Framing the COVID-19 Vaccine

An Experimental Investigation of the Influence of Gain and Loss Frames on Intention to Receive COVID-19 vaccination

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Abstract

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Since the outbreak of the COVID-19 pandemic, vaccination hesitancy has not become a new phenomenon, but a new threat. Although a large body of research literature exists that focuses on the influence of frames on intention to vaccinate, no framing studies exist yet that address the COVID-19 vaccine due to the recent pandemic. This study aims to produce new knowledge on the influence of gain and loss frames on intention to vaccinate against the COVID-19 virus. By using the theory of planned behavior and an online questionnaire, this study tests whether loss frames lead to higher intention to receive COVID-19 vaccine than gain frames and whether perceived vaccination efficacy and involvement moderate this influence. The analysis was unable to detect a significant difference between gain and loss frames as well as find a significant moderating influence. However, perceived vaccination efficacy, perceived vaccination safety, perceived severity, country, and involvement could exert significant influence as predictors. The results are not consistent with the theoretical derivation and results of other studies and therefore raise the question to what extent such nuance in message framing still holds in the face of heightened fear and uncertainty due to the COVID-19 pandemic.

Keywords: gain and loss frames, COVID-19 vaccine, intention, involvement, perceived vaccine efficacy

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1. Defining the research problem

This chapter introduces the COVID-19 pandemic, describes the phenomenon of vaccination hesitancy and why this represents a problem. Then, the relevance to the field of strategic communication is explained and the research question is formulated. Furthermore, it is explained what knowledge this work produces and which parties can benefit from it.

1.1 Introduction

When a "viral pneumonia" was first mentioned on the Wuhan Municipal Health Commission's website on December 31, 2019, the world had no idea what was to come in the months that followed (WHO, 2020). Several days later January 9, 2020, Chinese authorities determined that the outbreak was due to a novel coronavirus. 2 weeks later cases were already reported in the United States, Thailand, Japan, and South Korea (NY Times, 2021). WHO named the virus a "public health emergency of international concern" (NY Times, 2021) and gave it the name COVID-19 virus. By April 2, 2020, over one million cases had been reported and millions of people had lost their jobs. On March 11, WHO made it official, calling the COVID-19 outbreak a pandemic (BBC, 2020). The second wave of the pandemic that swept the world after the summer and new mutations of COVID-19 made it clear once again that the virus will not subside so quickly (NY Times, 2021). In September, 10 months after the outbreak in Wuhan, more than one million people have already died from the COVID-19 virus.

To stop the spread of the virus, many countries rely on stricter hygiene, social distancing, or entire lockdowns. However, these strategies offer mere containment of the virus so as not to collapse the health care system. Governments placed their hopes in the manufactured COVID-19 vaccines, which could potentially put an end to the pandemic. On December 8, 2020, the UK started vaccinations which represented the kickoff of the largest vaccination campaign in human history (NY Times, 2021, Bloomberg, 2021). By the end of February, Bloomberg (2021) calculated 218 million vaccine doses administered in over 99 countries. By their calculations, over 6.15 million vaccine doses per day would be administered worldwide. Globally, it takes an estimated five years to achieve the desired herd immunity at the current rate. This time frame further illustrated that the vaccination campaign will continue for some time and will be relevant.

1.2 Problem statement

Given these circumstances, the "far-from-universal willingness to accept a COVID-19 vaccine is a cause for concern" (Lazarus et al., 2020, p. 226). Several studies demonstrated a relatively low propensity to vaccinate in several European countries (Ipsos, 2020a, 2020b, Imperial College London, 2020, Lazarus et al, 2020, Kourlaba et al., 2021). The market research institute Ipsos (2020a) concluded in October 2020 that only 54% of people in France, 64% in Spain, 65% in Italy and 69% in Germany would like to be vaccinated against the COVID-19 virus. These findings are consistent with those from Imperial College London (2020) in November or those from Ipsos (2020b) in December.

This hesitancy for COVID-19 vaccination can be partly attributed to the anti-vaccine movement spreading vast amounts of misinformation and conspiracy theories all over the internet, misinformation about vaccines in general and controversy over the perceived rapid development, safety, efficacy, and forced delivery of the COVID-19 vaccine (Alley et al., 2021, Guidry et al, 2021, Ipsos, 2021). Other developments such as blood clots triggered by the AstraZeneca vaccine add to this uncertainty (CBC, 2021). For this reason, the most common reasons for vaccination hesitancy were found to be concerns about possible side effects (59%), lack of trust in the government to guarantee the vaccine's safety and efficacy (55%) or worries that the vaccine is too new (53%) (Neumann-Böhme et al., 2020, KFF, 2020). This phenomenon at hand is called vaccination hesitancy which is "not a new phenomenon, but new threat" (Koslap-Petraco, 2019, p. 624) as WHO now considers it one of the greatest threats to global health (WHO, 2019). Research has already examined the vaccine hesitancy phenomenon and found that people are concerned about the safety of the vaccine (Ball, Evans & Bostrom, 1998, Freed, Clark, Butchart, Singer, & Davis, 2010). A large percentage of the population has a misperception about the serious side effects, even though they rarely occur.

This vaccination hesitancy may affect the goal of herd immunity, according to which a country needs an immunization rate of 60% or more (ZDF, 2020). If the vaccination hesitancy is as low as the fore-mentioned studies indicate, it can slow down the herd immunity process which can lead to further complete lockdowns, a deeper recession in the economy, collapses of the health care system, and, most importantly, more COVID-19 victims. However, Imperial College London (2020) also notes in their study that these beliefs are not yet firmly established and could be influenced by a good communication strategy. A good crisis communication strategy is therefore of utmost relevance, as governments can use it to make their citizens' intentions

toward COVID-19 vaccination more positive and thus achieve high immunization levels more quickly and bring the pandemic to an end.

1.3 Relevance to Strategic Communication

According to research, message framing can provide such an effective and theoretically based communication strategy (Gerend & Shepherd, 2007). Framing, as a transdisciplinary science, can "easily form part of the strategist's communication toolkit" (Wickham, 2007, p. 64), as it is studied as part of strategic communication in a variety of ways in different disciplines. In campaign communication, political candidates use framing to push their issues through media coverage (Froehlich & Rüdiger, 2006). In marketing, companies utilize frames to better sell their products (Garg, Govind & Nagpal, 2021). In crisis communication, managers use frames to influence the perception of blame (Coombs & Holladay, 2010). Knight (1999) also lists public relations, organizational communication, and external communication as other areas of strategic communication in that framing can be used profitably.

This work can be classified as crisis communication due to the COVID-19 pandemic on the one hand and risk communication, risk perception to be more precise, on the other hand, because the communication campaign is adapted according to the risk perception of the individuals. Studies deal for example with communication campaigns that emphasize either in terms of the benefits of completing the recommended action (gain frame) or the costs of avoiding the recommended action (loss frame). Such gain and loss frames can also be used with a vaccine by communicating either the benefits of the vaccine (gain frame) or the costs of avoiding the vaccine (loss frame). Several studies have demonstrated how loss frames achieved higher intention to vaccinate (Abhyankar et al., 2008, Gerend & Shepherd, 2007). However, the open question in framing research is whether this effect can also be replicated in the COVID-19 vaccine. As another open question, various moderators such as involvement and perceived vaccine efficacy could be identified that had an impact on the relationship between frames and intention. However, identification of additional moderators is needed (Nan, Xie & Madden, 2021). Strategic communication can thus make an important contribution to a more effective communication campaign and identification of further moderators.

1.4 Aim and research question

The research question of this thesis is: How can strategic practitioners use Framing Theory to increase intention to get vaccinated in the general population? The work aims to produce knowledge on whether gain or loss frames can achieve a higher intention towards the COVID-19 vaccine, how strong their influence is, and which other explanatory variables exert the greatest influence on the relationship between frames and intention. As a foundation, the work thus makes use of framing theory and incorporates elements of the Theory of Planned Behavior. In a quantitative-deductive experimental research design, subjects are randomly assigned to read a loss or gain frame message. After the intervention, subjects are asked several questions about intention. The collected data are used to examine three hypotheses derived from the research literature and evaluate them using statistical analyses.

This research question is relevant for several reasons. First, several framing studies have already shown significant results how frames can influence the intention towards a vaccine, but more research is needed to identify moderators (Nan, Xie & Madden, 2012). For this reason, this paper incorporates two moderators perceived vaccine efficacy and involvement, examines their effect, and compares them with each other. Thus, this work can make an important contribution to the need for research on additional moderators. Second, this work represents the first classic framing study to examine the effectiveness of gain and loss frames using the COIVD-19 vaccine as an example. Third, the COVID-19 vaccine is highly relevant to the world at large. If the vaccination campaign can be improved in any way, even a tiny bit, this is of great importance.

The knowledge produced by this work is relevant to several stakeholders. Framing researchers benefit from the use of common moderators that they may also use or need to consider in future studies, and the first classic framing study focusing on the COVID-19 vaccine that may provide an incentive for new framing studies focusing on the COVID-19 vaccine. The government risk communications and public sector health communication benefit from the studied effectiveness of gain and loss frames and moderators focusing on the COVID-19 vaccine. If certain frames or moderators turn out to be relevant, governments' COVID-19 vaccine campaigns can be adjusted accordingly to achieve higher intention toward COVID-19 vaccination and thus achieve higher immunization rates among their populations. For the same reason, marketing departments of pharmaceutical or biotechnology companies can also benefit from this work, adjusting their product description and audience targeting accordingly to achieve higher sales. In this way, this work produces both theoretical knowledge for framing research and practical

knowledge for governments' crisis and risk communication and marketing departments of pharmaceutical and biotechnology companies.

2. Theory and Previous Research

After the first chapter introduced the research question, this chapter discusses first Theory of Planned Behavior, which explains the interplay between intention and behavior. Afterwards, the chapter will take a closer look at the Framing Theory. It discusses the basic assumptions of the framing theory, explains the definition of frames, and presents an overview of the most important studies in the field of framing. In the last part, the hypotheses are derived from the research literature and integrated into the research model.

2.1 Intention towards a vaccination

The Theory of Planned Behavior is used to explain the intention towards a vaccination. The theory states that subjective norms, perceived behavioral control, and attitude influence intention, which in turn determines whether an individual will perform a behavior (Ajzen, 1991). Research has empirically demonstrated that these three constructs predict intention with high accuracy. Figure 1 below illustrates this relationship.

Figure 1. Theory of Planned Behavior
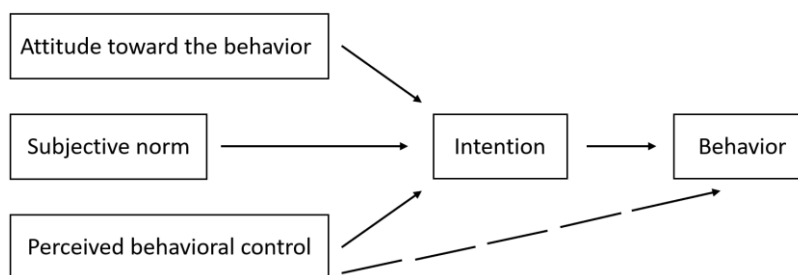
Attitude toward the behavior refers to whether a person has a favorable or unfavorable evaluation of that behavior such as a negative attitude toward COVID-19 vaccination. The term subjective norm describes the social pressure to perform or not perform that behavior. For example, parents may exert pressure on their child to be vaccinated against COVID-19. Perceived behavioral control refers to "people's perception of the ease or difficulty of performing the behavior of interest" (Ajzen, 1991, p. 183). In this regard, the resources, and opportunities available to the person determine this perception. For example, older people are prioritized for COVID-19 vaccination, which is why young and healthy people do not have the opportunity until later. Together, these three constructs influence an individual's intention to

perform a certain behavior such as getting vaccinated against COVID-19. Intention is thought to comprise all motivational factors and is an indication of how much individuals are willing and how much effort they put into performing this behavior. The higher the intention, the more likely it is that a specific behavior will be performed such as getting vaccinated against COVID-19 for example. Several studies have also demonstrated that a behavior is strongly influenced by one's perception of performing that behavior (e.g., perceived behavioral control) (Bandura, Adams & Beyer, 1977, Bandura, Adams, Hardy & Howells, 1980). For this reason, perceived behavioral control, along with behavioral intention, is also thought to directly predict behavior. The Theory of Planned Behavior thus provides a framework to explain the intention toward COVID-19 vaccination.

2.2 Basic assumptions of Framing Theory

The Framing Theory is an important part of this paper and, therefore, the basic assumptions of this theory will be explained. The framing approach is closely related to the basic assumptions of schema theory from psychology. The schema theory draws on the assumption that human knowledge is organized in a schema system (Matthes, 2014). A schema can be defined as pre-structured, relatively stable packages of knowledge that are activated or not. A human theoretically possesses an infinite number of schemas because there exists a schema for every situation, object, person, etc. For example, individuals have different schemas for their friends and work colleagues. They know that they must behave differently among work colleagues than among friends, because they have created specific schemas for each group and only have to activate the corresponding schema. When a human processes information, he either uses already existing schemas and thereby activates other linked schemas or no single schema is activated, and the information is not understood. In this case, the person forms a new schema to be able to process this information in the future.

Another assumption of the cognitive psychological schema theory is that humans tend to reduce complexity because they can only perceive and process a fraction of the information they receive (Bonfadelli & Friemel, 2015). To reduce complexity humans therefore discover common patterns in objects, events, and persons that that are consistent with pre-existing schemas in their minds (Bonfadelli & Friemel, 2015, Scheufele & Iyengar, 2014). Accordingly, humans process information based on hypotheses, which is not understood negatively as selective avoidance, but positively as a process of active meaning construction. These schemata guide the hypotheses as expectations and conceptions in the form of simple thinking strategies.

The waiter example is used to illustrate this assumption (Bonfaddeli & Friemel, 2016). Most people understand the sentence "Lars called the waiter. After he came, he ordered a glass of milk" to mean that Lars ordered a glass of milk, even though the sentence is grammatically ambiguous. The schema concept can serve as an explanatory approach. People are familiar with the procedure in a restaurant and "understand the sentence situation adequately by applying the 'restaurant schema'" (Bonfadelli & Friemel, 2016, p. 190). They reduce the complexity of information by applying the restaurant schema, which guides their information processing in the form of simple thinking strategies and hypotheses.

Based on the cognitive schemata of psychology, framing research assumes that topics in public discourse are also very complex such as abortion or genetic engineering, which is why certain aspects are emphasized while other aspects are neglected, depending on the communicator (Matthes, 2014). Several parties, such as politicians, companies, or the media, are therefore in a competition for the interpretive authority of certain topics in the public sphere, as they want to assert their own perspectives on topics. These parties communicate their own interpretations and compete with interpretations or frames of other parties with the aim that their own interpretation prevails in the public discourse. For example, frames such as "scientific progress," "economic prospects," "Pandora's box," or "public accountability" have been used in the debate on genetic engineering (Bonfadelli & Friemel, 2016, Leonarz, 2006). These frames form simple perspectives on the complex topic of genetic engineering. Recipients can reduce the complexity of this topic by connecting the frames discussed in public with their pre-existing schemas, such as Pandora's box or scientific progress. The way a piece of information is presented or framed (e.g., genetic engineering is a Pandoras Box) makes it more likely that this piece of information will be processed using a specific schema (Scheufele & Iyengar, 2014). In other words, the strength of a frame is based on how applicable they are to specific pre-existing cognitive schemas. Scheufele and Iyengar (2014) therefore refer to framing as applicability-based effects. For this reason, parties in public discourse resort to frames, as they reduce the complexity of the topic and increase the likelihood that recipients will connect these frames to pre-existing cognitive schemas and thereby process them further.

2.3 Defining Frames

Entman (1993) came up with a definition that is widely used and accepted ever since. Entman (1993) defined framing as selecting "some aspects of a perceived reality and making them more

salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation" (p. 52). With his definition Entman emphasizes the two functions selection and salience, as frames select certain aspects of reality (selection) and draw attention to them, making them more noticeable, meaningful, and memorable to recipients (salience). Frames classify what a party does with what costs and benefits (problem definition), identify their underlying problem (diagnose causes), evaluate the party and its effects (moral evaluation), and offer proposed solutions to the problem (treatment recommendation). As an example, Entman refers to the "cold war" frame, in which media defined certain foreign civil wars as problems (problem definition), defined the communist rebels as their cause (diagnose causes), offered atheistic aggression as an evaluation of the rebels (moral evaluation), and suggested American support for the other side as a solution (treatment recommendation). According to Entman's definition (1993), the framework of this work focuses on the problem definition as it demonstrates the benefits or costs of the COVID-19 vaccine.

Following Entman (1993), Scheufele (1999) organized fragmented framing research by distinguishing between media and audience frames. While media frames are understood as deep structures in a text, audience frames refer to cognitive deep structures in memory. A large part of framing research focuses on frame building, where the media frames produced and offered by journalists and the media are investigated and reconstructed by means of quantitative and qualitative content analyses (Scheufele, 1999, Bonfadelli & Friemel, 2015). Frame setting, on the other hand, focuses on how media users use their audience frames to perceive their reality in the first place and to what extent recipients transfer the media frames offered in media texts to their own audience frames and what effects this has on their perception, opinion formation, and behavior. Since this paper investigates the effect of gain and loss frames (media frame) on the intention of recipients (audience frame), this paper is classified in Frame Setting.

Years later, Scheufele and Iyengar (2014) attempted to diminish the conceptual vagueness by distinguishing between equivalence and emphasis frames. Equivalence frames are frames that present the same piece of information in different ways. Emphasis frames, on the other hand, refer to frames that present different perspectives on a piece of information. In this work, equivalence frames are used because the same topic (why you should get a COVID-19 vaccine) is presented in different ways (gain and loss frame).

