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HOW THE PAST AFFECTS THE FUTURE: UPWARD COUNTERFACTUALS, MOTIVATION, AND PERCEIVED RISK

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HOW THE PAST AFFECTS THE FUTURE: UPWARD COUNTERFACTUALS,
MOTIVATION, AND PERCEIVED RISK

By

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A capstone project submitted for Graduation with University Honors

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ABSTRACT

Counterfactual thinking occurs when a person considers whether an alternative course of action in the past could have changed the outcome of the present. One type, upward counterfactual thinking, imagines how the past could have been better. Previous research finds that upward counterfactuals influence an individual's motivation, but these findings have varied. For example, these counterfactuals may motivate someone to improve, prompting them to learn from their mistakes. However, such counterfactuals may prove dysfunctional when they are considered at length and cause. Less is known about how other factors, such as risk, can influence these thoughts. It was predicted that individuals who consider upward counterfactuals will have lower levels of motivation compared to individuals who did not consider a counterfactual. Additionally, individuals who were in a high-risk situation will have lower levels of motivation compared to those who were in a low-risk situation. Lastly, risk will moderate the relationship between upward counterfactual thinking and motivation will be stronger under conditions of high risk, whereas it will be weaker under conditions of low risk. Results from a scenario study of college students found that, although non-significant, individuals who were assigned the low-risk condition had higher motivation compared to those who were assigned the high-risk condition and those assigned the combined upward counterfactuals and low-risk condition had higher motivation compared to the upward counterfactual and high-risk condition, the control and low-risk condition, and the control and high-risk condition.

Keywords: Upward counterfactuals, motivation, perceived risk

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How the Past Affects the Future: Upward Counterfactuals, Motivation, and Perceived Risk

Consider the following scenario: a student has just completed an exam that consists of the majority of their final grade and they received a low score. Achieving a high score was essential for passing the course. After the exam, the student reflects on their performance and wishes they had performed better. Why does this matter? It matters because individuals can never truly know what their life may result in. Due to this unpredictability, individuals need to consider potential risks and take precautions to mitigate unfavorable outcomes. If these consequences were never considered, life would be almost impossible to navigate, as things would never get done in a timely manner if people never learned from their mistakes. Like a robot, their actions would be repeated without considering how to improve because that is all they were coded to do.

Fortunately, humans are more complex than robots. In their complexity, they can consider the probabilities of outcomes such as alternative possibilities to the past (counterfactual thinking), assess how severe or dangerous a situation might be (risk), and even consider how these factors make them feel towards completing a task (motivation). In particular, upward counterfactuals, which consider how the past could have been better, are addressed in this scenario. The provided scenario encapsulates both upward counterfactual thinking and perceived risk in order to help determine how these factors influence motivation.

Literature Review

Motivation

Motivation is commonly defined as a feeling or desire to accomplish a goal; however, this concept remains challenging to address, as it is often interpreted in different ways. The reason why motivation is so hard to conceptualize is due to its elusive nature. Numerous researchers have tried to define and measure it. In the 1940's, Maslow created his hierarchy of

needs to begin to explain why people are motivated (Bandhu et al., 2024). In more recent years, Pincus (2023) proposed his structure of human motivation, which is a hierarchical three-dimensional pyramid that reframes how motivation is organized when addressing different life domains and the levels of attainment that it can be sorted into. Despite all the time that has passed, researchers are still trying to discover the best way to measure and define motivation. Therefore, it is no surprise that motivation is a field that warrants further exploration.

Another way of defining motivation can be assessed through Deci and Ryan's self-determination theory (SDT) which combines multiple aspects of motivation such as: amotivation (the lack of motivation altogether), external regulation (aims to obtain a reward to avoid a negative outcome), identified regulation (recognizing the value in something), and intrinsic motivation (engaging in an activity because you want to) in order to evaluate a bigger picture (Aalto University, 2025; Deci & Ryan, 2008; Guay et al., 2000; Wasicek & McHugh, 2024). This core theory takes root in the situational motivation scale (SIMS), whose final score can be calculated to find its overall motivational score or self-determination index (SDI), which is centered around the SDT. SDT not only measures how determined someone is towards a task, but this motivation theory is on a continuum, and the higher one goes (from amotivation to intrinsic motivation), the more self-determined or motivated a person feels to complete a task (Aalto University, 2025; Guay et al., 2000; Wasicek & McHugh, 2024). This allows motivation to be measured not only as an overall numerical data point, but also to differentiate the types of motivation influencing the score along the way. This scale has also helped measure motivation across multiple domains of life such as work, school, online environments, sports, and health care (Deci & Ryan, 2008), which further demonstrates the diverse fields in which motivation can be considered.

