed to test whether the reactive devaluation hypothesis can account for the observed engagement bias found in Study 1, or whether participants were indeed affected by their clients' interests.

Study 2 method

Participants

In total, 160 business valuation specialists, none of whom also participated in Study 1, were recruited via e-mail. Of this group, 15 participants (9.4%) did not pass the attention check, meaning the final sample consisted of 145 participants. We again targeted the world's leading valuation and corporate finance firms to ensure a sample of highly experienced business valuation experts. Of the final sample, 119 were male (82.1%), the average age was 43.4 ($SD = 14.2$), and the average years of experience in their profession was 16.3 (SD = 11.1). Sixty-one (42.1%) had a post-master degree in accounting, 118 (81.4%) were enrolled or had been enrolled in a specialized business valuation course, 83 (57.2%) had a post-master degree in business valuation, 98 (67.6%) indicated that business valuation was their primary focus in their work, for 40 participants (27.6%) this was M&A, and for 7 participants (4.8%) this was accounting; 125 participants (86.2%) indicated that they conduct or are involved in business valuations on a regular basis.

In total, 28 different nationalities are represented in the sample. The five countries with the most participants are the USA with 50 participants (34.5%), Canada with 22 (15.2%), Italy with 12 (8.3%), Germany with 8 (5.5%) and the United Kingdom with 6 participants (4.1%). A complete overview of the participants' nationalities can be found in Section 9 of the supplementary materials available online. For 107 participants (62.8%), English was their native language. The non-native English speakers indicated on a 7-point Likert scale whether they understood the questions and experienced no difficulties in answering the questions, ranging from "Strongly disagree" (1) to "Strongly agree" (7) ($M = 6.20$, $SD = 1.22$).

Design, procedure, and measurements

Study 2 was identical to Study 1 apart from one crucial aspect. In Study 1 it said in both the introduction of the case as well as in the assignment that "To determine the value of the Company, [the Company/ the PE firm] hired a valuator". In Study 2, the introduction of the case stated: "To determine the value of the Company, both parties agreed to hire an independent valuator", and the assignment stated: "To evaluate the possible entrance of GEP as a new shareholder and to anticipate a possible dilution discussion, the Company and PE firm hired an independent valuation firm to conduct a DCF-valuation of the Company, taking into account the effects of the turnaround plan". Hence, the participants of Study 2 knew that the valuation report they were going to evaluate was made by an independent valuator who therefore could not have been affected by any stakeholder's interests.

The Cronbach alphas were .62 for the locus of strategic control scale and .68 for the perceived decline scale.

Results

Data preparation

Based on the same criterion as in Study 1, seven participants were excluded from further analyses, leaving a final sample of 138.[4]

Table 4. Results of the MANOVA and MANCOVA of Study 2 (i.e., with and without the control variables entered in the model).

Independent Variables	$F(5, 130)$	p	η_p^2	$F(5, 126)$	p	η_p^2
Anchor	59.66	<.001	.70	59.01	<.001	.70
Client	29.10	<.001	.53	28.97	<.001	.54
Anchor * Client	2.45	.037	.09	2.66	.025	.10
Control variables						
Gender				0.52	.761	.02
Age				3.42	.006	.12
Experience				4.62	.001	.16
Locus of Strategic Control				2.94	.015	.10

Anchoring and engagement bias

We again conducted a MANCOVA and the results showed that there were significant main effects for anchor, $F(5, 174) = 72.91$, $p < .001$, $\eta_p^2 = .68$, and client, $F(5, 174) = 62.74$, $p < .001$, $\eta_p^2 = .64$, as well as interaction effect between these two variables, $F(5, 174) = 3.13$, $p = .010$, $\eta_p^2 = .08$. Table 3 shows the Pearson correlations and Table 4 shows the results of the MANCOVA.

