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Goal Distance as Boundary Condition for Backward Planning

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Abstract

This thesis investigates the effectiveness of backward planning under different goal distances. Strategic planning is crucial for achieving personal and professional aspirations, enhancing clarity, motivation, and accountability. Among various planning methodologies, backward planning, which begins with the end goal and works backward to identify necessary steps, has shown potential benefits. However, the interaction between backward planning and goal distance, defined as the temporal span of goal achievement, still needs to be explored.

Through a detailed experimental design in an event management context, this research examines how backward planning influences motivation, goal expectancy, perceived time pressure, and planning difficulty compared to forward planning. Participants were assigned to plan an event using either backward or forward planning methods, with goal distances categorized as low (one month) or high (six months).

The findings indicate that backward planning enhances goal expectancy and reduces perceived time pressure, particularly for high-distance goals. However, backward planning does not significantly affect plan clarity or reduce planning difficulty compared to forward planning. Instead, forward planning is associated with lower perceived planning difficulty, making it potentially more suitable for complex or near-term goals.

This research aligns with and extends the work of Park, Lu, and Hedgcock (2017), validating the advantages of backward planning in enhancing motivation and reducing stress for long-term goals. Practical implications suggest that individuals and organizations should adopt backward planning for long-term projects to maintain motivation and manage time pressure. In contrast, forward planning may be preferable for immediate or complex goals due to its lower planning difficulty.

The thesis concludes that goal distance acts as a boundary condition influencing the benefits of backward planning.

Diese Masterarbeit untersucht die Wirksamkeit der Rückwärtsplanung bei verschiedenen Zielentfernungen. Strategische Planung spielt eine entscheidende Rolle bei der Erreichung persönlicher und beruflicher Ziele, da sie Klarheit, Motivation und Verantwortungsbewusstsein fördert. Rückwärtsplanung (backward planning), eine strategische Planungsart bei der vom Endziel rückwärts gearbeitet wird, hat sich als vielversprechend erwiesen. Es ist jedoch wenig erforscht, wie diese Methode mit der zeitlichen Zielentfernung interagiert.

In einem experimentellen Design im Eventmanagement untersucht diese Arbeit, wie Rückwärtsplanung im Vergleich zur Vorwärtsplanung Motivation, Zielerwartung, wahrgenommenen Zeitdruck und Planungsschwierigkeit beeinflusst. Die Teilnehmer des Experiments planten ein Ereignis rückwärts oder vorwärts mit einer kurzen (ein Monat) oder langen (sechs Monate) Zielentfernung.

Die Ergebnisse zeigen, dass Rückwärtsplanung die Zielerwartung erhöht und den Zeitdruck besonders bei langfristigen Zielen verringert. Im Vergleich zur Vorwärtsplanung verbessert sie jedoch nicht die Planungsklarheit oder reduziert die Planungsschwierigkeit. Tatsächlich ist die Vorwärtsplanung mit geringerer wahrgenommener Schwierigkeit verbunden, wodurch sie für komplexe oder kurzfristige Ziele geeigneter sein könnte.

Diese Forschung bestätigt und erweitert die Arbeit von Park, Lu und Hedgcock (2017), indem sie die Vorteile der Rückwärtsplanung für langfristige Ziele hinsichtlich Motivation und Stressreduktion hervorhebt. Praktische Implikationen deuten darauf hin, dass sowohl Einzelpersonen als auch Organisationen Rückwärtsplanung für langfristige Projekte nutzen sollten, um Motivation und Zeitmanagement zu verbessern, während für unmittelbare oder komplexe Ziele die Vorwärtsplanung aufgrund der geringeren Schwierigkeit besser geeignet sein könnte.

Die Arbeit stellt fest, dass die zeitliche Zielentfernung die Vorteile der Rückwärtsplanung beeinflusst.

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1. The Significance of Strategic Planning in Personal Goal Pursuit

The significance of strategic planning cannot be emphasized enough in the domain of personal growth and success. Many individuals hold aspirations, whether professional milestones, educational pursuits, or personal growth objectives. However, simply having goals does not ensure their realization. Instead, the careful formulation and implementation of strategic plans lead to success. In formulating these strategic plans, it is essential to understand that different factors influence the clarity of objectives, motivation, and, ultimately, goal attainment.

Strategic planning for personal goal pursuit is essential for individuals seeking to achieve their aspirations efficiently and effectively. By adopting a structured approach to goal setting and action planning, individuals can clarify their objectives, identify potential obstacles, and develop strategies to overcome challenges. This deliberate process enhances focus, motivation, and accountability, increasing the likelihood of success in reaching desired outcomes (Gollwitzer & Oettingen, 2012).

Applying different methodologies and planning approaches to personal goal pursuit enables individuals to maintain clarity of purpose, prioritize tasks, and adapt strategies as needed (Riopel, 2019). Backward planning, also known as backward design or backward mapping, is a strategic approach commonly employed in various fields such as education, project management, and organizational development. This methodology begins with identifying the desired end goals or outcomes and then working backward to determine the necessary steps to achieve these objectives. By focusing on the results from the outset, backward planning aims to ensure that all activities and resources are aligned to meet the predetermined goals effectively and efficiently.

Despite its widespread application and intuitive appeal, the effectiveness of backward planning can be significantly influenced by various boundary conditions. These conditions include goal distance, resource availability, stakeholder involvement, and task complexity. While there is research on the efficiency of backward planning compared to forward planning in personal goal pursuits, there is a lack of comprehensive understanding of how boundary conditions interact with and impact the efficacy of backward planning. This paper seeks to fill this gap by systematically

examining the critical boundary condition of goal distance and how it influences the success of backward planning (Wiese, Buehler, & Griffin, 2016; Saaty & Vargas, 1982).

The primary objective of this thesis is to investigate the boundary condition of goal distance and how it affects the implementation and outcomes of backward planning. The paper aims to understand how backward planning, compared to forward planning, influences motivation, goal expectancy, plan clarity, perceived time pressure, and planning difficulty of participants in combination with different goal distance conditions in the case of complex goals. This study will focus on identifying and analyzing these effects in the context of event management.

To guide this investigation, the following research questions will be addressed:

- Are there benefits to backward planning in case of complex goals?
- Does goal distance act as a boundary condition for backward planning?
- How does goal distance affect the process and implementation of backward planning?

This thesis takes the existing research of Park, Lu, and Hedgcock (2017) about the relative effects of forward and backward planning on goal pursuit as a foundation. It furthers their experiment to reproduce their results and to test goal distance as a boundary condition on the effects of forward and backward planning. The research will employ an experiment for an event management scenario, where backward and forward planning will be implemented with low and high goal distances.

The thesis is structured as follows: Chapter 1 introduces the topic, outlines the research questions, and states the objectives. Chapter 2 reviews the existing literature on factors influencing planning, forward and backward planning, and boundary conditions across different fields. Chapter 3 details the research methodology, including the design of the case study. Chapter 4 presents the findings from the case study, highlighting the effects of goal distance and backward planning. Chapter 5 discusses the survey results, analyzing the prevalence and impact of these conditions and their implications for practice. Finally, Chapter 6 concludes the thesis with a summary of the findings and suggestions for future research.

2. Theoretical Background

2.1 Examining the Synergy Between Planning and Goal Pursuit: A Comprehensive Analysis

Studies suggest that planning is generally advantageous when engaging in self-control-related activities. As highlighted by Townsend and Liu (2012), examining the impact of planning reveals multifaceted implications from various perspectives. From a problem-solving perspective, planning has been shown to enhance organization and preparation before undertaking a task, as emphasized by studies conducted by Hayes-Roth and Hayes-Roth (1979) and Kreitler and Kreitler (1987). Moreover, Brewer and Dupree (1983) established that from a goal-pursuit perspective, planning serves as a fundamental mechanism, reminding individuals of their goals.

A critical dimension of planning lies in its capacity to translate abstract goals into specific actions, facilitating effective execution. Within this context, the deliberative versus implementive mindset framework, proposed by Gollwitzer, Heckhausen, and Steller (1990), provides valuable insights. This framework suggests that planning encourages individuals to transition from contemplating the value of a goal to deliberating specific steps necessary for goal achievement.

A more specialized form of planning, known as implementation intentions, further enriches the planning process. Expressed in "if-then" form, these intentions offer explicit guidance on when, where, and how individuals should strive for a particular goal, enhancing the precision and effectiveness of goal-directed actions (Gollwitzer, Heckhausen, & Steller, 1990). Exploring these dimensions contributes to a comprehensive understanding of the intricate role planning plays in shaping cognitive processes and behavioral outcomes.

Within the context of implementation intentions, research indicates that even without explicit “if-then” structures, planning for specific behaviors significantly contributes to self-control. Levav and Fitzsimons (2006) highlight the impact of stating positive behavioral intentions and increasing behavior accessibility. Furthermore, planning establishes concrete standards for action, enhancing the likelihood of performing these actions (Sniehotta, Schwarzer, & Scholz, 2005). Extending beyond the specifics of planning, broader research consistently underscores the crucial role

planning plays in facilitating self-regulation. Transforming abstract goals into concrete implementation steps makes actions more accessible and easier to self-monitor.

Locke and Latham (1991) outline four goal mechanisms through which goals influence performance: the directive function, which focuses attention and effort on goal-relevant activities; the energizing function, where challenging goals increase effort; the persistence influence, which encourages sustained effort over time; and the indirect impact through arousal, discovery, and task-relevant knowledge and strategies, enhancing problem-solving and performance. These mechanisms collectively improve goal-directed behavior and the likelihood of achieving desired outcomes.

As Dalton and Spiller (2012) outlined, conceptual development portrays successful goal pursuit as a multistage process. Setting and committing to goals, planning to achieve them, defining goals as desired end states, and executing planned actions in goal-relevant situations are crucial steps. This aligns with Miller, Galanter, and Pribram's (1986) perspective.

Unlike traditional approaches that predominantly emphasize the advantages of planning (Latham & Locke, 2002; Locke & Latham, 1991; Parks-Stamm & Gollwitzer, 2009), present research contributes to a growing body of literature that explores circumstances in which planning may not yield benefits for goal pursuit. Noteworthy contributions to this emerging perspective include studies by Bayuk, Janisewski, and Leboeuf (2010), who found that excessive planning can lead to overthinking and anxiety, reducing action-taking. Cohen, Jaudas, and Gollwitzer (2008) noted that rigid plans limit adaptability in the face of unexpected challenges. Dewitte, Verguts, and Lens (2003) highlighted that meticulous planning could foster procrastination by delaying execution. Ülkümen and Cheema (2011) showed that detailed plans might create a false sense of control, leading to complacency. Townsend and Liu (2012) found that planning could increase stress, impairing performance in high-stakes situations. These findings underscore the need for a nuanced understanding of how different contexts affect the role of planning in goal pursuit. This shift in focus adds depth to existing knowledge by explaining conditions where planning may not be conducive to effective goal pursuit. The next chapter will look into possible conditions influencing the planning process and, thereby, the goal pursuit.

2.2 Factors Influencing Planning and Goal Pursuit

As stated in the previous chapter, recent research delves into the conditions under which planning, typically considered a beneficial self-regulatory strategy, can negatively affect goal pursuit. This adverse impact involves various mechanisms, encompassing specific plan formats, distinctions between in-plan and out-of-plan actions, the individual's current construal level, and the number of goals under consideration (Townsend & Liu, 2012).

For instance, when implementation intentions are framed in an "if, then not to do" structure, the likelihood of engaging in the to-be-avoided behavior increases due to its heightened accessibility (Adriaanse, Gollwitzer, De Ridder, De Wit, & Kroese, 2011). Concrete planning, as explored by Bayuk, Janisewski, and Leboeuf (2010), diminishes the ability to act on goal-consistent opportunities outside the plan. This causes a focus on in-plan activities while diminishing appreciation for activities that align with the goal but are not explicitly included in the plan.

Moreover, adopting a savings approach focusing on "how" rather than "why" has been found to undermine saving efforts (Ülkümen & Cheema, 2011). Forming implementation intentions for multiple goals simultaneously, as observed by Dalton and Spiller (2012), can weaken goal commitment.