In addition to the various ways motivation can be defined and measured, a multitude of factors can influence how motivated an individual turns out. For instance, Sánchez-Bolívar et al. (2023) examined how social skills can affect a student's motivation, finding that optimistic, empathetic, and assertive students have higher intrinsic motivation, whereas pessimistic, indifferent, and aggressive students have higher amotivation. Gunawan et al. (2024) assessed how the economic status of parents and a student's ability to think creatively contributed to how motivated a student was to learn. This reveals how multifaceted motivation is, as motivation can be influenced by external and internal factors. Over time, researchers have sought more effective ways to conceptualize and measure motivation to better understand human behavior. Despite this debate, one thing that can be agreed upon is noting how useful motivation can be when striving for a better future (Bandhu et al., 2024).

Counterfactuals and Motivation

Motivation is a complicated concept that can be influenced by several types of thoughts. Some ways that thinking has been identified as a significant influence on motivation include: optimistic and pessimistic thinking (Sánchez-Bolívar et al., 2023), creative thinking (Gunawan et al., 2024), and counterfactual thinking (Dyczewski & Markman, 2012; Epstude & Roese, 2008; Iles & Nan, 2017; Kokkinaki & Sevdalis, 2015; McCrea, 2008; Myers et al., 2014; Tyser et al., 2012; Wong, 2007; Xie et al., 2025; Zarrinabadi et al., 2023). In particular, counterfactual thinking occurs when a person thinks about the past and its alternative outcomes (Broomhall et al., 2017; Broomhall & Phillips, 2024; Dyczewski & Markman, 2012; Epstude & Roese, 2008; Iles & Nan, 2017; Kokkinaki & Sevdalis, 2015; Lin et al., 2024; McCrea, 2008; Myers et al., 2014; Wong, 2007; Zarrinabadi et al., 2023).

The ways in which counterfactuals are presented can also change how these thoughts can influence motivation. When evaluating counterfactual thinking it's important to note the similarities as well as the differences, such that counterfactuals tend to account for more specific events rather than the more generalizable ones (Epstude & Roese, 2008; Iles & Nan, 2017; Lin et al., 2024; Morris & Moore, 2000; Van Hoeck et al., 2015). This demonstrates that if a task is more clearly defined, then it can be easier to assess; if it is more ambiguous, then that leaves more room for things to be assumed, making it harder to evaluate. Motivation can also be affected by the specific type of counterfactuals that are being evaluated. The counterfactual types include: upward and downward, additive and subtractive, as well as self and other focused (Broomhall et al., 2017; Epstude & Roese, 2008; Iles & Nan, 2017; Lin et al., 2024; Zarrinabadi et al., 2023). Emotions can also play a role in how counterfactuals influence motivation, as counterfactuals have been shown to influence the mood of individuals (Broomhall et al., 2017; Broomhall & Phillips, 2024; Byrne, 2002; Epstude & Roese, 2008; Myers et al., 2014). When pursuing a goal, negative feelings that stem from a controllable cause, namely guilt and regret, can lead to different levels of motivation (Weiner, 2010, as cited in Kokkinaki & Sevdalis, 2015). That is why it is important to consider the context in which counterfactuals are presented.

Upward Counterfactuals and its Negative Relation to Motivation

To see how motivation is influenced by the different directional values of counterfactual thoughts, the relationship between upward counterfactuals and motivation can be examined. Upward counterfactual thoughts specifically consider how a situation from the past could have turned out better (Broomhall et al., 2017; Broomhall & Phillips, 2024; Byrne, 2002; Dyczewski & Markman, 2012; Epstude & Roese, 2008; Iles & Nan, 2017; Kokkinaki & Sevdalis, 2015; Lin et al., 2024; McCrea, 2008; Morris & Moore, 2000; Myers et al., 2014; Van Hoeck et al., 2015;

Wong, 2007; Zarrinabadi et al., 2023). For instance, after performing poorly on a test, one could consider how their grade could have been better if they had studied more. In contrast, downward counterfactuals consider how a situation from the past could have turned out worse (Broomhall et al., 2017; Byrne, 2002; Dyczewski & Markman, 2012; Epstude & Roese, 2008; Iles & Nan, 2017; Kokkinaki & Sevdalis, 2015; Lin et al., 2024; McCrea, 2008; Morris & Moore, 2000; Myers et al., 2014; Van Hoeck et al., 2015; Wong, 2007; Zarrinabadi et al., 2023). To illustrate this, one can consider how they could have done worse after performing poorly on a test. When upward counterfactual thoughts are internalized as excuses to protect an individual's self-esteem, they can reduce motivation and inhibit current and future performance (McCrea, 2008). Dyczewski and Markman (2012) addressed the differences in how the perception of intelligence-related abilities, such as when they are thought to be fixed, displayed less motivation when presented as an upward counterfactual compared to the downward counterfactuals. From this discussion, it can be hypothesized that individuals who engage in upward counterfactual thinking will have lower levels of motivation than those who do not. Formally,

Hypothesis 1a: Upward counterfactual thinking will be negatively related to motivation.

