Temporal value asymmetry in an organizational setting

Master thesis

Behavioural Economics

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TABLE OF CONTENTS

TABLE OF CONTENTS **1**

1. INTRODUCTION **2**

2. THEORETICAL FRAMEWORK **6**

2.1 PAST DISCOUNTING 6

2.2 TEMPORAL VALUE ASYMMETRY (TVA) 7

2.3 TEMPORAL AFFECT ASYMMETRY (TAA) 10

2.3.1 Self-serving bias *11*

2.4 HYPOTHESES 14

3. METHOD **16**

3.1 VIGNETTE 16

3.1.1 All conditions *17*

3.1.2 Difference between past and future conditions *19*

3.2 PARTICIPANTS 20

4. RESULTS AND DISCUSSION **21**

4.1 TOGETHER 22

4.2 MEN 26

4.3 WOMEN 28

4.4 PERCEIVED FAIRNESS 31

4.5 MEDIATION 33

4.6 GENERAL DISCUSSION 36

5. IMPLICATIONS **39**

6. CONCLUSION **41**

7. REFERENCES **42**

APPENDIX **46**

1. Introduction

In our capitalistic world everything has value and even every*one* has value. Valuing human life economically is not completely immoral anymore, and sometimes considered necessary to make accurate decisions. In the past century countless studies have been done to investigate what determines value, and economic value in particular. I will not try to establish value of human life, but I will investigate determinants of economic value. One of these determinants is an event's location in time. Where standard economic theory suggests that, as everyone is perfectly rational, the value of time is its opportunity cost (i.e. some (market) rate of interest), psychological research has shown that other factors play a role in the matter. Temporal construal (Trope & Liberman, 2003), intertemporal choice (Loewenstein & Thaler, 1997) and time discounting (McClure et al., 2004) are just a grasp of the concepts and theories that indicate that as the temporal distance of future events from the present increases, their value diminishes, and often differently than according to standard economic theory.

A large body of research in economics has focused on the discounting of future outcomes. Describing it as impatience, it tried to explain why people want to speed up pleasant events (events with positive utility) and delay unpleasant events (with negative utility). These theories are relevant, as they explain the tendency of people to obtain gains as soon as possible and delay costs or losses.

Standard economic theory can explain some of these tendencies. But several studies in behavioural economics showed empirically that certain assumptions in standard economic theory are violated. One of these assumptions is that people's preferences stay stable over time. In other words, standard economic theory suggests that outcomes should be discounted at a rate that is not influenced by time. Regarding time streams of utility over money this means that according to standard economists the appropriate rate would be the applicable (market) rate of interest (at the margin). That is when capital markets work perfectly so that people can borrow and lend unlimitedly (and riskless), which creates arbitrage opportunities. This implies a constant discount factor, with exponential discounting of outcomes over time because people are then supposed to have linear utility over money, because in a perfect capital market people can borrow and lend money unlimitedly. In instances were either there is an imperfect capital market, or regarding utility over other scarce goods, linear utility is not

a prerequisite. Utility can be different for virtually every good, but the discount rate at which the utilities are discounted should be the same. Moreover, it is not supposed to change over time regarding one and the same good according to standard economic theory.

But numerous studies in behavioural economics have shown that people are more willing to wait for outcomes when they have to make a choice between two outcomes that lie further in the future. Loewenstein & Thaler (1989) for example show this and some other violations of standard economic theory and constant, or exponential discounting. This has important implications for intertemporal judgment and decision-making and its effects are studied extensively in numerous domains (Frederick et al., 2002). But the lion's share of this research only covers roughly half of the array of intertemporal choices; it only considers temporal distance in the future. The other half consists of past events. When people behave in such a predictably irrational way when they evaluate events in the future, they arguably make similar "mistakes" in evaluating past outcomes. Especially when this mistake is not similar or symmetrical to the mistakes made in contemplating future events, this could have its implications in a wide array of economical settings. Such as, evaluating (investment) portfolio managers, predicting a firm's future cash flows on the basis of past cash flows, compensation of (accident) victims, etc.

Unfortunately, this topic has rarely been touched upon from an (behavioural) economic perspective. Some psychologists have investigated the matter and a few even discussed some economical implications (Caruso et al., 2008; Van Boven & Ashworth, 2007). But apart from that, the discounting of past outcomes only enjoys some interest in studies investigating decision-making from a somewhat more medical perspective. More specifically it investigates the implications it can have in the study of impulsiveness of drug (ab)users and other addicted people. Discounting of past outcomes has been used to explain the behaviour of gamblers, cigarette smokers, drug abusers, and other addicts (Yi et al., 2006; Stieg & Dixon, 2006; Bickel et al., 2008). These studies find that the discounting process for past events happens in a similar fashion as discounting of future outcomes. However, this research stems from a more medical than economical background. What they *do* show is, that sound theories about past discounting have yet to crystalize.

Other authors (Caruso et al., 2008; Guo, (2008); Suhler & Callender, 2012;) suggest a temporal value asymmetry (TVA), according to which past outcomes are discounted more sharply than future ones. That means that an event that lies at a given moment in the future will be valued more, than an event that lies in an equidistant moment in the past.

These studies have a more psychological angle, which applies more to the (upcoming) field of behavioural economics. If this theory of TVA applies outside their research settings, it could have some major implications, for example in the compensation of accident victims – which Caruso et al. (2008) use as an example. When juries or judges in court rulings are prone to TVA, they will give victims that have fully recovered less compensation than victims that have just begun, or still have to begin the process of recovery. Even though the recovery processes themselves are exactly the same, in terms of both pain, duration and medical costs. TVA could also be applicable in the field of behavioural corporate finance, for example in assessing a business' operations and its ability to generate cash flows in valuations for mergers or acquisitions. If future operations are seen as more intentional than past operations, even though they are similar and of equal temporal distance, it may be that future cash flows are valued more than equivalent cash flows in the past. This could for example provide an alternative explanation for the high percentage of value-destroying mergers and acquisitions.

Another interesting domain where a solid understanding of an asymmetry in valuation can prove advantageous is performance evaluation. When a manager has to evaluate employees' performances and is allowed some discretion or subjectivity in the process compensating them, it is important to know how s/he values this performance in the present time. Although other biases and heuristics have proved to have an influence in subjective performance evaluation[1], past discounting (and more specifically; TVA, as proposed by Caruso et al., 2008) can be an additional insight. As will be shown in this thesis it can be profitable for employees to reach an agreement with their manager about the value of or compensation for exceeding their performance targets beforehand. That way a higher value for the same performance can be established. For the manager or employer on the other hand, it will be more profitable to determine the value of performance targets in retrospect. That way the manager or employer can "get away" with paying less for the same performance, without jeopardizing the perceived fairness of the employee.

[1] For example Bol (2011) shows a leniency bias and a centrality bias.

In this thesis I will investigate how the value of past events is discounted over time, i.e. as their temporal distance from the present increases. More specifically, I will investigate if the value of exceeding a performance target is valued less after the fact than beforehand, as is suggested by TVA. Moreover, I will investigate how this affects employees' perceived fairness of performance-based compensation.

2. Theoretical framework

2.1 Past discounting

Although there are a few other studies that investigated the matter of past discounting - and some even tried to elicit a past discounting function – they did not find completely similar results. Yi et al. (2006) for example found that discounting of past and future outcomes are quantitatively and qualitatively similar. Contrary to the finding of Caruso et al. (2008) that there is TVA present, Yi et al. (2009) found that participants discounted past and future outcomes symmetrically. More specifically, the same exponential-power model they elicit from their data as the best fitting model for a future discounting function can be applied for past outcomes, according to their research.

In their method to find the value people attached to past events, Caruso et al. (2008) employed an entirely other method than Yi et al. (2006) and Yi et al. (2009). The latter used a research setup where participants had to indicate their preference on a computer, choosing between two temporal distant outcomes. In the past conditions these options were: "having gained amount *X* one hour ago" and "having gained amount *X* (delay) ago". In the future condition these were: "receive amount *X* right now" and "receive amount *X* in (delay)". This method can be perfectly suitable when you try to elicit a discounting function for future outcomes and it has proved its merits in establishing those functions and models. In evaluating future outcomes those options are a realistic trade-off, because the amount someone will receive in the future can actually/hypothetically still be spent – in other words: waiting can prove to be more, or less valuable. However, the setting above is quite an unrealistic setting for past discounting. In evaluating past outcomes, it is impossible to travel back in time, spend the money in the past and thereby derive either positive or negative utility from "dis-waiting". The method employed by Yi et al. (2006) and Yi et al. (2009) is therefore too unrealistic and not applicable in research where past outcomes have to be evaluated. I will discuss the more appropriate method of Caruso et al. (2008) in chapter 2.2.

2.2 Temporal value asymmetry (TVA)

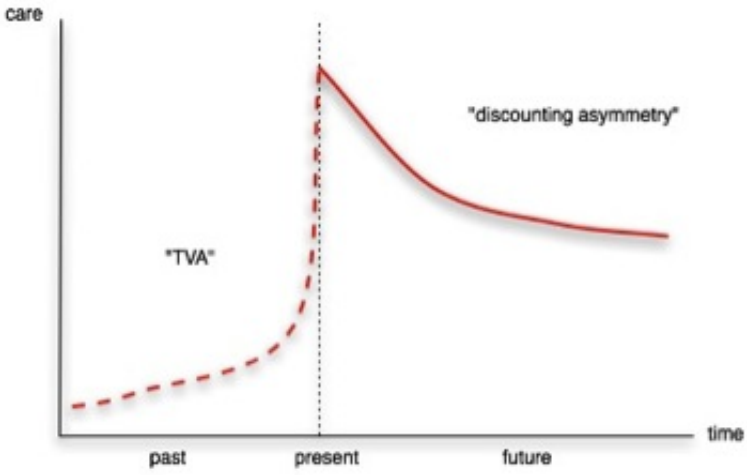
The extensive literature on intertemporal choice has produced a vast variety of discount factors for future outcomes. To quote from Frederick et al. (2002), in which they review a substantial part of this literature;

> "In sum, we believe that economists' understanding of intertemporal choices will progress most rapidly by continuing to import insights from psychology, by relinquishing the assumption that the key to understanding intertemporal choices is finding the right discount rate (or even the right discount function), and by readopting the view that intertemporal choices reflect many distinct considerations and often involve the interplay of several competing motives."

This last insight will most likely apply to intertemporal choice involving the past as well. Especially because Caruso et al. (2008) find such a wide variation in degrees of TVA in the different situations they proposed. Ranging from a 101% higher reward for entering data in the future than the past, to 24% more willingness to pay for an extended winter break beforehand than afterwards.