The main effect for anchor was significant for the variables measuring the valuation adjustment, $F(1, 130) = 15.41$, $p < .001$, $\eta_p^2 = .11$, the lower bound of the value range, $F(1, 130) = 30.05$, $p < .001$, $\eta_p^2 = .19$, the upper bound of the value range, $F(1, 130) = 118.51$, $p < .001$, $\eta_p^2 = .48$, and the perceived decline, $F(1, 130) = 4.00$, $p = .048$, $\eta_p^2 = .03$. Participants believed the valuation should be adjusted downwards more heavily in the high value anchor condition ($M = 2.30$, $SD = 1.22$) than in the low value anchor condition ($M = 3.02$, $SD = 1.17$), which is shown in Figure 5. Replicating Study 1, participants in the low value anchor condition gave a lower value for the lower bound of the value range ($M = 2.54$, $SD = 1.21$) than participants in the high value anchor condition did ($M = 5.50$, $SD = 4.42$). Also replicating Study 1, the average value for the upper bound indicated by participants in the low value anchor condition was lower ($M = 4.53$, $SD = 1.45$) than the value indicated by participants in the high value anchor condition. ($M = 10.48$, $SD = 4.45$). In contrast to Study 1, an effect of anchor was found for the perceived decline. Participants in the low value anchor condition perceived the decline as slightly less severe ($M = 4.12$, $SD = 0.85$) than participants in the high value anchor condition, ($M = 4.42$, $SD = 0.79$), which can be seen in Figure 7. No effect for anchor was found for the final recommendation ($F < 1$).

Fully replicating Study 1, the main effect for client was significant for the variables measuring the adjustment of the valuation qualitatively, $F(1, 130) = 30.23$, $p < .001$, $\eta_p^2 = .19$, the lower bound of the value
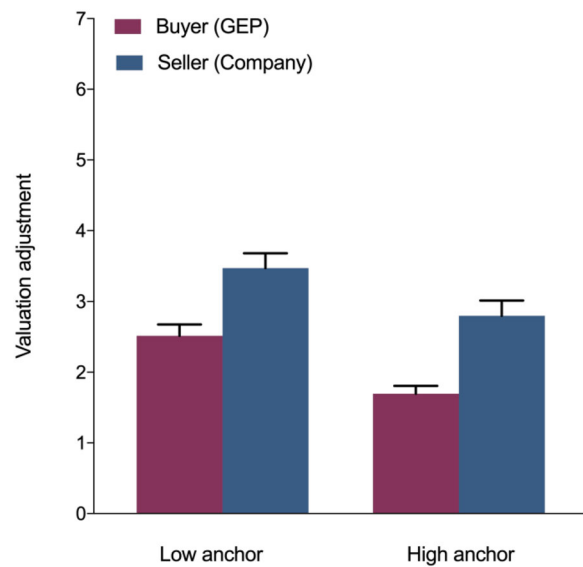
Figure 5. Average valuation adjustment for participants in the low value and high value anchor condition, separated by client (buyer vs. seller).
Note: Scores below to midpoint (4) indicate adjustments downwards and scores above the midpoint indicate adjustments upwards.

range, $F(1, 130) = 6.44$, $p = .012$, $\eta_p^2 = .05$, the upper bound of the value range, $F(1, 130) = 12.48$, $p = .001$, $\eta_p^2 = .09$, and for the final recommendation, $F(1, 130) = 120.36$, $p < .001$, $\eta_p^2 = .48$. For the valuation adjustment, participants representing the buyer believed the valuation should be adjusted downwards more heavily ($M = 2.09$, $SD = 0.87$), than participants representing the seller ($M = 3.11$, $SD = 1.33$), which is shown in Figure 6. Similarly, those representing the buyer indicated a lower value for the lower bound of the valuation range ($M = 3.23$, $SD = 2.30$) than those representing the seller ($M = 4.87$, $SD = 4.34$). For the upper bound, those representing the buyer gave a lower value for the upper bound ($M = 6.58$, $SD = 3.96$) than those representing the seller ($M = 8.63$, $SD = 4.75$). Similar to Study 1, participants representing the seller again recommended their client to go forward with the deal ($M = 4.78$, $SD = 1.47$), whereas those representing the buyer did not ($M = 2.30$, $SD = 1.09$). Hence, Study 2 provides further evidence for the existence of engagement bias among valuation specialists.