2.4 Previous Research

This overview of the Framing approach first explains the gain and loss frames based on Kahneman and Tversky's studies (1979, 1981). Building on this, we outline how Rothman et al. (1997) have linked these gain and loss frames to detection and prevention behaviors. The next sections explain why vaccination as a prevention behavior, however, is a special case in Rothman et al. (1997) findings. Finally, some moderators are presented that could influence the results of this study.

2.4.1 Gain and Loss Frames

López-Rabadán and Vicente-Mariño (2009) divided the development of framing theory into three major phases (Ardèvol-Abreu, 2015). They identified the first phase as the period from 1974 to 1990, which was characterized by the first instrumental applications based on the sociological definition of the term. Framing theory slowly entered and grew in communication studies. This phase includes Kahneman and Tversky's (1979) Prospective Theory, a milestone of framing theory. Prospective Theory states that presenting the same information in different ways changes people's perceptions, preferences, and actions (Kahneman & Tversky, 1979, Abhyankar, O'Connor & Lawton, 2008). On the one hand, people are willing to take risks when faced with losses or costs of an action (Nan, Xie & Madden, 2012). On the other hand, people behave risk averse when faced with the factual equivalent gains or benefits of the action.

The best example is the study that became famous as the "asian disease problem", in which Kahneman and Tversky (1981) placed the participants in the imaginary situation in which an Asian disease would kill 600 people. Participants each had to choose between Plan A and Plan B (Nan, Xie & Madden, 2012, Kahnemann & Tversky, 1981). Plan A involved a certain outcome with less risk, while Plan B offered an uncertain outcome with more risk. If the options were gain-framed ("if Program A is adopted, 200 people will be saved," "if Program B is adopted, there is one-third probability that 600 people will be saved and two-thirds probability that no people will be saved"), more participants went for the safer and less risky option A. However, when the options were presented in a loss frame ("if Program A is adopted, 400 people will die", "if Program B is adopted, there is one-third probability that nobody will die and two-thirds probability that 600 people will die"), the participants favored the riskier Plan B. Thanks to Kahnemann and Tversky's results (1979, 1981), the study of gain and loss frames became a central component of framing research in communication science.

2.4.2 Detection and prevention behavior

López-Rabadán and Vicente-Mariño (2009) cited the 1990s as the second phase in which framing became a specialty in media studies, finding its application in the analysis of media discourse (Ardèvol-Abreu, 2015). During this period, there was an uncontrolled and dispersed methodology and a heated debate erupted as to whether framing theory was merely an extension of agenda setting theory or a complementary and distinct theory. Inspired by the findings of Prospect Theory (Kahnemann & Tversky, 1979), Rothman and Salovey's (1997) study illustrates the effects of framing in health communication (Latimer, Salovey & Rothman, 2007). From Kahnemann and Tversky's study (1979), they concluded that "the effect of a particular frame on people's willingness to perform a behavior is contingent on whether the option under consideration is perceived to reflect a riskaverse or risk-seeking course of action" (Rothman, Kelly, Hertel & Salovey, 2003, p. 281).

The authors assumed that loss-framed messages are more persuasive when a situation or action is considered risky such as having a mammogram (Nan, Xie & Madden, 2012). Performing a mammogram is perceived as risky because it can detect life-threatening disease. Such loss frames would draw attention to the costs of not taking the recommended action such as lower chance of survival if the disease is discovered later. The advantage of loss frames for detection behavior has been empirically demonstrated several times in the research literature (Abood, Coster, Mullis & Black, 2002, Kalichman & Coley, 1995, Meyerowitz & Chaiken, 1987, Williams, Clarke & Borland, 2001). Gain-framed messages, on the other hand, are more persuasive when the situation or action is considered rather safe or harmless such as using a sunscreen. Using a sunscreen is not considered risky because it will prevent a future health problem. Such gain frames would emphasize the benefits of the recommended action such as prevention of skin cancer. Several studies could confirm the higher effectiveness of gain frames for prevention behavior (Detweiler, Bedell, Salovey, Prinin & Rothman, 1999; Millar & Millar, 2006).

They thus distinguished between detection behavior (e.g., mammography) and prevention behavior (e.g., using sunscreen) as different types of health behavior that moderate the effects of framing (Abhanyankar, O'Connor & Lawton, 2008). Thus, Rothman and Salovey (1997). They concluded that gain frames are more persuasive for prevention behavior, whereas loss frames produce a stronger effect for detection behavior. Rothman and Salovey's (1997) work drew several studies that supported their prediction with empirical results (Cox & Cox, 2001,

Rothman, Martino, Bedell, Detweiler & Salovey, 1999, Rothman, Bartels, Walschin & Salovey, 2006).

2.4.3 Special case vaccination

López-Rabadán and Vicente-Mariño (2009) cited the beginning of the 21st century as the last phase marked by reorganization and empirical development, which continues today (Ardèvol-Abreu, 2015). In this phase, research attempted to carry out a conceptual and methodological unification, allowing a faster and more solid development through research synergies. This reorganization was also made in Rothman and Salovey's (1997) findings on prevention and detection behavior. Getting vaccinated is considered a preventive behavior and should not be considered risky, as it should prevent future health problems. Therefore, based on Rothman and Salovey's (1997) findings, gain frames should be more effective (Nan, Xie & Madden, 2012). However, vaccination studies in framing research found that loss-framed messages are more persuasive in a vaccination message (Abhyankar, O'Connor & Lawton, 2008, Ferguson & Gallagher, 2007, Gerend & Shepherd, 2007). The reason for these inconsistent results is due to varying perceptions of risk of prevention and detection behaviors rather than the inherent features of these behaviors (Abhyankar, O'Connor & Lawton, 2008). In other words, gain frames are not more effective for, in example, using a sunscreen because it is a prevention behavior, but because this behavior is subjectively perceived as not risky.

While performing a vaccination is a prevention behavior and less risky, it is not equivalent to other harmless and safe prevention behaviors in framing studies such as applying sunscreen or wearing a condom. Vaccination is considered risky for several reasons. First, people must have an unknown substance injected into their body that could cause new harm (Gerend & Shepherd. 2007). Second, the very act of vaccination is considered risky because it can cause pain and discomfort. Third, a perception of risk may be evoked if people do not believe the vaccine will work. These multiple reasons are consistent with current research that people are concerned about the safety of a vaccine (Ball, Evans, & Bostrom, 1998, Freed, Clark, Butchart, Singer, & Davis, 2010). People have a misperception for the potential side effects of a vaccine, even though they are rarely severe.

For this reason, it must be noted that although vaccination is a prevention behavior and therefore no negative outcome is expected, it is perceived as a risky action. Therefore, for example, there is such a great hesitancy to vaccinate against the COVID-19 virus. Thus, vaccination is a special case among the types of prevention behavior. Not gain frames as usually assumed, but loss

frames promise to be more effective in getting people to vaccinate. Such loss frames draw attention to the costs of non-adherence to the recommended action, such as lack of immune protection against measles. These findings are now linked to the COVID-19 vaccination hesitancy discussed in chapter 1.2, as loss frames could reduce this vaccination hesitancy. Based on these findings, the first hypothesis is derived:

H1: Subjects will express more favorable intention toward COVID-19 vaccination after exposure to a loss-framed message than after exposure to a gain-framed message.

Accordingly, this hypothesis aims to determine whether previous framing findings of vaccine can be applied to the COVID-19 vaccine. As the first classic framing study, this hypothesis will investigate whether loss frames can achieve a higher intention towards the COVID-19 vaccine than gain frames, thus making an important contribution to a gap in framing research.

2.4.4 Moderators enhancing Framing Effect on Intention

One of the largest areas of research in framing is the further identification of moderators (Rothman, Bartels, Wlaschin & Salovey, 2006, Nan, Xie & Madden, 2012). Since this paper aims to contribute to further identification of moderators, two moderators were integrated in the questionnaire. Kahnemann and Tversky's (1979, 1981) findings posited that preexisting beliefs such as perceived vaccine efficacy could moderate framing effects. Nan, Xie, and Madden (2012) demonstrated that loss frames led to higher intention than gain frames when subjects perceived the efficacy of the vaccine to be low. The reason that can be given is that people view a vaccine as riskier at low perceived efficacy because they cannot expect a safe outcome and they are not convinced that the vaccine could truly protect them. These findings are linked to COVID-19 vaccine hesitancy. Reasons mentioned for COVID-19 vaccine hesitancy included concerns about the lack of trust in the government to guarantee the vaccine's safety and efficacy (55%) or worries that the vaccine is too new (53%) (Neumann-Böhme et al., 2020, KFF, 2020). In other words, one of the most common reasons cited for their aversion to the COVID-19 vaccine were its efficacy. From these findings, the next hypothesis can be derived:

H2: Higher levels of perceived vaccine efficacy will strengthen the effect of framing on intention towards COVID-19 vaccination.

Accordingly, this hypothesis seeks to determine if the findings on perceived vaccine efficacy can be replicated when applied to the COVID-19 vaccine. If the hypothesis can be confirmed, important conclusions can be drawn about communication campaigns targeting unwilling vaccinators, as one of the most common reasons are the efficacy of the COVID-19 vaccine.

Furthermore, involvement is considered to play an important role. Several studies have demonstrated an influence of involvement on framing effects (Donovan & Jalleh, 1999, De Graaf, Van den Putte & De Bruijn, 2015, Jung & Villegas, 2011, Maheswaran & Meyers-Levy, 1990). In all studies, gain frames were found to be more effective with low-involvement people, while loss frames were more effective with high-involvement people. The result could be found in different subject areas such as drinking behavior (De Graaf, Van den Putte & De Bruijn, 2015), smoking behavior (Jung & Villegas, 2011) or product attributes (Donovan & Jalleh, 1999). One reason for these unanimous results lies in human information processing (Jung & Villegas, 2011). According to the findings of Cacioppo and Petty (1979), people with high involvement process information centrally, whereas people with low involvement process information peripherally. This difference in information processing also has implications for potential framing effects. When people process information centrally, negative information is weighted more (Kanouse, 1984, Petty & Cacioppo, 1986, Weinberger, Allen & Dillon, 1981). For this reason, loss frames achieve greater effectiveness with high-involvement people because they process information centrally and give more weight to negative information. However, when people process information peripherally, they respond to framed messages only on simple cues (e.g., tone, endorser). For this reason, gain frames are more effective with low-involvement people because they process information peripherally and respond to simple cues. These findings are associated with the COVID-19 pandemic. Because the COVID-19 virus put the world in a state of emergency and caused an unprecedented pandemic in modern times, it is believed that involvement is correspondingly high for many people. Many people will be highly involved because of COVID-19 restrictions, personal losses, or being a member of the risk group. The third hypothesis is derived from these considerations:

H3: Higher levels of involvement will strengthen the effect of framing on intention towards COVID-19 vaccination.

This hypothesis thus aims to test whether involvement will influence framing effects on a COVID-19 vaccine. Since the COVID-19 pandemic represents a state of emergency, involvement is assumed to be much higher than in other studied topics such as drinking

behavior or product descriptions. However, it could also be that the involvement is lower due to different numbers of infections, non-membership of the risk group or fatigue of COVID-19 news.

2.5 Research model

This paper examines how can strategic practitioners use Framing Theory to increase intention to get vaccinated in the general population which will be answered by the previously derived hypotheses. Those hypotheses and their respective dependent and independent variables are recorded in the following Figure 2.

Figure 2. Research Model
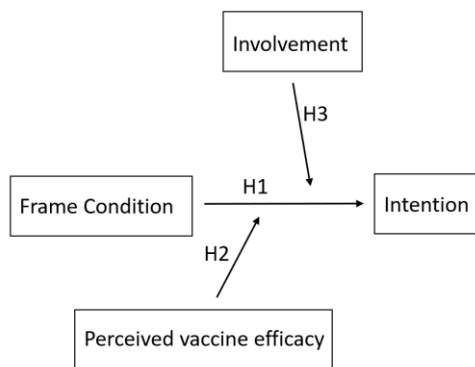
The first hypothesis (H1) suggests a significant influence of the independent variable frame condition on the dependent variable intention. According to the first hypothesis subjects with loss frames should achieve higher intention for a COVID-19 vaccination than subjects with gain frames. The second hypothesis (H2) examines the moderation effects of perceived vaccine efficacy on the influence of frame condition on intention. It is hypothesized that higher levels of perceived vaccine efficacy will strengthen the effect of framing on intention towards COVID-19 vaccination and thus moderate this relationship. The third hypothesis (H3) also examines possible moderation effects, namely those of involvement. The third hypothesis suggests that higher levels of involvement will strengthen the effect of framing on intention towards COVID-19 vaccination and thus moderates the influence of negative frames on intention. Thus, this research model will use these three hypotheses to identify how strategic practitioners can use frame condition, involvement, and perceived vaccine efficacy as part of framing theory to increase intention to get vaccinated against the COVID-19 virus.

3. Methdology

While second chapter focused on the theory and previous research, this chapter will explain the methodology used in this study. This chapter first explains the research paradigm in which this thesis is situated, the sampling strategy used to select the subjects, and the ethical standards considered for the subjects. In the next part, the definition and advantages and disadvantages of the experimental design will be explained and how it was implemented in this thesis. Furthermore, the advantages and disadvantages of the online questionnaire will be explained and in which way the most important constructs were measured in this questionnaire. Lastly, the steps of how the most important indexes were prepared for the data analysis were explained and which other assumptions for certain data analyses were controlled.

3.1 Research paradigm and research design

Based on the methodology and research design, this paper can be classified as post-positivism. Post-positivism is the consequence of positivism's limitations and combines positivism and interpretivism (Panhwar, Ansari & Shah, 2017). Although post-positivism wants to explore a phenomenon, unlike positivism, it believes that absolute truth cannot be found. Truth is probalistic and provisional, which is why there are no universal solutions to problems and conclusions can change over time (Panhwar, Ansari & Shah, 2017, Ryan 2006). Post-positivism researchers are supposed to try to present the truth as best as possible while considering the influence of one's subjectivity on reality (Mujis, 2004). Post-positivism features a pluralistic methodology because "one can never find full accuracy and perfection in a scientific method as all methods have their faults" (Panhwar, Ansari & Shah, 2017, p. 256). For this reason, the most appropriate methods for the selected variables will be chosen, which can mean both a quantitative and a qualitative approach. However, majority of the time, a quantitative approach is used because qualitative methods contribute greatly to the reduction of human experience and objectification of human beings. According to Ryan (2006), quantitative research has positivist features when it tries to link variables, test theories or hypotheses, predict, or it tries to isolate and define categories and determine the relationships between them before starting the research. This paper fulfills all these aspects, which is why it can be assigned to the post-positivist research paradigm. Variables such as involvement and perceived vaccine efficacy

were linked to frames, predictions were made about the relationships between these variables, and several hypotheses were formulated to find out how you can use the Framing Theory.

This paper represents an experimental cross-sectional study in a deductive-quantitative research design. Subjects were randomly assigned to face one manipulated condition each (gain and loss frame) in an experimental online questionnaire, whereupon inferences on the influence of gain and loss frames would like to be drawn. Characteristically for this research design, hypotheses were deductively derived from findings of established studies and theories which make predictions about relationships such as involvement and loss frame. In terms of quantitative research, these hypotheses are evaluated using statistical analyses of the data acquired from the online questionnaire. The subjects were all tested during the same period and not at different time points, which is why this is a cross-sectional study.

3.2 Participants

This chapter deals with the participants of this thesis. On the one hand, it explains the criteria according to which participants were included in the sample and which sampling method was used with its advantages and disadvantages. On the other hand, the data collection is shown and how the ethical standards regarding the participants were met.

3.2.1 Sampling and data collection

To belong to the sample, a part of the population, some criteria are usually created. This was also the case in this work, but all of them were discarded. Because this study examines the effectiveness of gain and loss frames on COVID-19 vaccination, no specific population was targeted, as people from all ages, education levels, and countries are affected by the COVID-19 pandemic and are therefore relevant. Originally, it was planned to exclude people who have already received the COVID-19 vaccination, as they have already formed a firm opinion on the COVID-19 vaccination and therefore cannot be influenced by frames. In addition, people who belong to the risk group or have already suffered COVID-19 infection were also critically evaluated. Subjects who have recovered from COVID-19 virus may see a smaller need for vaccination and subjects from the risk group see the virus as so dangerous that they want the vaccination at all costs, which is why even frames will no longer have any effect. Despite these concerns, these subjects were retained because their data may be useful in certain hypotheses and the goal was to have many subjects as possible. If this study were to exclude vaccinated or already infected subjects, the potential sample size would be dramatically reduced and thus lose

statistical significance. To detect potential bias in the results after data collection, subjects were asked whether they were already infected or vaccinated and whether they were in the at-risk group as control questions.

This work makes use of what is known as convenience sampling, which is a nonprobability sampling method that a researcher uses to choose a sample of units from a population (Etikan, Musa & Alkassim, 2016). The convenience sampling "relies on available subjects - those who are close at hand or easily accessible" (Berg, 2009, p. 32). For example, if the teacher uses his students for his questionnaire or the student uses his siblings as subjects for his project. Members of a convenience sample meet "certain practical criteria, such as easy accessibility, geographical proximity, availability at a given time, or the willingness to participate are included for the purpose of the study" (Etikan, Musa & Alkassim, 2016, p. 2). As the biggest advantage, convenience sampling made it possible to reach many people within a short period of time and with little effort and costs (Berg, 2009, Michaelson & Stacks, 2014). In addition to the low effort, cost effectiveness and speed of data collection, the easy accessibility of subjects is also considered an advantage. Therefore, the convenience sampling "can be useful when the researcher has limited resources, time and workforce" (Etikan, Musa & Alkassim, 2016, p. 1). Convenience sampling is also useful when the population is too large for randomization or when general results that apply to the population do not want to be found.