Caruso et al. (2008) suggest that the value of events in the past decrease in a similar way over time as the value of future events decrease with their tem poral distance to the present, but more sharply. This creates an asymmetry, a "wrinkle in time", as they call it. This way future events are valued more than equivalent events in an equidistant past. I will refer and have referred to this asymmetry, in their following, as the temporal value asymmetry (TVA). Figure 1 gives an intuitive insight into how this may look like graphically. But note that the specific form of the function has not yet been proved empirically if that is possible at all given the quote above from Frederick et al. (2002).

Figure 1[2]



In a series of experiments Caruso et al. (2008) substantiate this theory. They asked participants to give their subjective value of several events, e.g. helping someone move or awarding an accident victim with compensation for their suffering. One half was asked how much they valued the event if it would take place a certain time from now in the future, the other half was asked how much they valued the event when it had already taken place in an equidistant past. The degree of TVA varied quite a bit. From a 24% TVA for students to extend their winter break, up to 101% TVA for compensation for entering data.

The variety of degrees of asymmetries supports Frederick et al.'s (2002) notion, mentioned above, that there does not exist a universal discount factor that is applicable to every single situation. Although the degrees of TVA varied between the different situations, the results in Caruso et al. (2008) were significant across several studies. Next to hypothetical events their research also included an actual event; the winter break were about to have or just had had.

The only instances were no significant TVA was found, was in a within-person design and when participants had to contemplate events concerning other people, the so-called self-irrelevant condition. In one of the studies of Caruso et al. (2008) they showed that TVA was present when people compensated themselves for work. But when they were asked to compensate a randomly selected person, no significant TVA was found. This suggests that an employee will have a TVA, when assessing the value of his or her own performance. But for

[2] Taken from Suhler & Callender (2012)

a manager valuing the work of an employee the results from Caruso et al. (2008) provide ambiguous indications, as the situation of a supervised employee entails no randomly selected person, but still can be described as self-irrelevant. Managers may feel some kind of connection with the company and its performance, which increases the self-relevance in valuing the work of an employee. Because managers still do not compensate themselves, it is arguable that they do show a TVA, but that is affected by the self-irrelevance, which makes the TVA less pronounced than the TVA for employees. In their study (Caruso et al., 2008) the past valuations did not differ significantly between the self-relevant and self-irrelevant condition. Therefore it could very well be that an employee will not perceive a lesser compensation in retrospect as unfair. Whereas the future valuation of managers and employees can deviate more substantially, and thus lower the employee's perceived fairness. Behavioural research has shown a significant influence of perceived fairness of performance-based compensation on employee performance (e.g. Akerlof & Yellen, 1988). Determining the value of exceeding performance targets in retrospect could thus be more efficient than beforehand. As it costs less and future employee performance will not be affected through lower perceived fairness.

The first absence of TVA mentioned above in the within-person design implies that people will value future events more than past ones (significant between-person results), but once confronted with this asymmetry, believe it is irrational (indicated by the disappearance of the significance in the within-person design). The second absence of TVA in self-irrelevant situations has two implications for my study. One directly relates to the setting with a manager and his / her employee. When assessing future events, a manager's valuation (self-irrelevant) could be lower than that of an employee (self-relevant). Agreeing upon an appropriate bonus pay for yet to realize performances thus can prove to be difficult. However, an employee's past valuation could be much lower and arguably more in the range of a manager's valuation of a past event, which makes it easier to agree upon an appropriate bonus pay for already realized performance exceedances.

The second implication concerns the difference in affect towards past and future. I will refer to this temporal *affect* asymmetry analogously, as TAA. Caruso et al. (2008) found that this TAA fully mediated the TVA. But it may also have its merits concerning a phenomenon in attribution theory called the self-serving bias. I will elaborate on both in sections 2.3 and 2.3.1, respectively.

2.3 Temporal affect asymmetry (TAA)

How undocumented the TVA and its implications may have been in economics before Caruso et al. (2008), their finding of a temporal asymmetry in affect (which mediated the TVA) is more widely researched in the field of psychology. Van Boven & Ashworth (2007) specifically researched this TAA, although they do not use the specific term. They found that more intense emotions were reported during anticipation of emotional events, than during retrospection. The results held under a variety of emotional events. Whether events were negative (annoying noises, menstruation), positive (Thanksgiving Day), routine (menstruation), or hypothetical (all-expenses-paid ski vacation), a TAA was found. Thinking of events happening in the future thus proved to evoke a more intense affect than thinking of the same events happening in the past. This asymmetry in affect is also associated with Caruso's (2010) finding that people judge past moral violations less negatively, than future ones.

This more intense affect towards future behaviour results in an interesting finding. Burns et al. (2012) found that people judge future actions more intentional than when the exact same action is completed in the past. Burns and collaborators (2012) investigated a similar situation as Caruso (2010). They looked at the perceived intentionality of moral transgressions and found that future moral transgressions were perceived as more intentional than past transgressions, were Caruso (2010) found that they evoke more intense affect. Moreover, Burns et al. (2012) found that people were willing to punish the future behaviour more severely because of this heightened perceived intentionality. This higher perceived intentionality of an event provides a reasonable explanation for the fact that people feel a more a more intense affect, which in turn causes them to value future events more than past ones. Especially because Burns et al. (2012) found that people were willing to punish more severely, so arguably they are willing to award a higher value to a positive event. Temporal affect asymmetry in that case causes temporal value asymmetry, or to keep abbreviation constant; TAA causes TVA (in this thesis I will consider perceived intentionality as a part of TAA). This causal path is also investigated in Caruso et al. (2008). They found that the contemplation of future events evoked greater affect than that of past events, which mediated the TVA. This path was found to be more significant, than a model wherein TVA was used as a mediator for the asymmetry in affect. In other words; the higher affect caused people to give a higher value. The higher value did not cause people to feel more intense affect.

2.3.1 Self-serving bias

One of the most famous subjects in social psychology is attribution research. Attribution research has two main pillars (Hilton et al., 1995). The first, commonly referred to as causal attribution, looks at how people explain behaviour. The second looks at how people infer traits from behaviour and is usually referred to as dispositional attribution. My focus will be on the former, causal attribution. This field has long been dominated by the model of attribution as covariation (and some of its variants) from Kelley (1967). However in recent years, this theory has been criticized with another proposed theory; a folk-conceptual theory of behavior explanation by Malle (2011).

This folk-conceptual theory returns to the model of attribution proposed by Heider (1958) that he thought people use when they explain human behaviour, which was labeled 'commonsense psychology' by him. The distinction he introduced for explaining behaviour was "personal" vs. "impersonal", i.e. intentional vs. unintentional. However, since Kelley's (1960) review of Heider's (1958) book, he was accredited with the distinction between "person cause" and "situation cause" in explaining people's behaviour. In other words a distinction between internal and external causes of behaviour. The meaning of personal cause was changed to "any reason inside a peron's skin" (Gilbert & Malone, 1995). But this was a misconception. Malle (2011) returns on this misunderstanding of Heider (1958) in a folk-conceptual theory of behavior explanation. He convincingly argues that the distinction that people use (and that Heider actually meant) in social perception is between intentional ("personal") and unintentional ("impersonal") behaviour. Were Kelley would make yawning, feeling happy and shouting all a person cause because the cause of each would lie inside a person's skin, Heider would make use of his own distinction. According to his commensense psychology yawning and feeling happy would be labeled the same "impersonal cause" as raining and leaves falling; in other words unintentional. And Malle proposes to return on this distinction between intentional and unintentional behaviour with the folk-conceptual theory of behavior explanation.[3]

[3] See Malle (2011) for an extensive review about the history of and advances in attribution theory and Malle et al. (2007) for the new-found actor-observer asymmetries according to the folk-conceptual approach.

A well-observed phenomenon in attribution theory, and more specifically in the pillar of causal attribution, is the self-serving bias. It is usually referred to as the tendency of actors to provide more person causes than situation causes for positive events (take credit) and more situation causes than person causes for negative events (deflect blame). This tendency is reversed for observers. According to Malle's (2006) meta-analysis, performed on the published literature on the traditional actor-observer asymmetry, all actors indeed offered more person causes and fewer situation causes for positive events than observers did. However, although actors offered fewer person causes than observers for negative events, they did not provide more situation causes. But in the light of intentionality judgments this is more reasonable. With the lower person ratings for self-relevant negative events, actors seek the assurance that the event was not intentional. Observers on the other hand may express something else with their relatively higher person ratings. Intentionality may not be the issue, but they may be more concerned with indicating that surely there was some reason inside the actor that caused the negative event. Because of these possible differences in what actors and observers may want to convey in their responses, actors' and observers' ratings are not easily comparable to conclude what their attributions mean (Malle, 2011). Even though Malle (2006) indeed found partial confirmation of the predictions of the classic actor-observer hypothesis, he found a bias-corrected average effect size of 0. In a second meta-study they showed that the actor-observer hypothesis in terms of a model following the folk-conceptual approach could be confirmed in the same data wherein the classic actor-observer was disconfirmed (Malle et al., 2007).

This difference in intentionality links the attribution theory to the temporal affect asymmetry. Or more precisely, it places the TAA under the umbrella of attribution theory and more specifically under the folk-conceptual theory of behavior explanation. An events place in time then influences the perceived intentionality of behaviour. As in Burns et al. (2012), temporal perspective is also proposed as an attributional moderator by Helzer & Gilovich (2012) in their study on how people believe an individual's will impacts past and future events. Moreover, they find that this asymmetry holds even when people contemplate the outcomes of others. However, Caruso et al. (2008) did not find results supporting an asymmetry in valuation nor affect when contemplating other people's behaviour.

The revision of Heider's (1958) theory on attribution by Malle (2011) combined with other recent work (Burns et al., 2012; Helzer & Gilovich, 2012; Caruso et al., 2008) suggests that temporal perspective plays an important role in people's belief of intentionality. Which in turn plays an important role in the TAA (Van Boven & Ashworth, 2007) that Caruso et al. (2008) found to mediate the TVA.

2.4 Hypotheses

In conclusion there is extensive literature that has investigated intertemporal judgment and decision-making. The vast majority thereof is devoted to the discounting of future events. This however, only covers half of the story. The discounting of past outcomes has received very little attention in the literature, especially in (behavioural) economics. In this research I will investigate the effects of past discounting in the assessment of the value of exceeding a performance target. The theory and methods employed by Caruso et al. (2008) will be most applicable in this setting. Especially their notion of a temporal value asymmetry (TVA) – if found – may prove to be a valuable insight for both managers and employees.

