ERASMUS UNIVERSITY ROTTERDAM
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Goal framing and risk

How framing goals on actions or results influences an individual's risk attitude and risk perception.

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Abstract

This study provides insight for managers and decision makers on the behavior under risk of employees when they are given goals framed in a certain way. I study two different approaches to formulate goals, goals that are just focused on getting certain favorable actions done and goals that are just focused on getting a final end result. I conduct a survey with two treatment groups among students to see if subjects have a different risk perception and risk attitude when they are presented with these different goal frames. Furthermore, I study if the projection of the goal difficulty (easy or hard) has an effect on risk perception and risk attitude of the subjects. According to the results, subjects have the same level of risk perception and risk attitudes when either presented with goals that just focus on actions compared to when they are presented with goals that just focus on results. Subjects *did* have a significant lower perception of risk when their goal was relatively easy to attain compared to when their goal was hard to attain. However, this difference in reference outlook on the goal difficulty did not extend in the same way to their risk attitude. Risk perception is influenced by the difficulty of the goal, but risk attitude is not.

Preface and acknowledgements

During my master in behavioral economics, I took a seminar in Management Accounting Research. During this course, we discussed papers on budgeting and what effect a loose or tight budget/goal might have on performance and effort of employees. However, none of these papers really crossed the threshold into behavioral economics. Although, in my eyes, the theories and concepts of behavioral economics could be very relevant for how budgets and goals should be designed in organizations.

In this thesis, I want to provide the reader with useful knowledge on the setting of goals to get good performance from employees, and the different ways to do so. Furthermore, I want to bring the fields of management accounting and behavioral economics together, for I believe this happens much too infrequently.

I want to thank my supervisor, dr. Kirsten Rohde, for her insights and guidance. She helped me a great deal in designing the survey and was always there to give constructive and accurate feedback, on a short notice.

I want to thank my parents for their support they gave me these last months when writing this thesis.

I hope this thesis provides useful insights and food for thought for everyone who finds him- or herself in the position of setting goals for people in their organization, or for themselves.

Enjoy reading!

Daan Gouka

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1. Introduction

One of the basic ways to motivate people in organizations is by setting clear, reachable goals. In management literature, it is acknowledged how goals should match certain specific criteria to create the most optimal effect, for example a goal should be measurable, attainable and should have a sensitivity to a relevant time period. However, behavioral economics introduces a different concept that might have an effect of how goals elicits behavior in individuals who try to attain them. *Framing effects.* A framing effect is a cognitive effect (or bias) where the way a situation is framed (say if the goal is formulated in a positive or negative way) has an effect on the choices people make in that situation.

In this thesis, I will look into different types of goal frames. A situation that can function as a useful example arises in university course types. On the Erasmus School of Economics, there are roughly thought two types of courses: courses with lectures and an exam at the end, and seminars. A course with lectures and a (100%) exam at the end, gives a student the freedom to prepare himself optimally for the exam, whether he does this by preparing and attending all the lectures or just start studying really hard the week before the exam. The real goal that the student has to attain in this class is getting a 5.5 or higher for the final exam, this goal includes no statements on the actions and processes the student has to perform in order to get a successful grade. It is a goal that solely focuses on the final outcome, or final performance of the student (a 5.5 or higher on the final exam) and not on the actions and processes that he or she must follow to get there. This can be seen as *An outcome-based goal*. Another form of course is the seminar with (100%) assignments, where the student is obligated to read, discuss and present papers, take part in class discussions, solve and present business cases and do assignments. The goal of the seminar is participate in all these task with maximum effort, once

a student does this, he will end with a good mark for the course and pass it[1]. The actions and processes the student must undertake are made clear for the student, and when the student follows these actions and processes as described, he or she is almost certain of a successful outcome (assuming the student has a sufficient level of intelligence, knowledge and skill that is required in the seminar, see footnote[1]). The goal here focuses far more on following certain actions and processes, and less on a final test that determines the performance outcome. *These types of seminars have action-based goals.*

These are the different types of frames I want to look at in this thesis, *action-based goal and result-based goals. The action-based goal* is a goal where the individual focuses on the short term processes and actions time and time again and, as a result of following these processes will accomplish a result in the long term. The focus here is strictly on the short term processes and actions that are favorable for the individual or the organization, instead of on the long term result and outcomes. *The result-based goal* is a goal where there is no focus on the short term processes, but solely on the long term result, or final outcome. In the theoretic part of the thesis, I will explain the different aspects of using the different goals to motivate individuals in organization. Although I will briefly explain when either frame, *process oriented or outcome oriented*, is more suitable to the situation, this question has already been thoroughly covered in existing literature and therefore will not be the main question in my research.

As this is a thesis in the field of behavioral economics, it will be about how these differently framed goals influence certain *behavior*. I will research how these different types of frames influence *risk perception* and *risk attitude* of the individual who gets the goal set. I will do a survey to research if action-based goals induce a different risk perception and risk attitude in

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[1] A very important assumption in this example, is that the student has enough knowledge, intelligence and skills to complete the assignments and tasks he or she encounters in the seminar. If a student has too few of the characteristics, maximum effort will of course not provide the student with a 5.5 for a seminar. At the ESE, there are always pre-requisites to a seminar. For example, bachelor students are required to have passed all there prior courses and master students need to have a bachelors degree in order to start the master study. This way, the faculty controls for the intelligence, knowledge and skill level for their students who participate in seminars.

individuals compared to result-based goals. Risk perception is defined as how risky an individual rates a risky prospect on a scale of riskless to risky, in 7 increasing steps. Risk attitude is defined as which choice the subject actually makes, either the safe choice (relatively more risk-averse and less risk-seeking) or the risky choice (relatively more risk-seeking and less risk-averse).

I want this thesis to be a valuable for managers, not only by providing insights on the different types of ways how goals can be framed, and the properties of both frames, but also by combining all fields of science together to provide new empirical findings on behavior that are immediately valuable in the practical day to day operations of organizations. It is important for a manager to know if the type of goal frame he sets for his employees has an effect on the risk perception and risk attitude of the employee. It could be the case that the manager wants to control for risk seeking or aversion of the employee, and by knowing the effects of the goal frame, he could make a better choice in drawing up goals and targets and the way he motivates his employees. Furthermore, I want to find out if the *reference point* has any influence on the risk perception and risk attitude of the individual in those situations. It could, for instance, be the case that when a worker is very unconfident and negative about reaching a target, he will behave differently compared to when he is very confident and positive. I want to research if people react differently to process and outcomes goals when they have different reference points. Results might point out that a negative reference outlook on a goal combined with an result-framed goal elicit different behavior combined to that negative reference outlook combined with a action-framed goal or vice versa. The same thing can of course be the case when dealing with the positive reference outlook.

After I have discussed all current research action-based and result-based control systems, I will briefly discuss some management accounting, behavioral economic and psychological theories that can relevant in explaining possible behavioral effects. After I have discussed related literature, I will state briefly state the research question of this thesis. I will then describe the design and method of my survey and discuss its results. Next, using insights and theories I have

explained up to that point, I will form my own expectations on the research question and form the hypotheses that are to be tested in a survey. In part 4, I will thoroughly and critically discuss the results of the survey, how the results can be interpreted and possible limitations on internal and external validity. I will end this thesis with the conclusion.

2. Related Literature

In the first section of this literature overview, I will, very shortly discuss framing effects. Next, I will discuss literature on *(management) control systems*, which has his origins in management accounting. The use of goals and targets are forms of control systems. In the third part, I will discuss *goal orientation* literature, which stems from the field of psychology. Both fields of science provide useful insight on the way goals can be framed. Finally, in section 2.4, I will discuss behavioral economics theories that are helpful in forming expectations on how these different types of frames and reference points can influence risk perception and risk attitudes.

Before I go deeper into the different frames of goal setting, first I want to shortly describe *framing effects,* which is useful for people who do not have a background in behavioral economics. According to literature from Tversky and Kahneman (1981), a decision frame is the decision-makers conception of the "facts, outcomes and contingencies associated with a particular choice" and is partly controlled by the *"formulation of the problem"* and partly by *"partly by the habits, norms and personal characteristics"* of the decision-maker. Standard economic decision making (Arrow, 1982), states that a different formulation of a choice problem should give the same preference order of choices of the decision-maker. In their paper, Tversky and Kahneman demonstrated with the help of several experiments how a change of formulation of a change problem caused a massive shift of behavior of people, and their choices. It was an eye opening finding, and gave birth to the idea that peoples choices, decisions and behavior is largely affected by the way the decision frame is constructed. For example, there are preference reversals shown when people first get presented with a problem in terms of gains and later in terms of losses. This is done with experiments and surveys on loss of lives and the gaining and losing of wealth. Furthermore, the way a frame is formulized can emphasize certain aspects of a situation, making the individual more focused and even more emotionally attached to that emphasized aspect. In the following sections, I will explain in more depth which two frames I will use in this research.

2.2 Action and result-based control systems

As I explained in the introductory, the frames I look into in this thesis are action-based goal frames and result-based goal frames and their effect on behavior under risk and whether reference point of difficulty makes a difference. It is important to first describe the differences between process-based goals and result-based goals. A good way to do this is to look pieces of literature from the field of management accounting; control systems.

Merchant (1982) thoroughly discusses control systems in his monumental paper the *control function of management*. It is an important piece in the literature regarding different control systems. According to Merchant, good controls are needed because employees might have personal limitations (related to skills, abilities and possible biases) but also for a *lack of goal congruence*. There might be a lack of goal congruence if personal and organizational goals are not the same. These problems might lead to lower performance of employees or even failure of the organizational goals. Merchant describes, that if there is perfect control in an organization, there is no doubt that that all accomplishments will go precisely as planned. In his eyes, this is impossible, for there is always the possibility of unforeseen events. It is much more realistic to strive for good *control,* which means that the individual and the organization can be reasonably confident that there will be no unpleasant surprises (related to performance or other organizational goals).