However, convenience sampling also comes with some disadvantages. Etikan, Musa, and Alkassim (2016) cite the likelihood of bias as the biggest disadvantage. The convenience sample is not intended to be representative of the population because certain subgroups dominate the sample and sampling is of subjective nature (Berg, 2009, Etikan, Musa & Alkassim, 2016). The distribution of the questionnaire link through the social media channels may lead to bias, as the sample was strongly influenced by the sociodemographic characteristics of the author, such as young age or being white. For example, older people tend to be at higher risk for a severe COVID-19 outcome, which is why their vaccination intentions are higher than those of young people (AARP, 2021). Furthermore, several studies in the United States indicated a large skepticism of the African American population toward COVID-19 vaccination, which can be attributed to the systematic disadvantage in the health care system (CNN, 2021). Since the author of this work is young and white, social groups such as blacks or older people tended to be reached to a lesser extent, which is why there is a risk of possible systematic bias in the sample. To counteract this, several sociodemographic characteristics (i.e., age, education) were queried in the questionnaire and were considered in the data analysis.

Another bias can be response bias when "participants give responses that do not necessarily reflect their true beliefs" (Field, 2016 p. 720). For example, in social desirability bias, subjects provide the socially desirable responses instead of expressing their possible rather less socially desirable opinions. This bias is particularly important for this study because governments as well as the media and large segments of the population are in favor of the COVID-19 vaccine, and thus public pressure to get vaccinated against COVID-19 is very high. Subjects may thus feel pressure in the questionnaire not to express their possible dislike of the COVID-19 vaccine. Since this work uses an online questionnaire, this effect should occur to a lesser extent, since an interviewer is missing and subjects attribute more anonymity to an online questionnaire (Möhring & Schlütz, 2010). Nevertheless, some measures were taken to prevent this bias. It was emphasized before the questionnaire that data would be collected anonymously and kept confidential. In addition, respondents were never asked directly about their intentions toward the COVID-19 vaccine, but were asked about associated feelings or in applied phrases.

Another disadvantage is the risk of outliers because wrong subjects can become part of the survey due to self-selection (Berg, 2009, Etikan, Musa & Alkassim, 2016). Therefore, a convenience sample is susceptible to hidden bias and by using numbers from a convenience sample, only weak statements about a characteristic can be made about the sample rather than a formal inductive inference concerning the population of interest. To minimize this drawback, an exploratory data analysis was conducted to look for potential outliers prior to the actual data analysis.

Despite these drawbacks, convenience sampling was chosen for this work. First, the population is too large for randomization, since all people were affected to a greater or lesser extent by the COVID-19 pandemic. In addition, the work had to be written in a short time window, which is why convenience sampling was suitable thanks to its speed of data collection and easy availability of subjects. Since this work was written as part of a master's thesis and was not financed by a company, for example, the cost-effectiveness of convenience sampling was another advantage.

Data were collected between 02/24/2021 and 04/14/2021. A link randomly directing subjects to either the Gain Frame or Loss Frame questionnaire was shared on all social media channels (Facebook, Facebook Groups, Facebook Messenger, WhatsApp, LinkedIn, Instagram Messenger). This strategy was chosen because it was possible to reach older segments of the population (Linkedin, Facebook) as well as young people (WhatsApp, Instagram). The aim was always to adhere to the quotas of the population. In addition, thanks to the international

background of the author, it was also possible to include different cultures and countries of origin. A total of 386 subjects completed the sample, with 293 subjects remaining after data cleaning. The sample was predominantly female (58%), comes from Switzerland or Sweden (59.4%), has a bachelor's degree (41.3%) and tends to be young ($M = 29.9$). A cut of 93 cases is a surprisingly large number, which can be attributed to the high number of dropouts. A possible explanation for this dropout rate may be the distribution channels of the questionnaire, as the questionnaire was distributed on all possible social media channels. Consequently, many subjects clicked on the link from their smartphone, filled it out until a new push-up notification or another possible distraction caused them to abandon the questionnaire. Another explanation could be that the questionnaire took too long to complete. However, the time spent in the questionnaire was 7.2 minutes ($M = 432.80$). Thus, a too long completion time of the questionnaire can be excluded. Since the sample was rather young ($M = 29.9$), one possible cause could be that some subjects became bored after a certain point and they intentionally dropped out of the questionnaire.

3.2.2 Ethical considerations

The work considered and adhered to ethical standards in several aspects. First, before the actual questionnaire, it was explicitly stated that the data would be kept confidential. They will only be used to answer the research question and will not be passed on to third parties.

Second, subjects were assured that participation was completely voluntary and anonymous. No individual or identifiable information would be collected. The only exception was question number 19, as this question offered subjects the opportunity to leave their email address if they wished to receive a summary of the results. However, subjects also had the option to select "No, thank you." In addition, question number 18 offered the option to leave individual feedback if subjects had any comments.

As a third ethical standard, subjects were shown the option to stop the questionnaire at any time without fear of negative consequences. At this point, however, it was expressed that the study would benefit from complete completion of the questionnaire. All questions of the questionnaire were mandatory, which is why subjects could not skip some questions at will. This measure was taken because otherwise there was a risk of a high number of missing data. While Pallant (2015) points out several methods for dealing with missing data, he also points out the dangers of small sample size or bias in the results, which is why the questions were kept mandatory. However, the three questions about whether one belonged to the risk group, had

already been infected with the COVID-19 virus, and had already received the COVID-19 vaccine were tending to be more sensitive questions. For this reason, the response option "I don't want to say" was included for these three questions in case these questions were too personal for certain subjects. Subjects were informed of all these ethical standards on the first page of the questionnaire. If they agreed, they could press "Continue" to begin the actual questionnaire.

3.3 Experimental design

In the first step, the advantages and disadvantages of an experimental design are explained and why this paper has made use of it. This study uses an experimental design, which Mujis (2004) defines as "a test under controlled conditions that is made to demonstrate a known truth or examine the validity of a hypothesis" (p. 13). The biggest difference from quantitative non-experimental design is control, because in an experiment the researcher controls the environment as much as possible and focuses only on the variables he wants to study. For this reason, many experimental studies take place in a laboratory, as external influences can be minimized in this way. Control is also applied to the predictor variable because in an experiment the predictor variable is manipulated, whereas in a non-experimental design the predictor is used as it appears.

The greatest advantage of experimental design is the high explanatory power due the control over external factors and variables because "it allows us to make a stronger claim to have determined causality than any other type of research" (Mujis, 2004). Determining causality, that is, asking questions such as "What causes what?", "What is the effect?", or "What is the effect?" is common in quantitative research (Mujis, 2004). However, establishing causality is difficult due to three factors: a relationship, a time sequence, and a non-co-founding variable. First, a positive or negative relationship must exist between two variables; otherwise, causality does not exist. Second, the time sequence matters because the predictor variable must come before the dependent variable. However, it is possible that this relationship is reciprocal because both variables influence each other. Third, the relationship should arise because of a co-founding variable, i.e., it should not be explained by a third variable. An experimental design cannot establish a relationship better than other research designs. However, factors two and three are better controlled by an experimental design because the manipulation of the predictor preserves the time sequence, and the minimization of external influences excludes a cofounding variable. Therefore, the experiment offers a high explanatory power.

However, an experimental design also has some disadvantages. First, results from an experiment must be replicated, as they can arise by chance. Another disadvantage is the artificial situation, as it makes it difficult to transfer to real life. This effect can be influenced by countless contextual factors in real life. Third, there is always the possibility that causality is due to an external factor since all possible external factors can never be excluded.

This study uses an experimental design because frame is manipulated as a predictor in the form of gain or loss frame. It is hoped through an experimental design that causality can be established between frames and intention. However, the disadvantages of experimental design have also been considered. First, a basic relationship of frames cannot be denied because countless studies have already demonstrated and replicated the effect, which is why random causality is unlikely. Second, the use of an online questionnaire exposed all subjects to the same conditions, since they were not influenced by interviewer effects, for example. Third, several control variables were queried to determine potential cofounding variables in the data analysis. Despite these measures, the results may be limited because translation to real life is likely to be difficult as people are exposed to many messages about the COVID-19 vaccine. In addition, other external factors cannot be ruled out because the COVID-19 pandemic affects people in many ways. In addition, the situation cannot be controlled in an online survey. Some subjects completed the questionnaire in a concentrated manner in a quiet place, while other subjects completed it quickly in a noisy place.

The second step shows how the experimental design was carried out in this paper. Two questionnaires were created that had either a gain or loss frame as an intervention. The sample was thus divided into two groups with different conditions and their differences were compared afterwards. A survey link was used to randomly direct subjects to one of these questionnaires. This ensured that there was a balanced distribution between the two questionnaires. The first two pages of the questionnaire included social demographic questions such as age, gender, and country of residence. The implementation of the framing message was guided by the studies of Nan, Xie, and Madden (2012), Abhyankar, O'Connor, and Lawton (2008), Gerend and Shepherd (2007), and Nan (2012), all of which examined framing effects on the intention to get vaccinated. All these studies ensured that all subjects were at the same level of knowledge regarding the virus prior to the actual message. For this reason, subjects read the following abbreviated description of the COVID-19 virus, from the European Centre for Disease Prevention & Control:

The novel COVID-19 virus is a new strain of coronavirus that has not been previously identified in humans. SARS-CoV2 is mainly transmitted via respiratory droplets and aerosols from an infected person when they sneeze, cough, speak or breathe and are in close proximity to other people. The infectious period may begin around two days before symptoms appear, but people are most infectious during the symptomatic period, even if symptoms are mild and nonspecific.

Symptoms of COVID-19 vary in severity from none at all (asymptomatic) to having fever, cough, sore throat, general weakness, fatigue and muscular pain. The most severe cases can develop pneumonia, acute respiratory distress syndrome and other complications, all potentially leading to death.

COVID-19 vaccines aim to prevent COVID-19 disease by triggering an immune response. There is currently a limited number of doses available to the immunisation programmes in each country and therefore prioritisation among target groups has been necessary. Uptake in different target groups will be monitored carefully as well as vaccine safety and effectiveness when used in real world settings as compared to clinical trial settings.

The description thus informed the subjects about the possibilities of infection, the possible symptoms, and the development of COVID-19 vaccination. More information such as COVID-19 vaccination was not presented because it could distort the actual intervention of the study. This informational text was followed first by general COVID-19 questions such as positive infection and membership in the at-risk group, and then by specific COVID-19 questions such as subjective norms or perceived vaccine efficacy. Before the actual intervention, the subjects still had to read an introduction:

This is a message from your government. Several questions will be asked later in the survey based on this message. Therefore, you should take plenty of time to carefully read the text several times and give it your full consideration before turning to the next page.

This was to ensure that the subjects read through this message carefully and with concentration. Therefore, the government was chosen as the communicator because it was mainly the governments that announced new measures during the pandemic. In addition, it highlights the relevance of this work to government communication measures. After this introduction, subjects were exposed to the actual intervention. Either they read the gain frame or the loss frame. The message title "Why you should get the COVID-19 vaccine" was also used in the

studies of Nan, Xie, and Madden (2012) and Nan (2012). In the following, the gain frame is presented, while the changes in the loss frame are shown in the parentheses.

By [not] vaccinating yourself, you will be able [fail] to protect other people against the potentially deadly COVID-19 virus and may decrease [won't] your chance of contracting it. You will [fail] take advantage of a safe and lifelong immunization, which make you feel less [more] anxious and safer [less safe]. Moreover, you will contribute to a faster [slower] herd immunity in your country, which will result in a faster [slower] loosening of the COVID-19 restrictions.

While the Gain Frame focused on the benefits of COVID-19 vaccination, the Loss Frame provided information on the costs of avoiding COVID-19 vaccination. Several arguments were covered such as safety for you and the at-risk group, contribution to herd immunity, and feelings such as fear. The actual message was not kept too long so that subjects would be motivated enough to reread and internalize the message. After the presentation of the gain and loss frames, subjects were asked several questions designed to measure the influence of the frames. Among other things, they answered questions about intention, attitude, and perceived behavioral control. Since subjects were previously exposed to different conditions (gain and loss frames), by using the different ratings of intention, attitude, etc., conclusions can be drawn about the effectiveness of gain and loss frames.

3.4 Survey instrument

This subsection explains the advantages and disadvantages of the online questionnaire used in this thesis. Furthermore, it explains the way in which the most important constructs were measured in the questionnaire.

3.4.1 Standardized Online Survey

Since other framing studies (i.e. Abhyankar, O'Connor & Lawton, 2008, Ferguson & Gallagher, 2007, Gerend & Shepherd, 2007) used an online survey, this paper was also conducted using a standardized online questionnaire, which has several advantages. First, the online questionnaire is independent on time and space, as it can be completed anytime and anywhere (Möhring & Schlütz, 2010). This is also associated with the advantage of speed, as the online questionnaire can "reach thousands of potential respondents anywhere in the world in a very short time" (Möhring & Schlütz, 2010, p. 133) and the data is already available in computer-readable form

after completion of the questionnaire. The automation of the online questionnaire proves to be the third advantage. The program can avoid sequence effects thanks to filter guidance and rotation of answer choices, immediately draw attention to missing answer entries and identify so-called lurkers, who click through the questionnaire, or dropouts by means of recording the completion time. Identifying lurking dropouts and excluding them from data analysis can improve data quality. Fourth, respondents attribute more anonymity to an online questionnaire than other survey methods, which is why sensitive topics are particularly suitable (Taddicken, 2007). As a next advantage, no interviewer effects or social desirability effects can arise due to the lack of an interviewer (Wagner & Hering, 2014). The online questionnaire also represents a cost-effective research method because costs such as telephone costs or payment of an interviewer can be avoided (Möhring & Schlütz, 2010). The standardization of the questionnaire has the advantage of high objectivity and the answers can be better compared with each other, because the different answers can be attributed exclusively to different information provided by the respondents and not to different conditions during the interview.

One of the biggest disadvantages of the online questionnaire is the lack of representativeness, because not the entire population has an Internet connection, active Internet users do not correspond to the normal population and recruitment is actively based on a selection population (Möhring & Schlütz, 2010). A second disadvantage is the low response rate because the link must be found in the first place, respondents must become active themselves and participation involves transaction costs. This is called self-selection because the sample draws itself. Third, the education and age barrier turn out to be problematic because less educated and older people tend to be excluded. With online questionnaires, the survey situation is also difficult to control, which is why respondents could, for example, fill out the questionnaire more than once and thus distort the results. The lack of presence of the interview avoids interviewer effects and effects of social desirability, but there is no possibility of motivation by the interviewer. There is therefore a risk of a higher dropout rate.

In addition, measurement error must be considered as a potential bias, which can be defined as the difference between the observed and true numbers of a construct (Field, 2016). This error can be attributed to measurement instruments, interviewers, respondents, or survey mode (Baur & Blasius, 2014). To minimize errors due to the measurement instruments, only constructs from established studies that should guarantee high reliability and validity were used and were either directly adopted, abbreviated, or adapted to the COVID-19 vaccine. Errors due to survey mode were ensured by data cleaning. Subjects who were unusually long or fast were excluded, as

were those subjects who reported not being focused or distracted. To minimize errors by respondents, a small pretest ensured that subjects understood the questions in the correct way. However, subject bias may arise because subjects have already been exposed to gain or loss messages about the COVID-19 vaccine prior to this study and therefore may have formed an opinion. Accordingly, exposing subjects to gain and loss frames in this study may exert no effect or a very weak effect.

3.4.2 Measurements

INTENTION The construct intention was measured by the established scales of Bae (2008) and Nan, Xie, and Madden (2012). In Bae's (2008) construct, subjects had to give their assessment on four statements on a 7-point scale with endpoints of "stronlgy disagree" and "strongly agree." (I plan to receive a COVID-19 vaccine in the forthcoming months, I intend to receive a COVID-19 vaccine in the forthcoming months, I expect to receive a COVID-19 vaccine in the forthcoming months, I am likely to receive a COVID-19 vaccine in the forthcoming months). In Nan, Xie, and Madden's (2012) study, subjects had to answer three questions on a 5-point scale with the endpoints "Extremely unlikely" and "Extremely likely" (How likely are you to get the COVID-19 vaccine sometime soon for the 2021 season? If you were faced with the decision of whether to get the COVID-19 vaccine today, how likely is it that you would choose to get the vaccine for the 2021 season? How likely are you to get the COVID-19 vaccine in the future for the 2021 season?). Originally, only Nan, Xie, and Madden's (2012) measurement was used. In view of the great importance of the construct intention and the measurement by only three questions, the operationalization was supplemented and deepened by Baes (2008).

PERCEIVED VACCINE EFFICACY Perceived vaccine efficacy was also adopted from the Nan, Xie, and Madden (2012) exemplar study. Subjects had to answer three questions on a 5-point scale with endpoints of strongly disagree and strongly agree (I believe the COVID-19 vaccine is effective in preventing the spread of COVID-19, I believe if I get the COVID-19 vaccine, I will be less likely to get the COVID-19 virus, I believe the COVID-19 vaccine works in preventing the COVID-19 virus).

PERCEIVED VACCINE SAFETY Perceived vaccine safety was adapted from the Nan, Xie, and Madden (2012) exemplar study. On a 5-point scale with endpoints "strongly disagree" and "strongly agree," subjects were asked three questions (I worry about the short-term side effects of the COVID-19 vaccine, I worry that the COVID-19 vaccine might negatively affect my body, I worry that the COVID-19 vaccine might have unknown long term side effects).