The first hypotheses are on the basis of Caruso and collaborators' "Wrinkle in time" (i.e. the temporal value asymmetry) (2008) strengthened by the notion of a higher perceived intentionality of future actions than of past ones (Burns et al., 2012; Van Boven & Ashworth, 2007; Caruso, 2010; Helzer & Gilovich, 2012). So I state the first hypotheses:

H1a: Employees value their own performance target exceedance more when the exceedance lies in the future, than as when the same exceedance lies in the equidistant past.

H1b: Managers value the same performance target exceedance of an employee more when the exceedance lies in the future, than as when it lies in the equidistant past. This temporal value asymmetry however is less pronounced, than in the employee setting.

According to the literature mentioned above a TVA will be mediated by a temporal asymmetry in affect. The asymmetry in affect is caused by a difference in (perceived) intentionality, which links the TAA to attribution theory. Therefor my second hypothesis is:

H2: Differences in valuation are mediated by temporal differences in affect concerning the target exceedance.

On top of that, I will investigate whether determining the value of exceeding one's performance target in retrospect will influence an employee's perceived fairness. On the basis of the finding of Caruso et al. (2008) that TVA is found in their participants when compensating themselves, but not when compensating others. And moreover based on the expectation, formulated above, of a less pronounced TVA among managers, I formulate my final hypothesis:

H3: Employees' perceived fairness is affected by the timing of determining their performance-based compensation.

In the remainder of this thesis I will elaborate on the research method that I intend to use to investigate these hypotheses in chapter 3, report and discuss the results in chapter 4 and discuss the implications in chapter 5. Chapter 6 will conclude.

3. Method

3.1 Vignette

To investigate and explore my hypotheses I will use vignettes. Vignettes essentially are short stories about individuals in particular situations. Using vignettes enables the possibility to present a hypothetical scenario and measure participants revealed preferences, perceptions, attitudes and values (Hughes, 1998). This can approximate real cases better than traditional survey questions. Still one must be cautious in applying the findings from vignette responses to everyday life, as Hughes (1998) remarks. The hypothetical representation may cause respondents to give different answers than how they would act when they would find themselves in the actual situation. But in this research, the vignettes are used to provide an interpretation of the real world and provide respondents with some context to make their decisions in. Rather than an attempt to replicate real life and its experiences, it gives people a situated context to respond in. This usage makes the vignette a useful research tool (Hughes, 1998). Four versions of the vignette can be found in Appendix A. There are separate versions for managers and employees. For both, a separate version is presented for the past and future condition, making it a total of 4 conditions.

To elaborate on the choice of certain numbers in and the choice of wording and phrasing in the vignettes, I will clarify this in the following sections. Most considerations will apply to all conditions, others only to the specific timeframe (past / future) or role (manager / employee).

3.1.1 All conditions

To keep as many factors as possible constant, participants were presented with a very similar version of the vignette. Participants were asked to assign a value to their performance target exceedance in the form of an appropriate bonus pay. To prevent participants to bring their individual abilities to the table a reference framework was constructed, which was kept constant across all four conditions. As an employee, they received a fixed salary of € 42.935. Besides the fixed salary they received a bonus pay when they had surpassed their performance target. The bonus pay was solely depending on their target exceedance, which was kept constant at twelve percent. The situation as presented for the employee is exactly the same for the employee that managers had under their supervision in their versions of the vignette.

One drawback of using such a reference framework is that people try to calculate the multiplication of the percentage of the performance target exceedance and the fixed pay. This could anchor them on this number, when assessing the value of the target exceedance. The odd looking numbers were chosen to avoid anchoring on an easy calculation. For example, a fixed pay of € 40.000 and an exceedance of 10%, could have anchored participants on the simple multiplication of the two (i.e. € 4.000). For this purpose, participants were also instructed upfront that a calculator was not allowed while answering the questions in the questionnaire. Of course these measures do not entirely rule out the possibility of calculating the multiplication, but because it is much harder, it is less likely that it will serve as an anchor.

Furthermore, participants had to assess the value of the bonus pay or target exceedance. The fixed pay was intended only as a reference framework. For that purpose it was clearly mentioned that neither employees, nor their managers had any influence whatsoever on both the height of the fixed pay and on the height of the performance target. The board of the company independently set both.

After having assessed the value of the performance target exceedance, participants were asked to answer three more questions about the target exceedance, which they indicated on a 7-point Likert-scale. They were asked to indicate how difficult they thought it was to achieve this twelve percent exceedance (ranging from 1: extremely easy, to 7: extremely difficult). How stressed they felt now when thinking of the exceedance (ranging from 1: not at all, to 7: very stressed). And finally to what they owed the exceedance (ranging from 1: completely to your

own abilities and effort, to 7: completely to luck). The first two questions about stress and difficulty were adopted from Study 4 in Caruso et al. (2008) to measure affective reactions. The third question about cause was asked to measure perceived intentionality more closely. “Completely to your own abilities and effort” should resemble completely intentional and “completely to luck” should resemble completely unintentional. The degree of affective reactions will be used as a mediating variable to try and replicate the mediation results from Caruso et al. (2008) for stress and difficulty (significant / insignificant in their study respectively). Cause will be tried as an additional possible mediating variable.

3.1.2 Difference between past and future conditions[4]

The last factor that was to remain constant is the temporal distance. There are three distinct moments in the factor of temporal distance. First, there is the moment when respondents have to decide what the value of an appropriate bonus pay is (or will be); the *decision moment*. Second, there is the moment at which the bonus pay is (or will be) paid out; the *payment moment*. And third, there is the moment when the surpassing of the performance target takes (or will take) place; the *performance moment*. A performance target exceedance cannot be pinned at a specific point in time, because it is accumulated in the course of (in this case) a year. That year should lie in an equidistant moment in the past as the coming year lies in the future, so for arguments sake I will take the average of the respective year. That means that, past year's exceedance 'happened' six months ago. The same applies to the future target exceedance, which will 'happen' in six months.

In the past condition, respondents imagined that it was the end of the year in which they surpassed their target, so the performance moment was six months ago. They had to determine the value of the target exceedance that moment. So the decision moment was 'now'. Payment of the bonus pays would be done immediately after setting them. The payment moment can be considered to have been 'now' as well.

In the future condition, respondents imagined that is was the beginning of the year in which they will surpass their target, so the performance moment is six months from 'now'. They had to determine the value of the target exceedance that moment. So the decision moment was 'now' as well. Payment of the bonus pays will be done immediately after the year will end. So finally, the payment moment can be considered to be in a year.

To summarize; the performance moments lie in equidistant moments in time from 'now' (i.e. six months in the past/future), which is necessary to test for a TVA. The decision moments are at the same point in time. The only thing that is not kept equal across conditions is the moment of paying the bonuses. For an exact test of TVA, the bonus in the future condition should have been paid out 'now' as well, before the performance moment. That way any differences in valuations could be solely described to the difference in temporal location.

[4] In this chapter I will only discuss the difference for employees. The line of reasoning is also applicable to the situations where managers assess the value of the surpassing of their subordinate.

Considering the importance of the vignettes appearing real (Finch, 1987) and relevant (Neff, 1979), this option was discarded. Paying a bonus before the target exceedance on which it should be based has occurred meets neither of these criteria. Moreover it is non-existent in business practice to my knowledge.

The final consideration regarding the timeframe was whether or not to give respondents both past and future versions of the vignette. Caruso et al. (2008) found that people apparently consider the TVA to be irrational. In one of the studies in their research, they compared the between-person analysis with the within-person analysis. In the between-person analysis people valued future events more than past ones. But the within-person analysis revealed that future and past events were valued equally. This need for a sort of rational consistency was also found in a paper by Kahneman & Ritov (1994), they refer to. When asked to assess the value of the health of endangered animals and migrant farm workers, between-person analysis showed that people place a higher value on the health of endangered animals. But when people are asked to place a value on both (within-person design), they provide higher values for the health of migrant farm workers. This indicates that they deem it irrational to place a higher value on the health of endangered animals than on that of migrant farm workers. These results rendered the choice to only do a between-person analysis to investigate the TVA. A within-person analysis would be just another check if people deem the TVA irrational, which is fairly established.

3.2 Participants

The vignettes were given to 201 undergraduate students of Erasmus School of Economics. To perform the experiment I visited twelve different workgroups of the course "Organization & Strategy" which, for students, were mandatory to attend.[5] Each class was randomly given only one condition of the vignette (e.g. employee, future condition) to make sure they did not know the purpose of the questionnaire, and answer accordingly. Three outliers were eventually excluded from the analysis.[6]

[5] I would like to take the opportunity here to thank dr. B. Karreman again for performing the experiments during the workgroups of his course.
[6] Valuations > 45,000 (mean 4,322.51; st.dev. 2,040.86)

4. Results and Discussion

At this point it must be noted that the percentage of women among respondents was quite low (30.4%). Apart from any ethical considerations about an equal share of both sexes in the labour market (and at the manager level), this percentage was compared to approximate actual percentages in the Netherlands. Although the percentage of women in management functions (28%, Binomial $p = .254$) did not differ significantly, the percentage of women in the labour market (43%, Binomial $p < .001$) did.[7] In the remainder of this thesis I will therefore also discuss the results of these demographic groups separately. In section 4.1 men and women will be analyzed and discussed together as one group. In sections 4.2 and 4.3 I will analyze and discuss them separately and in section 4.4 I will compare the separate results to each other.

[7] Source: www.cbs.nl

4.1 Together

Table 1 shows that employees[8] valued their own future target exceedance 23% higher than their past target exceedance. Managers awarded their subordinates a slightly higher bonus in the future of 7.1%. Also, the difference in valuations of managers and employees is much larger in the future, than in the past situation.

Table 1 Mean values and ratings of past and future events Together

Role	Temporal location of target exceedance	
	Past	Future
Manager		
Valuation	4080 (1746)	4368 (2071)◆
Difficult	4.608 (0.874)	4.853 (0.950)
Stress	4.020 (1.273)◆	4.265 (1.361)◆
Cause	2.588 (0.853)	2.588 (1.043)
Employee		
Valuation**	4575 (2307)	5638 (2812)◆
Difficult*	4.592 (1.117)	4.920 (0.922)
Stress	3.449 (1.582)◆	3.360 (1.208)◆
Cause	2.755 (0.969)	2.800 (1.125)

Standard deviations are in parentheses. Asterisks indicate values or ratings that differed significantly between past and future situations in parametric testing. Diamonds correspond to diamonds at the same value or rating for the other role in the same temporal location[9] in nonparametric testing.
$p^{**} < .050$, $p^{*} < .100$; $p^{◆} < .100$.