Theory on the setting of goals, targets and budgets is part of the theory on management control because by giving an employee goals, and the way management constructs these goals can be very influential on behavior of that employee, and is there to make sure the employee works as hard as possible in the best interest of the organization. Goal setting is a part of organizational control. By setting goals and targets, a principal tries to get an agent to reach a certain level of output, a goal can work as a guideline, or has motivational value for the agent to reach that level of output. This output can for example be a level of performance or a certain level of products produced or even a certain level of quality. *To conclude, control is a very broad*

term for all instruments that maximize the possibility that individuals act in the best interest of the organization, goals are such an instrument.
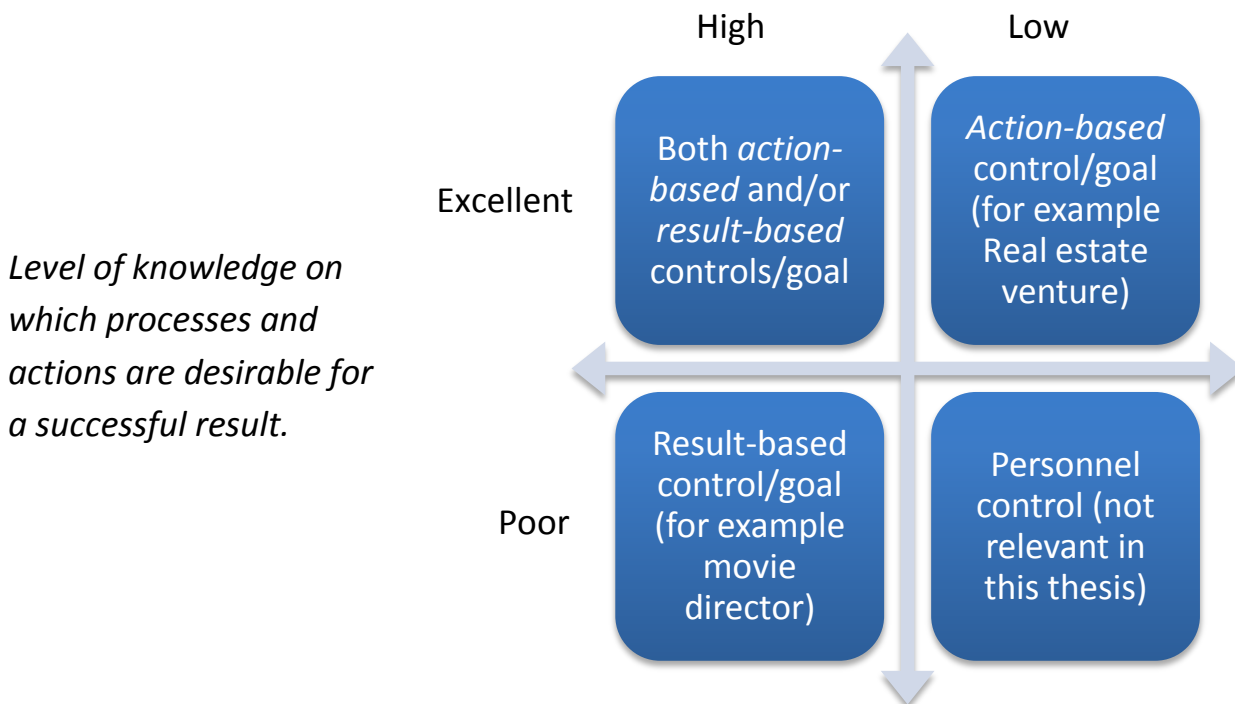
Merchant clearly splits control systems in multiple categories; control-problem avoidance, control of specific actions, control of results, control of personnel. Within my research question, only control of specific actions (action-based controls) and control of results (result-based controls) are relevant, and I will focus on these controls. Merchant describes an action-based controls as a control system that attempts to make sure that individuals perform (or do not perform) certain specific actions that are known to be advantageous (or disadvantageous) for the organization. This can be done with behavioral constraints, where the occurrences of negative actions and activities get limited by for example physical devices such as locks and administrative constraints, like segregation of duty. Another type of action-based control that is more closely to the goal literature, is *action accountability,* a type of feedback where employees are being held accountable for their actions and the processes they follow in their activities. It is important to notice that the focus here is on whether the employee focuses on the plausible actions/procedures, and not so much on the end result. Rather, a sufficient end result (in the long run) is assumed when an employee has followed all the correct actions, processes and procedures that are expected of him. Action-based goals are goals that have a high degree of action accountability. Merchant captures the elements that are necessary for action-based controls to function properly. It is essential that employees understand the actions that are expected from them, and that their actions will be noticed and significantly rewarded or punished. *Knowledge of which specific actions are desirable* seems to be the most important variable in determining if action-based controls, like action-based goals/targets are effective.

The other control systems from the paper that I discuss, are result-based control systems, like result-based goals and targets. With result-based controls, it is important that the dimensions are precisely defined along which the results are requested (for example high quantity or high quality). Next, and very important, it is necessary that the results can be precisely measured.

And lastly, again it is important that rewards and punishments are significantly strong, and according to the level of the result. Merchant emphasizes the importance of *measurability* of the result. Contrary to action-based controls, the actions and procedures of employees are not the focus, but the focus lies on the final result of their performance, therefore it is crucial that these result can be measured accurately. Merchant uses the following matrix to show when it is better to use an action-based control (goal) compared to a result-based control (goal). Personnel controls (at poor-low) are not relevant for this thesis, therefore I do not discuss it.

fig. 1[2]

Ability to measure results accurately on performance indicators.

	High	Low
Excellent	Both *action-based* and/or *result-based* controls/goal	*Action-based* control/goal (for example Real estate venture)
Poor	Result-based control/goal (for example movie director)	Personnel control (not relevant in this thesis)

Level of knowledge on which processes and actions are desirable for a successful result.

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[2] This matrix comes from the paper of Merchant, K.A. (1982). The control function of management. Sloan Management Review (Summer 1982), 43-55.

As I discussed on the previous page, action-based and result-based goals both have a very important factor in determining whether they can be successful applied. This is illustrated more clearly in the matrix of figure 1. When there is a high ability to measure results on important performance dimensions *and* an excellent amount of available knowledge of which specific actions are desirable, it can be the right choice to use either (or both) action-based or result-based goals (or controls). However if one of these elements is missing, the favorable choice quickly switches to either one of these frames.

Imagine a real-estate venture, where a large amount of capital is invested in real estate. The outcomes and results of these investment often only show after a large period of time, and it is hard to determine all the factors that have contributed to whether the investment turned out to be a success or failure. For example, macroeconomic forces like economic growth, developments on the housing market or changes of interest and exchange rates could play a big part in the success of a real-estate venture. When there are a lot of other variables that have an effect on final performance, it becomes difficult to measure whether the final performance is due to the behavior and choices of employees. However, the actions and procedures employees have to take and undergo to come to a investment decision, *are* very well developed. Consider for example the many techniques (say NPV and sensitivity analyses) to review whether a real instate investment should be pursued. Existing theories says it would be more effective, in that case, to put *action-based controls*, say action-based goals, on the actions and procedures that we know that will lead to high investment returns on the long run, instead of putting result-based controls on those returns in the long run to motivate and steer employees in the right direction.

Now imagine a different example, say, a movie director. The creation of a movie is a creative process. There are movie directors who have very unconventional actions and procedures when it comes to creating and directing their movies, who are able to make massively successful movies. Because they are no strict guidelines on which actions, processes and procedures must be followed in order for a movie to be successful, we can assume that there is little knowledge on the standard actions, processes and procedures that are desirable for a movie to be

successful. Therefore, it will be very difficult to put action-based controls on the movie director, however the factor that *can* be accurately measured is the amount of gross earnings the movie generates in the cinema's when released. In this situation, the final result the director produces can be accurately measured in terms of money, in contrast to the actions he takes to get to that final result. In that situation, literature states that result-based controls (and thus result-based goals) will be more effective than action-based controls. So far the management accounting view on different goal setting. In the next section, I will review the psychological views on 'goal orientation', which take a very different angle than the management accounting theories (a more internal view) and also includes more information on risk, the concept I want to capture in this capture.

2.3 Goal orientations

It common knowledge that in an organization, workers can have very different attitudes to the way they allocate their efforts to a certain task, how they are motivated by incentives or react to feedback with regards to a goal or target. The research on determining the factors behind this fact, can be seen as *open* research. There are so many possible relevant theories and factors contributing to the behavior of people who want to reach their targets, that it can be very difficult to determine a fixed framework that explains the between differences of the attitudes of workers. In this section, I am looking to another one of the facets of motivational theory.

One of the frameworks behind the question of what drives an employee's attitude is the *goal orientation* framework. This framework was proposed by Dweck (1986) and is part of a huge body of literature from the field of *psychology.* In this part of my research, I will review the findings of psychology and how they resonate with my hypotheses.

Goals are often described as certain performance standards that are to be reached. (Locke, Latham, 1990). They are used by a *principal* (for example; an employer) to inform his *agent* (for example; an employee) on which level of performance or effort is expected of him/her, and to motivate the agent on reaching that level. Researchers have looked into how this process can be influenced by changing the difficulty, attainability, specification and acceptance of the goal. Other important papers by Dweck (1986) and Dweck & Legett (1988) proposed a framework of *goal orientations*, which are an important force driving an individual's behavior related to goals. I will shortly describe the 2 different goal orientations discussed in this framework; *the learning goal orientation* and *the performance goal orientation*.

A. Learning goal orientation

- The learning goal orientation specifically focuses on the individual learning a new task/skill or mastering a new kind of situation. Learning the skill, has a bigger focus than the final performance.
- Knowledge, skill and ability is seen as incremental over time.
- Adaptive stance on failure.

B. Performance goal orientation

- The performance goal orientation specifically focuses on the individual demonstrating his level of skill, and validating the adequacy of his competence-level regarding a certain skill, or how he masters a specific situation. This is done by seeking positive opinions, and avoiding negative ones regarding his level of competence.
- Knowledge, skill and ability is seen as fixed over time.
- Maladaptive stance on failure.

These two different orientations have some very precise differences, which I will explain. Individuals with learning goal orientations tend to hold their personal characteristics very flexible. Attributes like knowledge, ability and intellect tend to be *incremental*, this means with this orientation, when effort is invested in these skills over a time period, more experiences are gathered and the levels of the attributes will increase. Because people with a learning goal orientation believe skill levels can be developed, they are more open to be engaged by goals that focus on the development of certain skills rather than just demonstrating one's skill level.