INVOLVEMENT The construct involvement was adopted in a shortened form from Bae (2008). On a 7-point scale with endpoints, subjects were asked the following question: "To me, receiving the COVID-19 vaccine is...". In ten different endpoints the subjects had to determine their feelings (unimportant/important, boring/interesting, irrelevant/relevant, unexciting/exciting, means nothing/means a lot, unappealing/appealing, mundane/fascinating, worthwhile/valuable, uninvolving/involving, unnecessary/necessary).

PERCEIVED SEVERITY The construct Perceived Severity was adopted from Nan, Xie, and Madden (2012) and measured using three items on a 5-point scale with endpoints of strongly disagree and strongly agree (It is likely that I will catch COVID-19, I am at risk for catching COVID-19, It is possible that I will get COVID-19).

PERCEIVED SUSCEPTIBILITY Based on the study by Nan, Xie, and Madden (2012), the construct perceived susceptibility was assessed using three items on a 5-point scale with endpoints strongly agree and strongly disagree (I believe that the COVID-19 virus will result in severe health problems for me, I believe that the COVID-19 virus has serious negative consequences for me, I believe that the COVID-19 virus is extremely harmful for me).

3.5 Data Analysis

In this subchapter, the first arrangements for data analysis are made before the actual data analysis to answer the hypotheses is carried out in the next chapter. In the first step, the items of the constructs intention, perceived vaccine efficacy, and involvement were condensed into a mean index and tested for reliability, item-total correlation, item difficulty, and item homogeneity, respectively. The results of these tests can be reviewed in Appendix 2. First, the term reliability describes the extent to which a test produces the same results when administered repeatedly to the same subjects (Hussy et al., 2013).

Table 1. Reliability for Key Measures[1]

	Cronbach's Alpha when Item removed									
Intention	.77	.71	.62							
P. V. Efficacy	.86	.87	.85							
Involvement	.94	.95	.94	.95	.94	.94	.95	.94	.94	.94

[1] To simplify the table, the item names have been excluded. The item order of perceived vaccine safety is: PR06_01, PR06_02, PR06_03. The item order of intention is: PO04_01, PO04_02, PO04_03. The item order of involvement is: PR13_01, PR13_07, PR13_02, PR13_08, PR13_03, PR13_06, PR13_09, PR13_04, PR13_10, PR13_05.

The reliability of the intention (Cronbach's α = .78), perceived vaccine efficacy (Cronbach's α = .9), and involvement (Cronbach's α = .95) scales is good, as reflected in Table 1. Cronbach's alpha indicates how strongly several items correlate with each other. The reliability of the scale would not increase if one of the items were removed. In conclusion, these items can measure a common construct. Second, the term item-total correlation describes how well the overall test result can be predicted by answering a single item (Hussy et al., 2013). Each item of the intention, involvement, and perceived vaccine efficacy constructs scored the minimum value of 0.3, making each item sufficiently strongly correlated with and adequately representative of the overall scale. Third, the term item difficulty describes the percentage of all subjects who answered the item positively[2] (Hussy et al., 2013). In research, a wider spread of item difficulty is often desired because the test score should be differentiated across the spectrum. Each item on the perceived vaccine efficacy and intention scales was within the targeted range of 0.20 to 0.80, which is why each item achieved a wide spread and did not have disproportionate distributions at specific scores. Only the involvement scale had five items above 0.8. However, given the other five items, which ranged from 0.2 to 0.8, these items were retained. Fourth, the term item homogeneity describes whether the items capture a single trait rather than several different traits which was tested by a factor analysis (Hussy et al., 2013). The items of perceived vaccine efficacy and intention are homogeneous because only one factor could be extracted as they load on one factor and collectively measure a latent trait. On the other hand, several items of the involvement scale load on two factors. However, either the difference in the dual loads is greater than 0.3 or an item loads so strongly on one factor that it is not a true dual load here. For this reason, the items of the involvement scale are also homogeneous and together represent a latent characteristic.

For the actual data analysis, a hierarchical regression analysis is planned, which is why the requirements for a regression analysis are checked here. First, the dependent variable intention must be continuous, and the independent variables must be continuous or categorical. The dependent variable intention and the variables involvement, perceived vaccine efficacy, perceived vaccine safety, perceived susceptibility, and perceived severity are continuous because they were measured on either 5- or 7-point scales with labeled endpoints. The independent variables frame condition (0 = gain frame, 1 = loss frame), sex (0 = male, 1 = female), country (0 = Sweden, 1 = Switzerland), risk group membership and COVID-19 infection survived (each 0 = Yes, 1 = No) are or were dummy-coded for analysis, which is why

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[2] Formula according to Kelava and Moosbrugger (2008): $(\bar{X}i - Xmin) / (Xmax - Xmin)$

they are suitable for regression analysis despite nominal scaling. Thus, the correct scale level is fulfilled as the first condition for all three hypotheses.

As a second condition, the residuals must be controlled for normality, linearity, and homoscedasticity. According to Field (2016), it must be checked whether the distribution of the residuals in the normal PP plot is normally distributed, whether there is a linear relationship between the dependent variable and the dependent variable, and whether the distribution of the residuals along different points of the independent variable in the scatterplot is approximately the same. According to the normal PP plots and scatterplots in Appendix 2, the three conditions are fulfilled since a straight diagonal is given in the PP plots and the residuals are approximately equally distributed on the expressions of the independent variable in the scatterplot. However, as a limitation, it must be mentioned that an optimal distribution of the residuals is a rectangular shape with most points in the center. The scatter plots had a rectangular shape, but not always the most points in the center.

As a final requirement, no outliers should distort the results (Pallant, 2016). An exploratory data analysis was conducted to determine whether potential outliers in the distributions of intention, involvement, or perceived vaccine efficacy could skew the results. The boxplots, which can be found in Appendix 2, were able to identify three to four potential outliers for each of the three variables. However, the differences between the original mean and the 5% trimmed mean of intention ($M = 3.71$, $M_{5\%} = 3.79$), involvement ($M = 5.67$, $M_{5\%} = 5.82$), and perceived vaccine efficacy ($M = 4.16$, $M_{5\%} = 4.26$) are quite small, which is why they were retained.

4. Results

In this chapter, the data analysis is applied to the hypothesis derived from the second chapter using the program IBM SPSS Statistics. In the first step, the descriptive statistics for the sample and the main predictors are explained as well as control variables. In the second step, the actual hypotheses are evaluated using a data analysis strategy. In the last step, the results are summarized, discussed and it is explained why these results were reached. To save space, the histograms, PP plots, and scatterplots have been moved to Appendix 2.

4.1 Descriptive Results

As a first step of the data analysis, the descriptive statistics were analyzed, which can be found in Appendix 2. After data cleaning, 293 valid cases remained out of a total of 386, with a majority of 58% female (39.6% male, 2.4% other). The mean age is 29.9 years ($SD = 11.3$), left-skewed ($Mo = 25$, $Mdn = 26$) and thus rather young, with a minimum of 19 years and a maximum of 76 years. 37.9% of the subjects are from Sweden, 21.5% chose Switzerland, and at 40.6%, the majority of subjects reported being from a country other than Switzerland or Sweden. The sample tends to have a good academic education, as 41.3% have a bachelor's degree and 23.9% have a master's degree. Based on these socio-demographic characteristics of the sample, it can be assumed that the sample consists mainly of students, which is why it can be said that the sample is moderately to poorly representative of the population of Switzerland or Sweden. Regarding the pandemic, the majority of the sample has not been infected with COVID-19 (No = 77.1%, Yes = 14.7%), does not belong to the risk group (No = 86.3%, Yes = 12.6%) and has not yet been vaccinated against COVID-19 (No = 83.6%, Yes = 8.2%). Subjects also reported not being interrupted while completing the questionnaire (Not interrupted = 72.4%) and answered the questions in a focused manner (Focused = 51.2%, 4 = 29.7%). The high concentration and low interruption rate indicate high data quality, while the low infection rate and vaccination rate represent a good sample for the topic of this paper.

As a second descriptive statistic, the distributions of the most important variables are examined. The following statistics can be found in Apendix 2. The first step is to test for normal distribution. The test for normal distribution was significant for the variables intention,

involvement and perceived vaccine efficacy ($p < .05$), which is why the null hypothesis was rejected and it was assumed that a normal distribution cannot be assumed.

In the second step, the skewness and kurtosis are used to examine to what extent these distributions differ from the normal distribution. A skewness greater than +1 or -1 is "an indication of a substantially skewed distribution" (Hair et al., 2017, p. 61). In contrast, a kurtosis of +1 means that the distribution is too peaked, while a kurtosis of -1 signals a distribution that is too flat (Hair et al., 2017). According to Table 5, the variables intention ($M = 3.7$, $Md = 4$, $Mo = 5$) with a skewness of -0.923, involvement ($M = 5.7$, $Md = 6$, $Mo = 7$) with a skewness of -1.747, and perceived vaccine efficacy ($M = 4.2$, $Md = 4.3$, $Mo = 5$) with a skewness of -1.323 are all negatively skewed. This assumption is also confirmed by the location parameters, as the mean is smaller than the median and the median in turn is smaller than the mode, suggesting negative skewness (Bremer, 2003). The term skewness describes how much a distribution deviates from a symmetrical shape (Hussy, Schreier & Echterhoff, 2013). A skewed distribution is problematic because it is not possible to unambiguously interpret the mean (Schäfer, 2016). This no longer represents the center of a distribution because it is influenced by extreme values and is skewed in a certain direction.

Table 2. Descriptive Statistics for Key Measures

	Min - Max	*Mean*	*SD*	*Md*	*Mo*
Frame C.	0 - 1	0.50	0.50	0.00	0.00
P. V. Efficacy	1 - 5	4.16	0.96	4.33	5.00
Involvement	1 - 5	5.66	1.33	6.00	7.00
Intention	1 - 5	3.71	1.05	4.00	5.00

Regarding kurtosis, the distributions of involvement with a kurtosis of 3.418 and perceived vaccine efficacy with a kurtosis of 1.446 are too peaked, while the distribution of intention with a kurtosis of 0.524 is more evenly distributed. Considering the kurtosis, skewness and location parameters, it can be concluded that the subjects of this sample formulated high intention to COVID-19 vaccination, attributed high efficacy to the vaccine and are very involved in the topic of COVID-19 vaccine.

In the third step, the bar charts of several explanatory variables were analyzed, revealing initial tendency for the actual data analysis.

Figure 3. Intention by Frame Condition
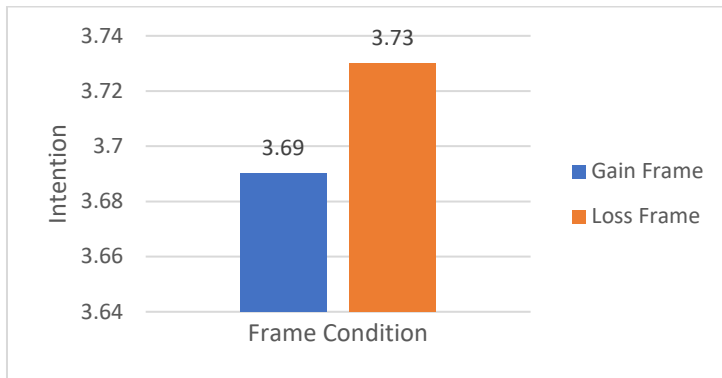
According to Figure 3, subjects with loss frames ($M = 3.73$, $SD = 1.06$) formulated a higher intention to receive COVID-19 vaccination than subjects with gain frames ($M = 3.69$, $SD = 1.04$). Since this is a bar chart, no definitive answer can be given yet. A further analysis will follow in the next chapter.

Figure 4. Intention by Country
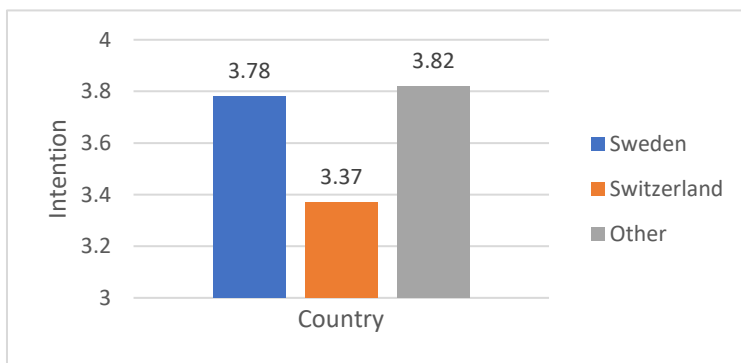
In addition, country integrates another new control variable that relates to the countries Switzerland and Sweden. It can be speculated that the different COVID-19 strategies of the countries as well as the different courses of the COVID-19 epidemic also have an impact on a possible COVID-19 vaccination. Regarding the countries, Figure 4 shows that people who live in Sweden ($M = 3.78$, $SD = 1.05$) formulated a higher intention for COVID-19 vaccination than people who live in Switzerland ($M = 3.37$, $SD = 1.09$), even though people who live outside these two countries ($M = 3.82$, $SD = 0.99$) formulated the highest intention. However, the differences turn out to be small.

Figure 5. Intention by Education
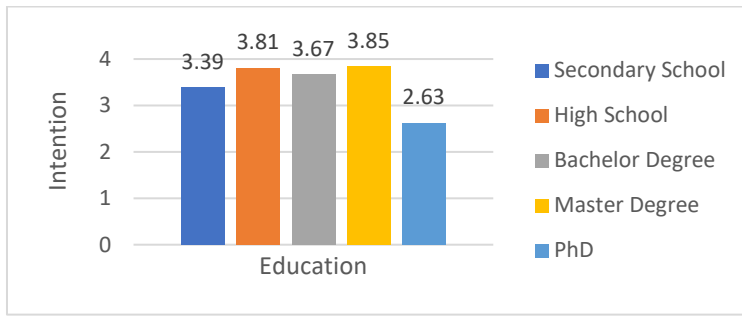
The study by Guidry et al. (2021) was already able to identify education as predictors of COVID-19 vaccination, which is why they will also be added as control variables. In terms of academic training, according to Figure 6, there are no large differences in intention to receive COVID-19 vaccination between secondary school ($M = 3.39$, $SD = 1.30$), high school ($M = 3.81$, $SD = 0.96$), bachelor's degree ($M = 3.67$, $SD = 1.06$), and master's degree ($M = 3.85$, $SD = 0.99$). Subjects with doctoral degrees ($M = 2.63$, $SD = 1.25$) formulated lower intentions to COVID-19 vaccination uptake, but this can be attributed to the small sample ($N = 8$), which allows extreme values to strongly influence the mean in one direction.

4.2 Effects of Demographic and Control Variables

To test the three hypotheses and to answer the research question how strategic practitioners can use Framing Theory to increase intention to get vaccinated in the general population, a hierarchical regression analysis was performed in four blocks. The first block contains the demographic variables age, sex, education, and country, as well as the behavioral control variables of belonging to the risk group, survived COVID-19 infection, and performed COVID-19 vaccination. The second block pulls in three health beliefs with perceived susceptibility, perceived severity, and perceived vaccine efficacy. The main predictors perceived vaccine efficacy, involvement, and frame condition are included in the third block. The fourth and last block includes the product terms frame condition x perceived vaccine efficacy and frame condition x involvement. A regression analysis provides information about the directional influence of an independent continuous variable on a dependent continuous variable. For a simpler and better overview, the results were recorded in the large regression Table 6.

Table 3. Predictors of Intentions Towards COVID-19 Vaccination

	Standardized Beta	p-value
Age	-0.053	0.590
Gender (female)	0.035	0.666
Country (Switzerland)	-0.170	0.044
Risk Group (No)	-0.045	0.641
COVID-19 Infection (No)	0.019	0.820
$\triangle R^2$	*0.031*	*0.460*
Perceived Susceptibility	0.031	0.677
Perceived Severity	0.280	0.006*
Perceived Vaccine Safety	-0.469	0.000*
$\triangle R^2$	*0.202*	*0.000**
Frame Condition (loss, FC)	0.068	0.283
Perceived Vaccine Efficacy (PVE)	0.200	0.015*
Involvement (I)	0.491	0.000*
$\triangle R^2$	*0.253*	*0.000**
Frame Condition x PVE	0.094	0.805
Frame Condition x I	-0.026	0.939
$\triangle R^2$	*0.033*	*0.968*
Total R^2	0.486	0.000*
Adjusted R^2	0.438	0.000*

According to the regression Table 6, the regression model can provide a significant explanatory contribution ($F(13,140) = 10.188$, $p = 0.000$) and explain a good proportion of the variance in the dependent variable intention with 43.8% (Adjusted $R^2 = 0.438$, $p = 0.000$). According to Cohen (1988), this is a strong effect ($f = 0.88$). The only significant variable in the first block is country ($\beta = -0.170$, $p = 0.044$). Accordingly, people from Sweden formulate a significantly higher intention for COVID-19 vaccination than people from Switzerland. All other socio-demographic and behavioral control variables in the first block all turned out to be non-significant. In other words, there are no significant differences in age ($\beta = -0.053$, p = 0.590), genders ($\beta = 0.035$, $p = 0.666$), risk group membership ($\beta = -0.045$, $p = 0.641$), or infection overcome ($\beta = 0.019$, $p = 0.820$) regarding intention towards COVID-19 vaccine uptake. For this reason, the first block of the regression model is not significant and explains only 3.1% of the variance in intention to receive the COVID-19 vaccine ($\triangle R^2 = 0.031$, $p = 0.820$).