Participants' valuations of the target exceedance were submitted to a 2 (temporal location: past / future) × 2 (role: manager / employee) ANOVA (analysis of variance). This showed a main effect of temporal location, $F(1, 197) = 7.627$, $p = .036$, $\eta_p^2 = .022$, and a main effect of role, $F(1, 197) = 4.471$, $p = .006$, $\eta_p^2 = .037$. However, the interaction effect Role×Temporal Location was not found to be significant, $F(1, 197) = 1.474$, $p = .226$, $\eta_p^2 = .007$. Pairwise comparisons revealed that the difference between employees' past and future valuations differed significantly ($p = .020$), but the difference for managers did not. All pairwise

[8] For the ease of reading I will refer to the participants as if they were actually in their role.
[9] E.g. a diamond behind the stress score from the manager, past condition indicates that it differs significantly from the stress score from the employee, past condition, which also has a diamond behind it for a better overview.

comparisons, also for men and women separately, can be found in Appendix B. Tables with results from the 2 × 2 ANOVA can be found in Appendix E.

All scores on the 7-point scales were separately submitted to a 2 (temporal location) × 2 (role) ANOVA. Only a main effect of temporal location on the perceived difficulty of the target exceedance was found, $F(1, 197) = 4.399$, $p = .037$, $\eta_p^2 = .022$ and a main effect of role on the reported stress, $F(1, 197) = 14.742$, $p < .001$, $\eta_p^2 = .070$. Surprisingly, reports of how stressed managers thought the employee would feel when s/he thought about the target exceedance, were significantly higher than employees' reports in both the past and future condition, as can be seen from Table 1. Another remarkable result is that managers thought that the target exceedance was more due to the employees' effort than due to luck, than the employees themselves thought. Both indicate that the asymmetry in affect or intentionality which was expected according to the folk-conceptual theory is not supported by the data.

Because all variables were not normally distributed (all Kolmogorov-Smirnov p's < .001), several nonparametric Kruskal-Wallis tests were conducted to check the factorial ANOVA's results. See Appendix C for all the results, also for men and women separately. These revealed that almost all the results from the ANOVA are qualitatively similar in the nonparametric tests, although the difference between employees' past and future reports on difficulty was not significant.

It thus appears there is indeed evidence for a temporal value asymmetry among employees in the together group. Both the parametric and nonparametric test confirmed the TVA for the 23.2% higher bonus payment they demanded, which supports hypothesis 1a. Managers only awarded their subordinates a 7.1% higher bonus, which confirms the suspicion of a lower TVA among managers, but does not support hypothesis 1b of a significant TVA among managers.

The main effect of role suggests there is also some sort of an actor-observer asymmetry present. But this asymmetry is not backed by an asymmetry in affect, and neither in intentionality to confirm the folk-conceptual theory of behavior explanation (Malle, 2011). It could be that participants in the future condition were not convinced that the twelve percent exceedance was reached with absolute certainty, which might have affected the results. This perception might have made participants prone to some extra uncertainty concerning the

achievability of the target exceedance, which in turn might have increased participants' valuations. Instead of by the temporal location, the value asymmetry then would be caused by uncertainty. But when valuations were higher because of extra uncertainty difficult, stress and cause should arguably be higher as well. Since only the difference in difficult ratings from employees was significant (Tables 1, 3 and 4[10]), I will continue this thesis under the presumption that this was not the way participants perceived the twelve percent target exceedance.

Kruskal-Wallis tests were also performed for both past and future valuations to test whether managers and employees differ significantly from each other in each respective temporal location. As employees' valuations were all higher than those of managers, Kruskal-Wallis tests were performed to test whether managers' valuations were significantly lower than valuations of employees. A significance level of ten percent was used. If the difference between managers and employees was below this level it would be considered too large. Too large in this respect means that the gap between the two valuations was considered too big to close in negotiations between a manager and an employee about an appropriate bonus pay. Failed negotiations were then considered as being perceived unfair by the employee. Or otherwise, when negotiations are not common practice, a one-sidedly determined bonus payment would be established by the manager. If the difference between the established bonus payment and the valuation the employee had had in mind was too big (i.e. below a ten percent significance level), the established bonus payment would be considered unfair as well. Although only the difference in the future condition is significant ($p = 0.0270$, the p-value for the difference in the past condition is relatively low ($p = 0.105$). The above definition of perceived fairness will also be used in the separate analyses for men and women in sections 4.2 and 4.3. I will return on the subject of perceived fairness in section 4.4, when perceived fairness results for men and women separately will have been discussed.

To more elaborately test whether the difference between men and women was significant, an additional factorial ANOVA was co nstructed. This time gender was included as an extra factor. Valuations and all 7-point scale ratings were submitted to this 2 (temporal location) × 2 (role) × 2 (gender) ANOVA. Of these factorial ANOVAs only difficult showed some interesting significant interactions, as can be seen below in Table 2. The results for valuation

[10] For women not a single difference between past and future ratings on any of the 7-point scale ratings was significant.

and cause can be found in Appendix D. The results for stress were not included as its Levene's test of equality of error variances produced p = .020 and were therefore not interpretable.

Table 2 2 × 2 × 2 ANOVA on *Difficult*

Source	*SS*	*df*	*F*	*Sig.*	*Partial Eta Squared*
Role	0.005	1	0.006	0.94	0
Temporal location	1.038	1	1.12	0.291	0.006
Gender	0.032	1	0.035	0.852	0
Role × Temp	0.309	1	0.334	0.564	0.002
Role × Gender	0.008	1	0.008	0.927	0
Temp × Gender*	3.213	1	3.466	0.064	0.018
Role × Temp × Gender*	3.143	1	3.39	0.067	0.017
Error	178.922	193			

$p^{**} < .050$, $p^{*} < .100$

Levene's test of equality of error variances: p = 0.298

As can be seen from Table 2, the main effect of temporal location on difficult dropped to non-significance compared to the 2 × 2 ANOVA. The main effect of gender was not significant, but the interaction term Temp × Gender was and so was Role × Temp × Gender. Both can be explained by the rather counterintuitive difficult ratings for female employees in the future condition compared to those of male employees. Whereas male and female managers gave quite comparable difficult ratings (Tables 3 and 4) in both past and future condition (future condition 0.248 / 0.242 points higher resp.), male and female employees differed in their perception of difficulty. Where male employees rated the twelve percent target exceedance 0.627 points more difficult to accomplish in the future condition, women rated it 0.517 points less difficult in the future condition. This explains both the non-significance of above mentioned main effects, as well as the discussed interaction effects.

Because the 2 × 2 × 2 ANOVA did not provide very insightful information regarding the gender differences (apart from difficult ratings) I will discuss the results for men and women separately in sections 4.2 and 4.3. There the data will be split on the basis of gender and separately analyzed in a 2 × 2 ANOVA.

4.2 Men

Table 2 shows the mean values and ratings for men only. Due to the splitting of the data, the number of data decreased. Therefore the significance level was lowered from .05 to .10 for the results from men and women (section 4.3).

Table 3 Mean values and ratings of past and future events Men

Role	Temporal location of target exceedance	
	Past	Future
Manager		
Valuation	4377 (1767)	4479 (1990)◆
Difficult	4.611 (0.838)	4.859 (1.059)
Stress	3.778 (1.333)	4.109 (1.390)◆
Cause	2.667 (0.862)	2.500 (1.026)
Employee		
Valuation**	4381 (2432)	5799 (3002)◆
Difficult**	4.424 (1.200)	5.051 (0.887)
Stress	3.182 (1.740)	3.231 (1.180)◆
Cause	2.636 (0.929)	2.718 (1.025)

Standard deviations are in parentheses. Asterisks indicate values or ratings that differed significantly between past and future situations in parametric testing. Diamonds correspond to diamonds at the same value or rating for the other role in the same temporal location[11] in nonparametric testing.
$p^{**} < .050$, $p^{*} < .100$; $p^{\blacklozenge} < .100$.

All of these results were submitted separately to a 2 (temporal location) × 2 (role) ANOVA. Results from these can be found in Appendix E. These revealed a main effect of:

- Temporal location on valuation

  $F(1, 197) = 3.582, p = .061, \eta_p^2 = .026$
- Temporal location on difficult

  $F(1, 197) = 6.707, p = .011, \eta_p^2 = .047$
- Role on stress

  $F(1, 197) = 9.459, p = .003, \eta_p^2 = .065$

[11] A diamond behind the stress score from the manager, past condition indicates that it differs significantly from the stress score from the employee, past condition, which also has a diamond behind it for a better overview.

Male employees required an even higher percentage in the future condition than the together group (32%), but male managers also showed no significant difference in their valuation of subordinates' target exceedance. All in all, the results for men were qualitatively rather similar to the combined results. As in the above, managers and employees only showed a significant difference in valuation in the future condition, and their past valuations were remarkably close to each other. Stress scores were again significantly higher for managers than for employees in the future conditions. In the past condition stress scores were higher as well, but not significantly.

Because of the decreased sample size (n = 140), nonparametric tests are even more appropriate in this instance to check the results of the factorial ANOVA, given the non-normality of the data. Again, the results were qualitatively very similar, with the only exception of reported stress in the past condition between managers and employees, which was not significant in the Kruskal-Wallis test. However, this result also has to be interpreted with caution, because variances of Stress scores did not pass Levene's test of equality of error variances ($p = 0.036$).

It thus appears there is indeed evidence for a temporal value asymmetry among employees in the male participants. On average they demanded a 32.4% higher bonus in the future than in the past, which both the parametric and nonparametric test confirmed to be significant. This strengthens the confirmation of hypothesis 1a. The 2.3% higher bonus, awarded by male managers, further strengthens the disconfirmation of hypothesis 1b. The fact that male employees demanded a higher percentage, and male managers a lower percentage in the future condition than the together group implies the reverse pattern for women, but I will return to this in section 4.3. Again there is no asymmetry in affect, and neither in intentionality to confirm the folk-conceptual theory of behavior explanation (Malle, 2011).

Kruskal-Wallis tests were also performed for both managers and employees to test whether past and future valuations differ significantly from each other (ps = 0.894 / 0.060 resp.). Clearly managers and employees disagree quite severely when assessing the value of a future target exceedance. But when contemplating a past target exceedance, valuations are remarkably close to each other. The issue of perceived fairness will be further discussed in section 4.4.

4.3 Women

Table 3 shows the mean values and ratings for women only.