Upward Counterfactuals and its Positive Relation to Motivation

Previous research has also shown an increase in motivation when upward counterfactuals are engaged in contexts where event repeatability can occur; however, this only happens under certain conditions. When upward counterfactuals were communicated to undergraduate students in the form of written feedback, they were more motivated to improve, which helped enhance their performance; whereas, students who received the downward counterfactual condition were less motivated to improve, hindering their performance (Wong, 2007). When the upward counterfactuals were presented in a written format, the non-linguistic comments on a student's

writing helped enhance motivation and lower anxiety; whereas, downward counterfactuals revealed higher levels of anxiety, reducing the effectiveness of motivation (Zarrinabadi et al., 2023). If intelligence-related abilities were thought to be adaptable, then they can improve motivation when in the presence of upward counterfactuals as compared to downward counterfactuals (Dyczewski & Markman, 2012). After generating upward counterfactuals, Myers et al. (2014) found that individuals improved only when a negative affect produced by the counterfactual was interpreted as a signal that their prior performance was insufficient. These findings are in congruence with what this study predicts. From this discussion, it can be hypothesized that individuals who engage in upward counterfactual thinking will have higher levels of motivation than those who do not. Formally,

Hypothesis 1b: Upward counterfactual thinking will be positively related to motivation.

Risk and Motivation

The relationship between risk and motivation is important because other factors that impact motivation may derive from perceived risk. Life can be unpredictable, but the brain works hard to process information to achieve the best possible outcome. In doing so, the decision-making process becomes essential for navigating life, revealing how risk can influence decisions (Bacchus, 2024). Despite the extensive literature on risk, its nature makes it harder to define and operationalize when examining it across the different disciplines and contexts in which it is used (Roehl & Fesenmaier, 1992, as cited in Xie et al., 2025). For instance, noting how counterfactuals can influence risk management and mitigation (Lin et al., 2024). Simply put, risk is considered the “possibility of loss or injury” (Merriam-Webster, n.d.). Despite this simple definition, it does not account for all the nuanced ways in which risk can be portrayed, such as risk in sports (Park et al., 2014), medical fields (Merriam-Webster, n.d.), business (Haid

et al., 2019), and even travel (Xie et al., 2025). To narrow the focus, this study examines perceived risk, which refers to individuals' subjective judgments when faced with a task (Darker & Whittaker, 2020; Xie et al., 2025). This subjective judgment centers around the individual.

Risk impacts motivation in several ways. In particular, risk can be seen to increase motivation when a low-risk scenario was provided. Haid et al. (2019) evaluated data from a population of auditors and found that they were more motivated to complete a task when a risky scenario could be avoided. When evaluating marine sports participation, which included participants who windsurfed, water skied, did skin-scuba diving, or participated in yachting, if participants thought the situation was less dangerous, they were more likely to be motivated to try a task again (Park et al., 2014). In both articles, they focus on the riskiness of a task on potential outcomes. If the task appeared too risky, then it influenced a participant's motivation in a way that makes the task less likely to be completed. This highlights why it is important to consider how other influences, such as risk, can impact the perception of how individuals may see a scenario to be worth their time or not.

When comparing the different types of motivation that can influence risk, the results varied. The differences between achievement motivation, power motivation, and affiliation motivation have been shown to influence how likely an individual is to engage in high or low risks. Specifically, those who score high for power motivation will take more extreme risks in order to stand out in a crowd, boasting themselves; whereas, individuals who score high in affiliation motivation will be more withdrawn from taking risks to avoid public competition (McClelland & Watson, 1973). Furthermore, in order to evaluate the impact of risk on motivation, this study hypothesized that individuals faced with high risk will have lower motivation than those who do not. Formally,

Hypothesis 2: Perceived risk will be negatively related to motivation.

The Moderating Role of Risk Between Upward Counterfactuals and Motivation

Upward counterfactuals influence motivation by examining the alternative outcomes of a scenario and how they could have been achieved if such an event turned out differently. Prior research shows that contextual moderators shape the motivational consequences of counterfactual thinking. Moderators such as attainability beliefs (Dyczewski & Markman, 2012) and goal orientation (Kokkinaki & Sevdalis, 2015) influence whether counterfactuals strengthen or weaken motivation.