People with a performance goal orientation seem to look at personal attributes like ability, knowledge and intellectual level as a *fixed* variable. They believe that one's level of ability is very difficult to improve and view ability as a fixed signal of one's competence. Because of the way ability is fixed in this orientation, it is viewed as a clear and honest signal of skill, and persons are often seeking to demonstrate their level of ability because it validates their competence regarding a certain task or situation.   Because of this, someone with a performance orientation will state that the short term development of skills will not have necessarily mean that the task or skill is mastered in the future. With the performance orientation, it is more likely that the high level of effort invested in learning a new skill is a

signal of low ability, because a high-ability level person would not need to exert so much effort in learning the skill or task at hand.

Whether ability is fixed instrument is a very important difference between the different goal orientations, another big difference is how goal orientation influences one's attitude to failure and difficulty of the goal. A learning goal orientation tends to take an adaptive stance on failure, where failure is of course viewed as generally negative, though it has positive side effects. Challenging tasks (where failure can occur) ask for an increase in effort, and this is also viewed as something that is to be enjoyed, because the learning process is part of one's personal development. Furthermore, it is acknowledged that conquering a challenge often instigates positive emotions and a sense of achievement. A *challenging* goal is often reported as *engaging*. With a performance goal orientation however, the individual tends to respond in an maladaptive way, where they will withdraw effort from the hard task with a high chance of failure (the focus is shifted to easier tasks) and the difficult task generally is seen as less enjoyable. This is a result from the fact that ability is fixed at a performance orientation, because if it becomes known that an individual fails at a goal, or if a goal is too challenging, the individual is afraid that others will interpret this as a signal of his low ability. With increasing one's effort at a certain task, a performance oriented worker risks revealing his low ability (for if he had a high ability, he would not need to exert high effort to perform a certain skill).

Because of this, people with a learning goal orientation can have a more positive outlook to challenging elements compared to people with a performance goal orientation, and arguably, they might perceive less risk and be less risk-averse compared to people with a performance goal orientation. Learning goal orientations have similar properties as action-based goals and the same goes for performance goal orientations and result-based goals. Action-based and learning frames are more focused on the activities, actions, and processes an individual undertakes and has to assumption that if this is the case, there will be a successful result in the future. Result-based and performance frames do not focus on these specific activities, actions and processes, but rather focus on the measurable result or performance on the long run.

Building further on the theories regarding goal orientation, there are also empirical studies which type of goal orientation has individuals exert most effort, learn more efficiently and achieve the highest level of performance. This is not something I test in this thesis, but these papers do contain useful findings for readers who are interested in more behavioral effects of both goal frames.

As I will explain more thoroughly in section 3 of this thesis (the research question), I am about to test whether an action-based/learning oriented goal frame induces a different behavior than a result-based/performance oriented goal frame. The behavior I am interested in, is risk perception and risk attitude. In the next section, I will review important behavioral economic theories that might help form expectations.

2.4 Prospect theory

The implications of Prospect Theory from Kahneman and Tversky (1979,1992) could be a relevant theory when looking into risk attitude of individuals, especially reference-dependency and the reflection effect of risk-seeking and risk-aversion. Prospect theory describes how a reference point is important in decision making and how gains and losses relative to this reference point can have different values of utility.

Prospect Theory also introduces the concept of loss aversion, where people experience a loss more intense than a gain of the same quantity (Losses loom larger than gains). Meyerowitz and Chaiken (1987) find that observed differences in positive and negative goal framing might driven by loss aversion, because subjects with negative framed goals performed systematically better than subjects with positive framed goals.

Furthermore, prospect theory describes how people have a *reference point*, a point of wealth or quantity of goods (or status quo situation) that serves as a focal point. People can experience losses and/or gains that move their position away from their reference point, and also experience losses and/or gains that move their position closer to their reference points. Also the position of the reference points decides whether an event gets characterized as a gain or a loss. The utility function, as proposed in prospect theory is s-shaped, this means that the function is concave for gains and convex for losses. The utility function is steeper for losses than for gains (which implies the loss aversion) and the function is defined on the focal point of the reference point in the centre. The s-shaped value function Tversky and Kahneman showed in their paper on PT from 1979 is showed in figure 2:

Figure 2[3]
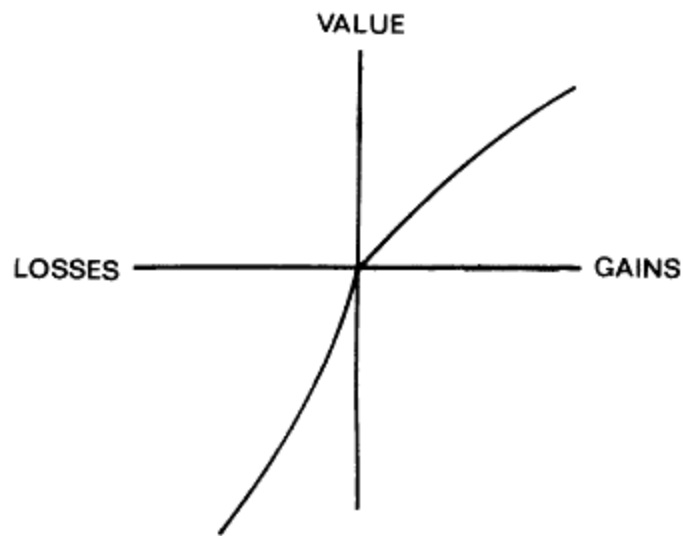
Next, people might have the tendency to subjectively weight probabilities. If individuals are prone to this, they weigh small probability events too high and/or underweigh events with a high probability compared to if they would rate them objectively. This is portrayed by the subjective probability weighting function. Figure 3 shows the graph from the paper of Kahneman and Tversky (1992) on Cumulative Prospect Theory.

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[3] Figure is from the paper of Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. Econometrica, 47, 263-291.

Figure 3[4]
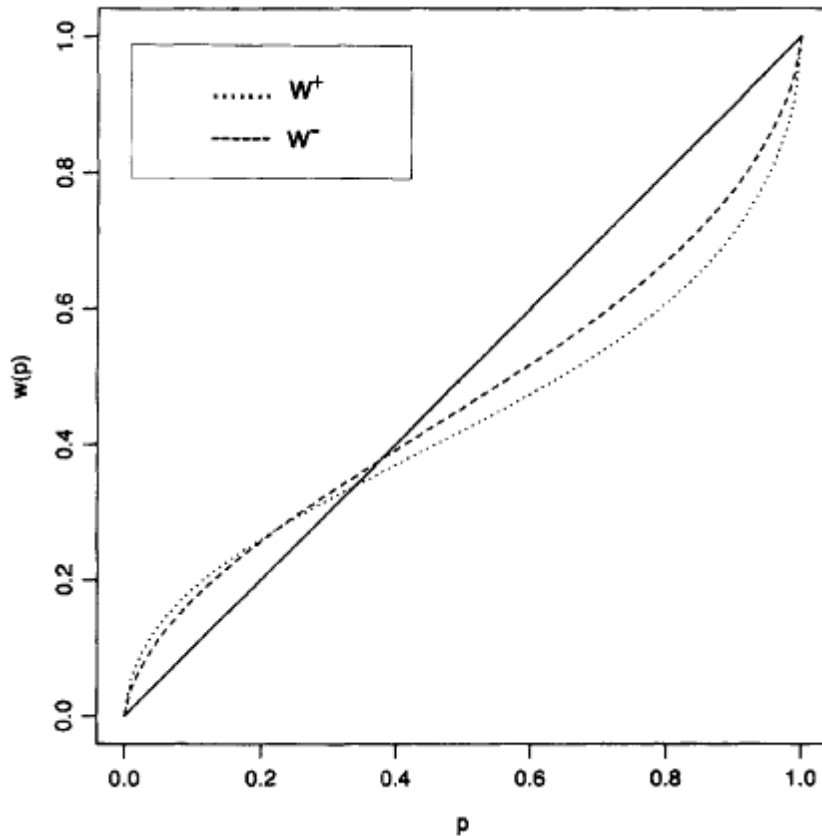
Kahneman and Tversky found the subjective probability weighting functions as shown in figure z. They found slightly different functions for gains (w+) as for losses (w-). On the horizontal axis is *p*, the objective probability and *w(p), the subjective probability.* As can be seen in the figure, small probabilities are overweighed and higher probabilities are underweighted.

The s-shaped value function and the overweighting of small probabilities together create the *fourfold pattern of risk attitude,* this concept is important in this thesis*.* The fourfold pattern suggests that people might display *risk-averse behavior for gains with moderate probabilities and losses with small probabilities, and risk-seeking behavior for losses with moderate probabilities and gains with small probabilities*.

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[4] Tversky, A., & Kahneman, D. (1992). Advances in prospect theory: Cumulative representation of uncertainty. Journal of Risk and Uncertainty, 5, 297-323.

This shift from risk-averse behavior for gains to risk-seeking behavior for losses is called the *reflection effect of risk attitude.*

The implications of reference points can also be important for the hypotheses tested in this thesis. Prior research shows that certain pieces of information can possibly be used by individuals as possible reference points, and that these reference points can elicit certain behavior regarding risk. The fact that performance targets, goals and expectations can function as reference points is already mentioned by Kahneman and Tversky in the original paper on Prospect Theory. Furthermore, Crum et al (1981) show that performance targets can be reference points for individuals, and that the effects of these reference points can be manipulated by increasing the importance of the performance targets. Lopes (1987) and March & Shapira (1987) conclude that certain aspects of a particular situation can also influence one's reference point, because situational factors and how they are framed can cause a shift in attention of that individual. Again, it is shown that performance targets can be a focal point of attention, and the position of this focal point relative to a pay-off can influence risky behavior related to that pay-off.

In past research it is widely established that performance goals and targets function as reference points (Heath et al, 1999; Payne, Laughhunn & Crum, 1980, 1981). It is established that when individuals are far below their performance target, they can behave much more risk-seeking compared to when they were above their performance target. Furthermore, they can behave more risk-averse when they are above their performance target compared to when they are below their performance target. The explanation is fairly intuitive, when someone has already reached his target or goal, risky decisions that do not pay off can compromise the high performance measurement of the individual. On the other hand, if an individual has not yet accomplished his or her goals, risky decisions might seem warranted in order to still accomplish these goals.