Table 4	**Mean values and ratings of past and future events Women**	
	Temporal location of target exceedance	
Role	Past	Future
Manager		
Valuation	3369 (1518)◆	4181 (2244)
Difficult	4.600 (0.986)	4.842 (0.765)
Stress	4.600 (0.910)◆	4.526 (1.307)
Cause	2.400 (0.828)◆	2.737 (0.783)
Employee		
Valuation	4975 (2040)◆	5066 (2009)
Difficult	4.938 (0.854)	4.455 (0.934)
Stress	4.000 (1.033)◆	3.818 (1.250)
Cause	3.000 (1.033)◆	3.091 (1.446)

Standard deviations are in parentheses. Asterisks indicate values or ratings that differed significantly between past and future situations in parametric testing. Diamonds correspond to diamonds at the same value or rating for the other role in the same temporal location[12] in nonparametric testing.
$p^{**} < .050$, $p^{*} < .100$; $p^{◆} < .100$.

All of these results were submitted separately to a 2 (temporal location) × 2 (role) ANOVA. Results from these can be found in Appendix E. These revealed a main effect of:

- Role on valuation

  $F(1, 197) = 5.744, p = .020, \eta_p^2 = .092$

- Role on stress

  $F(1, 197) = 4.835, p = .032, \eta_p^2 = .078$

- Role on difficult

  $F(1, 197) = 3.338, p = .071, \eta_p^2 = .056$

[12] A diamond behind the stress score from the manager, past condition indicates that it differs significantly from the stress score from the employee, past condition, which also has a diamond behind it for a better overview.

Most remarkable about these results is not that there is not a main effect of temporal location on valuation among women (and thus no significant TVA), because much of it can be blamed to the small sample size (n = 61). But the valuations across conditions show that female employees require a marginal higher compensation in the future condition than in the past condition (1.8%), whereas female managers value their subordinates' target exceedance 24.1% percent higher than female managers in the past condition, albeit not significantly. Also the lower perceived difficulty by employees in the future compared to the past condition is something noteworthy.

Another surprising result is the reported cause, which leans significantly more towards the employee's capabilities and effort, than to luck, according to managers than to employees in the past condition (in the future as well, but not significantly). This seems like quite a counterintuitive result because, following the traditional (according to Malle (2011) flawed) attribution theory, actors (employees) should tend to attribute such a positive event more to person causes than observers (managers). But because the folk-conceptual theory of behavior explanation (Malle, 2011) makes a solid argument in changing the traditional attribution theory from person vs. situation explanations to intentional vs. unintentional judgments, we should at least consider its perspective as well. Apart from the scarce literature that tried to explain actions along the lines of the folk-conceptual theory of behavior explanation, studies on differences in perceived intentionality between actors and observers across temporal locations are non-existent to my knowledge. Furthermore, Malle (2011) proposes an elaborate research framework to study the various domains in which the folk-conceptual theory of behavior explanation is applicable, which was beyond the scope of my research to implement. So even though even though theoretically the folk-conceptual theory of behavior explanation is superior, the research setup to test accurately for it was too difficult to implement in my study. The affect and intentionality questions in my study were thus more along the lines of traditional actor-observer research.

An explanation Malle (2011) gives that observers might use for explaining unusual negative events could be applicable analogously. Observer respondents (managers) do not have a base-rate for how well an employee usually does in reaching and exceeding one's performance target. They have a base rate that consists of one observation that suggests the employee did considerably well (the twelve percent performance target exceedance in the vignette). When asked for an explanation, they may be perfectly justified to attribute the event to personal

factors, at least partially. This provides a very reasonable explanation for the mixed and seemingly counterintuitive results on the cause-question.

Because of the small sample size, nonparametric tests are arguably more trustworthy and appropriate in this instance to check the results than the parametric factorial ANOVA. However, the results were also in this instance qualitatively very similar, with now the exception of stress in the past condition between managers and employees being significant in the Kruskal-Wallis test, $p = .006$, whereas the pairwise comparisons in the factorial ANOVA indicated no significant difference between managers and employees.

Female employees thus not show a significant temporal value asymmetry in neither the parametric nor the nonparametric test. Hypothesis 1a is thus not confirmed for women, even though for the together group and men it was. Hypothesis 1b is firmly disproven by the female results, because not only no significant TVA was found for managers, but the difference between past and future valuations for managers was higher than the difference between past and future valuations for employees (24.1% / 1.8% resp.).

Seemingly there were also actor-observer asymmetries among women. The significant main effect of role on valuation and the main effects of role on both stress and difficult, in combination with the significant nonparametric differences between female managers and employees (albeit only in the past condition) gave more ground for the folk-conceptual theory. However, when more closely examined, both cause and stress showed an opposite pattern of what was expected according to this theory.

Kruskal-Wallis tests were also performed for both managers and employees to test whether past and future valuations differ significantly from each other (ps = 0.014 / 0.308 resp.). Apparently the results for women are opposite to those of men. Female managers and female employees disagree quite strongly when assessing the value of a past target exceedance (p = 0.014). But on average agree more on the value of a future target exceedance (p = 0.308).

4.4 Perceived Fairness

Finally, the analyses regarding perceived fairness provided some insightful information. Differences at the ten percent level between the valuations of managers and employees were considered significant and to be perceived as unfair in the eyes of the employee. When a significant difference was present, managers' valuations would differ too much from those of employees to be considered fair. Managers' and employees' valuations were compared to each other in each temporal location for each group, the results of which can be found in Table 5.

Table 5	**Difference in valuation between managers and employees**	
	Temporal location	
	Past	Future
Group		
Together	0.105	0.027**
Men	0.894	0.060*
Women	0.014**	0.308

Kruskal-Wallis *p*-values, $p^{**} < .050$, $p^{*} < .100$
Past/future valuations, manager-employee respectively for;
Together: 4080-4575 / 4368-5638;
Men: 4377-4381 / 4479-5799; Women: 3369-4975 / 4181-5066

At first glance, the *p*-values from the group 'together' give rise to suspicion regarding hypothesis 3 (Table 5). There does not seem to be a lot of wiggle room in any negotiations about bonus payments for target exceedance. The future valuations differ quite significantly $p = 0.027$, and also $p = 0.105$ in the past condition indicates a relatively big difference in valuations, albeit not significant. However, significance levels cannot be considered fully informational in this instance and have to be treated with care. A *p*-value of 0.105 means that there is a chance of roughly eleven percent that the true median valuations of managers and employees are equal. This is quite low and does not guarantee a high level of perceived fairness within a company. Furthermore, the absolute difference between managers and employees in the past with this amount of respondents ($n = 100$) gives rise to a *p*-value of 0.105, but with an increased sample size *p*-values could drop. In other words, *p*-values are only a relative indicator of perceived fairness.

When more closely examined it appears there are ways to circumvent this high degree of perceived unfairness. Male managers and male employees in the past situation seem to agree on what an appropriate bonus pay should be. The same holds for female managers and female employees in the future condition. As can be seen from Table 5 $p = 0.308$ for women and as high as $p = 0.894$ for men. This shows that there is enough room to reach an agreement between manager and employee. Or at least that the bonus payment that will be determined one-sidedly by managers will be considered fair. Because this was quite a surprising result, I performed an additional Kruskal-Wallis test to see how these differences play out in the other possible settings: those of a male manager and a female employee and vice versa (Table 6).

Table 6	**Difference in valuation between managers and employees of different sexes**	
	Temporal location	
	Past	Future
Group		
M man. / F emp.	0.125	0.414
F man. / M emp.	0.076*	0.067*

Nonparametric p-values, $p^* < .100$
Male / female (M / F); manager / employee (man. / emp.)
Valuations, M man. through M emp., past / future respectively:
4377; 4975; 3369; 4381 / 4479; 5066; 4181; 5799.

It appears that male managers are most likely to uphold perceived fairness in establishing a bonus payment for their employees. Whether that employee is male or female and whether the target exceedance lies in the past or in the future, p-values are all higher for male managers (except for a marginal smaller p-value in the future, same sex condition), as can be seen from Tables 5 and 6. This is mainly due to the relatively low average valuation of female managers (past: 3369, future: 4181), which can be found in Table 4. All in all, there is enough evidence to support hypothesis 3. Employees' perceived fairness is indeed affected by the timing of determining their performance-based compensation.

4.5 Mediation

The second hypothesis involving mediation was mainly constructed to check the findings of Caruso et al. (2008). They found that participants' reports on how stressful the work was, mediated the TVA. Other studies (Van Boven & Ashworth, 2007; Caruso, 2010; Helzer & Gilovich, 2012; Burns et al., 2012) found similar asymmetries in affect or intentionality, which I summarized as a temporal affect asymmetry. An attempt was made to see if the reported scores on the 7-point scales mediated the effect of temporal location on the valuation of the target exceedance. First stress was tried, although the results of neither the 2 × 2 ANOVA, nor the results of the Kruskal-Wallis tests gave ground for this step. I performed the analyses anyway to see if the mediation results from Caruso et al. (2008) could be replicated. The previous tests on difficulty, showed results that were more in line with expectations, with higher ratings for future and self-relevant situations. So even though in Caruso et al. (2008) difficult did not mediate the TVA, it was tried for completeness. Finally cause was tried, which could arguably capture intentionality best, although differences in cause ratings were negligibly small. The method used was slightly different from Caruso et al. (2008) though. Were Caruso and collaborators used the method outlined by Baron & Kenny (1986), I used Preacher & Hayes' (2004) Bootstrapping Method.

A simple mediation model tries to establish how the relationship between an independent variable (temporal location) and a dependent variable (valuation) changes with inclusion of a third variable, the mediator variable (affect/intentionality scores). The method outlined by Baron & Kenny (1986) has been the traditional method to test for mediation effects and consists of three steps. The first step is to regress the dependent variable (valuation) on the independent variable (temporal location) and check if there is a significant relationship between the two. The second step is to regress the mediator variable (affect/intentionality scores) on the independent variable (temporal location) and thereby checking that the independent variable (temporal location) has a significant relationship with the mediator (affect/intentionality scores). If this relationship is not present a mediation effect is ruled out. The third and final step is to regress the dependent variable (valuation) on both the independent variable (temporal location) and the mediator (affect/intentionality scores) simultaneously. That way you test whether there is a significant relationship between the mediator variable (affect/intentionality scores) and the dependent variable (valuation), while controlling for the independent variable (temporal location). In this final step you try to demonstrate that when the mediator (affect/intentionality scores) is included in the first

regression it is a significant predictor and the previously significant path between independent variable (temporal location) and dependent variable (valuation) is greatly reduced, if not dropped to non-significance. If so, a significant mediation effect is established.

Without going in too much statistical detail, Preacher and Hayes' method is a nonparametric method, which thus not violates any distributional assumptions. It also has more power, due to the bootstrapping which essentially means repeatedly randomly sampling of the observations at hand with replacement for a total of *k* times[13]. For each of the *k* samples the mediation effect is estimated. Once all effects are collected, the researcher will have a distribution of all the separate mediation effects, which serves as an empirical approximation of the real effect in the original population. When ordered from smallest to largest a confidence interval can be constructed to analyze if the mediation effect differs significantly from zero. The above procedure makes it an excellent method to test for mediation in small sample sizes. This method has become the preferred method in recent years according to Hayes (2009).