2.2.1 Self-efficacy/ Confidence

Within Bandura's (1986) social-cognitive theory, self-efficacy is a pivotal concept denoting task-specific self-confidence. It surpasses the scope of effort-performance expectancy in expectancy theory, containing all elements contributing to effective task performance, such as adaptability, creativity, resourcefulness, and the perceived ability to orchestrate complex action sequences. The measurement of self-efficacy involves subjects expressing their belief in achieving various performance levels (self-efficacy magnitude) and rating their confidence in reaching each level (self-efficacy strength). Self-efficacy’s robust and direct influence on performance is consistently demonstrated (Bandura, 1997).

2.2.2 Goal Commitment

According to Latham and Locke (2002), goal commitment and task complexity are two essential moderators that play a significant role in goal-setting. Dalton and Spiller (2012) study how commitment, specifically established during the planning phase of

pursuing a goal, influences subsequent behavior when executing that goal. Traditionally, research has predominantly focused on goal execution behavior (Brandstätter, Lengfelder, & Gollwitzer, 2001). However, Dalton and Spiller's research introduces a new perspective by emphasizing that the effectiveness of implemental plans (plans that outline specific actions to achieve a goal) remains consistent despite external factors that might be seen as limiting (referred to as "boundary factors"). They argue that this consistency is due to the automatic nature of goal execution once plans are in place.

When establishing implementation intentions, individuals intentionally create links between goal-relevant behaviors and future contextual cues in memory. This deliberate linkage enables individuals to recognize relevant contextual cues easily and execute planned actions automatically. Even in the presence of distractions, hidden cues, or challenging goal execution circumstances, the automatic execution of goals with implementation intentions depends on the level of goal commitment (Brandstätter, Lengfelder, & Gollwitzer, 2001; Sheeran, Webb, & Gollwitzer, 2005).

The relationship between goals and performance is most robust when individuals are highly committed to their goals. Goal commitment is crucial, particularly in challenging situations where goals demand considerable effort and are associated with lower probabilities of success. Assessing goal commitment through questionnaires has shown high reliability and validity, as Seijts and Latham (2000) demonstrated. The factors influencing goal commitment include the motivation derived from the reasons why goal attainment is essential and the belief in one's self-efficacy to achieve the goal.

Contrasting perspectives emerge when examining the relationship between goal commitment and planning. Traditional views, such as those presented by Sheeran, Webb, and Gollwitzer (2005) and Parks-Stamm and Gollwitzer (2009), posit that a solid commitment to a goal naturally leads to formulating plans. Recent studies, including those by Dalton and Spiller (2012), challenge this notion by suggesting that planning can, in specific contexts, undermine the very commitment that prompted the planning process initially. This contrast emphasizes the need for a nuanced understanding of the interplay between commitment, planning, and goal pursuit.

2.2.3 Goal Complexity

According to Latham and Locke (2002), task complexity is the other key moderator. As task complexity increases, individuals must employ higher-level skills and strategies that may not yet be fully automated. The intricacies of complex tasks require a more deliberate and conscious application of cognitive resources, making task complexity a critical factor in the goal-setting process.

Moreover, a specific goal assumes a regulatory role in determining effort or energy expenditure (i.e., intensity), where individuals tailor their effort in response to the task or goal difficulty level. This forms the core explanation of the goal difficulty effect, which holds positively when the effort is measured in terms of physical exertion (Bandura & Cervone, 1983), work rate (Bryan & Locke, 1967), subjective ratings, third-party effort assessments (Terborg & Miller, 1978), and physiological indicators.

Addressing goal difficulty as an attribute (Locke & Latham, 1991), the empirical research clarifies a consistent finding: the higher the goal difficulty, the greater the performance. This phenomenon is primarily attributed to individuals adjusting their effort levels to the task's difficulty, exerting more effort for challenging goals than easier ones. Locke and Latham's (1991) goal-setting theory explores performance disparities among individuals in work tasks, emphasizing the impact of goal difficulty on performance. Atkinson's (1958) research reveals optimal effort exertion when a task is moderately difficult.

On the other hand, expanding on Vroom's (1964) valence-instrumentality-expectancy theory, the force to act is shaped by anticipated satisfaction, belief in rewards, and expectancy. While expectancy positively correlates with performance, challenging goals introduce hurdles, resulting in a negative correlation between expectancy and performance.

2.2.4 Goal Distance

Building on this emerging body of findings, an additional dimension is proposed to influence the effect of planning: Goal Distance. In examining goal-setting practices, the distinction between low-distance (proximal) and high-distance (distal) goals emerges as a critical factor influencing self-regulation and performance outcomes.

Despite the widespread endorsement of both types of goals, there has been a notable absence of investigations into their relative effectiveness on self-regulation. A review

of the literature up to 1989 provided inconsistent results (Locke & Latham, 1991). Nevertheless, a study by Stock and Cervone (1990) sheds light on the efficacy of low-distance goals as potent self-regulators, influencing performance in multiple ways.

Firstly, Stock and Cervone observed that assigning a low-distance goal significantly increased an individual's initial self-efficacy for task completion. Specifically, individuals who were given both low- and high-distance goals showed notably higher initial self-efficacy ratings compared to those assigned only high-distance goals. This suggests that breaking down the task into smaller, manageable parts (low-distance goals) enhanced perceived manageability and confidence in performing the task from the outset. Secondly, the positive impact of achieving low-distance goals on self-efficacy was also evident over time. As individuals reached these subgoals, their confidence continued to grow. In contrast, those who achieved a similar level of performance without being aware of the low-distance goals did not experience the same boost in self-efficacy. This indicates that the awareness and accomplishment of subgoals are crucial for sustained self-efficacy enhancement. Thirdly, attaining the low-distance goal positively influenced self-evaluative reactions, leading to more significant progress satisfaction than those without low-distance goals.

Lastly, individuals with low-distance goals displayed increased persistence on the task, demonstrating a sustained commitment beyond those without such goals. Stock and Cervone (1990) concluded that setting proximal (low-distance) goals positively influences self-reflective thoughts, motivation, and overall task performance, particularly when uncertain about one's ability in complex endeavors.

Despite their overall efficacy, low-distance goals may fail to be implemented in certain contexts. In long-term behavior change programs, especially when individuals are highly interested in the activity, moderately distant goals may offer more flexibility in tactical approaches than low-distance goals (Kanfer & Grimm, 1978). The rigorous standards associated with specific, low-distance goals in such scenarios may hinder critical thinking and problem-solving by diverting attention to non-task-related activities (Wood & Bandura, 1989).

Another hypothesis on goal distance is the goal-gradient hypothesis, as expounded by Kivetz, Urminsky, and Zheng (2006). It draws inspiration from behaviorist Clark Hull's original concept in 1932, asserting that the inclination to approach a goal intensifies as one nears its realization. This theory extends beyond the realm of

animals, examining its applicability to human behavior. The hypothesis states that individuals exhibit an increased expenditure of effort as they approach a reward, similar to the observed behavior in animals. Additionally, the perception of progressing toward a goal stimulates accelerated actions, particularly evident in consumer purchasing behaviors.

Embedded within dynamic motivation models proposed by Atkinson (1957) and Miller N. E. (1944), the goal-gradient hypothesis aligns with social cognition theories and human decision-making. These theories emphasize the significant influence of goals on the strong achievement drive inherent in human psychology. One noteworthy aspect of this research is its focus on relative goal distance, emphasizing the spontaneous distance remaining to the goal. The study examines achievements not only in terms of temporal proximity but also in the context of accomplishments. It suggests that achievement motivation intensifies as goal distances diminish, indicating a heightened commitment to the goal. Within this framework, temporal proximity emerges as a crucial factor that enhances the perceived value of rewards. As individuals approach the threshold of reward attainment, there is an observable increase in persistence, rate, and magnitude of effort devoted to goal pursuit. Thus, the goal-gradient hypothesis offers valuable insights into the intricate dynamics of human motivation and behavior in pursuing goals.

A series of five experiments conducted by Townsend and Liu (2012) delves into the intricate dynamics of goal pursuit by examining two fundamental variables: goal distance and the formulation of concrete implementation plans.

In line with previous studies, the study states that planning concrete implementations can facilitate self-control, particularly when an individual is close to achieving a goal. However, the paradoxical finding emerges that when a person is considerably distant from their goal, engaging in such planning may ironically lead to diminished self-control compared to situations where no plan exists (Townsend & Liu, 2012).

To unravel the mechanisms behind this unexpected negative effect, the research explores the interplay between recognizing the distance to a goal and adopting a concrete view of the implementation process toward that goal. This combination creates a sense of distress for the individual, ultimately deterring them from actively pursuing the goal (Townsend & Liu, 2012). The study sheds light on the nuanced

factors influencing the relationship between goal distance, concrete planning, and the subsequent impact on self-control in the context of goal pursuit.

Notably, the feeling of distress from planning occurs specifically for individuals in poor goal standing. For those far from their goal, the concrete view of implementation becomes distressing due to the actions needed for goal achievement. This distress is emphasized when participants plan with detailed steps, creating a clear picture of their goal through backward planning (Townsend & Liu, 2012).

Crucially, Townsend and Liu (2012) assert that the distress caused by planning is unique to those in poor goal standing. For those close to their goal, seeing the concrete implementation toward the goal is unlikely to cause psychological distress because, regardless of the efforts prescribed in the plan, one is sufficiently close to the goal such that goal accomplishment is not perceived as overwhelming—an absolute goal distance (in time alone) may not be sufficient to elicit the feeling of being too far from the goal.

The research findings underscore a significant discrepancy: Without planning, individuals more distant from a goal are equally or even more motivated to pursue it than those closer. However, with planning, they become more demotivated, aligning with the goal-gradient hypothesis. This discrepancy arises because the effect of goal distance is contingent on how this distance is psychologically represented. When represented abstractly as a gap between an ideal and the current state, a significant gap might be motivating; however, when the distance is framed in terms of concrete implementation, the classic goal gradient effect emerges strongly. Individuals far from the goal become distressed and consequently demotivated, providing crucial insights into the interplay between goal distance, planning, and motivation (Townsend & Liu, 2012).

In conclusion, the existing literature reveals several key insights about the relationship between goal distance and motivation for goal pursuit (Hull, 1932; Kivetz, Urminsky, & Zheng, 2006). Proximity to a goal is negatively correlated with the effort invested in reaching that goal, suggesting that individuals are more willing to exert effort when the goal is perceived as close (Hull, 1932; Kivetz, Urminsky, & Zheng, 2006). The value of incremental progress holds greater significance for those perceiving themselves as close to the goal, positively impacting behavior (Bandura & Karen,

1977). Additionally, the perceived probability of failure increases with goal distance, introducing elements of anxiety and demotivation (Bandura, 1997; Huber, 1985).

The goal gradient effect is also influenced by the visualization of goal outcomes, with concrete visions making the goal appear closer for those in close proximity while having little impact on those far from the goal (Cheema & Bagchi, 2011). The goal-gradient effect is not solely linked to abstract goal distance. Instead, it relies on the implications of this distance in terms of effort, difficulty, and the probability required to achieve the goal (Bandura, 1997; Bandura & Karen, 1977). While an abstract awareness of a significant goal distance alone may not be significantly demotivating, the overall outlook becomes daunting for the individual when combined with concrete considerations of goal implementation resulting from planning (Townsend & Liu, 2012). Thus, planning for a high-distance goal might harm goal execution and motivation. This possibility, in combination with backward and forward planning, will be closely examined as part of this research.

2.3 Previous Research on Backward Planning

Previous research on backward planning was conducted by Wiese, Buehler, and Griffin. Their research is based on the notion that individuals often underestimate the time needed to complete tasks, and backward planning can help counteract this optimistic bias. The backward planning method has produced more realistic plans by starting at the end goal and working backward through the required steps. Four experiments compared backward, forward, and unspecified planning on task completion time predictions, finding that backward planning led to longer and less biased predictions, increased attention to potential delays and obstacles, and altered perceptions of time. (Wiese, Buehler, & Griffin, 2016)

In Study 1, backward planning resulted in longer, more accurate task completion predictions, with participants more likely to anticipate delays and obstacles, disrupting idealized planning scenarios. Study 2, focused on a school assignment, found backward planning reduced optimistic bias and led to later predicted completion and start times, though the number of hours predicted for the task was unaffected. Study 3, which involved actual tasks, confirmed less optimistic predictions with backward planning, though it did not affect perceived planning insights or anticipated obstacles. Study 4 replicated the effect on predicted completion times for real projects and showed backward planning improved prediction accuracy without affecting actual

completion times, with some influence on predicted start times and time spent on tasks.