In the second block, health beliefs were examined, of which perceived severity ($\beta = 0.280$, $p = 0.006$) and perceived vaccine safety ($\beta = -0.469$, $p = 0.000$) were significant, while perceived susceptibility ($\beta = 0.031$, $p = 0.677$) failed to provide a significant explanatory contribution. Based on the positive influence, it can be said that subjects formulated significantly higher intention to receive COVID-19 vaccine when they perceived COVID-19 virus as severe and COVID-19 vaccine as safe. Perceived vaccine safety showed a negative relationship ($\beta = -$

0.469, $p = 0.000$), but this can be attributed to measurement, as a low indication (1 - 5) represents high perceived vaccine safety. In terms of effect size, perceived vaccine safety exhibits a strong effect ($\beta = -0.469$), whereas perceived severity ($\beta = 0.280$) represents a medium effect. Because of the two significant predictors, the second block of the regression model improves significantly and can explain 20.2% of the variance in intention to receive COVID-19 vaccination ($\triangle R^2 = 0.202$, $p = 0.000$).

4.3 Effects of Frame Condition

Finally, in the third block, the main predictors were inserted, of which perceived vaccine efficacy ($\beta = 0.200$, $p = 0.015$) and involvement ($\beta = 0.491$, $p = 0.000$) exerted a significant influence on the intention to take COVID-19 vaccine. Based on the positive relationship, it can be said that subjects formulated higher intention to COVID-19 vaccine uptake when they considered the efficacy of COVID-19 vaccine to be high and they were very involved in the topic of COVID-19 vaccine. Of particular relevance to the first hypothesis (H1) that stated subjects will express more favorable intention toward COVID-19 vaccination after exposure to a loss-framed message than after exposure to a gain-framed message, however, is the fact that frame condition, as the main effect of this work, failed to provide a unique significant explanatory contribution and thus failed to exert a significant influence on intention to COVID-19 vaccine uptake ($\beta = 0.068$, $p = 0.283$). Although the analysis continues at this point, it is important to keep in mind that these are non-significant relationships that are not robust for definitive conclusions. Based on the positive relationship, it can be said that the more negative a frame, the higher the intention. If frame condition differs by one standard deviation, intention differs by 0.068 standard deviations. In terms of effect size, Involvement ($\beta = 0.491$) exerts a strong effect and the strongest influence of the three predictors, followed by Perceived vaccine efficacy ($\beta = 0.200$) and frame condition ($\beta = 0.068$), whose strength of influence is rather small. Adding the main predictors significantly improved the third block of the regression model and explained 25.3% of the variance in intention to COVID-19 vaccination uptake ($\triangle R^2 = 0.253$, $p = 0.000$).

4.4 Effects of Moderators

Finally, in the fourth and last block, the product terms frame condition x perceived vaccine efficacy and frame condition x involvement were added to the regression model, which are of relevance for the second hypothesis (H2) and third hypothesis (H3). By adding the product

terms, the moderating influence can be examined because it can be compared with the main effect (frame condition) and the moderators (perceived vaccine efficacy, involvement). If the product term is significant, it can be seen in this way whether the product term provides a significant unique explanatory contribution and whether the moderator exerts a moderating effect on the independent variable. While the second hypothesis (H2) stated that higher levels of perceived vaccine efficacy will strengthen the effect of framing on intention towards COVID-19 vaccination, the third hypothesis (H3) assumed that higher levels of involvement will strengthen the effect of framing on intention towards COVID-19 vaccination. It was seen that both the product term frame condition x perceived vaccine efficacy ($\beta = 0.094$, $p = 0.805$) and the product term frame condition x involvement ($\beta = -0.026$, $p = 0.939$) could not provide a unique significant explanatory contribution and accordingly did not exert a significant influence on the intention to receive COVID-19 vaccination. Accordingly, no significant moderating influence of perceived vaccine efficacy or involvement was found. Although the analysis continues at this point, it is important to keep in mind that these are non-significant relationships that are not robust for definitive conclusions. When the product term of frame condition and perceived vaccine efficacy differs by one standard deviation, the intention to COVID-19 vaccine uptake differs by 0.094 standard deviations. Furthermore, the intention to COVID-19 vaccination uptake differs by 0.026 standard deviations when the product term of frame condition and involvement differs by one standard deviation. In both cases, the product terms represent a weak effect ($\beta = 0.094$, $\beta = -0.026$). Adding the product term in the fourth block did not significantly improve the regression model, explaining only 3.3% of the variance in intention to COVID-19 vaccinate ($\triangle R^2 = 0.033$, $p = 0.968$).

5. Discussion

This chapter first interprets the results of the fourth chapter and what they mean for the hypotheses. Afterwards, the first chapter will be picked up and it will be discussed what the results mean in terms of the research question, the research aim, the knowledge contribution to strategic communication, and the observed problem, and what conclusions can be drawn from them. In addition, the limitations of the thesis are pointed out, which somewhat limit the explanatory power, and further research possibilities in this area are pointed out.

5.1 Interpretation

To answer the first hypothesis (H1), the third block of the hierarchical regression analysis was used. It was shown that the frame condition did not significantly influence the intention to receive COVID-19 vaccination ($\beta = 0.068$, $p = 0.283$). Although the bar chart could show that the mean of the loss frame group is greater than the mean of the gain frame group. According to this result, it could be said that people do formulate a higher intention after confrontation with a loss frame than after a gain frame. The regression coefficient of the regression analysis was also positive, representing a positive relationship. According to this result, one could say that the more negative a frame, the higher the intention. However, the mean values are very close to each other and the effect size is very weak, which is why the influence was not significant. This result is inconsistent with the theoretical derivation from other studies (Abhyankar, O'Connor & Lawton, 2008, Ferguson & Gallagher, 2007, Gerend & Shepherd, 2007) that loss frames should lead to higher intention due to higher risk perception of vaccination. The null hypothesis for hypothesis 1 cannot be rejected for the main effect and thus the hypothesis that people formulate a higher intention to get vaccinated against the COVID-19 virus after exposure to a loss frame than a gain frame cannot be confirmed. By inductive inference, we can also answer the overall research question and conclude that strategic practitioners cannot use gain and loss frames as constructs of framing theory to increase intention to get vaccinated in the general poulation. Although the results showed some tendency for people with loss frames to formulate a higher intention, the differences are too small to be significant for the research question.

Regarding the second hypothesis (H2), the fourth block of the hierarchical regression analysis was used. It became apparent that the product term frame condition x perceived vaccine efficacy (FC x PVE) could not provide a significant explanatory contribution ($\beta = 0.094$, $p = 0.805$) and thus did not exert a significant influence on the intention to receive COVID-19 vaccination. The hierarchical regression model also could not be significantly improved by adding the product term ($\triangle R^2 = 0.033$, $p = 0.968$). In other words, perceived vaccine efficacy could not significantly moderate the effect of frame condition on intention to COVID-19 vaccination uptake. This result contradicts the theoretical derivation, according to which loss frames should lead to a higher intention because of the higher risk perception due to the low perceived vaccine efficacy. It is also interesting to note that the moderator perceived vaccine efficacy has a significant effect on intention as a predictor in the third block of the hierarchical regression analysis ($\beta = 0.200$, $p = 0.015$) and can explain more variance in intention than frame condition ($\beta = 0.068$, $p = 0.283$) or their product term ($\beta = 0.094$, $p = 0.805$). The null hypothesis for hypothesis 2 cannot be rejected for the main effect, and thus the hypothesis that higher levels of perceived vaccine efficacy will strengthen the effect of framing on intention towards COVID-19 vaccination cannot be confirmed. By inductive inference, the overarching research question can also be addressed and concluded that strategic practitioners cannot use perceived vaccine efficacy as a moderator part of framing theory to increase intention to get vaccinated in the general population. Although the moderator perceived vaccine efficacy is significant as a predictor, the product term perceived vaccine efficacy x frame condition does not provide a significant explanatory contribution, which is why no moderation effect was detected.

As with the second hypothesis (H2), the fourth block of hierarchical regression analysis was examined for the third hypothesis (H3). Again, the product term frame condition x involvement (FC x I) failed to provide a significant explanatory contribution ($\beta = -0.026$, $p = 0.939$) and, accordingly, did not exert a significant influence on the intention to receive COVID-19 vaccination. The hierarchical regression model was also not significantly improved by the addition of the product term ($\triangle R^2 = 0.033$, $p = 0.968$). In other words, involvement could not significantly moderate the effect of frame condition on intention to receive COVID-19 vaccination. Moreover, it can also be concluded here that the moderator involvement as a predictor can better explain the dependent variable intention ($\beta = 0.491$, $p = 0.000$) than frame condition ($\beta = 0.068$, $p = 0.283$) or its product term ($\beta = -0.026$, $p = 0.939$). This result is not in line with the theoretical derivation from other studies (Donovan & Jalleh, 1999, De Graaf, Van den Putte & De Bruijn, 2015, Jung & Villegas, 2011, Maheswaran & Meyers-Levy, 1990) that loss frames lead to higher intention at high involvement than gain frames because people

process information centrally at high involvement, where negative information is weighted more. The null hypothesis for hypothesis 3 cannot be rejected for the main effect and thus the hypothesis that higher levels of involvement will strengthen the effect of framing on intention towards COVID-19 vaccination cannot be confirmed. By inductive inference, the overall research question can also be targeted and stated that strategic practitioners cannot use involvement as a moderator part of framing theory to increase intention to get vaccinated in the general poulation. Although the moderator involvement provides a significant explanatory contribution, the product term and thus the moderation effect failed to exert a significant influence on the intention to receive COVID-19 vaccination.

After the discussion of the hypotheses, the question now arises how the low explanatory power and the non-significance of all three hypotheses can be explained. As a first explanation, the fact that COVID-19 is particularly severe and difficult to compare with viruses from other framing studies, such as MMR, HPV, and H1N1, can be cited. Only the H1N1 pandemic can be compared to the COVID-19 pandemic, but it did not have the same global impact. The COVID-19 virus has dominated the headlines for more than a year and has had an immense impact on world politics, global economy, and emotional mood of citizens in addition to casualties. Everyone has been more or less personally affected by the pandemic, has read up on the virus intensively, and has formed an opinion on the subject. MMR or HPV are quite common terms, but comparatively they have not been discussed so much in the media, nor have they had a similar global impact as the COVID-19 virus. These viruses are less relevant to people, their knowledge is correspondingly less pronounced, and their attitudes are not as firmly established, which is why framing effects can have a weaker impact.

Second, the sample can be cited as being very positive toward the COVID-19 vaccine, as suggested by the negatively skewed distributions of intention, and perceived vaccine efficacy. The vast majority of subjects already showed great intention toward the COVID-19 vaccine and, accordingly, had already made a decision to vaccinate or not to vaccinate COVID-19 before completing the questionnaire. For example, during the pretest, when asked if they had already been vaccinated, one respondent wanted to select the missing answer option "No, but I want to be vaccinated." This subject had already formed his intention and his opinion was solidified, which is why the exposure to a framed could no longer have a large effect on him. However, for the three hypotheses, it was of particular importance to obtain a normal distribution by having a balanced mix of subjects accepting as well as rejecting the COVID-19

vaccine. The sample simply contained too few subjects who were critical of the vaccine, which could mitigate a framing effect and explain the non-significant results.

Third, the theoretical derivation can also be considered as a reason for non-significance. The effects of gain and loss frames depend on the uncertainty of the outcome and thus the risk perception of the targeted behavior. While gain frames are more effective for behaviors with certain outcomes and low risk perceptions, loss frames achieve higher effectiveness for behaviors with uncertain outcomes and higher risk perceptions (Harrington & Kerr, 2016). The open question remains as to which option should be considered riskier in the COVID-19 pandemic: refusing to inject a foreign substance into the body or failing to protect against a potentially lethal virus. People may judge this risk perception differently, thus defying the basic theoretical premise of gain and loss frames that vaccination is considered risky. However, such differences in individual risk perceptions represent nuances that may lose relevance in the face of heightened fear and uncertainty (Chen, Dai, Xia, & Zhou, 2021). For this reason, Ferguson and Gallagher (2007), for example, write regarding their framing study of flu vaccination, "One other concern is the extent to which the flu vaccination is perceived as risky enough to offer an adequate test of the proposed theories" (p. 678).

Fourth, the non-significant results of this work are consistent with the results of framing studies on the COVID-19 vaccine in China (Chen, Dai, Xia & Zhou, 2021), on the COVID-19 restrictions in the United Kingdom (Sanders, Stockdale, Hume & Johna, 2021), or on the re-implementation of the classic Asian disease problem with COVID-19 context in India (Sharma, Uttrani & Dutt, 2020). None of these studies found significant differences between gain and loss frames. In particular, the study by Chen et al. (2021) provides a good comparison because, like this paper, they examined the influence of gain and loss frames on intention to get vaccinated against the COVID-19 virus in the classic framing design and found no significance.

Daily exposure about COVID-19 in the news, social media, and in conversations may provide a fifth explanatory approach. This is because there is a high probability that subjects have already been exposed to multiple gain and loss frames about the COVID-19 vaccine. Reading the framed message in the online questionnaire would then have been only one of many received frames about the COVID-19 vaccine and not the very first received frame, which could have weakened the framing effect.

The sixth point to note is the design of the intervention. While other framing studies created print materials or a poster for their framing message, this study used only a simple text message.

The framing effect might have been stronger if this work had designed a more elaborate framing message.

The high speed of the vaccination campaign can be cited as the last explanation for the non-significance of the results. According to Bloomberg (2021), over 1.3 million vaccine doses are used per day in the United States. The initial skepticism about vaccine efficacy noted in several studies (Alley et al, 2021, Guidry et al, 2021, Ipsos, 2021) quickly changed due to the high speed of the vaccination campaign, as more and more people were vaccinated and it was no longer considered something special. This assumption also suggests the negatively skewed distribution of the perceived vaccine efficacy variable. This reduction in vaccination hesitancy due to the high speed of the vaccination campaign could have mitigated the framing effect, as vaccination is no longer considered something new or unsafe.

5.2 Implications

To go back to the overall research question: How can strategic practitioners use framing theory to increase intention to get vaccinated in the general poulation. From the research literature, it became apparent that strategic practitioners could use loss frames to increase intention to vaccinate, as loss frames are more effective than gain frames due to the higher risk perception of vaccination. Therefore, based on the research literature, three hypotheses were theoretically derived to address the main effect of loss frames and the moderating influences of perceived vaccine efficacy and involvement, which could answer the research question. The COVID-19 virus was chosen as a specific example to address this research question.The data analysis was able to detect differences in the main effect, but the differences were very small to reach significance. In summary, strategic practitioners may well use loss frames as part of framing theory to achieve higher intention to get vaccinated, but the differences from gain frames are minimal and not significant. Strategic practitioners do not have to consider the moderating influences of perceived vaccine efficacy and involvement when using gain and loss frames, as their moderating influence was not significant in the data analysis.

The thesis had the aim of showing strategic practitioners in governments, pharmaceutical and biotechnology companies how they can use framing theory to improve their communication or marketing campaign for the COVID-19 vaccine to generate higher immunization rates or sales. However, the non-signficance of the main effect calls into question whether strategic practitioners of these parties should use gain and loss frames in optimizing their communication campaign, as other gain and loss frame studies on the COVID-19 pandemic have also failed to

achieve significant results (Chen, Dai, Xia & Zhou, 2021, Sanders, Stockdale, Hume & Johna, 2021, Sharma, Uttrani & Dutt, 2020). There is a tendency for gain and loss frames to lose their effectivity in the case of COVID-19 virus. Accordingly, the thesis could not achieve the goal of presenting gain and loss frames to strategic practitioners as a good way to improve their communication campaign for the COVID-19 vaccine. However, framing theory does not lose relevance for strategic practitioners because of this. Other framing studies focusing on emphasis frames, that is, focusing on presenting different perspectives about a piece of information, rather than equivalence frames as in this work, were able to target significant results (Motta, Sylvester, Callaghan & Lunz-Trujillo, 2021, Banker & Park, 2020, Palm, Bolsen & Kingsland, 2021). For example, Banker and Park (2020) demonstrated that self-focused frames ("protect yourself") are significantly more effective than distant prosocial frames ("protect your community").

The non-significant results are regrettable regarding the problem and phenomenon of vaccination hesitancy. An improved communication campaign through significant more effective loss frames that would have convinced more people of COVID-19 vaccination and accelerated herd immunity would have contributed greatly to combating vaccination hesitancy. Such a significant result would have been particularly helpful to the research literature, which also has yet to determine a perfect strategy to combat vaccination hesitancy (Fokoun, 2018, Dube, Gagnon, MacDonald & SAGE, 2015). For example, the European Centre for Disease Prevention and Control recommended strategies ranging from individualized conversations with parents and health workers to informational brochures or interactive social media tools (ECDC, 2017). From the perspective of strategic communication, this means "despite the complexity of vaccine hesitancy and the broad range of its determinants, a carefully devised communication strategy should be an integral component of any immunization programme, addressing the specific factors that influence vaccine uptake in the targeted population" (Dube, Gagnon, MacDonald & SAGE, 2015, p. 4123). Fortunately, COVID-19 vaccination hesitancy is moving in the right direction. According to Ipsos (2021), the "Initial hesitancy among the public about getting vaccinated is rapidly transitioning to a growing demand for immediacy" (p. 1). Therefore, Ipsos (2021) suggests that the initial hesitancy to vaccinate had been a logical and honest reaction of reasonable and thoughtful people, as they could not make the right decision due to lack of information and lack of experience. In addition, the progressive spread of the vaccine and targeted information campaigns by governments have helped, even if certain developments such as the back-and-forth of the AstraZeneca vaccine represent setbacks.