According to Epstude and Roese's (2008) functional theory of counterfactual thinking, this motivational effect depends on how individuals interpret the counterfactual within its context. Counterfactuals can be interpreted through two pathways, a content-specific pathway and a content-neutral pathway. The content-specific pathway examines the implied alternative behavior of a counterfactual, which provides a basis for improving future behavior by identifying what could have been done differently. The content-neutral pathway examines cognitive and emotional processes that can determine how strongly counterfactuals can influence motivation. Considering these two pathways can help explain why upward counterfactuals can motivate behavior. For example, the opportunity principle suggests that upward counterfactuals are more motivational when individuals can perceive a meaningful opportunity to change a future outcome (Epstude & Roese, 2008). In the case of perceived risk, it can help determine how meaningful or relevant a given scenario is. Even if risk itself cannot create an opportunity on its own, it can still make a behavioral alternative highlighted by a counterfactual seem more motivationally relevant. Therefore, perceived risk functions similarly by altering both the cognitive and emotional

context (content-neutral pathway) and the perceived importance of the behavioral alternative (content-specific pathway), thereby shaping the motivational impact of upward counterfactuals.

One way to illustrate this can include imagining how missing a flight by five minutes can be impacted by the perceived risk of the situation. For example, if the ticket is non-refundable or timed for just-in-time arrival to a once in a lifetime event, that might be perceived as high risk. Alternatively, if the plane ticket is refundable or planned for with extra time before the event, that might be perceived as low risk. In these instances, perceived risk can impact the relationship between upward counterfactuals and motivation. Specifically, by examining the influence of risk on upward counterfactuals and motivation, four potential situations emerge, which are discussed below.

In the upward counterfactual and high-risk condition the content-specific pathway provides a clear behavioral alternative that considers how an individual “could have left earlier”, and the content-neutral pathway that amplifies its motivational relevance because the consequences, such as losing a bunch of money and even missing an important event because the ticket was non-refundable, are considered severe. This condition is therefore predicted to show the strongest relationship between upward counterfactuals and motivation.

In the upward counterfactual and low-risk condition, the same behavioral alternative of considering how an individual “could have left earlier for the flight” still exists supporting the content-specific pathway, but if the ticket was refundable, and the individual provided themselves with extra travel time, the perceived consequences of missing the flight would be considered less severe. This reduces the urgency to act on the upward counterfactual, therefore, producing a weaker relationship.

In the no counterfactual and high-risk condition, individuals experience the demotivating effects of risk from missing a non-refundable flight and their important event, and in the absence of an upward counterfactual being generated, there is no behavioral alternative to channel the emotion into. The strength which a content-specific pathway could have provided is absent, which can leave a person feeling frustrated with nowhere to direct that anger, producing low motivation despite the high risk.

Finally, in the no counterfactual and low-risk condition, both urgency and corrective insight are minimal, since missing a flight that can be refunded elicits little emotional distress and in the absence of upward counterfactual thinking, there is no direction to guide future behavior, can in turn, produce the weakest relationship.

Overall, these considerations support the prediction that perceived risk will moderate the relationship between upward counterfactuals and motivation, such that it will strengthen the motivational impact of upward counterfactuals when individuals perceive risk as high.

Hypothesis 3: Perceived risk will moderate the negative relationship between upward counterfactuals and motivation, such that the relationship would be stronger under conditions of high risk, but weaker under conditions of low risk.

Methods

Design

The goal of this study is to determine how upward counterfactual thoughts and perceived risk impact motivation. To achieve this goal, an experimental, cross-sectional, self-reported, 2 (upward counterfactual, no counterfactual) x 2 (high, low risk) ANOVA, randomly assigned, single blind, between-groups survey was utilized. The possible conditions that could be assigned

to participants included: types of thoughts (upward counterfactual ($N = 241$) vs. control ($N = 243$) and type of risk (high ($N = 237$) vs low ($N = 247$)).

Participants

Participants consisted of individuals who are United States residents, 18 years of age or older, English speaking, student volunteers. Out of the 735 surveys collected, the final sample consisted of 484 participants ($N = 484$). Approximately 35% of the data was not used after average time taken, complying with a participant's wish for their data to be withdrawn, and any incomplete surveys were omitted. This omission of data was done to comply with the ethics of informed consent and to take out any outliers irrelevant to the study. The final sample ranged from 18 to 55 year olds ($M = 21.46$, $SD = 4.83$, $n = 484$). The gender identity of this sample of participants included Male ($n = 251$, 51.9%), Female ($n = 229$, 47.3%), and Non-binary/Other ($n = 4$, 0.8%). The social class that best describes the sample of participants included Lower Class ($n = 106$, 21.9%), Middle Class ($n = 348$, 71.9%), and Upper Class ($n = 30$, 6.2%). The ethnic identity of this sample of participants included Asian/Asian American ($n = 192$, 39.7%), Black/African American ($n = 15$, 3.1%), LatinX/Hispanic ($n = 189$, 39%), Middle Eastern ($n = 24$, 5%), Multiethnic ($n = 14$, 2.9%), White/Caucasian ($n = 49$, 10.1%) and Not Listed ($n = 1$, 0.2%). Participants also indicated their highest level of education with categories including Some high school ($n = 5$, 1%), High school diploma/GED ($n = 112$, 23.1%), Some college ($n = 183$, 37.8%), Associate's degree ($n = 121$, 25%), 4-year college (B.A./B.S. degree) ($n = 60$, 12.4%), Master's degree ($n = 2$, 0.4%).