Overall, backward planning consistently led to later and more realistic task completion predictions, reducing optimistic bias across different scenarios and task types. It increased the anticipation of obstacles and novel planning insights, influencing participants' time-motion perspectives. This easily implementable and adaptable method was found to possibly significantly improve time management and planning accuracy. The authors suggest that future research could explore different forms of backward planning, its effects in group settings, and its applicability to other predictions prone to optimistic bias, considering personal characteristics and contextual factors that moderate the impact. Empirically validated, backward planning mitigates optimistic bias in task completion predictions by influencing higher-order cognitive processes and highlighting potential obstacles, proving useful for planning and time management.

Another study, conducted by Rollier and Turner in 1994, examined backward planning and suggested that it leads to richer, more detailed descriptions of events and improved planning by generating more unique ideas and higher-quality plans.

The authors found that retrospective thinking helps visualize future outcomes by anchoring them in time and making them more sensible. This technique, though requiring strong imaginative capabilities, can stimulate more creative ideas by overcoming entrenched cognitive habits. Organizations facing high uncertainty may benefit from using retrospective thinking to enhance flexibility and innovation in decision-making processes. This method can improve the generation of alternative strategies and potentially lead to better preparation for uncertain futures.

The study investigates whether retrospective thinking produces more planning ideas and higher-quality plans than prospective thinking. It suggests that while retrospective thinking generates more ideas, the quality of these ideas does not necessarily surpass those generated prospectively. The authors suggest that future research should explore the characteristics that make some individuals more adept at retrospective thinking and how this technique could be practically applied in organizational planning and decision-making. (Rollier & Turner, 1994)

2.4 Park, Lu, and Hedgcock's "Relative Effects of Forward and Backward Planning on Goal Pursuit" (2017)

The research in this master's thesis is based on Park, Lu, and Hedgcock's article "Relative Effects of Forward and Backward Planning on Goal Pursuit" (2017). This article describes their research on the effects of planning order on motivation for and understanding of the necessary steps to goal achievement.

In their paper, the authors hypothesize that "different orders of planning affect people's motivation for and perceptions of goal pursuit." (Park, Lu, & Hedgcock, 2017) This hypothesis is based on two existing research lines. The first research line suggests that individuals thinking about a future event either adopt a prospective or retrospective perspective. These differences in temporal perspectives influence how the events are perceived and the individuals' predictions about these events. A retrospective perspective allows for easier visualization of future events and eases understanding of the necessary steps to make an event happen. The second research line states that mental simulation facilitates goal-oriented behavior. These mental simulations include envisioning the required steps toward the goal, leading to more fruitful actions, increased confidence, less anxiety, and expecting success instead of failure. This leads to better performance and a goal that seems closer in time. Additionally, it enables mental contrasting, which helps recognize reachable and unreachable goals, which leads to selective goal commitment and effective management of resources.

Before defining hypotheses for the research, the authors explain *backward* and *forward planning*. Backward planning means planning the steps to reach a goal in reverse chronological order, starting with mentally picturing when the goal is reached and continuing with detailed steps to achieve the goal, beginning with the step furthest from the present and ending with the step closest to today. The authors hypothesize that backward planning will enable retrospective thinking and a clear view of the plan and steps to reach a goal. Mental contrasting will help planners see the reality of today; they need to overcome and selectively commit to essential steps to achieve their goals. Imagining goal completion will lead to feeling more comfortable about and closer to the goal. In summary, backward planning results in greater motivation, higher goal expectancy, and less time pressure in goal pursuit. The researchers suggest that backward planning will be beneficial in complex planning, when goal pursuit involves complex timing and sequencing with steps depending on each other,

since backward planning limits the number of steps coming to mind and, through that, improves the plan and step clarity.

Forward planning means planning the steps to reach a goal in chronological order, starting by inferring from the present situation to the desired future and by planning from the step temporally closest to today and ending with the step furthest. Park, Lu, and Hedgcock hypothesize that forward planning difficulty is visualizing all sequentially related steps for goal attainment since considering a few future alternatives will lead to the exponential emergence of different options and possibilities. This will lead to a vague view of the essential steps and plan necessary for goal achievement with uncertainty in time management. Additionally, considering present issues first and future goals later will remove the motivational benefits of mental contrasting. Overall, forward planning will lead to less motivation, lower goal expectancy, worse quality of plan construction, and more significant time pressure.

The authors conducted four experiments to prove their hypotheses. All of them involved participants constructing plans to attain goals. One group of participants used forward planning, and the other used backward planning. The experiments took place in different situations and applied to different goals.

The first experiment was about exam and job interview preparations and measured the effect of planning order on motivation. The results showed that backward planners were more motivated and intended to make more effort to reach their goals. The second experiment was about a seven-day study plan with regular check-ins on goal progress. The results showed that backward planning had a higher completion level than forward planning. The third study was on the effect of planning order on actual academic performance. The participants prepared an actual study plan for their exam and were questioned about their desired grades and level of involvement while planning. While there was no significant difference between the desired grades of backward and forward planners, the backward planners performed significantly better on the exam than forward planners.

The last experiment was on goal complexity as a moderator and perceived clarity as a mediator. For different levels of complexity, a study plan for a midterm and a final exam was constructed. Questions about the perceived clarity of the plan, goal expectancy, and time pressure were asked during plan construction. The results showed that the assumption that planning for a final is more complex than planning

for a midterm was right. The planners planning with a higher goal complexity had marginally more significant motivation among backward planners than forward planners. The goal expectancy of backward planners was higher, while time pressure was perceived as lower. In the low goal complexity condition, planning order had no corresponding effects on motivation, and backward planners felt more time pressure than forward planners. The planning order also did not affect the perceived clarity of the plan when goal complexity was low. For high goal complexity, the backward planners felt clearer about planned steps, which led to higher motivation.

Before Park et al.'s research, abundant research demonstrated that planning affects goal pursuit, but little attention was paid to how plans are constructed and their effects. In summary, Park et al.'s results are as stated:

- Backward planning leads to greater motivation and better goal-directed behavior than forward planning.
- Backward planning, relative to forward planning, allows individuals to anticipate the necessary steps more clearly and follow the original plan to reach the set goal.
- Backward planning has higher goal expectancy and less time pressure when coordinating necessary steps to accomplish a complex goal. If the situation is relatively complex, these results seem consistent and generalizable in several settings.
- In line with the fantasy-realization theory, backward planning allows a clear view of essential steps, including obstacles, and effective goal pursuit management, ultimately leading to higher goal expectancy and lesser time pressure instead of an unclear view predicted in forward planning.
- Although this effect was only observed in one of their studies, backward planning benefits planning most vital in the middle of goal pursuit when individuals suffer most from decreased motivation. The relative effectiveness of backward planning compared with forward planning over time needs to be further researched.

One limitation of this research is the role of individual differences. Individual demographic factors or personal experiences may lead to differences in disposition towards backward or forward planning. According to the authors, how these individual dispositions affect goal pursuit needs to be examined (Park, Lu, & Hedgcock, 2017).

Based on the results of their research, this paper will further investigate the effects of backward planning compared to forward planning and mainly focus on their fourth experiment, which explores the impact of goal complexity in combination with planning order.

3 Building the Research Experiment

3.1 Boundary Conditions

As Busse, Kach, and Wagner (2017) outlined, boundary conditions encompass the "who, where, when" aspects of a theory, connecting to the boundaries in time, space, and the researcher's values. They describe the limits of a theory's generalizability, providing crucial parameters for theoretical propositions. Scholars widely acknowledge the significance of establishing boundary conditions, as these conditions impose limitations on the propositions generated from a theoretical model, defining the temporal and contextual factors that set the boundaries of generalizability (Whetten, 1989).

In the context of a given theory, boundary conditions depict the accuracy of theoretical predictions across various contexts, assessing the theory's generalizability. A construct's range signifies the contexts where it holds the same intended meaning, and its boundary marks the outer edge where the meaning changes. The boundary condition of a construct can be conceptualized as a function that describes the extent to which the meaning remains consistent (Whetten, 1989).

Four distinct approaches to exploring boundary conditions are identified: inside-out exploration, outside-in exploration, exploration under uncertainty, and serendipitous exploration. The inside-out exploration approach, primarily theoretical, focuses on further developing the theory by investigating its applicability in slightly different contextual conditions. Scholars employing this approach consciously explore unknown territory, recognizing it as a "known unknown." This research process is characterized as a "tame problem," involving a problem statement and organized phases leading to a better understanding of boundary conditions.

In contrast, the outside-in exploration approach delves into boundary conditions by first concentrating on a context where the theory is evidently inapplicable. This theoretical perspective aims to explore boundary conditions while often striving to

develop new theories specific to the identified context. Scholars pursuing this approach acknowledge the theory's limited applicability in the context under examination.

The remaining two approaches, exploration under uncertainty and serendipitous exploration, deviate from directly investigating the theory's boundary condition. Instead, they pursue different goals and borrow from the theory consciously or unconsciously, contributing to a nuanced understanding of boundary conditions in the research context.

Based on Park, Lu, and Hedgcock's (2017) paper, this research will examine goal distance as a boundary condition with an inside-out approach. It will further develop its theory and findings by exploring its applicability in slightly different contextual conditions.

Considering their research about the effects of backward and forward planning, this research will primarily focus on the following findings:

- Backward planning has higher goal expectancy and less time pressure when coordinating necessary steps to accomplish a complex goal. If the situation is relatively complex, these results seem consistent and generalizable in several settings.
- In line with the fantasy-realization theory, backward planning allows a clear view of essential steps, including obstacles, and effective goal pursuit management, ultimately leading to higher goal expectancy and lesser time pressure than an unclear view predicted in forward planning.
- In the low goal complexity condition, planning order has no corresponding effects on motivation. (Park, Lu, & Hedgcock, 2017)

Based on these findings, this experiment will further investigate the indicated positive effect of backward planning in cases of high goal complexity. Thus, the subjects will plan a task with high goal complexity, either backward or forward.

As a boundary condition, goal distance will be investigated. As stated in this paper, the pursuit of goals is influenced by various factors, including goal distance, planning, and motivation. Long-term goals require detailed planning and high motivation, often involving multiple steps and the establishment of short-term objectives as critical

milestones. Achieving these goals demands deliberate planning, unwavering commitment, significant effort, and time investment. However, their distant nature may decrease motivation toward long-term objectives (Dalton & Spiller, 2012). Conversely, short-term goals offer immediate results and are more manageable, providing quick gratification and visible progress within specific deadlines and shorter timeframes.

While the relationship between goal distance and planning has been extensively studied, the relationship between backward planning and goal distance has not been researched yet. Planning can enhance self-control as individuals approach their goals. It may paradoxically reduce self-control when the goals are distant (Townsend & Liu, 2012). This highlights the intricate dynamics involved in goal pursuit, emphasizing the need to understand these complexities to effectively achieve short-term and long-term goals with backward and forward planning.

This paper will shed light on the effects of complex backward and forward planning on short-term and long-term goals.

3.2 Hypotheses

The findings from the study conducted by Park, Lu, and Hedgcock (2017) indicate that for goals characterized by high complexity, backward planning consistently yields higher motivation than forward planning. Moreover, their research highlights that backward planning is associated with higher goal expectancy and less perceived time pressure than forward planning. Based on the findings of Dalton and Spiller (2012) and Townsend and Liu (2012), this research tested if planning for a high-distance goal could negate the positive impact of backward planning (Park, Lu, & Hedgcock, 2017). This experiment aimed not only to explore if Park, Lu, and Hedgcock's findings can be repeated in a similar setting but also explored its applicability in slightly different contextual conditions with goal distance as the boundary condition.