In this past research, it seems that the *reflection effect* of risk-aversion for gains and risk-seeking for losses, caused by the inverse s-shaped probability weighting function and the s-shaped value function, as discussed above in this section, also holds for a person's risk attitude with regards to a certain reference performance (that serves as the reference point). This is one of the elements I will test in a survey, which I explain in the following section.

3. Research Question

In the introduction and literature overview of this thesis, I explained how goals and performance targets for individuals, whether that be students, employees or other people that are set on getting tasks done, can be framed in two ways; action and result-based. I explained among other things how either a focus on actions or results can be better in different circumstances, the differences between the two frames and what different properties both frames poses.

The differences in action-based and result-based goals and controls have been researched in existing literature, and I have thoroughly discussed this in the previous section. Because this is a thesis in behavioral economics, I am interested in how the two different goal frames each have an effect on peoples behavior. The behavior I will test, *is risk perception* and *risk attitude.* I want to find out if people have a different risk perception and risk attitude, if they receive action-based goals compared to result-based goals, and vice versa. The questionnaire that I will use to test this, will be based on a business case, where the subjects are presented with a situation and needs to perceive risk and make a risky choice.

Furthermore, I want to test if there is a *reference point* effect present. As I described in the introductory, I will change a subject's outlook and position towards his or her reference point. In one treatment group , the subject is very confident and positive towards him or her reaching the presented goal and in the seconds treatment group , the subject is very unconfident and negative towards him or her reaching the goal. This way, I do not only test if the way the goal is framed in actions or results has an effect, but also if the position towards the reference point of goal difficulty has an anchoring effect. I formed the following research question:

Does the framing of an individual's goal, in either an action-based frame or result-based frame and the reference point of goal-difficulty, have an effect on the risk perception and attitude of the individual.

4. Survey

In this section, I will begin describing the survey design. After that, I will state the hypotheses and my expectations given the literature.

4.1 Design

To test whether these hypotheses and expectations hold, I have conducted a survey among students who are likely to be in the position of making management decisions in organizations. I conducted a survey among bachelor and master students of economic studies at HES and ESE[5]. In total, 88 students took part in the survey. They were distributed across 2 treatment groups:

Treatment group 1: 4 questions about scenarios concerning investment decisions, with an unconfident and negative reference outlook on the given goals.

Treatment group 2: 4 questions about scenarios concerning investment decisions, with a confident and positive reference outlook on the given goals.

Both treatment groups get 2 situations, situation 1 has an action-based goal and situation 2 has a result-based goal. Note that a single subject thus receives a situation with an action-based goal *and* a situation with a result-based goal. Observable differences between goal frames are tested *within* subjects in both treatment groups and observable differences between positive and negative reference outlooks are tested *between* subjects.

In the questionnaire, the subject is asked to imagine himself working for a firm that sells a product to other companies on a business-to-business basis. It is a job that a student of economics can relate to, and the case is specifically build to be interesting and relevant to students of economics. After a short introductory on the position of the subject and the company, it is made clear that he or she gets promoted and now is in charge of his or her sales

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[5] HES, Hogeschool Economische studies (part of the HRO, Hogeschool Rotterdam) and ESE, Erasmus School of Economics (students throughout different years, bachelor and master).

team. In situation 1, the subject is presented with a specific goal. Through the story, and multiple statements, it is emphasized how important this goal is, and that it is the role of the subject as team leader to complete the given goal. The goal in situation 1 is:

Approach at least 30 new clients this month. Do this with full effort and give as much sales presentations to clients as possible, where you show your value to them.

The act of approaching new clients is a process that consist of a certain, repetitive action that the subject with his team have to perform. It is an action-based goal, where the actions that the team has to undertake are known and there is no mention made of a certain required performance level at the end of the month.

After the goal is presented to the subject, the subject gets presented with the reference outlook on the given goal, that functions as a reference point for the subject. For *treatment group 1*, there is a negative and unconfident reference outlook on the given goal. This is formulated in the questionnaire in the following way, again, this reference outlook is on the given goal of approaching 30 new clients;

You determine that this is very difficult. In the current situation, **you are not confident that this goal is reachable even if you and your team put in the effort.** *The expectation of you and your team reaching the target is negative.*

After the subject is presented with the goal, and the reference outlook on that goal, he encounters two possibilities to expand the number in his sales team, and thereby increasing the chance that he and his team complete the goal they are given. He is presented with the following two choices:

Investment A	Investment B
Add a "reliable" group of new people to your team that can find and approach an additional 10 new potential clients per month.	Add an "extravagant" group of people to your team that have a 50% chance of finding an additional 20 clients and a 50% chance of not fitting in your team and not finding any additional clients at all.

Obviously, investment A is the "safe" choice, and investment B is the "riskier choice" with either 50% possibility for a "low" pay off and 50% for a "high" pay off. The subject then has to answer questions on how risky he perceives Investment B and which investment he would choose, given the goals he is presented with, either investment A or investment B:

1. How risky do you consider investment B on a scale of riskless to risky?

Riskless   *Very Risky*

O   O   O   O   O   O   O

2. Considering the goal you have to reach, which investment do you prefer?

O Investment A

O Investment B

Next the subject is presented with the second situation, the subject still leads a team at the same company, and the case remains the same. The only thing that is different in the next situation is the goal. The goal in situation 2 is:

Have a sales revenue this month of €60.000,-. Sell at least 6 products this month.

This is purely a result-based goal, the only thing that matters is the revenue level of €60.000 through the sale of 6 products (it is mentioned that a product sells for €10.000). In contrast to the goal in situation 1, there is no mention of the actions and processes the subject and his or her team must follow. Just the final performance outcome counts, and it is not relevant how they reach it. Like in situation 1, the subject gets presented the same negative/unconfident reference point:

Again, you determine that this is very difficult. In the current situation, **you are not confident that this goal is reachable even if you and your team put in the effort.** *The expectation of you and your team reaching the target is negative.*

And like in situation 1, the subject again gets presented two situations to extend the sales team to increase the chances of completing the goal:

Investment C	Investment D
Add a "reliable" group of new people to your team that can sell an additional 2 products this month, which generates a revenue of €20.000	Add an "extravagant" group of people to your team that have a 50% chance of selling 4 products (generating €40.000) and 50% chance of not fitting in your team and not selling any additional products at all.

Again, investment A is the "safe" choice, and investment B is the "riskier choice" with either 50% possibility for a "low" pay off and 50% for a "high" pay off. The subject then has to answer questions on how risky he perceives Investment D (on a scale of riskless to risky, with 7 choices in between, see appendix). The next question is again which investment he would choose, given the goals he is presented with, either investment C or investment D.

To solve for learning effects between situation 1 and 2, the order in which the situations where presented to the subjects were randomized. The subjects had 50% chance to first encounter the process goal and 50% to first encounter the result goal, and there number of subjects facing either goal first is equal. This way, I solve the problem of one goal being used as a reference situation more than the other goal.[6]

Treatment group 1 consisted of the negative/unconfident reference outlook. And situation 1 and 2 are presented to a single subject in the form of a 'within' subject design to see whether a subject has a different risk perception and risk attitude dealing with risky choices when confronted with a particular goal. However, like I stated in the beginning of this section, there are 2 treatment groups. Treatment group 1 has a negative reference outlook, treatment group 2 has a positive reference outlook.

The second treatment has exactly the same case and questions as the first treatment group, the difference is the reference outlook on the goal difficulty. In the second treatment group, the outlook on the goal is the following:

*You determine that this goal is realizable. In the current situation, **you are rather confident that this goal is within your reach if you and your team put the effort in.** Your expectation of you and your team reaching the target is positive.*

The second treatment group has the same goals in situations 1 and 2, an action-based goal on contacting new clients and a result-based goal on revenue. Again, the subject is presented with a "safe" investments A and C and a "risky" investments B and D. The subject then answers again on how risky he perceives Investments B and D and which investment he would choose, given the goals he is presented with, either investment A or B and investment C or D.

As opposed to treatment group 1, treatment group 2 has is a *positive and confident* reference outlook on the goal difficulty, and I will test whether subjects have a different risk perception

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[6] For both treatment groups, there was no significant effect difference found for risk perception and risk attitude when subjects were first randomly presented with situation 1, compared to when subjects where first randomly presented with situation 2.

and risk attitude when they are presented the same problem under a different reference point (and also considering they have different goals). In the next section, I will form the hypotheses I am going to test, how I will analyze the results and I will form expectations based on the theories I discussed in the literature review in section 2.

4.2 Hypotheses and expectations

In this section I will formulate multiple hypotheses that are to be tested with the survey among students. I will do this by looking at the related literature, past research and economic theory on this topic, which I covered in section two. I will also form predictions on these hypotheses.

If we assume standard economic theory, and that people are rational utility maximizers, we can assume *"description invariance.* According the famous micro economist Arrow, this states that "the preferences of people do not change when they are presented with different types of ways how the choice problems (in this case, this is extended to goals) are formulated." (Arrow, 1982). I discussed papers in the previous section, which argue that a change of frames might cause a preference reversal or a change in behavior (risk attitude and risk perception). However, the differences between an action-based control and a result-based control are more than just a frame formulation change, it is more than just a change of how the goal is presented. Like discussed in the literature section of this thesis on control systems, both frames have a different focus. Therefore, the standard economic model cannot predict a clear expectation between the two different goal systems.

Forming expectations on risk attitudes and risk perception is very difficult because the goal orientations of the subjects are unknown prior to the survey, and one could ask the question if the theorized effects of the goal orientation from the literature occur in the real world. However, it is possible to speculate what might happen *in accordance* with the psychological theory of the goal orientation framework (Dweck, 1986). As discussed in section 2.2, risky choices could be different at both situations could be because performance-orientation (caused by result-based goals) might induce behavior to avoid risks and challenging situations because the final result is being measured accurately and actively, and is being used as a indicator for the individuals performance level. They might be seeking to ensure positive performance reviews regarding their capabilities, for they are not reviewed on the actions, processes and procedures that got them there. On the other hand, action-based goals might make individuals

feel that as long as they put full effort in the correct actions, their effort will pay off. Continuing that line of reasoning, establishing the focus on the desired actions might "take the eyes" of the final result or outcome, and might make the individual take more of a *learning orientation* and *more* open to risky and challenging situations. Of course, this expectation depends on whether the goals in the survey influence behavior under risk in *that* way, which is still an unanswered question which I hope this research will ultimately partially answer.