The results of this paper, in conjunction with other framing studies (Chen, Dai, Xia & Zhou, 2021, Sanders, Stockdale, Hume & Johna, 2021, Sharma, Uttrani & Dutt, 2020), provide an important contribution to the field of strategic communication. This is because the framing studies showed a tendency for gain and loss frames to have no significant differences in the COVID-19 pandemic. This result is of particular importance for strategic communication because gain and loss frames are scientifically proven and established tools of strategic communication. The non-significant results mean a change for strategic communication because apparently certain tools of strategic communication do not work as desired in an extraordinary situation like the COVID-19 pandemic. The COVID-19 pandemic brings new conditions with increased fear, high involvement, daily developments, and conspiracy theories on social media to which strategic practitioners must respond. This work therefore provides an impetus for further research into situational factors in strategic communication and questions whether nuances in communication such as gain and loss frames can still have a significant impact in the face of situational factors such as the COVID-19 pandemic. This work also provides an important contribution to strategic communication as one of the first classic gain and loss framing studies focusing on the COVID-19 vaccine. It also represents one of the few framing studies that have conducted the data during an ongoing pandemic.

In a broader context, the research question focused on whether gain and loss frames as part of the framing theory are good predictors of the intention to get vaccinated against the COVID-19 virus. The results showed a tendency for gain and loss frames to be less good predictors, which raises the question of which predictors are good predictors of COVID-19 vaccination uptake. Other studies have demonstrated that education, having insurance, scoring high on subjective norms, a positive attitude towards the vaccine, high perceived susceptibility to COVID-19, high perceived benefits of the vaccine, scoring low on barriers to the vaccine, and scoring high on self-efficacy are significant predictors of COVID-19 vaccination uptake (Guidry et al., 2021). This work was also able to show that involvement and perceived vaccine efficacy can explain intention very well. However, the COVID-19 virus represented only the applied example of the research question. In a broader context, the research question sought to clarify whether frames can lead to higher intention to vaccinate in the general population. The research literature was able to demonstrate that frames can lead to higher intention to vaccinate for specific examples such as MMR, HPV, and H1N1. This work, using the COVID-19 virus as a concrete example, was unable to confirm this tendency. As addressed in the previous chapter, the question is how well the COVID-19 virus compares with these diseases.

5.3 Limitations

This paper is also subject to certain limitations in its explanatory power. The first point to note is the sample, which tended to be female, young, academically well-educated, and white. The use of convenience sampling may make the sample less representative and decrease ecological validity. Based on the demographic characteristics of the author and convenience sampling, there is an assumption that the sample consisted primarily of students. However, such a composition of the sample could introduce some bias. For example, a study at USC was able to demonstrate that people with higher academic education were more likely to be vaccinated against the COVID-19 vaccine and also more likely to believe in its efficacy and safety (USC, 2021). A study in the United Kingdom showed that younger people are less willing than older people to be vaccinated against the COVID-19 virus (Robertson et al., 2021). In contrast, another study was able to discover gender differences in vaccination intention, as men formulated a higher intention than women (Green, Abdullah, Vered & Nitzan, 2021). Even differences in race exist, as demonstrated by the great skepticism of the African American population due to the systematic disadvantage in the health care system (CNN, 2021). These studies were intended to illustrate examples of how demographic characteristics can skew intention toward the COVID-19 vaccine. The sample was unable to represent a normal distribution of the base population, which would have been desirable for the research question. A normal distribution involving more people of older age, lower academic education, or different race might have yielded different results. The sample also introduced the bias that it invariably formulated positive attitudes, high perceived vaccine safety and efficacy, and high intention toward the COVID-19 vaccine. More critical subjects could have prevented this bias. At this point, however, it must also be mentioned that the control variables and demographic variables of age, gender, country, COVID-19 infection, and risk group membership were not significant in the hierarchical regression analysis.

The second limitation is the dependent variable intention. Although intention is a good predictor of behavior, it is not a perfect predictor of actual behavior (Nan, Xie & Madden, 2012). The measurement of behavioral intention instead of actual vacination behavior can be a potential shortcoming (Conner & Norman, 2005, Sheeran & Orbell, 1998, Sniehotta, Scholz & Schwarzer, 2005). For example, one study demonstrated that subjects who formulated the intention to become more physically active often fail to implement it (Sniehotta, Scholz & Schwarzer, 2005). The study calls this an intention-behavior gap and therefore suggests the volitional constructs execution planning, coping planning, and action control to overcome this

gap. Other predictors such as attitude, subjective norm, or perceived behavioral control could also be used for actual behavior. In addition, intention was queried immediately after exposure to the framed message. Nan, Xie, and Madden (2012) wrote: "The extent to which short-term message effects can translate into long-term impact is not clear" (p. 567) becaus the long-term effects of message framing on the intention to get vaccinated have not been ascertained (Nan, 2012). In addition, the vaccine uptake may happen without intention or knowledge, as people may, for example, get vaccinated based on their doctor's recommendation. In such circumstances, intention would not be the optimal outcome variable. Bonfadelli and Friemel (2015) also raised the question to what extent frames contribute to the understanding of behavior and whether they even go beyond the concept of attitude. Matthes (2007) also mentioned the realism of experiments or the short-term nature of measured effects as problems of the framing approach. For this reason, the results of this work are limited because they are only relevant insofar as the outcome measure is the intention to receive COVID-19 vaccination rather than actual vaccine uptake (Nan, 2012).

The lack of measurement of covariates or mediators can be mentioned as a third limitation. First, potential covariates such as media consumption, prior knowledge about COVID-19 vaccine development, general knowledge about COVID-19 were not measured, but all could have influenced the results. However, such measurements could have provided interesting insights into the results. Second, mediators responsible for observed outcomes were not examined, although message framing often leads to different outcomes (Rothman et al., 1999, 2003). Identifying such mediators would greatly enhance understanding of how communication motivates behavior. Measurement of covariates and mediators was omitted in favor of a shorter and simpler questionnaire.

In the literature review of this paper, it became apparent that vaccination is a special case in framing research because it is considered risky despite being a prevention behavior. For this reason, the unique prevention health behavior of vaccination represents another limitation; the results cannot be compared to framing studies in a different health context. For example, it is questionable whether similar patterns would emerge for prevention behaviors such as mammography.

Another limitation of this thesis is due to the framing theory's own limitations. The biggest problem is the vague and broad definition of framing (Scheufele & Iyengar, 2014, Bonfadelli & Friemel, 2015). On the one hand, framing research owes its boom and popularity to its conceptual openness, as it can be applied as an interdisciplinary research or bridge concept in

communication and political science as well as psychology. On the other hand, framing became "arguably a victim of its own success" (Entman, Matthes & Pellicano, 2009, p. 175). Scheufele and Iyengar (2014) write that framing "has been characterized by significant levels of conceptual obliqueness and sometimes even fallacious reasoning" (p. 3). On the one hand, frames are understood as deep structures underlying texts that are formulated to analyze media texts (Bonfadelli, 2002, Leonarz, 2006, Scheufele, 1999). On the other hand, frames can be considered as individual patterns of interpretation that serve to construct meaning. The heterogeneous understanding of the term entails several problems. First, the vague definition of framing complicates the theoretical integration of different works and thus significantly limits the integrative potential of the research field (Matthes, 2014). Second, the ambiguous use of the term frame makes empirical verification difficult (Bonfadelli & Friemel, 2015). Third, it often remains unclear which empirical criteria must be met to be considered a frame. Fourth, frames are understood as micro phenomena instead of macro or meso-level phenomena (Scheufele & Iyengar, 2014). Fifth, framing effects are treated as underlying mechanisms instead of complex, indirect, and non-uniform mechanisms (Tewksbury & Scheufele, 2009).

5.4 Further Research

Optimal conditions and facilitators are one of the biggest areas for further research because Framing "in and of itself is not a magic bullet" (Rothman et al., 2006, p. 216). The use of frames would not always produce the desired health behaviors because the effectiveness of a frame message is shaped by numerous other influences. This circumstance has also clarified this work. On one hand, to explore the optimal conditions for framing effects, the next generation of framing research should revise the original assumptions of Rothman and Salovey (1997) (Rothman et al., 1999, 2003, Latimer, Salovey & Rothman, 2007). This goes beyond the mere distinction between prevention and detection behaviors and considers individual's construal of a behavior and individual's dispositional sensitivity to favorable or unfavorable outcomes (Rothman, Bartels, Wlaschin & Salovey, 2006). This study has contributed to this further research possibility because it prompts the idea of the extent to which the COVID-19 pandemic represents optimal conditions for framing effects. Gain and loss frames are based on individual risk perceptions of the targeted behavior. For this reason, Chen, Dai, Xia, and Zhou (2021) already posed the question, "whether such nuance in message framing still holds up during heightened fear and uncertainty should be further explored in future research" (p. 6).

On the other hand, the moderators of framing effects should be further explored because a great deal of empirical literature could demonstrate the relative effectiveness of frames, but the empirical differences turned out to be rather small (Nan, Xie & Madden, 2012). For this reason, the framing approach needs further research to identify potential moderators between framing and message effectiveness, interaction between moderators, and underlying psychological mechanisms (Rothman et al., 2006, Nan, Xie & Madden, 2012). This work could also provide an input to this further research possibility by including involvement and perceived vaccine efficacy as moderators. Other constructs, such as perceived vaccine safety or perceived severity of the virus, may also exert significant moderation effects on frames, but were not examined in the context of this work.

Another possibility for further research mentioned by Scheufele and Iyengar (2014) is the overly strong focus on emphasis frames, i.e., the presentation of different perspectives of a piece of information. This work as well as the study by Chen et al. (2021) therefore focused on equivalence frames, i.e., the presentation of the same piece of information in different ways. However, both studies could not show a significant influence of equivalence frames, whereas studies with emphasis frames could find a significant influence on the vaccination (Motta, Sylvester, Callaghan & Lunz-Trujillo, 2021, Banker & Park, 2020, Palm, Bolsen & Kingsland, 2021). The question arises as to why equivalence frames lose their significance in the COVID-19 pandemic and not emphasis frames. There is an opportunity for further research here, as a study with equivalence frames would confirm the non-significant trend, while a study with emphasis frames could confirm the previous significant studies and make recommendations to improve the communication campaign.

In addition, the limitations of this study provide the opportunity for further research, as the same study can be repeated with the limitations resolved. For example, the framing message can be extended to printed documents, videos, or posters instead of a simple text message. Research already calls for further research on the interaction of print media, TV, and the Internet (Shah, MCLeo, Gotlieb & Nam-Jim, 2009). In addition, a different sampling strategy should ensure a normal distribution, as both this paper and the Chen et al. (2021) study relied on convenience sampling and included too few subjects in the sample who have low academic education and low income. Quota sampling, for example, suggests itself because "we sometimes specify in advance what proportion of those groups we want to have in our sample and sample until that quota is met" (Mujis, 2004, p. 39). Quota sampling could be used to meet certain quotas of people with low academic education and low income. Furthermore, covariates such as

knowledge about the COVID-19 virus or media consumption or moderators such as perceived vaccine safety with repeated administration could be involved and tested.

As addressed in the limitations, intention is a good but not perfect predictor of vaccination uptake. It remains unclear in many framing studies whether significantly higher intention led to vaccination uptake (Abhanyankar, O'Connor & Lawton, 2008, Gerend & Shepherd, 2007). For this reason, another further research possibility could be to conduct a framing study that analyzes the framing effect on intention in the short term and investigates whether the higher intention triggered by the framing effect also results in actual vaccination uptake in the long term. In this way, a framing study could use an objective measure of behavior and reveal the extent to which the short-term framing effect and long-term behavior are related.

Other studies have demonstrated significant predictors of COVID-19 vaccination uptake such as education, having insurance, scoring high on subjective norms and a positive attitude toward the vaccine (Guidry et al., 2021). Many of these predictors have already been used as moderators (e.g., self-efficacy) or control variables (e.g., perceived susceptibility) in other framing studies. However, other significant predictors, such as education or having insurance, have not been considered as strongly in many other framing studies, but are significant predictors in the case of COVID-19 vaccination uptake. Therefore, another research opportunity could investigate how new significant predictors of COVID-19 vaccination uptake relate to gain and loss frames.

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7. Appendix

Appendix 1 – Questionnaire

soSci
oFb - der onlineFragebogen

Welcome!

We are very pleased about your interest in this survey. As part of a master's thesis at Lund University, we want to investigate attitudes about COVID-19 vaccination.

The survey will take no longer than 6 to 7 minutes to complete. Participation in the study is voluntary and completely anonymous. Your data will be kept strictly confidential. You have the possibility to withdraw from the survey at any time without any negative consequences. However, we would of course be very pleased if you would continue the survey to the end without interruption.

Please click "Continue" if you would like to participate in this study.

`Next`

Background questions

First, we would like to know some information about you.

1. What country are you from?
Choose one of the options below.

○ Sweden
○ Switzerland
○ Other

2. What year were you born in?
Please fill in the year (XXXX) you were born in the empty box.

I was born in [   ]

3. What is your gender?
Choose one of the options below.

- ○ Male
- ○ Female
- ○ Other

4. What is your highest level of education you have completed?
Choose one of the options below.

- ○ Secondary school
- ○ High School
- ○ Bachelor Degree
- ○ Master Degree
- ○ PhD

Please read this text carefully before turning to the next page.

European Centre for Disease Prevention & Control about COVID-19

The novel COVID-19 virus is a new strain of coronavirus that has not been previously identified in humans. SARS-CoV2 is mainly transmitted via respiratory droplets and aerosols from an infected person when they sneeze, cough, speak or breathe and are in close proximity to other people. The infectious period may begin around two days before symptoms appear, but people are most infectious during the symptomatic period, even if symptoms are mild and non-specific.

Symptoms of COVID-19 vary in severity from none at all (asymptomatic) to having fever, cough, sore throat, general weakness, fatigue and muscular pain. The most severe cases can develop pneumonia, acute respiratory distress syndrome and other complications, all potentially leading to death.

COVID-19 vaccines aim to prevent COVID-19 disease by triggering an immune response.There is currently a limited number of doses available to the immunisation programmes in each country and therefore prioritisation among target groups has been necessary. Uptake in different target groups will be monitored carefully as well as vaccine safety and effectiveness when used in real world settings as compared to clinical trial settings.

COVID-19 questions

Now we would like to ask you some general questions about the COVID-19 virus.

5. Have you tested positive for the COVID-19 virus?
Choose one of the options below.

- ○ Yes
- ○ No
- ○ No, but I showed very clear symptoms
- ○ I don't want to say

6. Do you feel like you belong in the risk group?
Since a high-risk patient may have one or more risk factors, this question is about your own evaluation of being a high-risk patient.

- ○ Yes
- ○ No
- ○ I don't want to say

7. What do you think about the COVID-19 vaccine?

Please indicate whether you agree or disagree with the following statements. Each question has individual endpoints, which are indicated in the brackets of the respective question. You can use the values in between to grade your indication.

	1	7
To me, the COVID-19 vaccine is... (1 = Unimportant, 7 = Important)	○ ○ ○ ○ ○ ○ ○	
To me, the COVID-19 vaccine is... (1 = Boring, 7 = Interesting)	○ ○ ○ ○ ○ ○ ○	
To me, the COVID-19 vaccine is... (1 = Irrelevant, 7 = Relevant)	○ ○ ○ ○ ○ ○ ○	
To me, the COVID-19 vaccine is... (1 = Unexciting, 7 = Exciting)	○ ○ ○ ○ ○ ○ ○	
To me, the COVID-19 vaccine is... (1 = Means nothing, 7 = Means a lot)	○ ○ ○ ○ ○ ○ ○	
To me, the COVID-19 vaccine is... (1 = Unappealing, 7 = Appealing)	○ ○ ○ ○ ○ ○ ○	
To me, the COVID-19 vaccine is... (1 = Mundane, 7 = Fascinating)	○ ○ ○ ○ ○ ○ ○	
To me, the COVID-19 vaccine is... (1 = Worthless, 7 = Valuable)	○ ○ ○ ○ ○ ○ ○	
To me, the COVID-19 vaccine is... (1 = Uninvolving, 7 = Involving)	○ ○ ○ ○ ○ ○ ○	
To me, the COVID-19 vaccine is... (1 = Unnecessary, 7 = Necessary)	○ ○ ○ ○ ○ ○ ○	

Specific COVID-19 questions

After the general questions, we would like to know more information about your thoughts regarding the COVID-19 virus.

8. What do you think about the possibility of catching the COVID-19 virus?

If you have already caught the COVID-19 virus, consider the chance of catching the COVID-19 virus or a mutation of it again.

	strongly disagree				strongly agree
It is likely that I will catch COVID-19	○	○	○	○	○
I am at risk for catching COVID-19	○	○	○	○	○
It is possible that I will get COVID-19	○	○	○	○	○

9. What do you think the COVID-19 virus can do to you?

Please think about what the COVID-19 virus could do SPECIFICALLY to you and NOT to society in general.

	strongly disagree				strongly agree
I believe that the COVID-19 virus will result in severe health problems for me	○	○	○	○	○
I believe that the COVID-19 virus has serious negative consequences for me	○	○	○	○	○
I believe that the COVID-19 virus is extremely harmful for me	○	○	○	○	○

10. What do you think about the consequences of the COVID-19 vaccine?

Please indicate whether you "agree strongly" or "disagree strongly" with the following statements. You can use the values in between to grade your indication.

	strongly disagree				strongly agree
I worry about the short term side effects of the COVID-19 vaccine	○	○	○	○	○
I worry that the COVID-19 vaccine might negatively affect my body	○	○	○	○	○
I worry that the COVID-19 vaccine might have unknown long term side effects	○	○	○	○	○

11. What do you think about the impact of the COVID-19 vaccine?

Please indicate whether you "agree strongly" or "disagree strongly" with the following statements. You can use the values in between to grade your indication.

	strongly disagree				strongly agree
I believe the COVID-19 vaccine is effective in preventing the spread of COVID-19	○	○	○	○	○
I believe if I get the COVID-19 vaccine, I will be less likely to get the COVID-19 virus	○	○	○	○	○
I believe the COVID-19 vaccine works in preventing the COVID-19 virus	○	○	○	○	○

12. How would people who are important to you react if you received the COVID-19 vaccine?

Please indicate whether you "agree strongly" or "disagree strongly" with the following statements. You can use the values in between to grade your indication.

	strongly disagree						strongly agree
Most people who are important to me want me to vaccinate myself against the COVID-19 virus in the forthcoming months	○	○	○	○	○	○	○
Most people who are important to me do not think I should vaccinate myself against the COVID-19 virus in the forthcoming months	○	○	○	○	○	○	○
Most people who are important to me will vaccinate themselves against the COVID-19 virus	○	○	○	○	○	○	○

Gain Frame:

This is a message from your government. Several questions will be asked later in the survey based on this message. Therefore, you should take plenty of time to carefully read the text several times and give it your full consideration before turning to the next page.