This observation prompted the following research question: "Does Goal Distance Act as a Boundary Condition Influencing the Benefits of Backward Planning?"

The following hypotheses were formed:
H1: Backward planning has no benefits in the case of complex goals.
H2: The benefits of backward planning are not influenced by goal distance.

H3: When goal distance is high, the motivation and commitment to reach the goal for backward planning will not be higher than for forward planning.
H4: When goal distance is high, the goal expectancy for backward planning will not be higher than for forward planning.
H5: When goal distance is high, the perceived time pressure for backward planning will not be lower than for forward planning.
H6: When goal distance is high, the perceived goal clarity for backward planning will not be higher than for forward planning.
H7: When goal distance is high, the reported planning difficulty will not be lower for backward planning than for forward planning.

3.3 Method

To test the hypotheses, an experimental research study to compare the effects of backward and forward planning on low- and high-distance goals was designed. Since Park, Lu, and Hedgcock detected high complexity as a precondition for backward planning to be more effective, the complexity was manipulated to be high throughout the experiment.

The study tested the boundary condition of goal distance in four complex conditions. It was conducted in a 2 (planning order: forward vs. backward) x 2 (goal distance: high-distance vs. low-distance) between-participants design.

- Group 1: Low-distance x forward planning
- Group 2: Low-distance x backward planning
- Group 3: High-distance x forward planning
- Group 4: High-distance x backward planning

Participants were randomly assigned to one of the experiment groups. Low distance was defined as one month, and high distance was described as six months until goal fulfillment.

In each group, every participant had to plan the organization of an event by correctly sequencing nineteen fixed activities that might overlap or take place simultaneously. The number of steps, the possible overlapping, and the existence of several correct planning sequences led to high task complexity. The temporal direction of their planning and the goal distance were manipulated depending on their assigned group.

Participants in the backward planning condition listed the steps in reverse chronological order, while the forward planners listed their steps chronologically. After creating their lists of steps, each participant was asked to participate in a survey. Each question had to be answered on a scale from 1 (=not at all/strongly disagree) to 7 (=definitely/strongly agree). The questions measured perceived clarity of tasks, motivation, goal expectancy, perceived time pressure, and goal complexity.

The survey questions were based on Park, Lu, and Hedgcock's research to reproduce comparable results:

1. Perceived Task Clarity: To what extent do you feel that the things you need to do in order to prepare for the event are clear to you? (Park, Lu, & Hedgcock, 2017)
2. Motivation: How much effort will you allocate in planning this event? / How much will you strive to have a successful event? (Park, Lu, & Hedgcock, 2017)
3. Goal Expectancy: What is the probability that you will have a successful event in 1 month/ 6 months? / Are you optimistic about having a successful event in 1 month/ 6 months? (Louro, Pieters, & Zeelenberg, 2007)
4. Perceived Time Pressure: Do you feel you are short of time in organizing this event? / Do you think you have sufficient time to complete all the steps in 1 month/ 6 months? (Durham, Locke, Poon, & McLeod, 2000)
5. Goal Complexity: It was difficult to plan things to do in (reverse) chronological order. / It was easy to establish the event plan in (reverse) chronological order. (Park, Lu, & Hedgcock, 2017)

The experiment was designed similarly to the original study of Park, Lu, and Hedgcock, setting the power to .80 to detect an effect (Cohen's d) of .90 with an alpha of .05. This led to the same sample size of a minimum of 21 participants per group, which was rounded to 25 participants per condition.

One hundred and four participants (71.2% female, 26.9% male, 1.9% other; mean age = 26.45 years) participated in the experiment via an online survey. Twenty-seven participants planned with the low-distance and forward planning, twenty-six with the low-distance and backward planning, twenty-six with the high-distance and forward planning, and twenty-five with the high-distance and backward planning condition.

Participants completed a self-administered online survey to investigate how individuals plan for future events. Initially, participants provided demographic information, including age, gender, and academic status. They were then presented with a scenario in which they worked for the marketing/sales team of PapaClips, a company that sells paper clips. In this scenario, participants were tasked with planning a speaker's event for their customers following a team meeting.

Participants were instructed to develop a detailed plan for organizing the speaker's event by sequencing a set of given tasks. Participants were randomly assigned to one of four conditions to examine the effects of planning direction and goal distance. Before beginning the survey, participants were given explanations of backward and forward planning methods. They were also informed of the time available (either one month or six months) to plan the event. Following the instructions to plan backward or forward, the starting point for backward planning was the event itself. Conversely, the starting point for participants in the forward planning condition was the team meeting where they were initially assigned the planning task.

4 Results

Before analyzing the results, invalid results with participants not following instructions were filtered. Two of the groups conducted the experiment in German. These groups' results and surveys were translated into English. All results were translated into variables and fed into JASP, an open-source statistics program. The reverse questions in the survey were reverse quoted. Frequencies, descriptives, and median were recorded and calculated.

4.1 Planning Difficulty

Planning Difficulty is the challenge of planning a specific task or objective. When a goal is more complex, individuals tend to exert more effort or energy to achieve it. This heightened effort results from individuals adjusting their exertion levels in response to the task's difficulty. Consequently, performance tends to improve with higher goal difficulty as individuals allocate more resources and effort toward accomplishing challenging objectives. (Höpfner & Keith, 2021)

Additionally, goal complexity plays a role in determining the difficulty of planning for a goal. Complex goals involve multiple steps or require intricate planning, increasing

their perceived difficulty. For example, planning tasks in reverse chronological order may be more challenging than doing so in chronological order. This complexity can influence individuals' efforts toward goal attainment and ultimately impact their performance. (Lenzen, Daniels, van Bokhoven, van der Weijden, & Beurskens, 2017)

In the following section, the effect of planning order and goal distance on participants' perceived planning difficulty will be analyzed.

4.1.1 Testing Correlation Between Planning Difficulty Values

Pearson's Correlations

Variable		Complexity1	Complexity2
1. Complexity1	Pearson's r	—	
	p-value	—	
	Upper 95% CI	—	
	Lower 95% CI	—	
2. Complexity2	Pearson's r	0.750***	—
	p-value	< .001	—
	Upper 95% CI	0.824	—
	Lower 95% CI	0.652	—

* p < .05, ** p < .01, *** p < .001

Table 1: Pearson's Correlations – Complexity1 and Compexity2 (JASP)

The measures of planning difficulty (Goal Difficulty = Complexity1 & Ease of Planning = Complexity2 (the latter reverse coded)) for all groups were strongly correlated (r = .750, 95% CI = [.652, .852], p < .001). Based on these results, the measures of planning difficulty to provide an index (Complexity12) were averaged.

4.1.2 ANOVA Planning Difficulty

Test for Equality of Variances (Levene's) ▼

F	df1	df2	p
0.811	3.000	100.000	0.491

Table 2: Planning Difficulty: ANOVA Assumption Check (Levene's) (JASP)

Results met the assumption for homogeneity of variances, as assessed by Levene's test for equality of variances (p > .05).

ANOVA – Complexity12

Cases	Sum of Squares	df	Mean Square	F	p	η^2	ω^2
TimeFrameNum	0.031	1	0.031	0.014	0.908	1.095×10^{-4}	0.000
PlanningTypeNum	53.741	1	53.741	23.721	< .001	0.192	0.182
TimeFrameNum ✻ PlanningTypeNum	0.152	1	0.152	0.067	0.796	5.408×10^{-4}	0.000
Residuals	226.553	100	2.266				

Note. Type III Sum of Squares

Table 3: Planning Difficulty: ANOVA

To interpret the results, the p-values for the main effect of factor one (hypothesis one), the main effect of factor two (hypothesis two), and the interaction (hypothesis three) were examined. If the p-value was less than the alpha level of .05, the null hypothesis was rejected.

1) *H0(1): There is no main effect of goal distance on the reported planning difficulty of participants.*

   The group means of the first factor, goal distance (TimeFrameNum), show no significant statistical difference, as indicated by a p-value of .908. Since the p-value exceeds the predetermined alpha level of .05, the first null hypothesis was not rejected. Therefore, it was concluded that goal distance has no main effect on planning difficulty (Complexity12).
   Main Effect for Goal Distance: F(1, 100) = .014, p = .908, ω2 = .00

2) *H0(2): There is no main effect of planning order on the reported planning difficulty of participants.*

   The group means of the second factor, planning order (PlanningTypeNum), exhibit a significant statistical difference, with a p-value < .001. Since the p-value falls below the alpha level of .05, the second hypothesis was rejected. This indicates a main effect of planning order on planning difficulty (Complexity12).
   Main Effect for Planning Order: F(1, 100) = 23.721, p < .001, ω2 = .182

3) *H0(3): There is no significant interaction between goal distance and planning order on reported planning difficulty for participants.*

   No significant interaction is observed between goal distance and planning order, as evidenced by a p-value of .796. Since this p-value exceeds the predetermined alpha level of .05, the third null hypothesis cannot be rejected.

Consequently, it was concluded that there is no significant interaction between goal distance and planning order concerning perceived planning difficulty for participants.

Main Effect for Interaction Goal Distance x Planning Order:

F(1, 100) = .067, p = .796, ω2 = .00

A 2 (planning order) x 2 (goal distance) ANOVA revealed only a significant main effect of planning order. Planning backward led to a higher planning difficulty (M=4.824, 95% CI = I4.373, 5.274I) than forward planning (M=3.387, 95% CI = I3.008, 3.766I).

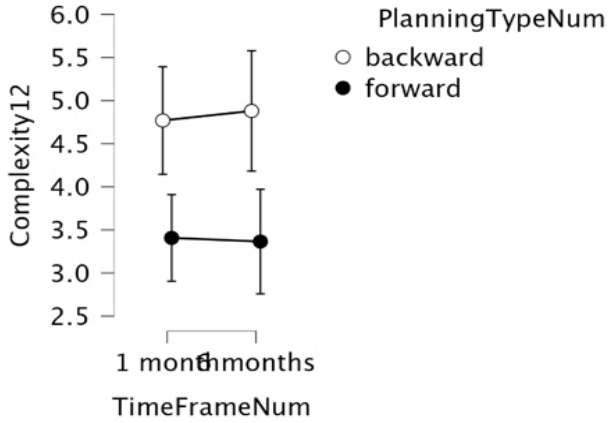

Figure 1: Planning Difficulty: ANOVA - Descriptive Plots (JASP)

Examining the descriptive plots on the left revealed an ordinal interaction, where the group means in the graph do not intersect or overlap. Forward planners reported significantly lower planning difficulty than backward planners. This confirmed the assumption that backward planning has no positive impact on planning difficulty; on the contrary, it leads to higher planning difficulty.

4.1.3 Mediation of Planning Difficulty

Mediation analysis is a statistical technique that aims to understand how one variable influences another through an intermediary variable. It helps researchers investigate the mechanism or process through which an independent variable affects a dependent variable. By examining whether the effect of the independent variable on the dependent variable is explained or "mediated" by one or more intermediary variables, mediation analysis provides insights into the underlying relationships between variables. This method is valuable for unraveling the complex interplay of factors within the research framework, enhancing the understanding of causal pathways, and contributing to more nuanced interpretations of study findings. (van Kesteren, 2020)

Direct effects

			Estimate	Std. Error	z-value	p	95% Confidence Interval Lower	Upper
PlanningType	→	GoalExpectancy12	−0.104	0.242	−0.432	0.666	−0.529	0.311

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Indirect effects

					Estimate	Std. Error	z-value	p	95% Confidence Interval Lower	Upper
PlanningType	→	Complexity12	→	GoalExpectancy12	0.295	0.121	2.430	0.015	0.100	0.543

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Total effects ▼

			Estimate	Std. Error	z-value	p	95% Confidence Interval Lower	Upper
PlanningType	→	GoalExpectancy12	0.190	0.225	0.845	0.398	−0.280	0.629

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Table 4: Mediation of Planning Difficulty – Effects on Goal Expectancy (JASP)

A mediation was performed to analyze whether Planning Order influences Goal Expectancy and whether the direct path would be mediated by the reported Planning Difficulty of participants. Using the bootstrap confidence intervals (Table 4), it was concluded that there is mediation in this model: the 95% CI of the indirect effect is [0.100, 0.543], which does not include 0. There was no significant effect of Planning Order on Goal Expectancy (95% CI = [-0.529, 0.311]) without the mediator (Planning Difficulty) present. This means that Planning Order only influences Goal Expectancy indirectly through Planning Difficulty. So, any influence of the independent variable, Planning Order, on the dependent variable, Goal Expectancy, is entirely mediated by the mediator variable, Planning Difficulty.