Furthermore, it must be noted that not only the goals are framed differently in both situation 1 and 2, also the relevant investments A&B are different than investments C&D. This could also influence behavior. That said, taking into account existing literature, the matter is still *too complex* to form clear expectations on possible differences between the action-based and result-based situations. It is unknown if the different goal orientations even have an effect on behavior under risk, the theory does not extend to that and there are too many variables concerning the general risky behavior of the subjects.

The research question leads me to formulate the first hypotheses that are to be tested in this thesis.

*H1a: There are systematic differences in risk **perception** when individuals are presented with action-based targets/goals compared to when they are presented with result-based targets/goals.*

*H1b: There are systematic differences in risk **attitude** when individuals are presented with action-based targets/goals compared to when they are presented with result-based targets/goals.*

At the above hypotheses, I look at differences induced by the different goal frames at both the positive and negative reference points. However, I will also test if there are *'within'* systematic differences within a subject's behavior regarding the process-based targets/goals and outcome-

based targets/goals, at the negative/unconfident reference point (treatment group 1). I will do the same for the positive/confident reference point (treatment group 2). All differences are caused by framing effects, though there could be different findings at both reference points.

As explained in the previous section, I introduce two treatment groups, both with a unique reference point. In the first treatment group, it is stated that you are unconfident that you will reach the goal, and that you have a negative outlook on the chances of reaching the target. The subjects are asked to take that into consideration when answering the questions on perceived risk and when making the choice that defines their risk attitude. Their performance here lies 'under the reference point'. The other treatment group is confident on their chances of reaching the goal, and their outlook is positive. I will test if the reflection effect is present in this situation using the following hypotheses:

*H2a: There are systematic differences in **risk perception** when individuals are confident and positive about reaching their target/goal compared to when they are unconfident and negative about reaching their action-based or result-based target.*

*H2b: There are systematic differences in **risk attitude** when individuals are confident and positive about reaching their target/goal compared to when they are unconfident and negative about reaching their action-based or result-based target.*

At the above hypotheses, I will look for differences caused by the reference point *when the individual is presented with action-based and result-based frames separately.* I will run a test if there are 'between' systematic differences between the subject's behavior regarding both the action-based goals and the result-based goals, between treatment groups 1 and 2. I want to see if there are differences in behavior, at action-based goals between the confident and the unconfident reference point *and* at the result-based goals between the confident and the unconfident reference point. All observable differences are caused by the reference point, however there could be different findings at both the positive and negative reference point.

I expect more risky choices in treatment group 1, with a negative and unconfident reference point compared to the other treatment group with a more positive reference point. The reason for this is, looking at existing research and related literature, I believe that the *reflection effect* might be present in this survey. I have discussed this effect in section 2.4 of this thesis, where people show risk-seeking behavior when dealing with (medium, to large) probabilities of losses (and small gains), and risk-averse behavior when dealing with (medium, to large) probabilities of gains and small losses. Also in section 2, I have given examples of papers where is shown that people behave more risk-seeking when their performance is below their reference point and risk-averse when their performance is above the reference point. Of course, the reflection effect is for risk *attitude*. It is still uncertain if there is such a comparable effect for risk perception, because there is not enough existing literature to assume such a reversal of risk perception to be present.

To summarize, there might be a "goal framing effect" (of action and result framing), possible reflection effects (of risk-aversion and risk-seeking), differences in risk perception, interactions of those effects or of course, no systematic effects at all. Hypotheses 1 test for a "goal framing effect" and hypotheses 2 test for a reflection effect caused by reference-dependency.

5. Results

First I will discuss descriptive statistics of respectively risk perception and risk attitude. Following that, I will present the tests on whether the differences are systematically significant.

The questions on risk perception have led to the following descriptive statistics and graphs:

Figure 4

	Mean risk perception (on a scale of 1-7)	Standard deviation	Minimum value	Maximum value
Risk perception investment *B*(action-based goal), *treatment 1 (unconfident)*	4.867	1.173	2	7
Risk perception investment *D (result-based goal), treatment 1 (unconfident)*	4.909	1.096	3	7
Risk perception investment *B (action-based goal), treatment 2 (confident)*	4.477	0.792	3	7
Risk perception investment *D (result-based goal), treatment 2 (confident)*	4.545	0.761	3	7

The results on risk perception are graphically shown in the following figure:

Figure 5

Mean risk perception
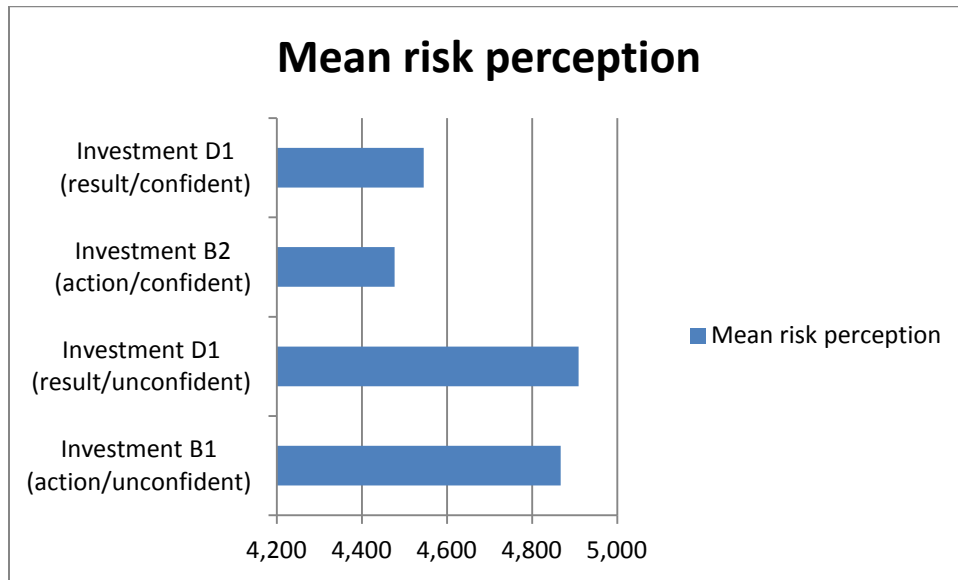
The differences in risk perception between situations 1 and 2, in both treatment groups are very small. On the first glance, there seems to be no systematic difference in risk perception if people are presented with either an action-based goal or a result-based goal. *However,* there do seem to be a substantial difference between risk perception in treatment group 1 (with an unconfident, negative reference outlook on the goal difficulty) and risk perception in treatment group 2 (with a confident, positive reference outlook on the goal difficulty). It seems that the subjects that had an unconfident and negative outlook on the goal difficulty perceived *more risk* at both risky prospects.

Now let us look at descriptive statistics of risk attitude:

Figure 6 & 7
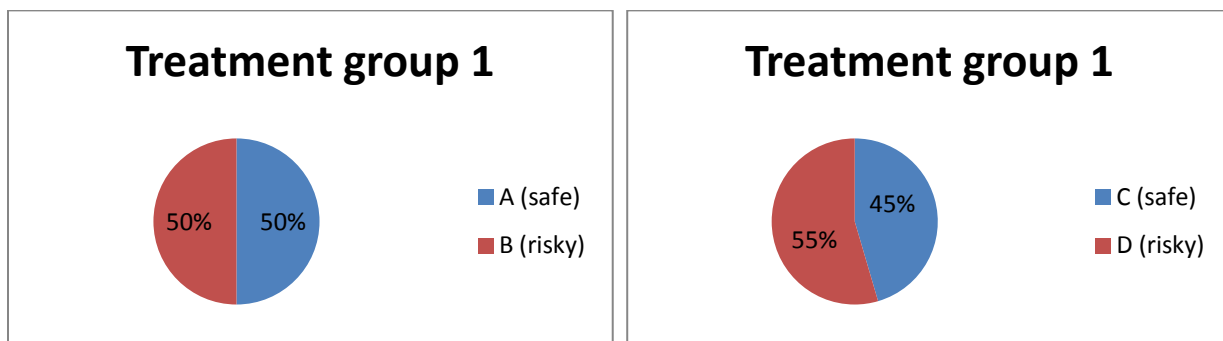
If we look at choices in both the action-based and result-based situations, in treatment group 1, there seem almost no differences between choices. Both investments have been chosen relatively equally given both goals in treatment group 1 (with the unconfident reference outlook)

Figure 8 & 9
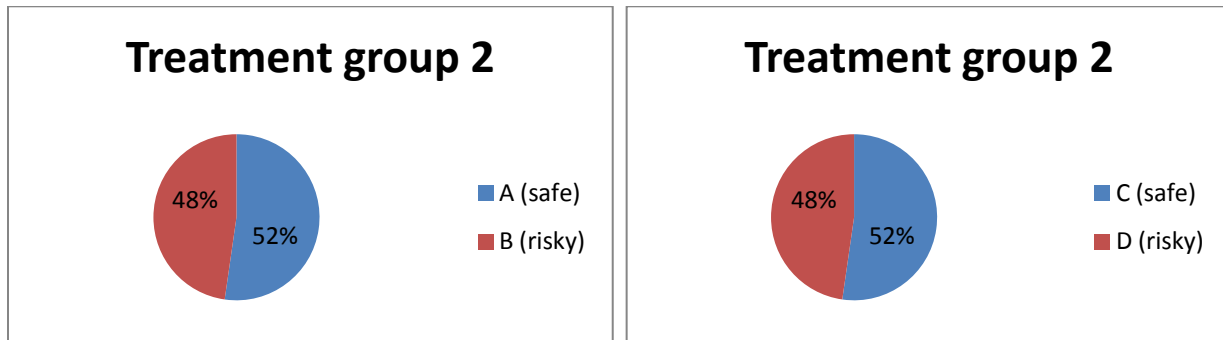
Also, if we look at choices in both the action-based and result-based situations in treatment group 2, there also seem to be almost no differences between choices. Again, both investments have been chosen relatively equally given both goals in treatment group 2 (with the confident reference outlook)

In the next part of this section, I will present the p-values of the statistic tests. I looked for whether the differences in mean risk perception, and investment choices are systematically different between situations (table 1) and between treatment groups. Because of this, the results of the survey are analyzed in two different ways. For 'within treatment' (situation 1 versus situation 2) hypotheses, I use a Wilcoxon matched-pair signed rank test because the data is pooled. For the 'between treatment' hypotheses (treatment group 1 versus treatment group 2), the Mann-Whitney rank sum test is used because there the data is unpooled. All stata output is documented, in the appendix. The main results of the survey are shown in the following tables.