The interaction effect between anchor and client was significant only for the lower bound of the valuation range, $F(1, 130) = 6.37$, $p = .013$, $\eta_p^2 = .05$. Analyses decomposing this interaction effect showed that the effect of client was significant only for the high value anchor, $F(1, 71) = 7.46$, $p = .008$, $\eta_p^2 = .10$, but not for the low value anchor, $F(1, 63) = 0.87$, $p = .35$, $\eta_p^2 = .01$. Similar to Study 1, this interaction effect seems to be an artifact of the study materials
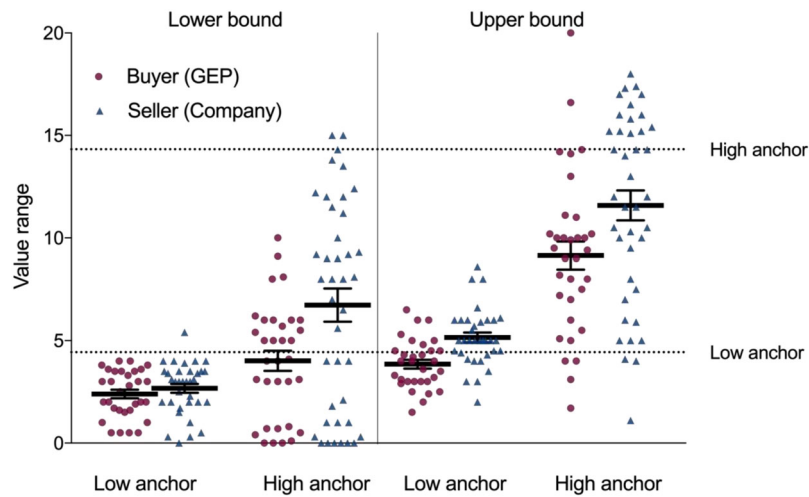
Figure 6. Individual data points for the dependent variables measuring the lower bound (left pane) and upper bound (right pane) of the indicated valuation range, for participants of Study 2 in the buyer condition (purple circles) and seller condition (blue triangles), separated by the value of the anchor (low value vs. high value).
Note: The two horizontal dotted lines represent the value of the high anchor (14.324M) and the low anchor (4.435M) as presented in the valuation report.
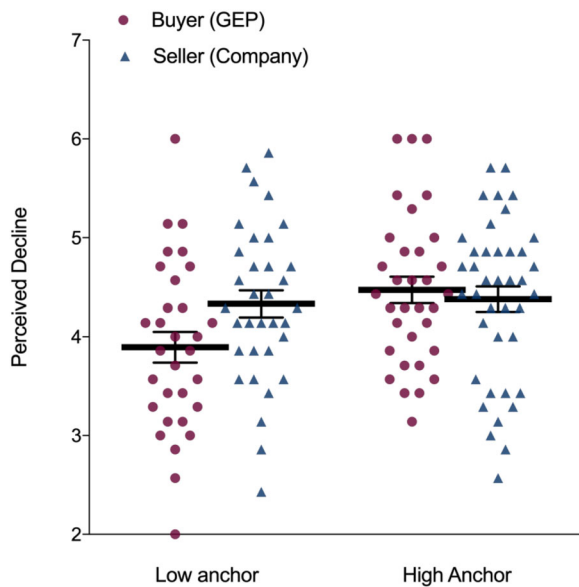
Figure 7. Individual data points of perceived decline for participants representing the buyer (purple circles) or seller (blue triangles) in Study 2, with the averages and error bars per anchor and condition indicated by the horizontal black lines.
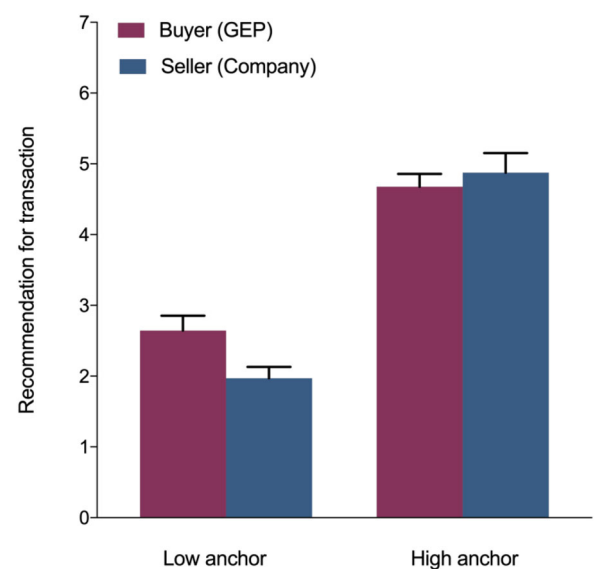
Figure 8. Average recommendation scores in Study 2 for each anchor, separated by client condition.
Note: Scores below the midpoint (4) indicate the participants would not recommend their client to go forward with the transaction, and scores above the midpoint indicate the participants would recommend their client to do the deal.