Direct effects

			Estimate	Std. Error	z-value	p	95% Confidence Interval Lower	Upper
PlanningTypeNum	→	TimePressure12	0.377	0.332	1.134	0.257	−0.245	1.009

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Indirect effects

					Estimate	Std. Error	z-value	p	95% Confidence Interval Lower	Upper
PlanningTypeNum	→	Complexity12	→	TimePressure12	−0.373	0.164	−2.278	0.023	−0.807	−0.053

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Total effects

			Estimate	Std. Error	z-value	p	95% Confidence Interval Lower	Upper
PlanningTypeNum	→	TimePressure12	0.004	0.308	0.014	0.989	−0.578	0.620

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Table 5: Mediation of Planning Difficulty - Effects on Time Pressure (JASP)

A second mediation analysis was conducted to investigate the influence of Planning Order on Time Pressure and whether this direct relationship is mediated by participants' reported Planning Difficulty. Based on the bootstrap confidence intervals (Table 5), it is evident that mediation exists in this model: the 95% confidence interval (CI) for the indirect effect is [-0.807, -0.053], which excludes 0. Notably, there was no significant direct effect of Planning Order on perceived Time Pressure, as indicated by the 95% CI of [-0.245, 1.009] when the mediator (Planning Difficulty) was not considered. This suggests that Planning Order affects Time Pressure indirectly through its impact on Planning Difficulty. Therefore, any influence of the independent variable, Planning Order, on the dependent variable, Time Pressure, is entirely mediated by the mediator variable, Planning Difficulty.

Direct effects

							95% Confidence Interval	
			Estimate	Std. Error	z-value	p	Lower	Upper
PlanningTypeNum	→	Clarity	−0.026	0.274	−0.097	0.923	−0.534	0.454

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Indirect effects ▼

					Estimate	Std. Error	z-value	p	95% Confidence Interval	
									Lower	Upper
PlanningTypeNum	→	Complexity12	→	Clarity	0.442	0.149	2.960	0.003	0.170	0.844

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Total effects

							95% Confidence Interval	
			Estimate	Std. Error	z-value	p	Lower	Upper
PlanningTypeNum	→	Clarity	0.416	0.262	1.587	0.113	−0.104	0.892

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Table 6: Mediation of Planning Difficulty - Effects on Plan Clarity (JASP)

A mediation analysis was conducted to explore the relationship between Planning Order and Plan Clarity and whether participants' Planning Difficulty influences this relationship indicated mediation in this model (Table 6): the 95% confidence interval (CI) for the indirect effect is [0.170, 0.844], demonstrating that Planning Difficulty partially mediates the relationship. Notably, Planning Order did not have a significant direct effect on perceived Plan Clarity, with a 95% CI of [-0.543, 0.454] when Planning Difficulty was not considered. This suggests that Planning Order affects Plan Clarity indirectly through its impact on Planning Difficulty, implying a fully mediated relationship between Planning Order and Plan Clarity by Planning Difficulty.

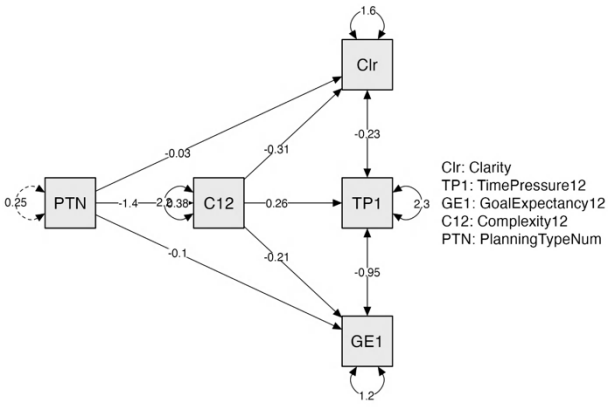

Figure 2: Mediation of Planning Difficulty (JASP)

By conducting a mediation analysis for Planning Difficulty, following the bootstrapping techniques for conditional indirect effects, a significant indirect effect of Planning Difficulty on Goal Expectancy, perceived Time Pressure, and Plan Clarity of participants was found.

4.2 Motivation

Motivation can be defined as the driving force behind goal pursuit, characterized by the level of commitment individuals have toward their objectives. The relationship between goals and performance is most vital when individuals are deeply committed to their goals, especially in challenging situations where significant effort is required, and success is uncertain. Goal commitment is assessed through factors such as the importance of goal attainment and belief in one's ability to achieve the goal (Gollwitzer & Oettingen, Goal Pursuit, 2012).

However, contrasting perspectives arise regarding the relationship between goal commitment and planning. Traditional views suggest that strong commitment naturally leads to the formulation of plans, while recent studies challenge this by proposing that planning can sometimes undermine commitment. This highlights the complexity of the relationship between commitment, planning, and goal pursuit, emphasizing the need for a nuanced understanding of how these factors interact (Norem, 2018).

In essence, motivation is reflected in individuals' efforts toward planning and striving for their goals. Analyzing the effects of planning order (backward vs. forward) and goal distance (proximal vs. distal goals) on motivation can provide deeper insights into how these factors influence goal pursuit and achievement.

4.2.1 Testing Correlation Between Motivation Values

Pearson's Correlations ▼

Variable		Motivation1	Motivation2
1. Motivation1	Pearson's r	—	
	p-value	—	
	Upper 95% CI	—	
	Lower 95% CI	—	
2. Motivation2	Pearson's r	0.571***	—
	p-value	< .001	—
	Upper 95% CI	0.688	—
	Lower 95% CI	0.426	—

* p < .05, ** p < .01, *** p < .001

Table 7: Motivation: Pearson's Correlation - Motivation1 and Motivation2 (JASP)

The measures of motivation (Effort = Motivation1 & Striving = Motivation2) were strongly correlated (r = .571, 95% CI = [.451, 1.0], p < .001). Based on these results, the measures of motivation were averaged to provide an index (Motivation12).

4.2.2 ANOVA Motivation

Test for Equality of Variances (Levene's)

F	df1	df2	p
2.478	3.000	100.000	0.066

Table 8: Motivation: ANOVA - Assumption Checks (Levene's) (JASP)

Results met the assumption for homogeneity of variances, as assessed by Levene's test for equality of variances (p > .05).

ANOVA - Motivation12 ▼

Cases	Sum of Squares	df	Mean Square	F	p	η^2	ω^2
TimeFrameNum	0.364	1	0.364	0.424	0.516	0.004	0.000
PlanningTypeNum	0.007	1	0.007	0.008	0.929	7.879×10^{-5}	0.000
TimeFrameNum ✻ PlanningTypeNum	0.186	1	0.186	0.216	0.643	0.002	0.000
Residuals	85.932	100	0.859				

Note. Type III Sum of Squares

Table 9: Motivation: ANOVA (JASP)

1) *H0(1): There is no main effect of goal distance on participants' motivation.*

   The group means' comparison of the first factor, goal distance (TimeFrameNum), reveals no statistically significant difference, as indicated by a p-value of .516. Given that the p-value exceeds the predetermined alpha

level of .05, the first null hypothesis cannot be rejected. Consequently, it was concluded that goal distance has no main effect on motivation (Motivation12).
Main Effect for Goal Distance: F(1, 100) = .424, p = .516, ω2 = .00

2) *H0(2): There is no main effect of planning order on participants' motivation.*

   The comparison of group means for the second factor, planning order (PlanningTypeNum), shows no statistically significant difference, with a p-value of .929. The second hypothesis cannot be rejected since this p-value exceeds the predetermined alpha level of .05. Consequently, it was concluded that planning order has no main effect on motivation (Motivation12).
   Main Effect for Planning Order: F(1, 100) = .008, p = .929, ω2 = .00

3) *H0(3): There is no significant interaction between goal distance and planning order on participants' motivation.*

   The analysis indicates no significant interaction between goal distance and planning order, with a p-value of .643. Since this p-value exceeds the predetermined alpha level of .05, the third null hypothesis cannot be rejected. Therefore, it can be concluded that there is no significant interaction between goal distance and planning order concerning participants' motivation.
   Main Effect for Interaction Goal Distance x Planning Order:
   F(1, 100) = .216, p = .643, ω2 = .00

A 2 (planning order) x 2 (goal distance) ANOVA revealed no significant main effect of planning order or goal distance on motivation.

4.3 Goal Expectancy

Goal Expectancy refers to individuals' beliefs about their likelihood of achieving a particular goal. It plays a crucial role in motivation and performance, encompassing the confidence one feels about completing a task or objective. When goals are perceived as challenging, individuals may see more significant obstacles, leading to decreased expectancy, which can negatively impact performance. This is because the perceived difficulty can cause individuals to doubt their ability to achieve the goal, reducing their effort and persistence.

Research supports the idea that expectancy beliefs significantly influence motivation and achievement. For example, Eccles and Wigfield's expectancy-value theory suggests that an individual's expectation of success and their value on the goal are critical determinants of their motivation and performance. This theory has been extensively used to understand various educational and psychological outcomes, highlighting that when individuals believe they are likely to succeed and value the outcome, they are more motivated and perform better (Eccles & Wigfield, 2002).

Moreover, the relationship between goal difficulty and expectancy is well-documented. Complex tasks often lead to lower expectancy because they are perceived as more challenging. This can be seen in contexts such as event planning, where assessing the likelihood of a successful event within a specific timeframe involves evaluating numerous variables and potential challenges, thereby affecting goal expectancy (Conley, 2012; Eccles, 1987).

Understanding the dynamics of goal expectancy is crucial for designing interventions and strategies to enhance motivation and performance, particularly in challenging scenarios. By addressing factors influencing expectancy beliefs, such as providing feedback, setting achievable sub-goals, and fostering a growth mindset, individuals can maintain high motivation and improve their chances of success (Eccles & Wigfield, 2002).

In the following section, the effect of planning order and goal distance on participants' perceived planning difficulty was analyzed, considering how these elements interact with goal expectancy to influence overall motivation and performance.

4.3.1 Testing Correlation Between Goal Expectancy Values

Pearson's Correlations

Variable		GoalExpectancy1	GoalExpectancy2
1. GoalExpectancy1	Pearson's r	—	
	p-value	—	
	Upper 95% CI	—	
	Lower 95% CI	—	
2. GoalExpectancy2	Pearson's r	0.740***	—
	p-value	< .001	—
	Upper 95% CI	0.816	—
	Lower 95% CI	0.638	—

* p < .05, ** p < .01, *** p < .001

Table 10: Goal Expectancy: Pearson's Correlations - GoalExpectancy1 and GoalExpectancy2 (JASP)

The measures of goal expectancy (Probability = GoalExpectancy1 & Optimism = GoalExpectancy2) were strongly correlated (r= .740, 95% CI = [.638, 0.816], p < .001). Based on these results, the measures of Goal Expectancy were averaged to provide an index (GoalExpectancy12).

4.3.2 ANOVA Goal Expectancy

Test for Equality of Variances (Levene's) ▼

F	df1	df2	p
0.931	3.000	100.000	0.429

Table 11: Goal Expectancy: ANOVA - Assumption Checks (Levene's) (JASP)

Results met the assumption for homogeneity of variances, as assessed by Levene's test for equality of variances (p > .05).