Figure 10: *Hypotheses 1*

Unconfident or confident reference point	What is tested?	P-value risk perception	P-value risk attitude
Confident/unconfident taken together.	Action-based compared to result-based goals	0.2636	0.5637
Unconfident reference point	Action-based compared to result-based goals	0.5238	0.4795
Confident reference point	Action-based compared to result-based goals	0.3173	1

As could be expected by looking at the descriptive statistics, there are no systematic differences found between action-based goals and targets and result-based goals and targets. All those findings are insignificant, both for risk perception as for risk attitude. The survey did not show that people have different risk perception or risk attitude when they get presented with different goal frames. Also, with the reference points taken separately, there are no differences between the situations in treatment group 1 with the unconfident reference point, and neither for the second group with a confident reference point. To answer the relevant hypotheses formulated in the previous section;

Figure 11

> **H1a: There are systematic differences in risk *perception* when individuals are given respectively result-based target/goals and result-based goals.**

- The H0 is not rejected, there are no systematic differences in behavior related to risk perception caused by process- and outcome-based goals/targets within both treatment groups.

> **H1b: There are systematic differences in risk *attitude* when individuals are given respectively action-based target/goals and result-based goals.**

- The H0 is not rejected, there are no systematic differences in behavior related to risk attitude caused by action- and result-based goals/targets within both treatment groups.

Now let us look at differences between both treatment groups, between the different reference outlooks on goal difficulty.

Figure 12 : Hypotheses 2

Which goal frame?	What is tested?	P-value risk perception	P-value risk attitude
Action-based goals.	Confident reference point compared to unconfident reference point	0.0422	0.8321
Result-based goals.	Confident reference point compared to unconfident reference point	0.0592	0.5247

As the descriptive statistics might lead on, there is a systematic difference in risk perception between the two treatment groups with different reference points of goal difficulty. This effect is present when looking at action-based risk perception between group 1 and group 2 (P-value of 0.0422), as well as result-based risk perception between group 1 and group 2 (P-value of 0.0592). If we join both groups together, to look at differences in risk perception mainly caused by the difference reference point, this effect is logically, still significant. To answer the hypotheses stated in the previous section;

Figure 13

*H2a: There are systematic differences in **risk perception** when individuals are confident and positive about reaching their target/goal compared to when they are unconfident and negative about reaching their action-based or result-based target.*

- *H0 is rejected, there are systematic differences in behavior related to risk perception when people have a unconfident and negative reference outlook on the goal difficulty compared to when they have a confident and positive reference outlook on the goal difficulty. People in the unconfident/negative group perceived more risk compared to the confident/positive group.*

*H2b: There are systematic differences in **risk attitude** when individuals are confident and positive about reaching their target/goal compared to when they are unconfident and negative about reaching their action-based or result-based target.*

- The H0 is not rejected, there are no systematic differences in behavior related to risk attitude when people have a unconfident and negative reference outlook on the goal difficulty compared to when they have a confident and positive reference outlook on the goal difficulty. They are equally risk-averse and risk-seeking.

The subjects that had an unconfident and negative outlook on the goal difficulty perceived systematically *more risk* at both risky prospects. Interestingly, this effect is not found at risk attitude. There is no change between risk-seeking and risk-aversion between two treatment groups, just a change of risk perception. The observed difference between treatment groups, caused by a change of reference points does occur at risk perception, but does not occur at risk attitude. I will discuss the possible reasons in the next section.

6. Discussion

The hypotheses researched in this thesis look into *risk perception and risk attitude*. There might be big differences in behavior when employees are either presented with action-based goals and outcome-based goals, and I hypothesize that this is the case. Behavior that is likely to change could arguably be the amount of effort that is exerted, and learning effects. A study done by Zimmerman and Kitsanas (1997) did an experiment where they taught a big group of students the skill of darts, by using action-based and result-goals. The group that started with action-based goals, that shifted to result-based goals on the correct moment had the best result. Students that focused more on action-based goals in the beginning had a higher self-efficacy and enjoyed the task more than students that focused on the result too quickly. Although in these studies, the researchers found differences in behavior between the two goal approaches, my study cannot find differences in behavior concerning risk attitude and risk perception between the two goal approaches.

If we assume the results of this study to be valid, this could be useful information for managers of employees. It implies that if a manager would present his employees either with a goal focused on actions or on results, it would not change the employees attitude towards risks or his perception of risky phenomenon. The manager could construct goals for his employees that are the most effective for the particular situation, without having to worry whether that type of goal influences the behavior under risk of the employees. Again, I emphasize that behavior under risk is only a small part of behavior in general, my study does not say anything about effort exerted, enjoyment of the task or learning effects, although it would be very interesting for future research.

I found it very difficult to design a survey that captured behavior on both the result-oriented goal and the action-oriented goal. Because I needed a task where both controls could be implemented, I needed a task where there was both an ability to measure final performance accurately *and* there was enough knowledge on the desirable actions of employees. I do believe that additional experiments are needed that have a higher external validity. Particularly an

experiment that looks into the revealed preferences of people, instead of their stated preferences. Furthermore, the survey asked subjects to imagine themselves having the job of the sales manager, instead of actually feeling the true risk of not making the target or the true feeling of enjoyment of reaching their target.

The study finds a systematic effect that subjects who where unconfident on them reaching the target perceived the riskier investment as more risky compared to people who were confident about them reaching the goal. This effect can be intuitively explained. The person that has already reached his or her goal, considers themselves as 'safe' and therefore considers the risky investment as 'less risky'. In contrast to a person that finds his goal very difficult, who perceives the risky choice as too big of a risk because he is uncertain if he can make the target anyway. One might argue that a person who is 'below reference point' is actually more likely to choose the more risky investment, to prevent bad performance, but this is not supported in the results. Also one might argue that an individual who is 'below reference point' perceives less risk because he or she needs to make risky decisions with a high possible pay off to still make the target, but that is also a line of reasoning that is not supported by the results.

Interestingly, the differences in risk perception are not extended to risk attitude, for there are no differences in the investments subjects choose between the confident and the unconfident reference point. This finding can be interpreted. It seems that subjects in the experiments viewed/perceived the risk of the investment, focusing on the difficulty of the goal, but this effect did not extend to their ability to make the decision. They perceived the risky investment as *less* risky when their goal was easy compared to when their goal was hard, *however*, this perception did not have an effect on the *final decision* of investment. It seemed that the subjects, students of economic studies, did *not* let their high or low perception of risk of the investment (due to goal difficulty) interfere with their investment decision. When we assume this result to hold in practice, this would mean that when a person is presented with a difficult goal, he perceives a risky investment as more risky (compared to when the goal was easy), but he will not let this perception have an effect on his risk attitude.

Again, an experiment with a higher external validity is needed to find out if peoples behavior under risk really is unaffected by the goal difficulty. The changes in risk perception I found in this study across the reference points might be a signal that risk attitude can change when people have a different outlook on the goal difficulty, even though I was not able to find that effect in this thesis.

7. Conclusion

In this thesis, I wanted to provide the reader with information and new insights on how different ways of setting goals and targets was possible by using different frames. In the literature overview, I thoroughly discussed the different properties of action-based goals and result-based goals. Placing an action-based goal, target or control on an individual can be very effective when there is knowledge available on which actions are desirable for the completion of the tasks (or desirable for the organization). According to the literature, result-based goals are effective when final performance can be accurately measured. A lot of tasks of employees either have one of the two properties, and thus this theory provides the manager with the knowledge to create effective controls to maximize the chances of that employee behaving the way that is best for the organization.

Goal orientation literature stated how focusing on the learning of certain specific actions and processes and focusing and less on the measurement of final performance outcome could make an individual become more open to challenging goals and problems and vice versa because *skill* would be incremental and he would have less need to search validation through high performance measurement of the end result of his tasks (thereby favoring easy tasks, and avoiding challenging problems).

Furthermore, in existing theory it is widely established how goals and performance targets can function as a reference point. Existing research had found individuals to be more risk-seeking when below their performance target and more risk-averse when they were above their performance target. This is in line with prospect theory, and the fourfold pattern of risk attitudes. When a person is below his or her performance target/goal, that person faces losses with moderate probabilities (the punishment of not completing the goal), therefore being risk-seeking. Furthermore when a person is above his or her performance target/goal, that person faces gains with moderate probabilities (the rewards of completing the goal), therefore being risk-averse. This theory is also very intuitive especially when we assume that people can be prone to loss aversion. The person who is below the target faces the punishment of not making

that target, and is willing to take extra risks in order to make the target and avoid punishment. While people who are above their target do not want to risk their good performance measurement, and become risk-averse because they have already reached their goal.

In this thesis, *my* goal was to answer the following research question:

Does the framing of an individual's goal, in either a action-based frame or result-based frame and the reference point of goal-difficulty, have an effect on the risk perception and attitude of the individual.

I did a survey to see if an individual, who is motivated by *action-based* goals, has a different behavior concerning his perception of risk and attitude towards risk compared to an individual motivated by *result-based* goals. Furthermore I added two different reference points of goal difficulty. In one group, a subject was confident and positive of reaching the goal, and in the other group the subject was unconfident and negative of reaching the goal. By doing so, one is able to observe whether the outlook and expectation on the difficulty of a goal has an effect on behavior concerning perception of risk and attitude towards risky choices.