Procedure

The collaborative institutional training initiative (CITI) was completed to obtain UC Riverside IRB approval (#30844). Participants were recruited through flyers and word of mouth. Participants could either scan a QR code or type in a link to be able to access the survey.

Their responses were collected in Qualtrics XM, then the results were recorded and transferred to Google Sheets for the data to be cleaned and then analyzed using the IBM SPSS Statistics software version 31. This was done under a password protected computer.

The survey included an introduction and informed consent page to comply with ethical standards, notifying the participants of what to expect from the survey, their anonymous status, and how their data would be used. The questions in the survey pertained to both an individual's demographics, such as age, gender identity, social class, ethnic background, and highest level of education. As well as answering questions from the SIMS after reading one of the four randomly assigned scenarios. The following depicts the scenarios that the participants could have encountered, with the information in parentheses indicating the alternative scenario. You are a student who just took an exam. This test is worth 60% (10%) of your grade and you need to get a good score to pass. All you can think of is how you wished you could have done better (this sentence is omitted in the no counterfactual control condition).

From the data transferred over from Qualtrics XM, during data cleaning, the categories: "Start Date", "End Date", "Status", "Progress", "Duration (in seconds)", "Check the box below to continue with the survey", "Finished", "Recorded Date", "Response ID", "Distribution Channel", "User Language", and "If you do not want your survey to be used please indicate below" were eventually deleted as they were not necessary for the computational analysis of the data. Additionally, when cleaning the data, anything that was marked as not completed or its

progress was not indicated as 100% complete was deleted. If any questions were answered with "Prefer not to answer" or left unanswered, those surveys were also deleted. Anyone who selected the option "Don't use my survey" was removed from the data to adhere to the ethics of informed consent. Any outlier responses were also excluded from the final data analyses. The "Duration (in seconds)" category and average time taken on the survey was considered to omit data that was suspiciously completed too fast. Minor adjustments were made for the age category, i.e., if someone spelled out their age, it was changed to a number, and if they included "years old" after their numerical age, the extra words were removed. The data was then separated into separate tabs on the spreadsheet to easily access the different scenario results. Proceeding the separation of tabs, which encapsulated the different scenarios, the averages of each subcategory of motivation were computed using the formula setting in Google Sheets, which then allowed for the calculation of the SDI. Meaning the data was ready for SPSS, as everything was organized by independent variables such as the type of thought and type of risk, and the dependent variable, the SDI.

Measures

Upward Counterfactual Condition

Upward counterfactuals were manipulated for participants, as they were randomly assigned a no counterfactual or upward counterfactual thought scenario. Upward counterfactuals were established by utilizing the phrase: "all you can think of is how you wished you could have done better".

No Counterfactual Condition

Alternatively the no counterfactual control condition was manipulated for participants, as the phrase "all you can think of is how you wished you could have done better" was omitted

from the scenario in order to do this. In turn, the participants were not prompted to think of an alternative that they could have improved upon.

Perceived Risk

Risk was manipulated for participants, as they were randomly assigned a low or high-risk scenario. The risk was determined by a test grade being worth the majority of a student's grade (60%, high-risk condition) or a small part of their grade (10%, low-risk condition).

Situational Motivation Scale

The SIMS was selected to measure the motivation of participants in this study. The SIMS was measured on a linear likert scale that goes as follows: 1 = not at all; 2 = very little; 3 = a little; 4 = moderately; 5 = enough; 6 = a lot; 7 = exactly. After the participant read their randomized scenario distributed to them in Qualtrics XM they were asked to indicate their response for 16 items that addressed four main subcomponents of motivation which included: amotivation, which statements (4, 8, 12, and 16) addressed a lack of motivation, external regulation, which statements (3, 7, 11, and 15) expressed a person's interest to avoid a negative outcome, identified regulation, which statements (2, 6, 10, and 14) recognize the value in a situation, and intrinsic motivation statements (1, 5, 9, and 13) which displayed a personal interest in wanting to accomplish a task. To get a better understanding of how these items were portrayed see the Appendix for a list of items from the SIMS.