used. In Figure 6 it can be seen that there appears to be a floor effect for the lower bound in the low value anchor condition. Therefore, if a higher value were to have been chosen for the low value anchor (i.e. further away from the bottom end of the scale), it can reasonably be expected that the client variable would have had an effect here to.

For the final recommendation, participants representing the buyer recommended their client to not go forward with the transaction as indicated by an

average score below the midpoint of the scale ($M = 2.34$, $SD = 1.13$), whereas participants representing the seller recommended their client to do the deal ($M = 4.81$, $SD = 1.49$), as can be seen in Figure 8.

Bias blind spot

Similar to Study 1, participants believed the independent valuator was biased more often (42.0%) than they

believed themselves were biased (23.2%), again providing evidence for bias blind spot.

Discussion study 2

Study 2 replicated the key findings of Study 1, providing evidence for the robustness of anchoring bias and engagement bias among valuation specialists. Importantly, Study 2 aimed to test the extent to which processes of reactive devaluation could account for the observed engagement bias in Study 1. Considering the fact that Study 2 again provided evidence for the existence of engagement bias while the valuation report under scrutiny was produced by an independent valuator (thereby nullifying potential reactive devaluation), it is unlikely that reactive devaluation processes can account for the observed effects. Rather, it is more likely that the participants were in fact biased in their judgments due to their clients' interests. When comparing the effect sizes of Study 1 and Study 2, the engagement bias in Study 1 appears to be larger than in Study 2, suggesting that reactive devaluation processes can possibly account for at least some degree of the observed engagement bias in Study 1, but this difference is not statistically significant.[5]

General discussion

Collectively, the two studies investigated the influence of cognitive bias in a business valuation context. We tested whether valuators are affected by anchoring bias and engagement bias and found robust evidence for both. Specifically, when valuators are presented with an anchor (e.g., a valuation report conducted by another valuator), their perceptions regarding the value of a particular company are affected by the anchor, such that relatively high anchors result in higher valuations compared to when a relatively low anchor is presented. Additionally, when valuators represent their client's interest, this relationship affects the valuator's judgments such that these are more in tune with their client's wishes. If their client is looking to sell and would therefore benefit from a high valuation, the valuator indeed values the object higher than when the valuator represents a buyer who would benefit from a lower valuation.

Interestingly, when participants were asked to motivate their answers regarding the adjustment of the valuation, none of them hinted even vaguely toward the potential influence of anchoring bias or engagement bias. Also, the vast majority of participants in both studies self-reported they believed they

were not biased due to their client's interest. Therefore, we assume that these biases operate largely in an unconscious fashion and that the participants rationalized their intuitions regarding the company's value post-hoc. However, since we did not explicitly measure awareness of the biases' influence on the participants' judgments, we cannot draw strong conclusions regarding the degree to which the observed biases operate in an unconscious fashion.