ANOVA – GoalExpectancy12

Cases	Sum of Squares	df	Mean Square	F	p	η^2	ω^2
TimeFrameNum	20.050	1	20.050	18.309	< .001	0.145	0.136
PlanningTypeNum	0.834	1	0.834	0.762	0.385	0.006	0.000
TimeFrameNum ✳ PlanningTypeNum	8.192	1	8.192	7.481	0.007	0.059	0.051
Residuals	109.509	100	1.095				

Note. Type III Sum of Squares

Table 12: Goal Expectancy - ANOVA (JASP)

1) *H0(1): There is no main effect of goal distance on the goal expectancy of participants.*

   A significant statistical difference is evident among the group means for the first factor, goal distance (TimeFrameNum), with a p-value of less than .001. The first null hypothesis can be rejected since this p-value falls below the predetermined alpha level of .05. Hence, it was asserted that goal distance has a main effect on goal expectancy (GoalExpectancy12).
   Main Effect for Goal Distance: F(1, 100) = 18.309, p < .001, ω2 = .136

2) *H0(2): There is no main effect of planning order on the goal expectancy of participants.*

   The comparison of group means for the second factor, planning order (PlanningTypeNum), reveals no statistically significant difference, as indicated by a p-value of .385. The second hypothesis cannot be rejected since this p-value exceeds the predetermined alpha level of .05. Consequently, there was

no main effect of planning order on goal expectancy (GoalExpectancy12) found.

Main Effect for Planning Order: F(1, 100) = .762, p = .385, ω2 = .00

3) *H0(3): There is no significant interaction between goal distance and planning order on goal expectancy for participants.*

The analysis indicates a significant interaction between goal distance and planning order, with a p-value of .007. The third null hypothesis cannot be rejected since this p-value is less than the predetermined alpha level of .05. Therefore, it was concluded that there is a significant interaction between goal distance and planning order concerning participants' goal expectancy (GoalExpectancy12).

Main Effect for Interaction Goal Distance x Planning Order:
F(1, 100) = 7.481, p = .007, ω2 = .051

A 2 (planning order) x 2 (goal distance) ANOVA revealed a significant main effect of goal distance on goal expectancy. A low goal distance led to less goal expectancy (M=4.877, 95% CI = I4.546, 5.208I) than high goal distance (M=5.745, 95% CI = I5.482, 6.008I). The ANOVA also revealed a significant interaction between goal distance and planning order.

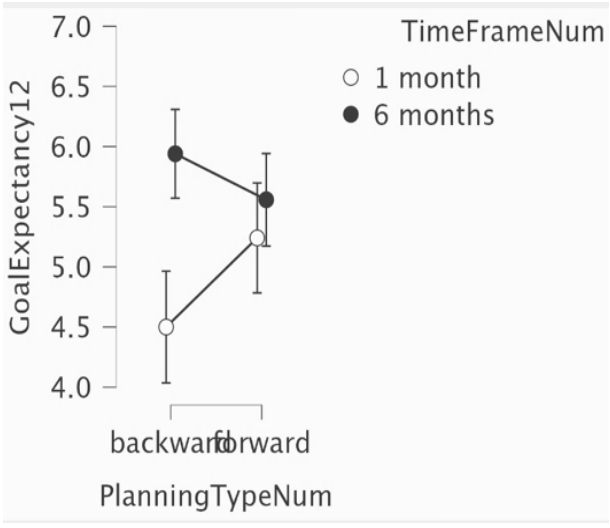

Figure 3: Goal Expectancy: ANOVA – Descriptive Plots (JASP)

Examining the descriptive plots on the left revealed an ordinal interaction, where the group means in the graph do not intersect or overlap. The group engaged in backward planning for a goal within one month expressed the lowest expectation of achieving their goal (low-distance x backward). Conversely, those planning backward for a goal in six months (high-distance x backward) reported the highest expectation of success. The line graph above suggests that goal distance had a notably more significant impact on goal expectancy for backward

planners than forward planners. The forward planning group was the group with the slightest effect of goal distance on goal expectancy.

To validate the understanding of the graph, post hoc tests were performed. Simple main effects, a frequently employed post hoc test for interpreting significant interactions with two-way ANOVAs, was utilized. This test examined whether there are discrepancies in the planning type factor at each level of goal distance (low distance = 1 month; high distance = 6 months) (Table 13).

Simple Main Effects – PlanningTypeNum ▼

Level of TimeFrameNum	Sum of Squares	df	Mean Square	F	p
1 month	7.268	1	7.268	6.637	0.011
6 months	1.863	1	1.863	1.701	0.195

Table 13: Goal Expectancy: ANOVA - Simple Main Effects - Planning Order (JASP)

The p-value on top (p = .011) shows that when comparing goal expectancy between forward and backward planning for low-distance (1-month) goal, there is a statistical difference since p < .05.
The p-value on the bottom (p = .195) shows that when comparing goal expectancy between forward and backward planning for a high-distance (6 months) goal, there is no statistical difference because p > .05.

The main effects test was repeated in Table 14 to see if there were any differences in the factor goal distance at each planning type (backward and forward).

Simple Main Effects – TimeFrameNum

Level of PlanningTypeNum	Sum of Squares	df	Mean Square	F	p
backward	26.428	1	26.428	24.133	< .001
forward	1.331	1	1.331	1.215	0.273

Table 14: Goal Expectancy: ANOVA - Simple Main Effects - Goal Distance (JASP)

The p-value on the top (p = < .001) tells us that when goal expectancy is compared between high and low goal distance for backward planners, there is a statistical difference because p < .05.
The p-value on the bottom (p = .273) tells us that when goal expectancy is compared between high and low goal distance for backward planners, there is no statistical difference because p > .05.

Following the analysis of simple main effects, a notable contrast in goal expectancy was noted between high and low goal distances for backward planners ($F(1) = 26.133$, $p < .001$). Backward planners aiming for goals with a high goal distance exhibited significantly higher goal expectancy than those targeting goals with a low goal distance. Conversely, no significant simple main effect was observed for forward planners ($F(2) = 1.215$, $p > .05$), indicating no discrepancies in goal expectancy across goal distances for this group.

Nevertheless, a significant simple main effect of planning type emerged for low-distance goals ($F(1) = 6.637$, $p = .011$). Forward planners displayed higher goal expectancy than backward planners for low-distance goals.

An omega-squared value of .051 was obtained for the interaction, which is a small effect. There is a statistical interaction between planning type and goal distance on goal expectancy, but the variance explained by that interaction is small. This means that the interaction between planning type and goal distance explains 5.1% of the variance in goal expectancy. Looking at the main effect for goal distance, however, the omega-squared value was .136. This means that the variance in goal expectancy explained by goal distance alone was 13.6%, which is a significant effect.

4.3.3 Mediation of Goal Expectancy

Direct effects

							95% Confidence Interval	
			Estimate	Std. Error	z-value	p	Lower	Upper
TimeFrameNum	→	TimePressure12	−1.056	0.249	−4.249	< .001	−1.575	−0.543

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Indirect effects ▼

								95% Confidence Interval	
				Estimate	Std. Error	z-value	p	Lower	Upper
TimeFrameNum	→	GoalExpectancy12	→	TimePressure12	−0.545	0.161	−3.377	< .001	−0.853	−0.299

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Total effects

							95% Confidence Interval	
			Estimate	Std. Error	z-value	p	Lower	Upper
TimeFrameNum	→	TimePressure12	−1.601	0.265	−6.037	< .001	−2.084	−0.973

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Table 15: Mediation Goal Expectancy - Effects on Time Pressure (JASP)

A simple mediation was performed to analyze whether Goal Distance influences perceived Time Pressure and whether the perceived Goal Expectancy of participants would mediate the direct path. Using the bootstrap confidence intervals (Table 15), it

may be concluded that there is mediation in this model: the 95% CI of the indirect effect is [-0.853, -0.299], which does not include 0. The effect of Goal Distance on perceived Time Pressure (95% CI = [-1.575, -0.543] was strengthened through the assumed Goal Expectancy of participants (95% CI = [-2.084, -0.973]).

Direct effects

						95% Confidence Interval	
			Estimate	Std. Error	z-value	p	Lower	Upper
TimeFrameNum	→	Complexity12	0.430	0.332	1.296	0.195	−0.315	1.108

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Indirect effects

							95% Confidence Interval	
				Estimate	Std. Error	z-value	p	Lower	Upper
TimeFrameNum	→	GoalExpectancy12	→	Complexity12	−0.398	0.157	−2.524	0.012	−0.806	−0.130

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Total effects

						95% Confidence Interval	
			Estimate	Std. Error	z-value	p	Lower	Upper
TimeFrameNum	→	Complexity12	0.032	0.322	0.101	0.920	−0.643	0.671

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Table 16: Mediation Goal Expectancy - Effects on Planning Difficulty (JASP)

A simple mediation was performed to analyze whether Goal Distance influences perceived Planning Difficulty and whether the direct path would be mediated by the perceived Goal Expectancy of participants (Table 16). Using the bootstrap confidence intervals (Table 21), it may be concluded that there is complete mediation in this model: the 95% CI of the indirect effect is [-0.806, -0.130], which does not include 0. There was no significant effect of Goal Distance on Planning Difficulty (95% CI = [-0.315, -1.108] without the mediator (Goal Expectancy) present. This means that Goal Distance only influences Planning Difficulty indirectly through Goal Expectancy.

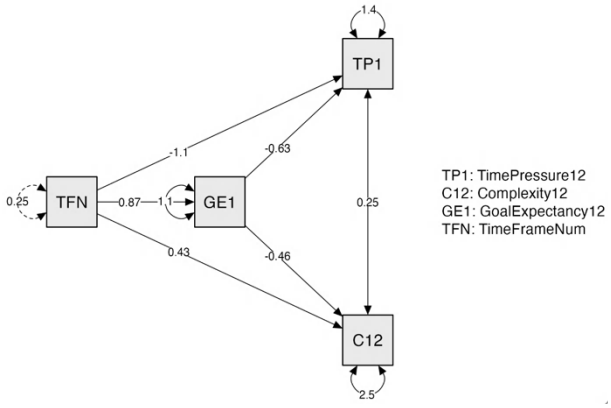

Figure 4: Mediation Goal Expectancy (JASP)

The mediation analysis conducted for Goal Expectancy, following the bootstrapping techniques for conditional indirect effects, showed a significant indirect effect of Goal Expectancy on participants' perceived Time Pressure and Goal Complexity.

4.4 Time Pressure

Time Pressure occurs when individuals feel restricted by a lack of time to accomplish a task or objective. In planning, it arises from deadlines or a sense of urgency. This pressure can induce rush and stress as individuals strive to meet time constraints. Durham et al.'s (2000) study underscores the importance of acknowledging perceived time pressure in event planning, as it significantly impacts the planning process's efficiency and success. Questions about perceived shortness of time and time sufficiency are used to assess perceived time pressure and understand individuals' perceptions of time limitations and their implications for planning. In the following, the effect of planning order and goal distance on participants' perceived time pressure was analyzed.

4.4.1 Testing Correlation Between Time Pressure Values

Pearson's Correlations ▼

Variable		TimePressure1	TimePressure2
1. TimePressure1	Pearson's r	—	
	p-value	—	
	Upper 95% CI	—	
	Lower 95% CI	—	
2. TimePressure2	Pearson's r	0.674***	—
	p-value	< .001	—
	Upper 95% CI	0.767	—
	Lower 95% CI	0.553	—

* p < .05, ** p < .01, *** p < .001

Table 17: Time Pressure: Pearson's Correlations - TimePressure1 and TimePressure2 (JASP)

The measures of time pressure (Short of Time = TimePressure1 & Sufficient Time = TimePressure2) were strongly correlated (r= .674, 95% CI = [.553, 0.767], p < .001). Based on these results, the measures of Time Pressure were averaged to provide an index (TimePressure12).

4.4.2 ANOVA Time Pressure

Test for Equality of Variances (Levene's)

F	df1	df2	p
1.623	3.000	100.000	0.189

Table 18: Time Pressure: ANOVA - Assumption Checks (Levene's) (JASP)

Results meet the assumption for homogeneity of variances, as assessed by Levene's test for equality of variances (p > .05).