The SIMS final score can be calculated by its SDI which is centered around the SDT. Originally, the SDI model was curated by both Deci and Richard Ryan who focused on SDT, but it was eventually adapted to be used in the SIMS, focusing on why behavior can occur in a specific situation (Guay et al., 2000; Sánchez-Bolívar et al., 2023; Wasicek & McHugh, 2024). The SDT measures both the motivational subtype and an individual's overall motivation. As a

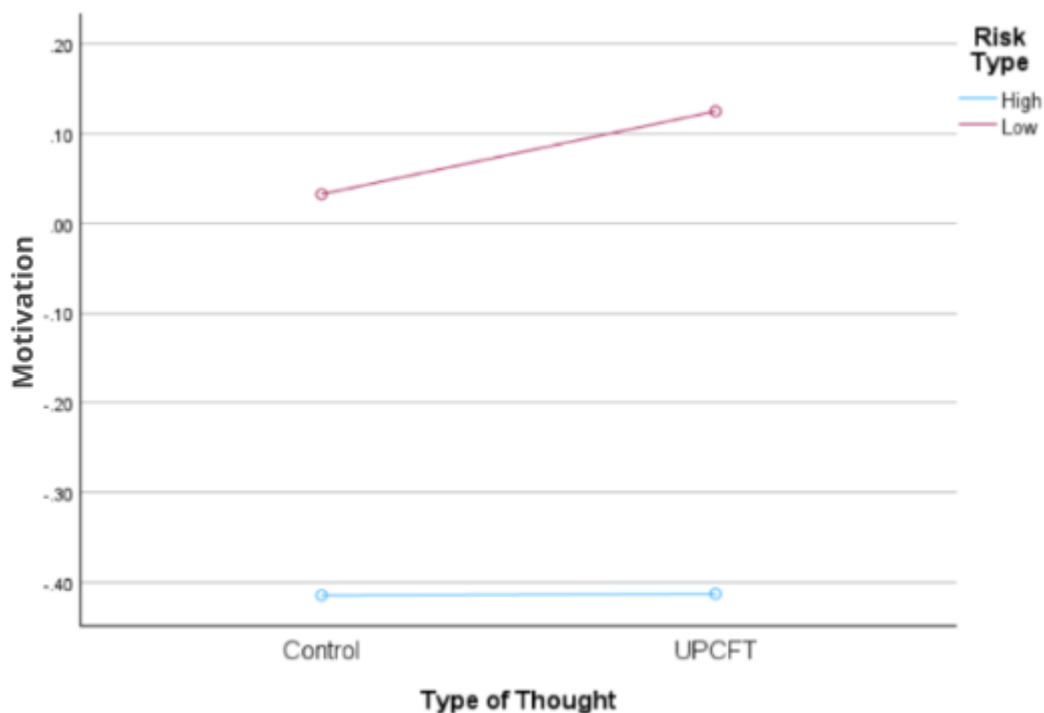
person moves from amotivation to intrinsic motivation, the more self-determined or motivated a person can feel when attempting to complete a task (Aalto University, 2025; Guay et al., 2000; Wasicek & McHugh, 2024). This allows for motivation not only to be measured as an overall numerical data point but differentiates the different types of motivation influencing the score along the way. The results from the scale were later used to calculate the SDI score with the formula, $SDI = (2 \times IM) + IR - ER - (2 \times AM)$. Where IM stands for internal motivation, IR stands for identified regulation, ER stands for external regulation, and AM stands for amotivation.

Results

A 2x2 ANOVA was conducted to examine the effects of thought type and risk level on motivation. For a visual depiction of these results, see Figure 1.

Figure 1

Using Motivation to explain the Relationship between Upward Counterfactuals and Risk



Note: UPCFT stands for upward counterfactual.

For counterfactual thinking, there was no significant main effect, ($F(1, 480) = .014, p = .907$), and participants in the upward counterfactual condition ($M = -.144, SE = .287$) reported motivation scores similar to those in the control condition ($M = -.191, SE = .285$). Therefore, hypothesis 1a and 1b were not supported.

There was also no significant main effect on risk type, ($F(1, 480) = 1.484, p = .224$), as participants' motivation in the low-risk condition ($M = .079, SE = .283$) did not differ significantly from those in the high-risk condition ($M = -.414, SE = .289$). Thus, hypothesis 2 was not supported.

Lastly, there was no significant interaction between thought type and risk type, ($F(1, 480) = .013, p = .911$). Mean scores for these groups are as followed: the upward counterfactual and high risk ($M = -.413, SE = .411$), the upward counterfactual and low risk ($M = .125, SE = .399$) the control and high risk ($M = -.415, SE = .406$), and the control and low risk ($M = .033, SE = .401$). A post-hoc test was not necessary as there were fewer than three categories listed within the independent variables. Given these findings, hypothesis 3 was not supported.

Discussion

The study attempted to investigate how risk can influence the relationship between upward counterfactuals and motivation. More specifically, how perceived risk can moderate the relationship between a upward counterfactual and motivation. Results for this study did not prove to be statistically significant.