The result of the survey showed *no goal framing effects between action-based goals and result-based*. Subjects had the same perception of risk and the same attitude towards risk when presented with both goal frames. The findings could implicate that risk perception and risk attitude are more holistic in nature, and are not influenced whether a goal is framed on the specific desired actions or on the level of final performance result.

The result of the survey do show an effect caused by a different reference point. The subjects that had a confident and positive outlook of them completing the goal, perceived less risk when rating the risky investment on a scale from riskless to risky compared to people that were unconfident and negative of them completing the goal. Interestingly, there is *no* observed effect of a different risk attitude of the subjects between the two reference points. The positive/negative change of reference point only had an effect on the perception of risk, but not on the choices people actually made on whether they would choose either the "safe" investment or the "risky" investment.

If the results of this research were to be directly translated to the real world, there would be no reason for managers to believe that a change from an action-based goal frame to a result-based goal frame (or vice versa) have an effect on risk perception and risk attitude of their employees. However, the results of this research emphasized the importance of the *reference outlook* the employees might have on the goal *difficulty*, and if an employee views a goal as easy to complete, this might make the employee perceive less risk in his risky choices compared to a if he had a very difficult goal. It is important for managers to be aware of the "reference point" of employees, and their opinion on the goal difficulty and their expectation of whether they can reach their goal.

8. Appendix

8.1 The survey

In this appendix I will present the surveys, as they are presented to the subjects. As is mentioned in part 3 of the thesis, the survey consisted of 2 treatment groups. Treatment group 1 had a *negative* (unconfident) reference point and treatment group 2 had a positive (confident) reference point.

Treatment group 1

In this questionnaire, you are asked to give your opinion on a certain situation.

Imagine that after you graduate, you immediately start looking for a job. As a graduate of an economic study, let's assume that you find a job in a company related to your specialization. This can among other things be sales, marketing, finance, auditing, control or accounting. Now let's say that after 6 months, because of your excellent skills and leadership abilities, upper management has decided to promote you.

You are promoted, and now in charge of a department with 30 employees. This department handles the production and the selling of a new product. Upper management has given you a goal in order to increase sales.

Please consider the following two situations and pay attention to the specific goal you are given.

Situation 1

You are working full time, 5 days a week to make sure your team sells your product to as many customers as possible. Your target audience consists of other businesses and the price of your product is €10.000,-. It is a product that massively improves efficiency of certain machines. Assume that management can observe the effort of you and your team, and can monitor whether you work hard enough.

Management gives you and your team the following goal for this month, it is very important for you to reach this goal because if you don't, management might replace you.

Approach at least 30 new clients this month. Do this with full effort and give as much sales presentations to clients as possible, where you show your value to them.

*You determine that this is very difficult. In the current situation, **you are not confident that this goal is reachable even if you and your team put in the effort.** The expectation of you and your team reaching the target is negative.*

To improve the chances for you and your department to reach this goal, you can choose between two investments to improve your sales team with new, skillful people to sell more products/approach more clients: Investment A and Investment B. Please answer the following questions, taking into account your goal, and your outlook on whether or not this goal is reachable.

Investment A	Investment B
Add a "reliable" group of new people to your team that can find and approach an additional 10 new potential clients per month.	Add an "extravagant" group of people to your team that have a 50% chance of finding an additional 20 clients and a 50% chance of not fitting in your team and not finding any additional clients at all.

1. How risky do you consider investment B on a scale of riskless to risky?

Riskless   *Very Risky*

O   O   O   O   O   O   O

2. Considering the goal you have to reach, which investment do you prefer?

O Investment A

O Investment B

Situation 2

Now consider exactly the same scenario, only you have a different goal.

You are working full time, 5 days a week to make sure your team sells your product to as many customers as possible. Your target audience consists of other businesses and the price of your product is €10.000,-. It is a product that massively improves efficiency of certain machines. Assume that management can observe the effort of you and your team, and can monitor whether you work hard enough.

Management gives you and your team the following goal for this month, it is very important for you to reach this goal because if you don't, management might replace you.

Have a sales revenue this month of €60.000,-. Sell at least 6 products this month.

Again, you determine that this is very difficult. In the current situation, **you are not confident that this goal is reachable even if you and your team put in the effort.** The expectation of you and your team reaching the target is negative.

To improve the chances for you and your department to reach this goal, you have 2 choices to improve your sales team with new, skillful people to sell more products/approach more clients. I call them Investment C and Investment D. Again. please answer the following questions, taking into account your goal, and your outlook on whether or not this goal is reachable.

Investment C	Investment D
Add a "reliable" group of new people to your team that can sell an additional 2 products this month, which generates a revenue of €20.000	Add an "extravagant" group of people to your team that have a 50% chance of selling 4 products (generating €40.000) and 50% chance of not fitting in your team and not selling any additional products at all.

5. How risky do you consider investment D on a scale of riskless to risky?

Riskless   *Very Risky*

O   O   O   O   O   O   O

6. Considering the goal you have to reach, which investment do you prefer?

O Investment C

O Investment D

Treatment group 2

In this questionnaire, you are asked to give your opinion on a certain situation.

Imagine that after you graduate, you immediately start looking for a job. As a graduate of an economic study, let's assume that you find a job in a company related to your specialization. This can among other things be sales, marketing, finance, auditing, control or accounting. Now let's say that after 6 months, because of your excellent skills and leadership abilities, upper management has decided to promote you.

You are promoted, and now in charge of a department with 30 employees. This department handles the production and the selling of a new product. Upper management has given you a goal in order to increase sales.

Please consider the following two situations and pay attention to the specific goal you are given.

Situation 1

You are working full time, 5 days a week to make sure your team sells your product to as many customers as possible. Your target audience consists of other businesses and the price of your product is €10.000,-. It is a product that massively improves efficiency of certain machines. Assume that management can observe the effort of you and your team, and can monitor whether you work hard enough.

Management gives you and your team the following goal for this month, it is very important for you to reach this goal because if you don't, management might replace you.

Approach at least 30 new clients this month. Do this with full effort and give as much sales presentations to clients as possible, where you show your value to them.

You determine that this goal is realizable. In the current situation, **you are rather confident that this goal is within your reach if you and your team put the effort in.** Your expectation of you and your team reaching the target is positive.

To improve the chances for you and your department to reach this goal, you can choose between two investments to improve your sales team with new, skillful people to sell more products/approach more clients: Investment A and Investment B. Please answer the following questions, taking into account your goal, and your outlook on whether or not this goal is reachable.

Investment A	Investment B
Add a "reliable" group of new people to your team that can find and approach an additional 10 new potential clients per month.	Add an "extravagant" group of people to your team that have a 50% chance of finding an additional 20 clients and a 50% chance of not fitting in your team and not finding any additional clients at all.

1. How risky do you consider investment B on a scale of riskless to risky?

    Riskless   *Very Risky*

        O   O   O   O   O   O   O

2. Considering the goal you have to reach, which investment do you prefer?

O Investment A

O Investment B

Situation 2

Now consider exactly the same scenario, only you have a different goal.

You are working full time, 5 days a week to make sure your team sells your product to as many customers as possible. Your target audience consists of other businesses and the price of your product is €10.000,-. It is a product that massively improves efficiency of certain machines. Assume that management can observe the effort of you and your team, and can monitor whether you work hard enough.

Management gives you and your team the following goal for this month, it is very important for you to reach this goal because if you don't, management might replace you.

Have a sales revenue this month of €60.000,-. Sell at least 6 products this month.

*Again, you determine that this goal is realizable. In the current situation, **you are confident that this goal is within your reach if you and your team put the effort in.** Your expectation of you and your team reaching the target is positive.*

To improve the chances for you and your department to reach this goal, you have 2 choices to improve your sales team with new, skillful people to sell more products/approach more clients. I call them Investment C and Investment D. Again, please answer the following questions, taking into account your goal, and your outlook on whether or not this goal is reachable.

Investment C	Investment D
Add a "reliable" group of new people to your team that can sell an additional 2 products this month, which generates a revenue of €20.000	Add an "extravagant" group of people to your team that have a 50% chance of selling 4 products (generating €40.000) and 50% chance of not fitting in your team and not selling any additional products at all.

5. How risky do you consider investment D on a scale of riskless to risky?

Riskless   *Very Risky*

O   O   O   O   O   O   O

6. Considering the goal you have to reach, which investment do you prefer?

O Investment C

O Investment D

8.2 Stata Output

In this part of the appendix, I have added all the Stata output in table form. Below, each table, I stated the hypothesis[7] tested so the reader understands the context of the table.

1. **Descriptive statistics**

Table 1A[8]

Variable	Obs	Mean	Std. Dev.	Min	Max
riskyB1	44	4.863636	1.173167	2	7
AorB1	44	1.5	.5057805	1	2
riskyD1	44	4.909091	1.095831	3	7
CorD1	44	1.545455	.5036862	1	2

Table 1B[9]

Variable	Obs	Mean	Std. Dev.	Min	Max
RiskyB2	44	4.477273	.7920722	3	7
AorB2	44	1.477273	.5052578	1	2
RiskyD2	44	4.545455	.7611052	3	7
CorD2	44	1.477273	.5052578	1	2

---

[7] in the hypotheses, I sometimes use the term process for action and outcome for result.
[8] RiskyB1: The data for the perceived risk on investment B in treatment group 1 (unconfident reference point)
AorB1: Data consisting of a value of 1 for the choice of investment A and the value 2 for the choice of investment B in treatment group 1 (unconfident reference point).
RiskyD1: The data for the perceived risk on investment D in treatment group 1 (unconfident reference point)
CorD1: Data consisting of a value of 1 for the choice of investment C and the value 2 for the choice of investment D in treatment group 1.
[9] RiskyB2: The data for the perceived risk on investment B in treatment group 2 (confident reference point)
AorB2: Data consisting of a value of 1 for the choice of investment A and the value 2 for the choice of investment B in treatment group 2 (confident reference point).
RiskyD2: The data for the perceived risk on investment D in treatment group 2 (confident reference point)
CorD2: Data consisting of a value of 1 for the choice of investment C and the value 2 for the choice of investment D in treatment group 2 (confident reference point).