ANOVA – TimePressure12

Cases	Sum of Squares	df	Mean Square	F	p	η^2	ω^2
TimeFrameNum	67.711	1	67.711	38.133	< .001	0.264	0.255
PlanningTypeNum	0.009	1	0.009	0.005	0.945	3.359×10^{-5}	0.000
TimeFrameNum ✻ PlanningTypeNum	12.544	1	12.544	7.065	0.009	0.049	0.042
Residuals	177.565	100	1.776				

Note. Type III Sum of Squares

Table 19: Time Pressure: ANOVA (JASP)

1) *H0(1): There is no main effect of goal distance on the perceived time pressure of participants.*

   The group means for the first factor, goal distance (TimeFrameNum), exhibit a significant statistical difference, with a p-value < .001. Given that this p-value falls below the alpha level of .05, the first null hypothesis can be rejected. Therefore, goal distance has a main effect on participants' perceived time pressure.
   Main Effect for Goal Distance: F(1, 100) = 38.133, p < .001, ω2 = .255

2) *H0(2): There is no main effect of planning order on the perceived time pressure of participants.*

   The comparison of group means for the second factor, planning order (PlanningTypeNum), shows no statistically significant difference, with a p-value of .945. Since this p-value exceeds the alpha level of .05, the second hypothesis cannot be rejected. Consequently, planning order has no main effect on participants' perceived time pressure.
   Main Effect for Planning Order: F(1, 100) = .005, p = .945, ω2 = .00

3) *H0(3): There is no significant interaction between goal distance and planning order on the perceived time pressure of participants.*

A significant interaction between goal distance and planning order is observed, with a p-value of .009. Given that this p-value is less than the predetermined alpha level of .05, the third null hypothesis can be rejected. Therefore, it was concluded that there is a significant interaction between goal distance and planning order regarding participants' perceived time pressure (TimePressure12).

Main Effect for Interaction Goal Distance x Planning Order:
F(1, 100) = 7.065, p = .009, ω2 = .042

A 2 (planning order) x 2 (goal distance) ANOVA revealed a significant main effect of goal distance on the perceived time pressure of participants. A high goal distance led to less perceived time pressure (M=2.824, 95% CI = I2.412, 3.235) than a low goal distance (M=4.425, 95% CI = I4.076, 4.773I). The ANOVA also revealed a significant interaction between goal distance and planning order.

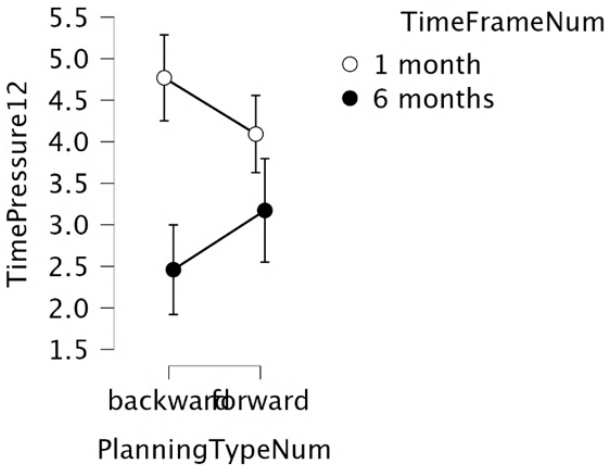

Figure 5: Time Pressure: ANOVA - Descriptive Plots (JASP)

Reviewing the descriptive plots on the left unveils an ordinal interaction characterized by non-overlapping group means in the graph. The participants involved in backward planning for a goal within one month demonstrated the highest perceived time pressure (low-distance x backward). Conversely, individuals planning backward for a goal in six months (high-distance x backward) expressed the lowest perceived time pressure. The line graph above indicates that goal distance had a considerably stronger influence on perceived time pressure for backward planners than forward planners. Among the forward planning groups, the impact of goal distance on time pressure was minimal.

To confirm the interpretation of the graph, post hoc tests were conducted. Simple main effects will be employed to interpret significant interactions in two-way ANOVAs.

This test will assess whether there are variations in the planning type factor at each level of goal distance (low distance = 1 month; high distance = 6 months). (Table 20)

Simple Main Effects – PlanningTypeNum

Level of TimeFrameNum	Sum of Squares	df	Mean Square	F	p
1 month	6.064	1	6.064	3.415	0.068
6 months	6.481	1	6.481	3.650	0.059

Table 20: Time Pressure: ANOVA - Simple Main Effects - Planning Order (JASP)

The p-value on top (p = .068) tells us that when perceived time pressure was compared between forward and backward planning for a low-distance (1-month) goal, there is no statistical difference because p is greater than .05.
The p-value on the bottom (p = .059) tells us that when perceived time pressure was compared between forward and backward planning for a high-distance (6-month) goal, there is no statistical difference because p is greater than .05.

The main effects test was repeated to see if there were any differences in the factor goal distance at each planning type (backward and forward). (Table 21)

Simple Main Effects – TimeFrameNum

Level of PlanningTypeNum	Sum of Squares	df	Mean Square	F	p
backward	67.964	1	67.964	38.275	< .001
forward	11.199	1	11.199	6.307	0.014

Table 21: Time Pressure: ANOVA - Simple Main Effects - Goal Distance (JASP)

The p-value on the top (p = < .001) tells us that when comparing perceived time pressure between high and low goal distance for backward planners, there is a statistical difference because p is smaller than .05.
The p-value on the bottom (p = .014) tells us that when comparing perceived time pressure between high and low goal distance for backward planners, there is a statistical difference because p is smaller than .05.

Following the analysis of simple main effects, a notable contrast in perceived time pressure between high and low goal distance for backward planners ($F(1) = 67.964$, $p < .001$) was identified. Backward planners aiming for a low-distance goal exhibited significantly higher perceived time pressure than those targeting high-distance goals. Additionally, a significant simple main effect was observed for forward planners ($F(2) = 11.199$, $p > .014$), indicating a contrast in perceived time pressure across goal

distance. Forward planners aiming for a low-distance goal exhibited higher perceived time pressure than those targeting high-distance goals. There was no significant simple main effect of planning order for low or high-distance goals.

An omega-squared value of .042 was obtained, a small effect for the interaction. There was a statistical interaction between planning type and goal distance on perceived time pressure, but the variance explained by that interaction was small. The interaction between planning order and goal distance only explains 4.2% of the variance in time pressure. Looking at the main effect for goal distance, however, the omega-squared value was .255. This means that the variance in time pressure explained by goal distance alone was 25.5%, which is a significant effect.

4.4.3 Mediation of Time Pressure

Direct effects

						95% Confidence Interval	
			Estimate	Std. Error	z-value	p	Lower	Upper
TimeFrameNum	→	GoalExpectancy12	0.240	0.211	1.136	0.256	−0.177	0.683

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Indirect effects

								95% Confidence Interval	
				Estimate	Std. Error	z-value	p	Lower	Upper
TimeFrameNum	→	TimePressure12	→	GoalExpectancy12	0.628	0.150	4.194	< .001	0.389	0.906

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Total effects ▼

							95% Confidence Interval	
			Estimate	Std. Error	z-value	p	Lower	Upper
TimeFrameNum	→	GoalExpectancy12	0.868	0.210	4.142	< .001	0.434	1.295

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Table 22: Mediation Time Pressure – Effects on Goal Expectancy (JASP)

A mediation analysis examined whether Goal Distance affects Goal Expectancy and whether participants' perceived Time Pressure mediated this direct relationship. Based on the bootstrap confidence intervals (Table 22), it can be concluded that mediation exists in this model: the 95% confidence interval (CI) for the indirect effect is [0.389, 0.906], indicating that it does not contain 0. Interestingly, there was no significant direct effect of Goal Distance on Goal Expectancy, as evidenced by the 95% CI of [-0.177, 0.683] when Time Pressure was not considered a mediator. This implies that Goal Distance indirectly impacted Goal Expectancy through its influence on Time Pressure. Therefore, any effect of the independent variable, Goal Distance, on the dependent variable, Goal Expectancy, was entirely mediated by the mediator variable, Time Pressure.

Direct effects

			Estimate	Std. Error	z-value	p	95% Confidence Interval Lower	Upper
TimeFrameNum	→	Complexity12	0.538	0.361	1.488	0.137	−0.249	1.291

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Indirect effects

					Estimate	Std. Error	z-value	p	95% Confidence Interval Lower	Upper
TimeFrameNum	→	TimePressure12	→	Complexity12	−0.505	0.202	−2.499	0.012	−1.096	−0.081

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Total effects

			Estimate	Std. Error	z-value	p	95% Confidence Interval Lower	Upper
TimeFrameNum	→	Complexity12	0.032	0.322	0.101	0.920	−0.579	0.633

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Table 23: Mediation Time Pressure – Effects on Planning Difficulty (JASP)

A simple mediation analyzed whether Goal Distance influences Planning Difficulty and whether the perceived Time Pressure of participants mediated the direct path. Using the bootstrap confidence intervals (Table 23), it was concluded that there is mediation in this model: the 95% CI of the moderate indirect effect is [-1.096, -0.081], which does not include 0. There is no significant effect of Goal Distance on Planning Difficulty (95% CI = [-0.249, 1.291] without the mediator (Time Pressure) present. This means that goal distance only indirectly influences planning difficulty through time pressure.

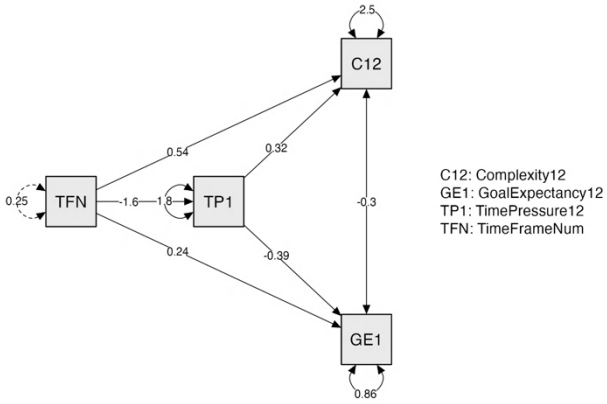

Figure 6: Mediation Time Pressure (JASP)

Conducting a mediation analysis for Time Pressure, a significant indirect effect of Time Pressure on participants' perceived Planning Difficulty and Goal Expectancy was found by following the bootstrapping techniques for conditional indirect effects.

4.5 Clarity of Plan

Clarity of Plan refers to how well individuals understand and find tasks for event preparation straightforward and manageable. This clear understanding is essential for effectively organizing and executing event-related activities. Research shows that clear goals and objectives enhance self-belief, confidence, and decision-making, leading to better task performance and a greater sense of purpose. Tools and techniques like self-reflection, mindfulness, and task management systems (e.g., Kanban boards) help achieve clarity, enabling better planning and execution of tasks. Understanding the role of clarity in planning is crucial, as it impacts motivation and performance, particularly in event preparation contexts (Anderson & Stritch, 2015). In the following, the effect of planning order and goal distance on participants' perceived plan clarity was analyzed.

4.5.1 ANOVA Plan Clarity

Test for Equality of Variances (Levene's) ▼

F	df1	df2	p
1.742	3.000	100.000	0.163

Table 24: Plan Clarity: ANOVA - Assumption Checks (Levene's) (JASP)

Results met the assumption for homogeneity of variances, as assessed by Levene's test for equality of variances ($p > .05$).

ANOVA – Clarity

Cases	Sum of Squares	df	Mean Square	F	p	η^2	ω^2
TimeFrameNum	9.466×10^{-5}	1	9.466×10^{-5}	5.154×10^{-5}	0.994	4.978×10^{-7}	0.000
PlanningTypeNum	4.609	1	4.609	2.509	0.116	0.024	0.014
TimeFrameNum ✻ PlanningTypeNum	1.998	1	1.998	1.088	0.299	0.011	8.391×10^{-4}
Residuals	183.661	100	1.837				

Note. Type III Sum of Squares

Table 25: Plan Clarity: ANOVA (JASP)

1) *H0(1): There is no main effect of goal distance on the clarity of the plan for participants.*

   The group means comparison for the first factor, goal distance (TimeFrameNum), indicates no statistically significant difference, with a p-value of .994. The first null hypothesis could not be rejected because the p-value exceeded the predetermined alpha level of .05. Therefore, it was

concluded that goal distance had no main effect on participants' clarity of plan (Clarity).