Although we acknowledge that differences in valuation outcomes can be partially explained by economic concepts like subjectivity and utility theory, and even that individual skills and experience of valuators might play a role in explaining such differences, we provide a first demonstration that cognitive biases might play a prominent role in explaining differences in valuation outcomes.

Theoretical and practical implications

The current research adds to the literature in the following ways. First, we have put forward a novel bias that builds on previous work in the auditing literature investigating self-serving biases in that context. The notion that business valuators (or any professional for that matter) are affected in their judgments following from their clients' interests is a bias we have called engagement bias. The optimal condition for a valuator is to have full professional autonomy when being involved in a valuation engagement. However, in line with the literature challenging the independence of auditors, we demonstrated that due to engagement bias, valuators' professional judgments can be overshadowed by the urge to satisfy clients, ultimately leading to suboptimal valuations, and possible even liability claims for the valuator. Perhaps more worrisome in light of the impending aftermath of the COVID-19 pandemic, engagement bias ultimately risks unduly liquidating economically viable companies when the liquidation value of a company is erroneously deemed higher than the going-concern value after restructuring and/or turnaround, or contrastingly the allocation of significant resources to save companies that in reality have little chance of surviving.

Second, the observation that valuators are affected by anchoring bias is alarming as valuations should ideally be constructed independent from any effects of initially presented values and guiding information. Without acknowledging the presence of anchoring effects in valuation engagements, discussions about value might start from an incorrect starting point,

resulting in misevaluations, suboptimal investment decisions and costly disputes.

There have been some inconsistencies in the literature regarding the extent to which experts are equally affected by the two biases as lay people, and our research adds to this body of research by demonstrating that in our studies even highly trained experts succumbed to the biases' effects. Notwithstanding this theoretical contribution to the literature, we consider this paper's contribution to lay with its implications for practitioners and policy makers. That is, following these findings, we encourage both academics and professionals in the field of business valuation to pay increased attention to the psychological factors affecting their work. Despite the commonly heard catchphrase "valuation is a craft, not a science" (e.g., Damodaran 2016), the clear focus in the valuation literature on valuation techniques and associated inputs suggests valuation is typically treated more as a science than an art. We would encourage an increased focus on the psychological factors that can influence perceptions regarding a valuation object and ultimately valuations. Although we acknowledge that cognitive biases are hard to minimize or regulate, we advocate for an increased awareness of the influence of biases in business valuations. Discussions regarding the cause of large differences in valuation outcomes can benefit from insights from behavioral sciences, including the current research.

Limitations and future research

Some potential limitations of the current research should be addressed. First, participants were presented a compressed valuation report and were requested to give a second opinion on a report from another valuator. The question can be raised whether the observed results would have been different when the participants were asked to reflect on a more comprehensive valuation report or even to conduct a complete valuation themselves. Nevertheless, practice demonstrates that second opinions providing a quick analysis on a valuation outcome are commonplace, suggesting the current findings can at least be generalized to such real-world situations. Moreover, it could even be that providing a comprehensive valuation report or conducting an own valuation would result in even stronger effects than the ones found in the current study. That is, if the manipulation used in the current study (i.e., asking participants to adopt the perspective of the valuator hired by either the Company or the PE-firm) already caused participants to be biased due to their client's interest, it is not unreasonable to think

that in the real world, where the pressure to successfully complete an engagement and satisfy clients is much more intensely felt, even larger effects might be observed. Nonetheless, we would encourage future research to investigate the current biases (as well as other biases) in real-world business valuations.

Second, one can question whether we truly observed anchoring effects, or whether the anchors provided in the case were actually informative in some way and in that sense it might actually have been rational to rely on that information when evaluating the presented valuation. Traditionally, anchoring effects were studied in a laboratory setting where the anchors were randomly generated and participants were often aware of the irrelevant source of such anchors (e.g., Englich, Mussweiler, and Strack 2006; Tversky and Kahneman 1974; Wilson et al. 1996). Since then, however, a large body of literature has studied anchoring effects in more realistic settings where the presented anchors did come from a credible and relevant source. In jury decision making research for example, it has repeatedly been demonstrated that juries' damages and sentences decisions are affected by plaintiffs' and prosecutors' requests (e.g., Campbell et al. 2016; Englich 2006; Englich and Mussweiler 2001; Marti and Wissler 2000). Even though plaintiffs and prosecutors typically offer a legally grounded motivation for their requests, juries should rely on their own assessment of the facts of the case and the nature of the crime, injury, or economic loss. Thus, even though the presented anchors in such research is nonrandom and perhaps even informative, juries should still not rely on them when awarding damages or making sentences decisions.