Why you should get the COVID-19 vaccine

By vaccinating yourself, you will be able to protect other people against the potentially deadly COVID-19 virus and may decrease your chance of contracting it. You will take advantage of a safe and lifelong immunization, which make you feel less anxious and safer. Moreover, you will contribute to a faster herd immunity in your country, which will result in a faster loosening of the COVID-19 restrictions.

Loss Frame:

This is a message from your government. Several questions will be asked later in the survey based on this message. Therefore, you should take plenty of time to carefully read the text several times and give it your full consideration before turning to the next page.

Why you should get the COVID-19 vaccine

By not vaccinating yourself, you will fail to be able to protect other people against the potentially deadly COVID-19 virus and won't decrease your chance of contracting it. You will fail to take advantage of a safe and lifelong immunization, which make you feel more anxious and less safe. Moreover, you will contribute to a slower herd immunity in your country, which will result in a slower loosening of the COVID-19 restrictions.

Attitude questions

After carefully reading the message, we would like you to answer some questions about how you feel right now based on the message you've just read.

13. After reading your government's message, how would you rate the COVID-19 vaccine?

Each question has individual endpoints, which are indicated in the brackets of the respective question. Please consider the message you've just read while answering the questions.

	1 7
For me, receiving the COVID-19 vaccine in the forthcoming months is... (1 = Sad / 7 = Happy)	○ ○ ○ ○ ○ ○ ●
For me, receiving the COVID-19 vaccine in the forthcoming months is... (1 = Unsatisfying / 7 = Satisfying)	○ ○ ○ ○ ○ ○ ○
For me, receiving the COVID-19 vaccine in the forthcoming months is... (1 = Unenjoyable / 7 = Enjoyable)	○ ○ ○ ○ ○ ○ ○
For me, receiving the COVID-19 vaccine in the forthcoming months is... (1 = Unpleasant / 7 = Pleasant)	○ ○ ○ ○ ○ ○ ○
For me, receiving the COVID-19 vaccine in the forthcoming months is... (1 = Of no use / 7 = Useful)	○ ○ ○ ○ ○ ○ ○
For me, receiving the COVID-19 vaccine in the forthcoming months is... (1 = Unimportant / 7 = Important)	○ ○ ○ ○ ○ ○ ○
For me, receiving the COVID-19 vaccine in the forthcoming months is... (1 = Not worthwhile / 7 = Worthwhile)	○ ○ ○ ○ ○ ○ ○
For me, receiving the COVID-19 vaccine in the forthcoming months is... (1 = Worthless / 7 = Valuable)	○ ○ ○ ○ ○ ○ ○

14. After reading your government's message, what do you think about the barriers of receiving the COVID-19 vaccine?

Each question has individual endpoints, which are indicated in the brackets of the respective question. Please consider the message you've just read while answering the questions.

	1 7
For me, to receive a COVID-19 vaccine in the forthcoming months would be... (1 = impossible, 7 = possible)	○ ○ ○ ○ ○ ○ ○
If I wanted to, I could receive a COVID-19 vaccine in the forthcoming months (1 = Definitely false, 7 = Definitely true)	○ ○ ○ ○ ○ ○ ○
How much control do you believe you have over receiving a COVID-19 vaccine in the forthcoming months? (1 = No control, 7 = Complete Control)	○ ○ ○ ○ ○ ○ ○
It is mostly up to me whether or not I receive a COVID-19 vaccine in the forthcoming months (1= Strongly disagree, 7 = strongly agree)	○ ○ ○ ○ ○ ○ ○

15. After reading your government's message, how do you feel about receiving the COVID-19 vaccine?

For this question, imagine the theoretical situation that you get the opportunity to receive the COVID-19 vaccine. Please consider the message you've just read while answering the questions.

	strongly disagree						strongly agree
I plan to receive a COVID-19 vaccine in the forthcoming months	○	○	○	○	○	○	○
I intend to receive a COVID-19 vaccine in the forthcoming months	○	○	○	○	○	○	○
I expect to receive a COVID-19 vaccine in the forthcoming months	○	○	○	○	○	○	○
I am likely to receive a COVID-19 vaccine in the forthcoming months	○	○	○	○	○	○	○

	Extremely unlikely				Extremely likely
How likely are you to get the COVID-19 vaccine sometime soon for the 2021 season?	○	○	○	○	○
If you were faced with the decision of whether to get the COVID-19 vaccine today, how likely is it that you would choose to get the vaccine for the 2021 season?	○	○	○	○	○
How likely are you to get the COVID-19 vaccine in the future for the 2021 season?	○	○	○	○	○

16. Have you been vaccinated against the COVID-19 virus?

Choose one of the options below.

○ Yes
○ No
○ No, but I know for sure I'll get vaccinated soon
○ I don't want to say

17. After reading your government's message, how would you rate your personality?

Please indicate whether you "agree strongly" or "disagree strongly" with the following statements. Please consider the message you've just read while answering the questions.

	Strongly Disagree						Strongly Agree
I do not feel comfortable taking chances	○	○	○	○	○	○	○
I prefer situations that have foreseeable outcomes	○	○	○	○	○	○	○
Before I make a decision, I like to be absolutely sure how things will turn out	○	○	○	○	○	○	○
I avoid situations that have uncertain outcomes	○	○	○	○	○	○	○
I feel comfortable improvising in new situations	○	○	○	○	○	○	○
I feel nervous when I have to make decisions in uncertain situations	○	○	○	○	○	○	○

	Strongly disagree				Strongly agree
Taking risks makes life more fun	○	○	○	○	○
My friends would say that I'm a risk taker	○	○	○	○	○
I enjoy taking risks in most aspects of my life	○	○	○	○	○
I would take a risk even if it meant I might get hurt	○	○	○	○	○
Taking risks is an important part of my life	○	○	○	○	○
I commonly make risky decisions	○	○	○	○	○
I am a believer of taking chances	○	○	○	○	○
I am attracted, rather than scared, by risk	○	○	○	○	○

Some last questions

Finally, we would like to know how you rate this study and your survey behavior.

	Not interrupted				Interrupted for a long time
During this survey, I was...	○	○	○	○	○

	Not focused				Focused
I was ... at filling out the questions	○	○	○	○	○

18. If you have any comments about the study, you can leave them in the comments box below.

After you have added your comment, please click "continue" to complete the study participation.

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┌─────────────────────────────────────────────────────────────────────────┐
│                                                                           │
│                                                                           │
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│                                                                           │
│                                                                           │
└─────────────────────────────────────────────────────────────────────────┘
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19. Contact us

If you are interested in the results of the study, you have the possibility to leave your e-mail address and we will contact you. You will then receive a summary by mail.

○ Yes, I am interested in the results of the study and would like to receive a summary at the following email address:
[   ]

○ No, thank you

Thank you for completing this questionnaire!

We would like to thank you very much for helping us.

You have now reached the end of the study and have answered all the questions. You have helped us a lot! We are conducting a study on the effectiveness of gain/loss frames on the intention and attitude towards the COVID-19 vaccine. If you have any further questions, please feel free to contact us at the following e-mail address: jo4507ba-s@student.lu.se

Appendix 2 – SPSS Output

Reliability Involvement.

Reliabilitätsstatistiken

Cronbachs Alpha	Anzahl der Items
,948	10

Item-Skala-Statistiken

	Skalenmittelwert, wenn Item weggelassen	Skalenvarianz, wenn Item weggelassen	Korrigierte Item-Skala-Korrelation	Cronbachs Alpha, wenn Item weggelassen
Involvement: To me, the COVID-19 vaccine is... (1 = Unimportant, 7 = Important)	50,34	145,005	,854	,940
Involvement: To me, the COVID-19 vaccine is... (1 = Boring, 7 = Interesting)	51,06	145,476	,732	,945
Involvement: To me, the COVID-19 vaccine is... (1 = Irrelevant, 7 = Relevant)	50,40	143,789	,839	,940
Involvement: To me, the COVID-19 vaccine is... (1 = Unexciting, 7 = Exciting)	51,48	144,353	,690	,947
Involvement: To me, the COVID-19 vaccine is... (1 = Means nothing, 7 = Means a lot)	50,72	140,819	,849	,939
Involvement: To me, the COVID-19 vaccine is... (1 = Unappealing, 7 = Appealing)	51,16	140,455	,784	,943
Involvement: To me, the COVID-19 vaccine is... (1 = Mundane, 7 = Fascinating)	51,60	146,569	,675	,947
Involvement: To me, the COVID-19 vaccine is... (1 = Worthless, 7 = Valuable)	50,43	144,383	,851	,940
Involvement: To me, the COVID-19 vaccine is... (1 = Uninvolving, 7 = Involving)	51,47	144,894	,736	,944
Involvement: To me, the COVID-19 vaccine is... (1 = Unnecessary, 7 = Necessary)	50,37	143,576	,845	,940

Reliability Perceived Vaccine Efficacy.

Reliabilitätsstatistiken

Cronbachs Alpha	Anzahl der Items
,902	3

Item-Skala-Statistiken

	Skalenmittelwert, wenn Item weggelassen	Skalenvarianz, wenn Item weggelassen	Korrigierte Item-Skala-Korrelation	Cronbachs Alpha, wenn Item weggelassen
Perceived Vaccine Efficacy: I believe the COVID-19 vaccine is effective in preventing the spread of COVID-19	8,26	4,133	,806	,862
Perceived Vaccine Efficacy: I believe if I get the COVID-19 vaccine, I will be less likely to get the COVID-19 virus	8,35	3,659	,797	,871
Perceived Vaccine Efficacy: I believe the COVID-19 vaccine works in preventing the COVID-19 virus	8,34	3,882	,820	,847

Reliability Intention.

Reliabilitätsstatistiken

Cronbachs Alpha	Anzahl der Items
,777	3

Item-Skala-Statistiken

	Skalenmittelwert, wenn Item weggelassen	Skalenvarianz, wenn Item weggelassen	Korrigierte Item-Skala-Korrelation	Cronbachs Alpha, wenn Item weggelassen
Intention (Nan, 2012): How likely are you to get the COVID-19 vaccine sometime soon for the 2021 season?	7,95	5,024	,553	,767
Intention (Nan, 2012): If you were faced with the decision of whether to get the COVID-19 vaccine today, how likely i...	7,02	4,842	,602	,712
Intention (Nan, 2012): How likely are you to get the COVID-19 vaccine in the future for the 2021 season?	7,29	4,763	,692	,616

Item difficulty[3].

	Item difficulty									
P. V. Efficacy	.8	.78	.79							
Intention	.55	.78	.71							
Involvement	.87	.75	.86	.68	.81	.73	.66	.855	.68	.87

Factor Analysis Involvement.

Rotierte Komponentenmatrix[a]

|	Komponente	
	1	2
Involvement: To me, the COVID-19 vaccine is... (1 = Unimportant, 7 = Important)	,886	,334
Involvement: To me, the COVID-19 vaccine is... (1 = Unnecessary, 7 = Necessary)	,885	,324
Involvement: To me, the COVID-19 vaccine is... (1 = Irrelevant, 7 = Relevant)	,877	,325
Involvement: To me, the COVID-19 vaccine is... (1 = Worthless, 7 = Valuable)	,875	,343
Involvement: To me, the COVID-19 vaccine is... (1 = Means nothing, 7 = Means a lot)	,802	,424
Involvement: To me, the COVID-19 vaccine is... (1 = Unappealing, 7 = Appealing)	,653	,509
Involvement: To me, the COVID-19 vaccine is... (1 = Mundane, 7 = Fascinating)		,847
Involvement: To me, the COVID-19 vaccine is... (1 = Uninvolving, 7 = Involving)	,369	,778
Involvement: To me, the COVID-19 vaccine is... (1 = Boring, 7 = Interesting)	,380	,761
Involvement: To me, the COVID-19 vaccine is... (1 = Unexciting, 7 = Exciting)	,333	,756

Extraktionsmethode: Hauptkomponentenanalyse.
Rotationsmethode: Varimax mit Kaiser-Normalisierung.[a]

a. Die Rotation ist in 3 Iterationen konvergiert.

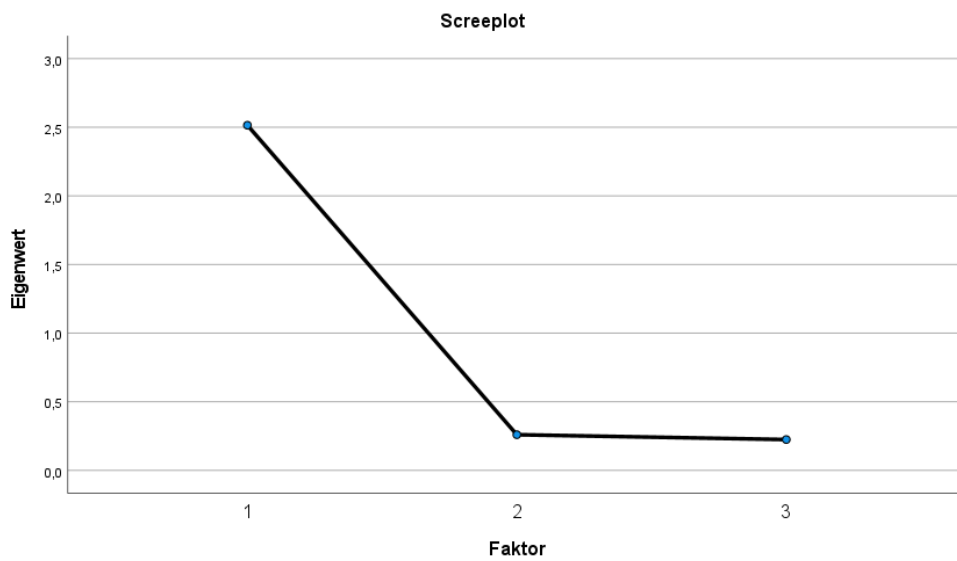[3] See footnote 1. Formula according to Kelava and Moosbrugger (2008): $(\bar{X}_i - X_{min}) / (X_{max} - X_{min})$

Factor Analysis Intention.
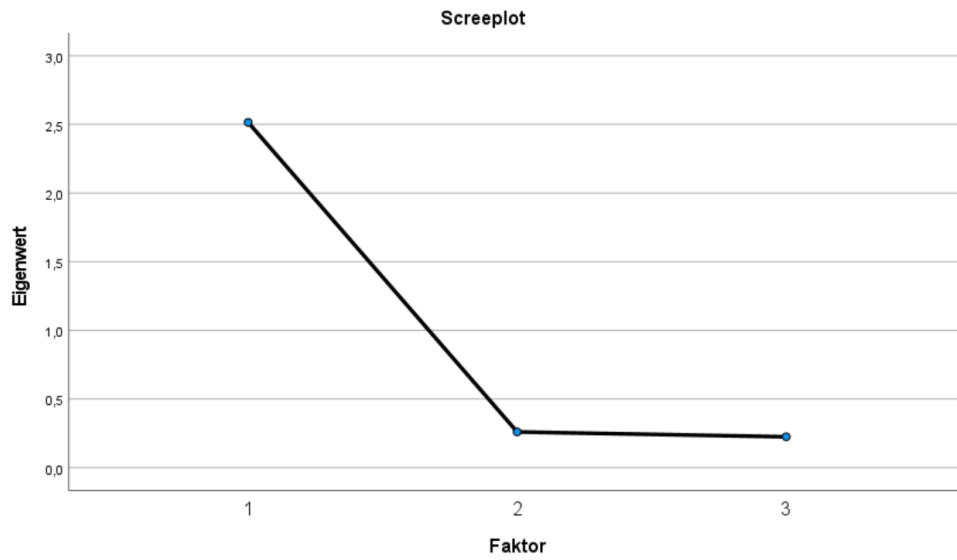
Only one factor could be extracted.

Factor Analysis Perceived Vaccine Efficacy.

Only one factor could be extracted.

Factor Analysis

Descriptive Statistics.

Variables: Gender, Age, Country, Education, COVID-19 Infection, Risk Group, COVID-19 Vaccine, Survey Distraction, Survey Concentration

Statistiken

		Gender	Age	Country	Education	COVID-19 Infection	Risk Group	COVID-19 vaccine	Survey distraction: During this survey, I was...	Survey concentration: I was ... at filling out the questions
N	Gültig	293	292	293	293	293	293	293	292	292
	Fehlend	0	1	0	0	0	0	0	1	1
Mittelwert		1,63	29,9075	2,03	2,93	1,94	1,88	2,01	1,49	4,24
Median		2,00	26,0000	2,00	3,00	2,00	2,00	2,00	1,00	5,00
Modus		2	25,00	3	3	2	2	2	1	5
Schiefe		-,044	2,104	-,053	,016	,214	-1,668	,559	2,062	-1,404
Standardfehler der Schiefe		,142	,143	,142	,142	,142	,142	,142	,143	,143
Kurtosis		-1,010	4,043	-1,732	-,417	2,561	3,226	4,908	3,580	1,776
Standardfehler der Kurtosis		,284	,284	,284	,284	,284	,284	,284	,284	,284
Minimum		1	19,00	1	1	1	1	1	1	1
Maximum		3	76,00	3	5	4	3	4	5	5

Descriptive Statistics.