But even the increased power due to the bootstrapping (× 5000[14]) could not replicate Caruso et al.'s (2008) result of mediation of the effect of temporal location on valuation by feeling stressed. The lower (LB) and upper (UB) bootstrapped 95%-confidence intervals included zero, which implies that there is no evidence for an indirect effect of stress (LB = -102, UB = 76). The Pearson correlation between stress and valuation was even negative (ρ = -.103). On average managers (both men and women) rated the amount of stress their subordinate would feel, higher than the employees themselves. Moreover, women reported higher stress ratings for a past target exceedance than for a future one. In the end, this insignificant mediation result is completely in line with expectations from the stress scores, because in my data reported stress levels did not show a comparable trend to those of Caruso et al. (2008).

A variable that was more in line with the movements of valuation across conditions was the ratings of how difficult participants deemed the target exceedance. Although the arguably more appropriate Kruskal-Wallis test, did not reveal any significant differences between temporal locations. And no interaction effect of Role×Temporal Location was found in

[13] Hayes (2009): "typically at least 1000, although I recommend at least 5000", p. 412.
[14] See Hayes (2009) for a more detailed discussion on other preferred methods to test for mediation effects.

neither valuation nor perceived difficulty. For completeness perceived difficulty was also tried to mediate the effect of temporal location on valuation, but again no significant results were produced by Preacher & Hayes (2004) Bootstrapping Method (LB = -79, UB = 149). Both stress and difficult were also tried as mediators separately for men and women, but nothing yielded significant results (men: LBs = -132 / -175, UBs = 77 / 232; women: LBs = -178 / -215; UBs = 215 / 143 resp.).

Even though Caruso et al. (2008) found stress to have a significant mediation effect, cause arguably more accurately measures intentionality. On the cause-scale ranging from 1: 'completely to your own abilities and effort' to 7: 'completely to luck', 1 would come closest to completely intentional and 7 to completely unintentional. If that were the case, cause would more accurately measure the TAA and be a better mediator for the TVA. To test this logic cause was also tried as a mediator for the effect of temporal location on valuation, although neither the 2 × 2 ANOVA nor the Kruskal-Wallis test gave reason to suspect a significant indirect effect. And indeed no significant effect was found (LB = -49, UB = 49), nor for men and women separately (LBs = -91 / -166; UBs = 101 / 430 resp.). As can be seen from Tables 1, 3 and 4 differences in cause were negligibly small. Only female employees' cause ratings were significantly higher than those of managers in the past condition (Table 3). Indicating that female employees think they owed the target exceedance more to luck than to their own abilities, than their managers do.

Preacher & Hayes' (2004) Bootstrapping Method did not result in any significant mediation effects of stress, which would have confirmed Caruso et al.'s (2008) results. Mediation results for difficult were neither significant, which was found by Caruso et al. (2008) as well. Cause, arguably more closely measuring intentionality than stress or difficult, did also not mediate the effect of temporal location on valuation. In sum, no evidence whatsoever was found to support hypothesis 2. In chapter 5 I will discuss the implications of the results reported in this chapter.

4.6 General Discussion

Some considerations concerning the general research method and its implications must be noted as well. First of all, the instruction not to use a calculator during the experiment may have triggered participants to calculate the multiplication of twelve percent and € 42.395 by hard. Or at least anchored them on a self-generated value, which arguably lies in or around the true outcome (given the fact that participants all studied economics and thus have reasonable math skills). Because there was no clear set of 'rules' to end up with a 'good' valuation, it can be considered to have been an effortful task. Epley & Gilovich (2006) found that in these instances people adjust insufficiently from their anchor. This might have influenced the results. It is a defensible reasoning that otherwise a significant TVA could have been found for managers and a more pronounced TVA for employees.

Now I will come back to the difference in payment moments between past and future condition, as mentioned in section 3.1.2. Theoretically the payment moment should have been equal across conditions. But when this ideal scenario was implemented the vignettes would not have appeared real and relevant, which are two vital requirements according to Finch (1987) and Neff (1979). The downside of the way the vignettes were presented to participants in my study is that they may have given a valuation in the future condition which is appropriate in terms of real value for next year, but in nominal terms thus not comparable to valuations of past years exceedance. That is, they may have corrected it by an inflation correction or an interest rate of some sorts. In other words, they may have used other standards in determining next years valuation than past years valuation. There are two reasons why this concern was put aside after some considerations.

First, the fixed wage in the future versions of the vignette were not inflated to correct for something like an inflation correction or interest rate. When participants did indeed relate the bonus payment to the height of the fixed wage as was suggested before, the above should not have been an issue. Because then participants in both past and future conditions related their valuation to the same fixed wage. That way the payment moment is virtually equal in both conditions. Especially because the setup was a between-subjects design, so participants in the future condition did not know the height of the fixed wage in the past condition, let alone that there was a past condition handed out to participants in other classes.

Second, when the above does not apply because people did not relate their valuations to the fixed wage (or for any other reason for that matter), another well-known phenomenon in economics does apply. Going back to 1928, Irving Fisher wrote an entire book about the subject in *The Money Illusion* (1928). It refers to the human tendency to think of money in nominal terms rather than real monetary value. The latter would be according to standard economic theory, as it implies a rational attitude towards money (Shafir et al., 1997). As the value of money changes over time when inflation is present, thinking of nominal monetary value implies using a value of money that was accurate in the past, but is not anymore in the present. Or put in terms of present and future value of money, people will use a reference framework in terms of the present nominal monetary value to value future events. That means that the valuations participants gave for past target exceedances were put in terms of nominal monetary value in the present, which coincides with its real monetary value in the present. For future target exceedances participants also used the present reference framework to formulate an appropriate bonus payment. But even though the payment moment was set to happen in a year, participants valuations for next year were in terms of today's nominal monetary value. In this situation the present nominal monetary value clearly does not coincide with next years real monetary value. But because it was put in terms of nominal monetary value of today, it is perfectly justified to compare it to participants' past valuations (which were also in terms of nominal monetary value of today), without making some sort of correction.

Furthermore, the results collected from female respondents were surprising at least. A reversed pattern was found in the data from women compared to the data from men with respect to valuation and difficult among others. Moreover it was for a large share incompatible with the literature to date on this subject. However, it must be noted that no other paper investigated the difference between men and women. Caruso et al. (2008) for example, report an equal share of men and women and leave it at that. Because no reasonable explanation can account for this difference, it is quite an interesting subject to investigate more extensively. That is, if this difference between men and women is a pervasive one and not an anomaly.

Finally, whether the use of student subjects is appropriate, has been debated extensively in the literature. There is however, convincing evidence that they serve as appropriate research subjects for organizational decision tasks (Sitkin & Weingart, 1995). Moreover, Ashton and Kramer (1980) report evidence in a literature review study on that students serve well as surrogates in tasks involving decision making (although not in studies of attitudes, but that does not apply to my study). They report that real world decision makers and students show "extremely similar information processing characteristics and biases" (p.3) Also, Helzer & Gilovich (2012) show that temporal asymmetries are present among older people as well and even more pronounced than among students.

5. Implications

In this chapter I will discuss some of the practical implications of the findings in the previous chapter. Especially how the results would affect managers and employees in real businesses and how the differences between men and women come into play.

From a company's perspective, the best recommendation is to connect male employees with male managers to reach an agreement on an appropriate bonus payment for a target exceedance that lies in the past (Table 5: $p = 0.894$). Female employees' valuations of the target exceedance are extremely close to each other (Table 4) and show no TVA (Kruskal-Wallis $p = 0.899$). This means they can uphold female employees' perceived fairness better by connecting them to male managers and establish a bonus payment for a target exceedance beforehand (Table 6: $p = 0.414$), than by connecting them to female managers and establish a bonus payment beforehand, which would be the second best option (Table 5: $p = 0.308$). When a company believes its overall productivity or profitability is suited best with employees that perceive the bonus payments as fair, it is in their interest to have as many male managers as possible. In fact the best combination would be an entire male staff, because perceived fairness is highest when male managers are coupled with male employees. And furthermore because the bonus payments could be relatively low due to the TVA, as perceived fairness of all employees is served best with bonus payment determinations/negotiations at the end of the respective year.

Even if such a company strives for an even share of men and women among their employees, perceived fairness is still upheld best when female employees are coupled to male managers (and determine/negotiate bonus payments at the beginning of the year). When companies do indeed care that much about perceived fairness this proposes an ethical problem. They are then inclined to hire only male managers. This could provide an alternative explanation for the fact that the share of women in management functions is as low as 28%.[15]

[15] Source: www.cbs.nl

On the other hand, when a company does not care about perceived fairness of employees at all and only about low (bonus payment) costs, they are far better off with an entire female management. Because in such a company perceived fairness is not an issue, bonuses should be determined in retrospect. Female managers' past valuations are over a thousand euros lower than valuations of any manager, in any condition. But given the low percentage of women at the manager level in the population, it does not seem that there are many companies with such an extreme low cost philosophy.

From an employee's perspective, recommendations are quite straightforward: bonus payments should tried to be established or negotiated beforehand. The TVA causes male employees to value the target exceedance significantly higher at the beginning of the year. Although female employees' valuations do not differ significantly between past and future conditions, they are still best off determining/negotiating bonus payments before hand. This because male managers' valuations are, just as their own valuations, slightly higher at the beginning of the year and female managers' future valuations are quite a bit higher than their past valuations, albeit that all these differences are not statistically significant.

With the implications of the approaches above, nothing is said about whether it is realistic or applicable in a given company. Besides the ethical considerations concerning a different bonus regime for male and female employees, perceived fairness will suffer when word gets out about the companies' reasons for the two different regimes. On the other hand, a fair regime where all bonuses are established at the end of the respective year gives rise to the same ethical problem. In such a regime it would be most profitable for a company to connect both male and female employees to a male manager and even to only higher male employees as well. So a choice must be made between less female managers and employees, or giving up part of the female employees' perceived fairness. This could provide an alternative explanation for the low proportion of women at the manager level.

6. Conclusion

Temporal value asymmetry appears to become a more widely established phenomenon. And its implications can be severe, e.g. in rewarding punitive damages or explaining value-destroying mergers and acquisitions. In this thesis I showed that it also has an impact on the valuation of performance target exceedances. The results from Caruso et al. (2008) held with respect to the self-irrelevant condition and no significant TVA was found among managers. Regarding the self-relevant condition, results were mixed. The together group and men indeed showed a significant TVA, but women did not. Their mediation result could not be replicated with these data for difficult, stress and cause. The fundamentally different responses for men and women in this study did prove to be insightful. And, apart from any ethical considerations, showed that male managers were more likely to uphold perceived fairness with employees of either sex.