Despite the non-significant results, this study can still contribute to the preceding literature that is similar to this topic. In previous studies, researchers wanted to consider how moderating factors could influence the relationship between counterfactuals and motivation.

They explored and found that other factors such as general attainability beliefs (Dyczewski & Markman, 2012) and goal orientation (Kokkinaki & Sevdalis, 2015) can contribute to how this relationship can be influenced. However this research did not examine how risk can moderate this relationship. Iles and Nan (2017) highlighted the need to evaluate how risk can affect counterfactuals, as risk perception can help predict behavior. This study attempted to add to that aspect of research. This is important to expand upon because counterfactuals and risk are rarely examined together in this type of way.

Despite the study's non-significant results, in comparison with previous findings, similar patterns were identified when assessing the context-dependent relationship between counterfactuals and motivation. As tested in this study's hypotheses 1a and 1b, the results showed that upward counterfactuals alone have the potential to influence motivation, but the direction varied. Other studies incorporated an additional factor to strengthen the direction and examine how upward counterfactuals influenced motivation, which the first hypotheses lacked, as the moderator had yet to be considered. Exemplifying how complex motivation is due to its reliance on the manipulation of other factors. For instance, when upward counterfactuals were influenced by excuses and used to protect one's self-esteem (McCrea, 2008) as well as evaluating intelligence-related abilities as fixed (Dyczewski & Markman, 2012), they were seen to decrease motivation. Whereas, when upward counterfactuals were communicated via written feedback (Wong, 2007; Zarrinabadi et al., 2023), or an individual's performance was thought to be insufficient (Myers et al., 2014), or if intelligence-related abilities were thought to be adaptable (Dyczewski & Markman, 2012), then motivation increased. This reveals how determining the strength of a counterfactual depends on its context.

Additionally, similar patterns were seen for how risk and motivation were related to one another, as tested in hypothesis 2. Depending on how risky an individual perceived a situation to be, their motivation varied, but when a situation was deemed less risky (Haid et al., 2019; Park et al., 2014) or one scored high in affiliation motivation (McClelland & Watson, 1973) a person was more motivated to engage in a task. Which is similar to the pattern that my results produced for high versus low risk. The low risk was seen to have high motivation, as the mean score was above 0. Any score listed as a mean score below 0 indicated a lack of motivation (see Figure 1).

In relation to hypothesis 3, in the low-risk scenarios, for both the no counterfactual control condition and upward counterfactual condition, a high motivation score was produced compared to the no counterfactual control condition and upward counterfactual condition in high-risk scenarios. This reveals that risk can play a role in moderating the relationship between upward counterfactuals and motivation, but with the study's findings not being significant, it may have been lacking in certain fields to properly be able to measure this relationship and the limitations should be considered for future improvement.

Limitations and Future Directions

Although these findings were non-significant, future research can still utilize what was found in this study to adjust and reframe this potential setup to attempt to find statistically significant results. Improvements such as, adding a manipulation check, implementing additional measures, analyzing other counterfactual types, and even considering expanding beyond academic populations when collecting data can help.

Considering where the data is coming from can help expand future studies to potentially address cultural and socio-economic differences which could further influence the moderating impact on the relationship between counterfactuals and motivation. Other aspects such as

regional differences can be looked into as well, since this study only focused on residents within the United States. In further consideration, most studies have been centered around an academic setting and evaluating students, but for research to expand, other studies could be replicated amongst populations which are not solely centered around a well-educated academic easily accessible population. Additionally, Gunawan et al. (2024) already assessed how the economic status of parents and a student's ability to think creatively contributed to how motivated a student was to learn. So, addressing how the economic status of students is impacted amongst this relationship could also be looked into further. On another note, other measures such as personality, could be implemented in the study to address how easily motivation can be influenced, since it is context-dependent. Overall, there are so many ways in which this study could be improved, but in particular one can start with re-examining how risk was utilized in this study.

Re-Examining Risk

Aspects surrounding how risk was portrayed in this study could be improved upon to strengthen the study in the future. Especially since, risk can be harder to operationalize due to various ways in which it is used (Roehl & Fesenmaier, 1992, as cited in Xie et al., 2025). That is why this study looks into perceived risk, which examines the subjective judgements of individuals (Darker & Whittaker, 2020; Xie et al., 2025). This subjectiveness plays a key role in determining why people are influenced to do a task because it is established around personal foundations. This study thought it could test this type of risk by establishing a numerical percentage to see how that would influence an individual. When considering the percentages of how the exam can impact a student, how they are currently displayed in the provided scenarios may not accurately represent perceived risk. This study could have also provided more context

on how important it was for the student to get a good grade to pass the exam to avoid failing the class. This could have helped further emphasize how risky it would be to fail the exam. This could help strengthen the survey, as the implementation of risk may not have accurately captured the weight of the academic consequences. It could have also been noted how detention, expulsion, or not being able to graduate, could result from failing the test. This added context might have impacted the students to really consider the risk of failing, as this would add to the emotional weight which the content-neutral pathway examines in determining how strongly counterfactuals can influence motivation. If the study expanded upon defining the scenario more, then the participants' engagement could have been better, allowing themselves to truly consider the hypothetical scenario, providing it with more weight.