The same applies to the context of business valuation. Even though another valuator might have conducted a careful assessment of a company's future outlook and discounted its estimated future earnings to the present value using the DCF-method, a valuator asked to conduct a second opinion or to conduct a new valuation from scratch should not rely on the assumptions made by the initial valuator. It is precisely the business valuators who know that a DCF-method is extremely sensitive to the assumptions used in the equation. In our experiments, the valuation experts were provided with details about the company, the industry it operated in, its shareholders (and their dispute), as well as detailed financial data concerning the company's historical performance. Based on these data points, valuators ought to be able assess the company's outlook and estimate its enterprise value. Indeed, the client the participant represented nor the

value of the anchor affected perceptions regarding the decline of the business. Moreover, the anchor had no effect on the degree to which the participants believed the valuation should be adjusted in qualitative terms. Thus, it seems that the participants all had similar ideas (on average) about the state of the company and its future outlook. However, when asked to provide a range for the company's enterprise value, the presented anchor clearly affected their judgments, suggesting that we in fact observed the classic anchoring effect. Nonetheless, we believe it would be worthwhile to investigate whether valuation experts are affected by anchors that stem from less credible and informative sources, such as a business owner that used a simple multiple (e.g. 5x earnings) to base their expectations on. Moreover, it might be the case that when valuators are asked to conduct a valuation from scratch, anchoring effects might be less pronounced compared to when valuators conduct seconds opinions as in our studies. However, considering the prevalence of second opinions in the valuation landscape, it is worrisome that in these cases anchoring effects bias valuators judgments, as this diminishes the usefulness and credibility of second opinions.

We encourage future research to develop measures that can mitigate the effects of biases that affect valuator's judgments. A first direction could be to enhance awareness on this topic across valuators and stakeholders of valuations. Incorporating knowledge of the effects of both anchoring bias and engagement bias in valuation education and training is a first step in mitigating these effects in the long run. A second direction could be to find ways that would allow valuators to conduct valuations in a more isolated manner, free from the pressure inherent to dependent client relationships, the purpose of the valuation in relation to the outcome and the client's interest in the valuation. Finally, it might be worthwhile to explore whether a protocol can be developed containing guidelines and principles geared toward reducing the effects of biases in valuations, ultimately contributing to the goal of creating more objective valuations and hence reducing large differences in valuation outcomes. Whereas auditors have seen intense scrutiny from regulators, the domain of business valuation remains largely unregulated. We believe that the presented research here suggests that this industry too ought to be under closer supervision by policy makers and regulators.

Notes

1. WACC (Weighted Average Cost of Capital), APV (Adjusted Present Value), CFE (Cashflow to Equity).

2. For the purpose of this research we assume a company and not an individual asset or a group of assets.
3. The 45 second cut-off was arbitrarily chosen and is strongly conservative as a thorough comprehension of the presented materials would require more time. However, this criterion did not affect the findings as similar p-values were found when 90 seconds or 180 seconds were used as cut-offs.
4. Similar to Study 1, the results of Study 2 did not differ in any meaningful way when less lenient cut-off criteria were used (e.g., 90 or 180 seconds).
5. The datasets of the two studies were combined and the dependence of the valuator was added as a factor (0 = dependent, 1 = independent). When adding this factor to the multivariate model, no interaction effect with client, $F(5, 309) = 1.42$, $p = .216$, $\eta_p^2 = .02$, nor a main effect of dependence was found, $F(5, 309) = 2.01$, $p = .077$, $\eta_p^2 = .03$.

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