It would be very interesting to investigate these asymmetries in the TVA between men and women further. For example to see what causes women to display a TVA in self-irrelevant instances. It would also be very interesting to see in what other fields TVA is present. Judged from the variety of percentages in Caruso et al. (2008) and this study, the research should be very subject specific. In line with what Frederick et al. (2002) remark in their overview study of intertemporal discounting the goal should not be to find a universal TVA, but to test how large and persistent it is in every separate situation.

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Appendix A[16]

Manager, future condition

Imagine you are a manager in a medium-sized company, were you are supervising several employees. The policy regarding wages is as follows: employees receive a fixed wage, which will be € 42.395 in the coming year. When employees reach and exceed their performance target, they will receive a bonus pay on the basis of that exceedance. You as a manager do not have any influence on neither the determination of the performance target nor on the height of the fixed wage. You as a manager are solely authorized to determine the bonus pay of your employees. The bonuses will be determined at the end of the respective year and paid out immediately.

Imagine that it is the start of the year. Please indicate what you think will be the value of an appropriate bonus pay for an employee that will exceed her/his performance target by 12% coming year.

Appropriate bonus pay:
€ ……

Now imagine the work of the employee and please answer the following questions on a scale of 1 – 7:

- How difficult will it be to realise this 12% exceedance for this employee?

1 2 3 4 5 6 7

Extremely easy — Extremely difficult

- How stressed will this employee feel to realise this 12% exceedance?

1 2 3 4 5 6 7

Not stressed at all — Extremely stressed

- To what will the employee owe this 12% exceedance?

1 2 3 4 5 6 7

Completely to her/his own qualities and abilities — Completely to luck

[16] Translated from the original vignettes in Dutch

Manager, past condition

Imagine you are a manager in a medium-sized company, were you are supervising several employees. The policy regarding wages is as follows: employees receive a fixed wage, which was € 42.395 in the past year. When employees reach and exceed their performance target, they will receive a bonus pay on the basis of that exceedance. You as a manager do not have any influence on neither the determination of the performance target nor on the height of the fixed wage. You as a manager are solely authorized to determine the bonus pay of your employees. The bonuses will be determined at the end of the respective year and paid out immediately.

Imagine that it is the end of the year and that you have to determine the bonus pays for your employees on the basis of their exceedances. Please indicate what you think that the value is of an appropriate bonus pay for an employee that has exceeded her/his performance target by 12% past year.

Appropriate bonus pay:
€ ……

Now imagine the work of the employee and please answer the following questions on a scale of 1 – 7:

- How difficult was it to realise this 12% exceedance for this employee?

1 2 3 4 5 6 7

Extremely easy — Extremely difficult

- How stressed did this employee feel to realise this 12% exceedance?

1 2 3 4 5 6 7

Not stressed at all — Extremely stressed

- To what did the employee owe this 12% exceedance?

1 2 3 4 5 6 7

Completely to her/his own qualities and abilities — Completely to luck

Employee, future condition

Imagine you are an employee in a medium-sized company, were a manager supervises you. The policy regarding wages is as follows: employees receive a fixed wage, which will be € 42.395 in the coming year. When employees reach and exceed their performance target, they will receive a bonus pay on the basis of that exceedance. Both you as an employee and your manager do not have any influence on neither the determination of the performance target nor on the height of the fixed wage. Your manager is solely authorized to determine the bonus pay of your employees. The bonuses will be determined at the end of the respective year and paid out immediately.

Imagine that it is the start of the year. Please indicate what you think will be the value of an appropriate bonus pay for you when you will exceed your performance target by 12% coming year.

Appropriate bonus pay:
€ ……

Now imagine your work as an employee and please answer the following questions on a scale of 1 – 7:

- How difficult will it be to realise this 12% exceedance coming year?

1 2 3 4 5 6 7

Extremely easy — Extremely difficult

- How stressed do you feel now, when you think of the 12% exceedance for coming year?

1 2 3 4 5 6 7

Not stressed at all — Extremely stressed

- To what will you owe this 12% exceedance?

1 2 3 4 5 6 7

Completely to your own qualities and abilities — Completely to luck

Employee, past condition

Imagine you are an employee in a medium-sized company, were a manager supervises you. The policy regarding wages is as follows: employees receive a fixed wage, which was € 42.395 in the past year. When employees reach and exceed their performance target, they will receive a bonus pay on the basis of that exceedance. Both you as an employee and your manager do not have any influence on neither the determination of the performance target nor on the height of the fixed wage. Your manager is solely authorized to determine the bonus pay of your employees. The bonuses will be determined at the end of the respective year and paid out immediately.

Imagine that it is the end of the year and that you have exceeded your performance target by 12% past year. Please indicate what you think is the value of an appropriate bonus pay for you on the basis of this exceedance of your performance target by 12% past year.

Appropriate bonus pay:
€ ……

Now imagine your work as an employee and please answer the following questions on a scale of 1 – 7:

- How difficult was it to realise this 12% exceedance past year?

1 2 3 4 5 6 7

Extremely easy — Extremely difficult

- How stressed do you feel now, when you think of the 12% exceedance from past year?

1 2 3 4 5 6 7

Not stressed at all — Extremely stressed

- To what did you owe this 12% exceedance?

1 2 3 4 5 6 7

Completely to your own qualities and abilities — Completely to luck

Appendix B

Past vs. Future TOGETHER

Pairwise Comparisons

Dependent Variable: Valuation

Manager = 0 Employee = 1	(I) Past = 0 Future = 1	(J) Past = 0 Future = 1	Mean Difference (I-J)	Std. Error	Sig.[b]
.0	.0	1.0	-287.490	448.307	.522
	1.0	.0	287.490	448.307	.522
1.0	.0	1.0	-1063.168*	455.072	.020
	1.0	.0	1063.168*	455.072	.020

Pairwise Comparisons

Dependent Variable: Difficult

Manager = 0 Employee = 1	(I) Past = 0 Future = 1	(J) Past = 0 Future = 1	Mean Difference (I-J)	Std. Error	Sig.[a]
.0	.0	1.0	-.245	.192	.203
	1.0	.0	.245	.192	.203
1.0	.0	1.0	-.328	.195	.093
	1.0	.0	.328	.195	.093

Pairwise Comparisons

Dependent Variable: Stress

Manager = 0 Employee = 1	(I) Past = 0 Future = 1	(J) Past = 0 Future = 1	Mean Difference (I-J)	Std. Error	Sig.[a]
.0	.0	1.0	-.245	.270	.365
	1.0	.0	.245	.270	.365
1.0	.0	1.0	.089	.274	.745
	1.0	.0	-.089	.274	.745

Pairwise Comparisons

Dependent Variable: Cause

Manager = 0 Employee = 1	(I) Past = 0 Future = 1	(J) Past = 0 Future = 1	Mean Difference (I-J)	Std. Error	Sig.[a]
.0	.0	1.0	.000	.198	1.000
	1.0	.0	.000	.198	1.000
1.0	.0	1.0	-.045	.201	.824
	1.0	.0	.045	.201	.824

Past vs. Future MEN

Pairwise Comparisons

Dependent Variable: Valuation

Manager = 0 Employee = 1	(I) Past = 0 Future = 1	(J) Past = 0 Future = 1	Mean Difference (I-J)	Std. Error	Sig.[b]
.0	.0	1.0	-102.111	575.737	.859
	1.0	.0	102.111	575.737	.859
1.0	.0	1.0	-1418.578*	560.496	.013
	1.0	.0	1418.578*	560.496	.013

Pairwise Comparisons

Dependent Variable: Difficult

Manager = 0 Employee = 1	(I) Past = 0 Future = 1	(J) Past = 0 Future = 1	Mean Difference (I-J)	Std. Error	Sig.[b]
.0	.0	1.0	-.248	.242	.307
	1.0	.0	.248	.242	.307
1.0	.0	1.0	-.627*	.236	.009
	1.0	.0	.627*	.236	.009

Pairwise Comparisons

Dependent Variable: Stress

Manager = 0 Employee = 1	(I) Past = 0 Future = 1	(J) Past = 0 Future = 1	Mean Difference (I-J)	Std. Error	Sig.[a]
.0	.0	1.0	-.332	.344	.336
	1.0	.0	.332	.344	.336
1.0	.0	1.0	-.049	.334	.884
	1.0	.0	.049	.334	.884

Pairwise Comparisons

Dependent Variable: Cause

Manager = 0 Employee = 1	(I) Past = 0 Future = 1	(J) Past = 0 Future = 1	Mean Difference (I-J)	Std. Error	Sig.[a]
.0	.0	1.0	.167	.244	.496
	1.0	.0	-.167	.244	.496
1.0	.0	1.0	-.082	.238	.732
	1.0	.0	.082	.238	.732

Past vs. Future WOMEN

Pairwise Comparisons

Dependent Variable: Valuation

Manager = 0 Employee = 1	(I) Past = 0 Future = 1	(J) Past = 0 Future = 1	Mean Difference (I-J)	Std. Error	Sig.[a]
.0	.0	1.0	-811.814	687.266	.242
	1.0	.0	811.814	687.266	.242
1.0	.0	1.0	-90.795	779.352	.908
	1.0	.0	90.795	779.352	.908

Pairwise Comparisons

Dependent Variable: Difficult

Manager = 0 Employee = 1	(I) Past = 0 Future = 1	(J) Past = 0 Future = 1	Mean Difference (I-J)	Std. Error	Sig.[a]
.0	.0	1.0	-.242	.303	.427
	1.0	.0	.242	.303	.427
1.0	.0	1.0	.483	.343	.165
	1.0	.0	-.483	.343	.165

Pairwise Comparisons

Dependent Variable: Stress

Manager = 0 Employee = 1	(I) Past = 0 Future = 1	(J) Past = 0 Future = 1	Mean Difference (I-J)	Std. Error	Sig.[a]
.0	.0	1.0	.074	.393	.852
	1.0	.0	-.074	.393	.852
1.0	.0	1.0	.182	.446	.685
	1.0	.0	-.182	.446	.685

Pairwise Comparisons

Dependent Variable: Cause

Manager = 0 Employee = 1	(I) Past = 0 Future = 1	(J) Past = 0 Future = 1	Mean Difference (I-J)	Std. Error	Sig.[a]
.0	.0	1.0	-.337	.343	.330
	1.0	.0	.337	.343	.330
1.0	.0	1.0	-.091	.389	.816
	1.0	.0	.091	.389	.816