Where this study failed to include a manipulation check other studies can improve upon this mistake. The manipulation check can be implemented in future studies, by including a closed-ended question to make sure the provided scenario accurately influences the participant the way the survey intends. When including a manipulation check for risk, such a question could ask, "how risky is this test to your overall grade", and the answers listed can be "very risky" or "not risky", to see if the test is risky enough and is measuring what it is supposed to measure. In a more direct manner, a question could be asked, "does this situation seem risky", and the answer that can be clicked could be "yes" or "no". By adding this manipulation check, it can help improve the internal validity of this study.

Re-Examining Counterfactuals

The other independent variable, upward counterfactual, would also benefit from incorporating a manipulation check. This manipulation check could have asked, "did this scenario make you think counterfactually", and the answers that could be clicked could be as

simple as “yes” or “no”. Except this may be limited already in the format in which the upward counterfactuals were presented. Since this study provided a hypothetical scenario, and participants had to imagine that they are that person for which the scenario occurred, it may limit whether or not the survey accurately measured an upward counterfactual thought. For the future, the upward counterfactual thought could instead be personally generated, based on a list of provided examples that could be incorporated into the survey, and then participants can be directed to answer a manipulation check to more accurately assess upward counterfactual thoughts.

Other counterfactual types can also be considered for future studies. Where this study limited itself to evaluating only upward counterfactuals, other types such as downward counterfactuals or even other-orientated counterfactuals could be considered when evaluating how risk can moderate the relationship between counterfactuals and motivation.

Re-Examining Motivation

Due to the nuances of how motivation can be operationalized future studies should clearly define and determine how to measure its data. Since this study’s scenario focused on school life and the participants were student volunteers, a measure that measured motivation in a school setting might have been more appropriate to use. In this study the SIMS was utilized to examine motivation, which focuses on the current situation. At first it was deemed useful to use as the current thoughts of a participant were being examined, but the potential for other motivation measures may be more plausible. However, the SIMS was believed to be useful as it not only addressed how motivated an individual was but also addressed the different subtypes of motivation which a person could be seen to be representing along the way. Although this also included how motivated a person felt, such as more or less motivated, in this study the scale just

might have been too complex for understanding the impact that different thoughts and levels of risk may have on it. Since this study generally focused on motivation, the main and interaction effects may not have emerged at this broader level. In the future, research can look further into the subdimensions of motivation and how they play a role in influencing the relationship between upward counterfactuals and motivation. In turn it can be possible that the effects of this study could emerge at a subdimensional level when examining the subtypes of motivation. Instead, a measure that reflects student motivation, such as the academic motivation scale, might have been a better measure to use, considering the aforementioned.

Since the SIMS tests motivation for the current moment or situation a person is in, incorporating thoughts into a person's mind may not have been the best way to go about doing that. The original study was an experiment done in the laboratory and the participants were actively engaging in an event which made them think counterfactually (Guay et al., 2000) as compared to this study. If this study were to be replicated and implemented and conducted in a laboratory environment with the specific level of risk being embedded, then perhaps the SIMS would have accurately measured motivation more than it did in this current self-report study, but again the nuances of forgetting to add a manipulation check should be addressed first if the study were to be replicated.

Conclusion

In conclusion, this study provided information on how different factors such as counterfactual thoughts and risk can influence motivation. Specifically, how risk moderated the relationship between upward counterfactuals and motivation when examining data from a population of student volunteers in the United States. Results of the study ended up being non-significant, but in its efforts, this study can be used as a backbone for the advancement and

consideration of future research. This study can be important in the real world because it addresses multiple things which people encounter everyday, such as the thoughts that live in people's minds rent free and the looming risk that lurks behind every corner.

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Appendix

List of Items from the Situational Motivation Scale (SIMS)

Items reproduced from Guay, Vallerand, and Blanchard (2000).

1. Because I think that this activity is interesting.
2. Because I am doing it for my own good.
3. Because I am supposed to do it.
4. There may be good reasons to do this activity, but personally I don't see any.
5. Because I think this activity is pleasant.
6. Because I think that this activity is good for me.
7. Because it is something that I have to do.
8. I do this activity but I am not sure if it is worth it.
9. Because this activity is fun.
10. By personal decision.
11. Because I don't have any choice.
12. I don't know; I don't see what this activity brings me.
13. Because I feel good that this activity is important for me.
14. Because I feel that I have to do it.
15. I do this activity, but I am not sure it is a good thing to pursue it.