Variables: Intention, Involvement, Perceived Vaccine Efficacy

Statistiken

		Index_Safety	Index_SubNorm	Index_Attitude	Index_Involvement	Index_Intention_Nan	Index_PerEfficacy
N	Gültig	293	293	293	293	293	293
	Fehlend	0	0	0	0	0	0
Mittelwert		2,7190	4,7213	5,5717	5,6560	3,7099	4,1581
Median		2,6667	4,6667	6,0000	6,0000	4,0000	4,3333
Modus		1,00	5,00	7,00	7,00	5,00	5,00
Std.-Abweichung		1,23292	,96754	1,49051	1,32918	1,04741	,96299
Schiefe		,314	-,333	-1,361	-1,747	-,923	-1,323
Standardfehler der Schiefe		,142	,142	,142	,142	,142	,142
Kurtosis		-1,001	2,740	1,377	3,418	,524	1,446
Standardfehler der Kurtosis		,284	,284	,284	,284	,284	,284

Tests for normal distribution.

Variables: Intention, Perceived Vaccine Efficacy, Involvement

Tests auf Normalverteilung

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistik	df	Signifikanz	Statistik	df	Signifikanz
Index_Intention_Nan	,135	293	,000	,906	293	,000

a. Signifikanzkorrektur nach Lilliefors

Tests auf Normalverteilung

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistik	df	Signifikanz	Statistik	df	Signifikanz
Index_PerEfficacy	,191	293	,000	,824	293	,000

a. Signifikanzkorrektur nach Lilliefors

Tests auf Normalverteilung

|	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistik	df	Signifikanz	Statistik	df	Signifikanz
Index_Involvement	,156	293	,000	,824	293	,000

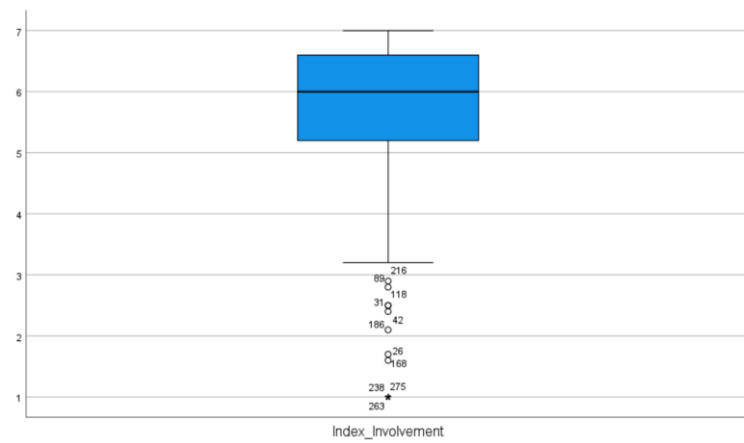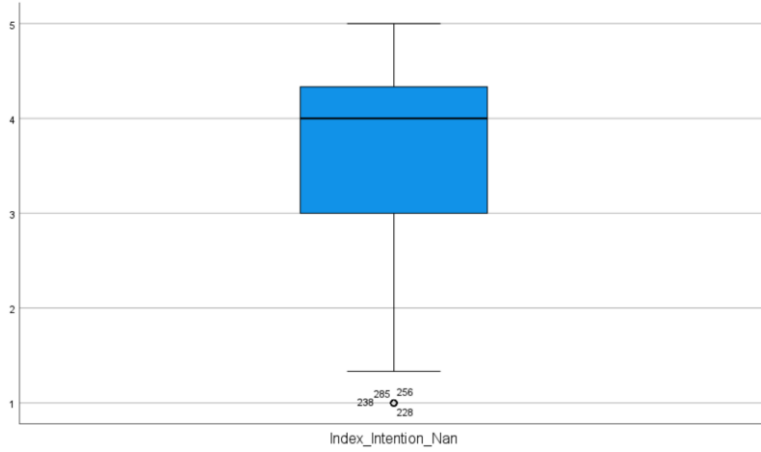a. Signifikanzkorrektur nach Lilliefors

Histograms.

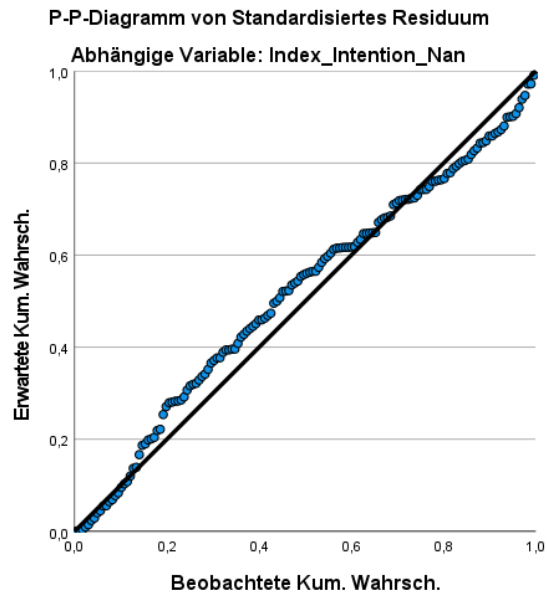Variables: Intention, Involvement, Perceived Vaccine Efficacy
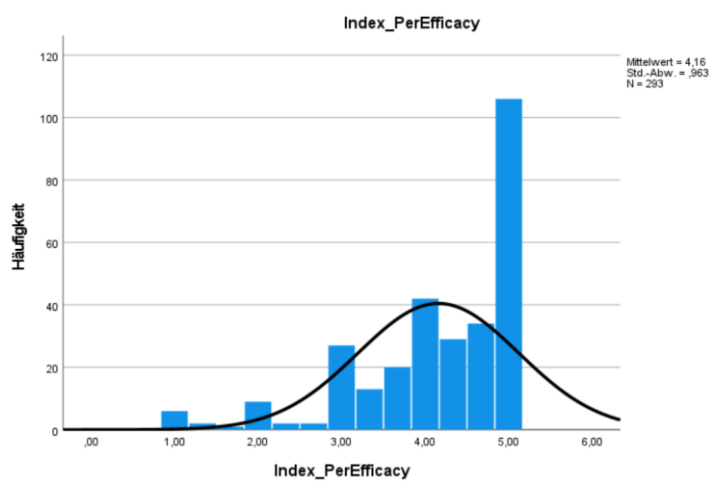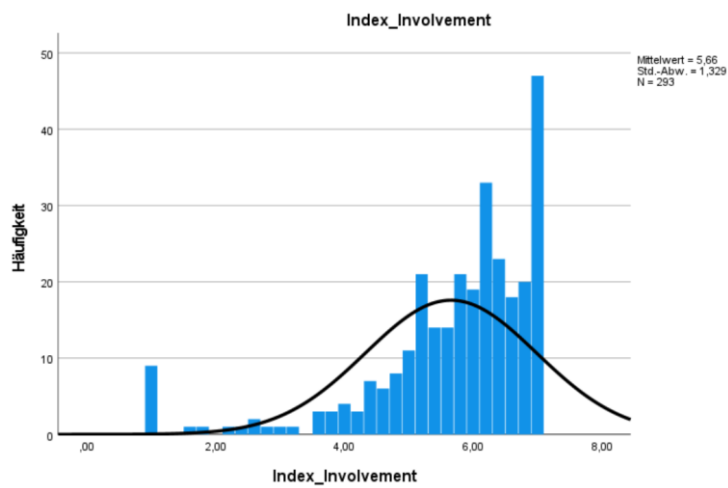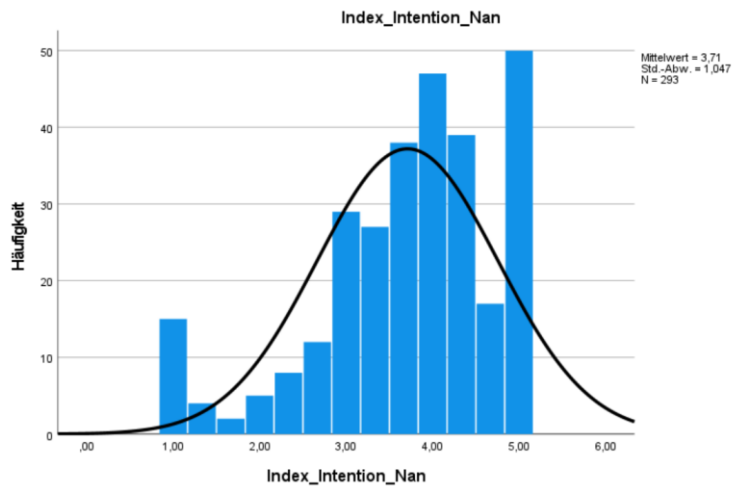
Boxplots for outliers.

Variables: Intention, Involvement, Perceived Vaccine Efficacy

Index_Intention_Nan

Index_Involvement

Index_PerEfficacy
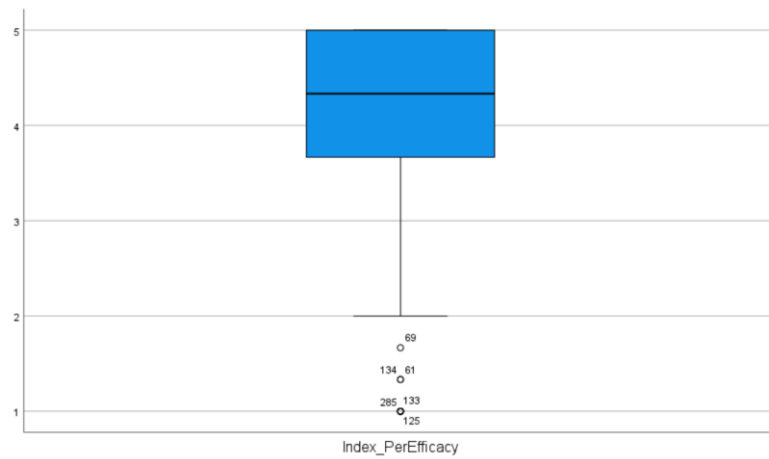
PP-Plot of hierarchical regression model.

Scatterplot of hierarchical regression model.
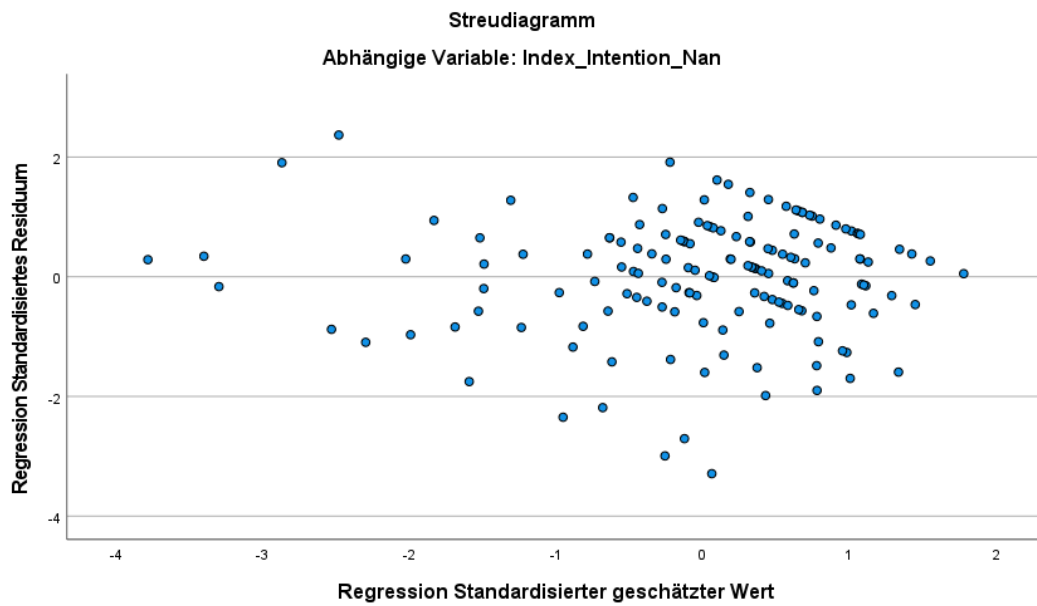
Hierarchical regression model.

Block 1: Age, Gender, Country, Risk Group, COVID-19 Infection

Block 2: Perceived Susceptibility, Perceived Severity, Perceived Vaccine Safety

Block 3: Frame Condition, Perceived Vaccine Efficacy, Involvement

Block 4: Frame Condition x Perceived Vaccine Efficacy, Frame Condition x Involvement

Modellzusammenfassung[e]

| Modell | R | R-Quadrat | Korrigiertes R-Quadrat | Standardfehler des Schätzers | Statistikwerte ändern | | | | |
					Änderung in R-Quadrat	Änderung in F	df1	df2	Sig. Änderung in F
1	,175[a]	,031	-,002	1,08163	,031	,935	5	148	,460
2	,483[b]	,233	,191	,97195	,202	12,762	3	145	,000
3	,697[c]	,486	,446	,80416	,253	23,273	3	142	,000
4	,697[d]	,486	,438	,80970	,000	,033	2	140	,968

a. Einflußvariablen : (Konstante), Infection01, Gender01, RiskGroup01, Country01, Age

b. Einflußvariablen : (Konstante), Infection01, Gender01, RiskGroup01, Country01, Age, Index_Suspectibility, Index_Safety, Index_Severity

c. Einflußvariablen : (Konstante), Infection01, Gender01, RiskGroup01, Country01, Age, Index_Suspectibility, Index_Safety, Index_Severity, Frame 0 1, Index_Involvement, Index_PerEfficacy

d. Einflußvariablen : (Konstante), Infection01, Gender01, RiskGroup01, Country01, Age, Index_Suspectibility, Index_Safety, Index_Severity, Frame 0 1, Index_Involvement, Index_PerEfficacy, Interaction_InvolFrame, Interaction_PerEffFrame

e. Abhängige Variable: Index_Intention_Nan

ANOVA[a]

Modell		Quadratsumme	df	Mittel der Quadrate	F	Sig.
1	Regression	5,471	5	1,094	,935	,460[b]
	Nicht standardisierte Residuen	173,147	148	1,170		
	Gesamt	178,618	153			
2	Regression	41,639	8	5,205	5,510	,000[c]
	Nicht standardisierte Residuen	136,979	145	,945		
	Gesamt	178,618	153			
3	Regression	86,790	11	7,890	12,201	,000[d]
	Nicht standardisierte Residuen	91,828	142	,647		
	Gesamt	178,618	153			
4	Regression	86,833	13	6,679	10,188	,000[e]
	Nicht standardisierte Residuen	91,785	140	,656		
	Gesamt	178,618	153			

Koeffizienten[a]

Modell		Nicht standardisierte Koeffizienten		Standardisierte Koeffizienten		
		Regressions koeffizientB	Std.-Fehler	Beta	T	Sig.
1	(Konstante)	3,956	,519		7,627	,000
	Age	-,005	,009	-,053	-,540	,590
	Gender01	,076	,176	,035	,433	,666
	Country01	-,374	,184	-,170	-2,028	,044
	RiskGroup01	-,150	,320	-,045	-,468	,641
	Infection01	,055	,240	,019	,228	,820
2	(Konstante)	4,152	,652		6,373	,000
	Age	-,001	,008	-,014	-,156	,876
	Gender01	,153	,160	,071	,960	,339
	Country01	-,343	,172	-,156	-1,997	,048
	RiskGroup01	,129	,341	,038	,377	,707
	Infection01	-,187	,224	-,066	-,834	,406
	Index_Suspectibility	,037	,089	,031	,418	,677
	Index_Severity	,277	,100	,280	2,765	,006
	Index_Safety	-,445	,074	-,469	-6,003	,000
3	(Konstante)	-,249	,826		-,301	,764
	Age	,010	,007	,109	1,426	,156
	Gender01	,066	,134	,031	,494	,622
	Country01	-,280	,143	-,127	-1,963	,052
	RiskGroup01	,366	,297	,109	1,235	,219
	Infection01	-,047	,188	-,017	-,251	,802
	Index_Suspectibility	,001	,074	,001	,015	,988
	Index_Severity	,157	,086	,159	1,820	,071
	Index_Safety	-,096	,075	-,101	-1,279	,203
	Frame 0 1	,146	,136	,068	1,077	,283
	Index_PerEfficacy	,236	,096	,200	2,455	,015
	Index_Involvement	,388	,062	,491	6,232	,000

	Index_Involvement	,000	,002	,101	0,202	,000
4	(Konstante)	-,131	1,009		-,130	,897
	Age	,010	,007	,106	1,314	,191
	Gender01	,069	,136	,032	,507	,613
	Country01	-,274	,146	-,125	-1,879	,062
	RiskGroup01	,363	,306	,108	1,188	,237
	Infection01	-,042	,191	-,015	-,220	,826
	Index_Suspectibility	-,002	,075	-,001	-,021	,984
	Index_Severity	,155	,087	,157	1,771	,079
	Index_Safety	-,098	,077	-,104	-1,275	,204
	Frame 0 1	,005	,730	,003	,007	,994
	Index_PerEfficacy	,209	,145	,177	1,440	,152
	Index_Involvement	,392	,091	,496	4,291	,000
	Interaction_PerEffFrame	,046	,186	,094	,247	,805
	Interaction_InvolFrame	-,010	,125	-,026	-,076	,939

a. Abhängige Variable: Index_Intention_Nan