2. Man-Whitney rank-sum tests

between differences treatment group 1 and 2 (and between process1,2 and outcome 1,2)

Table 2.1[10]

```
Two-sample Wilcoxon rank-sum (Mann-Whitney) test

          var11 |        obs      rank sum      expected
----------------+---------------------------------------
              0 |         88          8682          7788
              1 |         88          6894          7788
----------------+---------------------------------------
       combined |        176         15576         15576

unadjusted variance     114224.00
adjustment for ties     -11007.04
                        _____
adjusted variance       103216.96

Ho: riskyB~2(var11==0) = riskyB~2(var11==1)
           z =   2.783
    Prob > |z| =   0.0054
```

*H0: There are NO systematic differences in **risk perception** when individuals are confident and positive about reaching their target/goal compared to when they are unconfident and negative about reaching their target.*

Table 2.2[1112]

---

[10] (var 11==o is the dummy variable that specifies all the observations from treatment group 1 and var11==1 is the dummy variable that specifies all the observations from treatment group 2).

[11] The extremely low P-value can be explained because there are too much observations for this non-parametric test because of the aggregation. Therefore, I have not mentioned this result the result section of the thesis. However, of course, the same significant effect shows when we look into the hypotheses with a specific goal frame (at the 5% and 6% levels), which can be found in the results.

```
Two-sample Wilcoxon rank-sum (Mann-Whitney) test

        var11   |     obs     rank sum    expected
     -----------+----------------------------------
            0   |      88        7964        7788
            1   |      88        7612        7788
     -----------+----------------------------------
      combined  |     176       15576       15576

unadjusted variance     114224.00
adjustment for ties     -28553.23
                        ----------
adjusted variance        85670.77

Ho: ACorBD(var11==0) = ACorBD(var11==1)
          z =   0.601
    Prob > |z| =   0.5476
```

*H0: There are NO systematic differences in **risk attitude** when individuals are confident and*

positive about reaching their target/goal compared to when they are unconfident and negative

about reaching their target.

Table 2.3[13]

```
Two-sample Wilcoxon rank-sum (Mann-Whitney) test

  trtmntdummy   |     obs     rank sum    expected
  --------------+----------------------------------
            0   |      44       2189.5        1958
            1   |      44       1726.5        1958
  --------------+----------------------------------
      combined  |      88        3916         3916

unadjusted variance      14358.67
adjustment for ties      -1372.98
                        ----------
adjusted variance        12985.69

Ho: riskyB(trtmnt~y==0) = riskyB(trtmnt~y==1)
          z =   2.032
    Prob > |z| =   0.0422
```

---

[12] Each of the 44 subjects in a treatment group answered 2 questions on risk perception, so there are a total of 88 observations in each group. Because this is a between analyses, between subjects of treatment group 1 and treatment group 2, the answers of both the frames can be taken together.

[13] The H0 is rejected, there are systematic differences (at 5% level) in behavior related to risk perception regarding process-based goals between treatment group 1 and 2.

*H0: There are NO systematic differences in risk **perception** when individuals are unconfident and positive about reaching their <u>process</u>-based goal/target compared to when they are confident and negative about reaching their <u>process</u>-based target/goal.*

Table 2.4

```
Two-sample Wilcoxon rank-sum (Mann-Whitney) test

 trtmntdummy  |      obs    rank sum     expected
-------------+---------------------------------
           0 |       44        1980         1958
           1 |       44        1936         1958
-------------+---------------------------------
    combined |       88        3916         3916

unadjusted variance      14358.67
adjustment for ties      -3593.84
                        ----------
adjusted variance        10764.83

Ho: AorB(trtmnt~y==0) = AorB(trtmnt~y==1)
            z =    0.212
    Prob > |z| =   0.8321
```

*H0: There are NO systematic differences in risk **attitude** when individuals are unconfident and positive about reaching their <u>process</u>-based goal/target compared to when they are confident and negative about reaching their <u>process</u>-based target/goal.*

Table 2.5[14]

```
Two-sample Wilcoxon rank-sum (Mann-Whitney) test

  trtmntdummy  |       obs     rank sum      expected
---------------+-----------------------------------------
            0  |        44       2172.5          1958
            1  |        44       1743.5          1958
---------------+-----------------------------------------
     combined  |        88         3916          3916

unadjusted variance       14358.67
adjustment for ties       -1431.77
                         _____
adjusted variance         12926.90

Ho: riskyD(trtmnt~y==0) = riskyD(trtmnt~y==1)
          z =   1.887
   Prob > |z| =   0.0592
```

*H0: There are NO systematic differences in risk **perception** when individuals are unconfident and negative about reaching their <u>outcome</u>-based goal/target compared to when they are confident and positive about reaching their <u>outcome</u>-based target/goal.*

```
Two-sample Wilcoxon rank-sum (Mann-Whitney) test

  trtmntdummy  |       obs     rank sum      expected
---------------+-----------------------------------------
            0  |        44         2024          1958
            1  |        44         1892          1958
---------------+-----------------------------------------
     combined  |        88         3916          3916

unadjusted variance       14358.67
adjustment for ties       -3593.84
                         _____
adjusted variance         10764.83

Ho: CorD(trtmnt~y==0) = CorD(trtmnt~y==1)
          z =   0.636
   Prob > |z| =   0.5247
```

---

[14] The H0 is rejected, there are systematic differences (at 10% level) in behavior related to risk perception regarding outcome-based goals between treatment group 1 and 2.

*H0: There are NO systematic differences in risk **attitude** when individuals are unconfident and negative about reaching their <u>outcome</u>-based goal/target compared to when they are confident and positive about reaching their <u>outcome</u>-based target/goal.*

3. Wilcoxon matched-pair signed-rank tests

within differences in treatments groups

Table 3.1

```
Wilcoxon signed-rank test

        sign |      obs    sum ranks      expected
-------------+---------------------------------------
    positive |       10          766         981.5
    negative |       16         1197         981.5
        zero |       62         1953          1953
-------------+---------------------------------------
         all |       88         3916          3916

unadjusted variance      57761.00
adjustment for ties       -253.50
adjustment for zeros   -20343.75
                       _____
adjusted variance        37163.75

Ho: riskyB1 = riskyD1
           z =   -1.118
    Prob > |z| =   0.2636
```

*H0: There are NO systematic differences in risk **perception** when individuals are given respectively process-based target/goals and outcome-based goals.*

Table 3.2

```
Wilcoxon signed-rank test

        sign |       obs    sum ranks     expected
-------------+--------------------------------------
    positive |        10          766        981.5
    negative |        16         1197        981.5
        zero |        62         1953         1953
-------------+--------------------------------------
         all |        88         3916         3916

unadjusted variance      57761.00
adjustment for ties       -253.50
adjustment for zeros   -20343.75
                       ----------
adjusted variance        37163.75

Ho: riskyB1 = riskyD1
          z =   -1.118
    Prob > |z| =   0.2636
```

*H0: There are NO systematic differences in risk **attitude** when individuals are given respectively process-based target/goals and outcome-based goals.*

Table 3.3[15]

```
Wilcoxon signed-rank test

        sign |       obs    sum ranks     expected
-------------+--------------------------------------
    positive |         3        121.5          162
    negative |         5        202.5          162
        zero |        36          666          666
-------------+--------------------------------------
         all |        44          990          990

unadjusted variance       7342.50
adjustment for ties        -10.50
adjustment for zeros     -4051.50
                         ---------
adjusted variance         3280.50

Ho: AorB1 = CorD1
          z =   -0.707
    Prob > |z| =   0.4795
```

[15] A Wilconxon matched-pair signed rank test, to test whether there are systematic differences within the investment choices between A or B (values of 1 and 2) and C or D (also values of 1 and 2) in treatment group 1.

*H0: There are **NO** systematic differences in risk **attitude** when individuals are unconfident and negative about reaching their <u>process</u>-based goal/target compared to when they are unconfident and negative about reaching their <u>outcome</u>-based target/goal.*

Table 3.4

```
Wilcoxon signed-rank test

        sign |        obs    sum ranks    expected
-------------+----------------------------------------
    positive |          7        258.5         306
    negative |         10        353.5         306
        zero |         27          378         378
-------------+----------------------------------------
         all |         44          990         990

unadjusted variance        7342.50
adjustment for ties         -57.38
adjustment for zeros      -1732.50
                          ----------
adjusted variance          5552.63

Ho: riskyB1 = riskyD1
          z =   -0.637
   Prob > |z| =   0.5238
```

*H0: There are **NO** systematic differences in risk **perception** when individuals are unconfident and negative about reaching their <u>process</u>-based goal/target compared to when they are unconfident and negative about reaching their <u>outcome</u>-based target/goal.*

Table 3.5

```
Wilcoxon signed-rank test

        sign  |      obs    sum ranks     expected
   ───────────┼─────────────────────────────────────
    positive  |        3          120          180
    negative  |        6          240          180
        zero  |       35          630          630
   ───────────┼─────────────────────────────────────
         all  |       44          990          990

   unadjusted variance        7342.50
   adjustment for ties         -15.00
   adjustment for zeros      -3727.50
                            _____
   adjusted variance          3600.00

   Ho:  RiskyB2 = RiskyD2
              z =   -1.000
      Prob > |z| =    0.3173
```

*H0: There are **NO** systematic differences in risk **perception** when individuals are confident and positive about reaching their <u>process</u>-based goal/target compared to when they are confident and positive about reaching their <u>outcome</u>-based target/goal.*

Table 3.6

```
Wilcoxon signed-rank test

        sign  |      obs    sum ranks     expected
   ───────────┼─────────────────────────────────────
    positive  |        2           85           85
    negative  |        2           85           85
        zero  |       40          820          820
   ───────────┼─────────────────────────────────────
         all  |       44          990          990

unadjusted variance        7342.50
adjustment for ties          -1.25
adjustment for zeros      -5535.00
                          _____
adjusted variance          1806.25

Ho:  AorB2 = CorD2
           z =    0.000
   Prob > |z| =    1.0000
```

*H0: There are systematic differences in risk **attitude** when individuals are confident and positive about reaching their <u>process</u>-based goal/target compared to when they are confident and positive about reaching their <u>outcome</u>-based target/goal.*

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