Manager vs. Employee TOGETHER

Pairwise Comparisons

Dependent Variable: Valuation

Past = 0 Future = 1	(I) Manager = 0 Employee = 1	(J) Manager = 0 Employee = 1	Mean Difference (I-J)	Std. Error	Sig.[b]
.0	.0	1.0	-494.278	452.858	.276
	1.0	.0	494.278	452.858	.276
1.0	.0	1.0	-1269.956*	450.543	.005
	1.0	.0	1269.956*	450.543	.005

Pairwise Comparisons

Dependent Variable: Difficult

Past = 0 Future = 1	(I) Manager = 0 Employee = 1	(J) Manager = 0 Employee = 1	Mean Difference (I-J)	Std. Error	Sig.[a]
.0	.0	1.0	.016	.194	.934
	1.0	.0	-.016	.194	.934
1.0	.0	1.0	-.067	.193	.728
	1.0	.0	.067	.193	.728

Pairwise Comparisons

Dependent Variable: Stress

Past = 0 Future = 1	(I) Manager = 0 Employee = 1	(J) Manager = 0 Employee = 1	Mean Difference (I-J)	Std. Error	Sig.[b]
.0	.0	1.0	.571*	.272	.037
	1.0	.0	-.571*	.272	.037
1.0	.0	1.0	.905*	.271	.001
	1.0	.0	-.905*	.271	.001

Pairwise Comparisons

Dependent Variable: Cause

Past = 0 Future = 1	(I) Manager = 0 Employee = 1	(J) Manager = 0 Employee = 1	Mean Difference (I-J)	Std. Error	Sig.[a]
.0	.0	1.0	-.167	.200	.406
	1.0	.0	.167	.200	.406
1.0	.0	1.0	-.212	.199	.290
	1.0	.0	.212	.199	.290

Manager vs. Employee MEN

Pairwise Comparisons

Dependent Variable: Valuation

Past = 0 Future = 1	(I) Manager = 0 Employee = 1	(J) Manager = 0 Employee = 1	Mean Difference (I-J)	Std. Error	Sig.[b]
.0	.0	1.0	-3.937	571.100	.995
	1.0	.0	3.937	571.100	.995
1.0	.0	1.0	-1320.404*	565.220	.021
	1.0	.0	1320.404*	565.220	.021

Pairwise Comparisons

Dependent Variable: Difficult

Past = 0 Future = 1	(I) Manager = 0 Employee = 1	(J) Manager = 0 Employee = 1	Mean Difference (I-J)	Std. Error	Sig.[a]
.0	.0	1.0	.187	.240	.438
	1.0	.0	-.187	.240	.438
1.0	.0	1.0	-.192	.238	.421
	1.0	.0	.192	.238	.421

Pairwise Comparisons

Dependent Variable: Stress

Past = 0 Future = 1	(I) Manager = 0 Employee = 1	(J) Manager = 0 Employee = 1	Mean Difference (I-J)	Std. Error	Sig.[b]
.0	.0	1.0	.596	.341	.083
	1.0	.0	-.596	.341	.083
1.0	.0	1.0	.879*	.337	.010
	1.0	.0	-.879*	.337	.010

Pairwise Comparisons

Dependent Variable: Cause

Past = 0 Future = 1	(I) Manager = 0 Employee = 1	(J) Manager = 0 Employee = 1	Mean Difference (I-J)	Std. Error	Sig.[a]
.0	.0	1.0	.030	.242	.901
	1.0	.0	-.030	.242	.901
1.0	.0	1.0	-.218	.240	.365
	1.0	.0	.218	.240	.365

Manager vs. Employee WOMEN

Pairwise Comparisons

Dependent Variable: Valuation

Past = 0 Future = 1	(I) Manager = 0 Employee = 1	(J) Manager = 0 Employee = 1	Mean Difference (I-J)	Std. Error	Sig.[b]
.0	.0	1.0	-1605.617*	715.127	.029
	1.0	.0	1605.617*	715.127	.029
1.0	.0	1.0	-884.598	753.868	.246
	1.0	.0	884.598	753.868	.246

Pairwise Comparisons

Dependent Variable: Difficult

Past = 0 Future = 1	(I) Manager = 0 Employee = 1	(J) Manager = 0 Employee = 1	Mean Difference (I-J)	Std. Error	Sig.[a]
.0	.0	1.0	-.338	.315	.289
	1.0	.0	.338	.315	.289
1.0	.0	1.0	.388	.332	.248
	1.0	.0	-.388	.332	.248

Pairwise Comparisons

Dependent Variable: Stress

Past = 0 Future = 1	(I) Manager = 0 Employee = 1	(J) Manager = 0 Employee = 1	Mean Difference (I-J)	Std. Error	Sig.[a]
.0	.0	1.0	.600	.409	.148
	1.0	.0	-.600	.409	.148
1.0	.0	1.0	.708	.432	.106
	1.0	.0	-.708	.432	.106

Pairwise Comparisons

Dependent Variable: Cause

Past = 0 Future = 1	(I) Manager = 0 Employee = 1	(J) Manager = 0 Employee = 1	Mean Difference (I-J)	Std. Error	Sig.[a]
.0	.0	1.0	-.600	.357	.098
	1.0	.0	.600	.357	.098
1.0	.0	1.0	-.354	.376	.351
	1.0	.0	.354	.376	.351

Appendix C

P-values n.p. Levene's test			
	Mannen	Vrouwen	Samen
Waardering	0.864	0.367	0.670
Moeilijk	0.606	0.369	0.738
Stress	0.036**	0.756	0.111
Oorzaak	0.178	0.817	0.289
*** < .01 , ** < .05 , * < .1			

P-values K-W between all groups			
	Mannen	Vrouwen	Samen
Waardering	0.047**	0.064*	0.006***
Moeilijk	0.074*	0.472	0.24
Stress	0.028**	0.137	0.002***
Oorzaak	0.658	0.269	0.508
*** < .01 , ** < .05 , * < .1			

P-values K-W between groups: MP vs. MF			
	Mannen	Vrouwen	Samen
Waardering	0.437	0.204	0.188
Moeilijk	0.144	0.424	0.106
Stress	0.399	0.869	0.348
Oorzaak	0.329	0.179	0.932
*** < .01 , ** < .05 , * < .1			

P-values K-W between groups: WP vs. WF			
	Mannen	Vrouwen	Samen
Waardering	0.036**	0.899	0.073*
Moeilijk	0.035**	0.178	0.254
Stress	0.88	0.701	0.606
Oorzaak	0.665	0.758	0.725
*** < .01 , ** < .05 , * < .1			

P-values K-W between groups: MP vs. WP			
	Mannen	Vrouwen	Samen
Waardering	0.894	0.014**	0.105
Moeilijk	0.885	0.307	0.603
Stress	0.150	0.098*	0.075*
Oorzaak	0.990	0.088*	0.334
*** < .01 , ** < .05 , * < .1			

P-values K-W between groups: MF vs. WF			
	Mannen	Vrouwen	Samen
Waardering	0.060*	0.308	0.027**
Moeilijk	0.715	0.248	0.968
Stress	0.009***	0.106	0.001***
Oorzaak	0.272	0.389	0.267
*** < .01 , ** < .05 , * < .1			

Appendix D

2 × 2 × 2 ANOVA on *Valuation*

Source	*SS*	*df*	*F*	*Sig.*	*Partial Eta Squared*
Role**	37533183.45	1	7.322	0.007	0.037
Temporal location*	15147516.27	1	2.955	0.087	0.015
Gender	5384040.667	1	1.05	0.307	0.005
Role × Temp	914567.562	1	0.178	0.673	0.001
Role × Gender	3506152.449	1	0.684	0.409	0.004
Temp × Gender	985408.96	1	0.192	0.662	0.001
Role × Temp × Gender	10708203.38	1	2.089	0.15	0.011
Error	989391767.9	193			

$p^{**} < .050$, $p^{*} < .100$

Levene's test of equality of error variances: $p = 0.298$

2 × 2 × 2 ANOVA on *Oorzaak*

Source	*SS*	*df*	*F*	*Sig.*	*Partial Eta Squared*
Role*	3.362	1	3.35	0.069	0.017
Temporal location	0.303	1	0.302	0.583	0.002
Gender	1.289	1	1.284	0.259	0.007
Role × Temp	1.39E-05	1	0	0.997	0
Role × Gender	1.515	1	1.509	0.221	0.008
Temp × Gender	0.678	1	0.676	0.412	0.003
Role × Temp × Gender	0.63	1	0.628	0.429	0.003
Error	193.727	193			

$p^{**} < .050$, $p^{*} < .100$

Levene's test of equality of error variances: $p = 0.298$

Appendix E

Tests of Between-Subjects Effects *P-values of main effects and interaction (partial η2)* Together			
	M / E	P / F	M/E * P/F
Valuation	0.006*** (0.037)	0.036** (0.022)	0.226 (0.007)
Difficult	0.852 (<0.001)	0.037** (0.022)	0.762 (<0.001)
Stress	<0.001*** (0.070)	0.685 (0.001)	0.386 (0.004)
Cause	0.182 (0.009)	0.874 (<0.001)	0.874 (<0.001)
*** < .01 , ** < .05 , * < .1			

M/E = Manager / Employee = main effect of role
P/F = Past / Future = main effect of temporal location
M/E*P/F = interaction term

Tests of Between-Subjects Effects *P-values of main effects and interaction (partial η2)* Men			
	M / E	P / F	M/E * P/F
Valuation	0.102 (0.020)	0.061* (0.026)	0.104 (0.019)
Difficult	0.988 (<0.001)	0.011** (0.047)	0.264 (0.009)
Stress	0.003** (0.065)	0.429 (0.005)	0.556 (0.003)
Cause	0.583 (0.002)	0.803 (<0.001)	0.468 (0.004)
*** < .01 , ** < .05 , * < .1			

M/E = Manager / Employee = main effect of role
P/F = Past / Future = main effect of temporal location
M/E*P/F = interaction term

Tests of Between-Subjects Effects *P-values of main effects and interaction (partial η2)* Women			
	M / E	P / F	M/E * P/F
Valuation	0.020** (0.092)	0.389 (0.013)	0.491 (0.008)
Difficult	0.913 (<0.001)	0.601 (0.005)	0.119 (0.042)
Stress	0.032** (0.078)	0.669 (0.003)	0.856 (0.001)
Cause	0.071* (0.056)	0.413 (0.012)	0.637 (0.004)
*** < .01 , ** < .05 , * < .1			

M/E = Manager / Employee = main effect of role
P/F = Past / Future = main effect of temporal location
M/E*P/F = interaction term