Main Effect for Goal Distance: $F(1, 100) = 5.154x10^{-5}$, $p < .994$, $\omega 2 = .00$

2) *H0(2): There is no main effect of planning order on the clarity of the plan for participants.*

The comparison of group means for the second factor, planning order (PlanningTypeNum), reveals no statistically significant difference, with a p-value of .116. The second hypothesis cannot be rejected since this p-value exceeds the predetermined alpha level of .05. Consequently, no main effect of planning order on participants' plan clarity (Clarity) was found.

Main Effect for Planning Order: $F(1, 100) = 2.509$, $p = .116$, $\omega 2 = .014$

3) *H0(3): There is no significant interaction between goal distance and planning order on the clarity of the plan for participants.*

The analysis indicates no significant interaction between goal distance and planning order, as evidenced by a p-value of .299. Since this p-value exceeds the predetermined alpha level of .05, the third null hypothesis cannot be rejected. Therefore, it can be concluded that there is no significant interaction between goal distance and planning order concerning the clarity of the plan for participants (Clarity).

Main Effect for Interaction Goal Distance x Planning Order:
$F(1, 100) = 1.088$, $p = .299$, $\omega 2 = 8.391x10^{-4}$

A 2 (planning order) x 2 (goal distance) ANOVA revealed no significant main effect of planning order or goal distance on plan clarity.

Descriptives - Clarity ▼

TimeFrameNum	PlanningTypeNum	N	Mean	SD	SE	Coefficient of variation
1 month	backward	26	5.115	1.366	0.268	0.267
	forward	27	5.259	1.457	0.280	0.277
6 months	backward	25	4.840	1.625	0.325	0.336
	forward	26	5.538	0.859	0.169	0.155

Table 26: Plan Clarity: ANOVA - Descriptives

In the experiment, no significant main effects of forward and backward planning on plan clarity were found, nor were significant differences observed in any group means.

This aligns with the assumed planning complexity attributed to multiple planning steps throughout all experiment groups.

4.6 Summary of Results

The first step in the experiment results' analysis was filtering out invalid data resulting from participants not adhering to instructions. Additionally, two groups conducted the experiment in German, necessitating the translation of their results and surveys into English. All data were subsequently translated into variables and input into JASP for analysis. Reverse questions in the survey were reverse quoted, and frequencies, descriptives, and medians were calculated and recorded.

In the case of two questions and thus two values reporting the same variable, the correlation was tested to summarize both values into one variable. ANOVAs were conducted to compare means among the four experiment groups to determine whether there are significant mean differences across the groups. ANOVA assesses whether the differences in group means are due to actual effects or random variability. Finally, to validate the understanding of the significant interactions of the ANOVA, a simple main effects post hoc test was performed. Lastly, a mediation analysis examined how one variable influences another variable via an intermediate variable to understand the underlying mechanisms or pathways by which an independent variable affects a dependent variable, providing insights into the indirect effects of variables within a causal framework.

The variable planning difficulty reflects the challenge of planning a task or objective. A mediation analysis for Planning Difficulty revealed significant indirect effects on Goal Expectancy, perceived Time Pressure, and Plan Clarity of participants for Planning Order. Moreover, a 2x2 ANOVA showed a significant main effect of planning order on planning difficulty, with backward planning leading to greater difficulty than forward planning. However, no significant interaction between goal distance and planning order was observed regarding perceived planning difficulty.

Motivation is defined as the driving force behind goal pursuit and is closely tied to individuals' commitment to their objectives. A correlation analysis and ANOVA for motivation showed no significant main effects of goal distance or planning order on motivation. Similarly, no significant interaction between goal distance and planning order was found regarding participants' motivation levels.

The analysis revealed a significant main effect of goal distance on goal expectancy, indicating that high goal distances lead to a greater expectancy of success. Additionally, an interaction between goal distance and planning order was observed, highlighting how planning backward for distant goals enhances expectancy compared to planning forward for immediate goals. This finding suggests that the temporal aspect of goal setting significantly impacts individuals' confidence in goal achievement. A mediation analysis for Goal Expectancy showed a significant indirect effect on participants' perceived Time Pressure and Goal Complexity for Goal Distance.

The research uncovered a substantial main effect of goal distance on perceived time pressure, indicating that distant goals are associated with reduced pressure. Moreover, an interaction between goal distance and planning order demonstrates that backward planning for distant goals alleviates time pressure compared to forward planning for immediate goals. This suggests that temporal distance in goal setting influences individuals' perceptions of time constraints, affecting their planning strategies accordingly. A mediation analysis for Time Pressure showed a significant indirect effect on Goal Expectancy and perceived Planning Difficulty of participants for Goal Distance.

Despite not finding significant main effects or interactions, the analysis sheds light on the complexity of plan clarity in event planning. The absence of clear distinctions between forward and backward planning underscores the multifaceted nature of planning tasks, where clarity may not be significantly influenced by temporal or procedural factors alone.

The mediation analyses provide deeper insights into the underlying mechanisms linking goal expectancy, time pressure, and planning difficulty. Results indicate that planning difficulty mediates the relationships between goal expectancy and planning order and between time pressure and planning order. Goal expectancy mediates the relationship between goal distance and planning difficulty and strengthens the relationship between goal distance and time pressure. Time pressure mediates the relationships between goal distance and planning difficulty and between goal distance and goal expectancy. These results highlight the interplay between temporal perceptions, motivational factors, and planning challenges.

5 Discussion

5.1 Empirical Validation and Exploration of the Research Question

To answer the research question, "*Does Goal Distance act as a Boundary Condition influencing the Benefits of Backward Planning?"* the previously defined hypotheses will be examined first.

H1: Backward planning has no benefits in the case of complex goals.
Backward planning led to a higher perceived planning difficulty regardless of goal distance. Similarly, goal expectancy dropped while time pressure rose in cases of low goal distance and backward planning. No effects of planning order on motivation or clarity were observed.

However, in cases of high goal distance, backward planning significantly affected goal expectancy and time pressure in case of high goal distance. Backward planning for a distant goal led to higher goal expectancy and lower time pressure. Based on these results, backward planning can lead to benefits, and H1 cannot be rejected.

H2: The benefits of backward planning are not influenced by goal distance.
No main effect of goal distance was observed for the variables planning difficulty, motivation, and plan clarity. Nevertheless, for the variables goal expectancy and time pressure, the benefits of backward planning depended on goal distance and were only measurable for high-distance goals. H2 was rejected stating that the benefits of backward planning can be influenced by goal distance.

H3: When goal distance is high, the motivation and commitment to reach the goal for backward planning will not be higher than for forward planning.
No effect of goal distance on motivation was noted regardless of planning order. The motivation and commitment to reach the goal with backward planning were not higher than with forward planning, irrespective of goal distance. Based on that, H3 cannot be rejected.

H4: When goal distance is high, the goal expectancy for backward planning will not be higher than for forward planning.
In the case of goal expectancy, a high goal distance led to higher goal expectancy for backward planners. H4 will be rejected based on that result.

H5: When goal distance is high, the perceived time pressure for backward planning will not be lower than for forward planning.
The perceived time pressure was lower for backward planners in case of a distant goal. Based on that, H5 will be rejected.

H6: When goal distance is high, the perceived goal clarity for backward planning will not be higher than for forward planning.
There was no effect of goal distance on plan clarity, regardless of planning order. Regardless of goal distance, the perceived plan clarity for backward planning was not higher than for forward planning. Because of that, H6 cannot be rejected.

H7: When goal distance is high, the reported planning difficulty will not be lower for backward planning than for forward planning.
In terms of planning difficulty, forward planners registered significantly lower planning difficulty compared to backward planners, disregarding the planning order. Regardless of the planning order, the reported planning difficulty will not be lower for backward planning than for forward planning. H7 cannot be rejected.

Related to the research question, "*Does Goal Distance Act as a Boundary Condition Influencing the Benefits of Backward Planning?"* it can be concurred that goal distance can act as a boundary condition for backward planning and influence its benefits. Based on the experiment results, in the case of perceived time pressure and reported goal expectancy of participants, goal distance can influence the benefits of backward planning. A high goal distance combined with backward planning led to better results, higher goal expectancy, and less time pressure.

5.2 Comparative Analysis: Aligning the Research with Park, Lu, and Hedgcock's (2017) Findings

Park, Lu, and Hedgcock (2017) discovered that backward planning leads to higher motivation and more effective goal-directed behavior than forward planning across five studies. Backward planning helps individuals anticipate necessary steps, stick to their original plan, increase their expectations of achieving goals, and feel less pressured for time, especially in complex tasks.

Backward planning clarifies necessary steps and potential obstacles, aligning with fantasy-realization theory, which suggests that such clarity boosts goal expectancy

and reduces time pressure. The research also pointed out that backward planning is particularly advantageous during the middle phase of goal pursuit when motivation typically decreases. However, this effect should be interpreted cautiously because it was observed in only one study, prompting the need for further investigation into its long-term effectiveness.

The study found that backward planning significantly impacts goal expectancy and time pressure for high goal distance scenarios. Specifically, backward planning for distant goals resulted in higher goal expectancy and lower perceived time pressure. These benefits were only observed for high-distance goals. For goal expectancy, high goal distance increased expectancy for backward planners, while perceived time pressure decreased under backward planning for distant goals. However, goal distance did not affect plan clarity, which was similar for both planning methods. Forward planners consistently reported lower planning difficulty than backward planners, irrespective of goal distance. Thus, backward planning does not reduce planning difficulty compared to forward planning.

In summary, comparing the results of Park, Lu, and Hedgcock (2017) and this paper, it can be concluded:

Goal Expectancy and Time Pressure

Park, Lu, and Hedgcock (2017) conducted multiple studies across various contexts and found that backward planning consistently enhances goal expectancy and reduces perceived time pressure. This aligns with their conclusion that backward planning facilitates better anticipation of necessary steps and more effective management of goal pursuit. The research corroborates these findings by demonstrating that backward planning significantly boosts goal expectancy and decreases perceived time pressure, particularly for high-distance goals. This reinforces the notion that backward planning is especially advantageous in settings where goals are set at greater distances, supporting effective goal management and enhancing motivational outcomes.

Plan Clarity

According to Park, Lu, and Hedgcock (2017), backward planning improves plan clarity by helping individuals clarify necessary steps and anticipate potential obstacles, which enhances goal expectancy and reduces time pressure. However, the experiment presents findings that suggest goal distance does not significantly

influence plan clarity under backward planning. This might indicate that while backward planning aids in clarity regarding specific steps and obstacles, it does not necessarily lead to more precise overall plans than forward planning methods.

Planning Difficulty

Park, Lu, and Hedgcock (2017) did not directly address planning difficulty but implied that backward planning might involve more initial effort due to its detailed focus on steps and obstacles. In contrast, forward planners consistently perceive lower planning difficulty than backward planners, irrespective of goal distance. This discrepancy suggests that while backward planning benefits goal expectancy and time pressure, it may involve greater perceived difficulty in planning than forward planning approaches.

Middle Phase of Goal Pursuit

Park, Lu, and Hedgcock (2017) highlighted that backward planning is particularly beneficial during the middle phase of goal pursuit when motivation tends to decrease. In contrast, the middle phase of goal pursuit was not explicitly addressed. The focus was more on how goal distance influences goal expectancy and time pressure under backward planning.

In summary, both studies provide evidence supporting the effectiveness of backward planning in enhancing goal expectancy and reducing time pressure, emphasizing its role in improving goal-related outcomes. This research extends these findings by showing that backward planning significantly benefits high-distance goals. However, the findings regarding planning difficulty indicate a contrast with the perceived benefits reported by Park, Lu, and Hedgcock (2017), who suggested that backward planning aids in overcoming obstacles and clarifying steps. This highlights a nuanced perspective on the trade-offs in choosing planning methods based on different situational contexts and goals.

Overall, while both studies align on the advantages of backward planning in goal management, they diverge in their findings related to plan clarity and planning difficulty, offering complementary insights into the dynamics of planning strategies in achieving long-term goals.

5.3 Practical Implications and Significance of the Research Findings

In more practical terms, these findings offer valuable insights into how temporal aspects and planning strategies influence goal-related perceptions and outcomes, particularly in event planning contexts. The research reveals that backward planning enhances individuals' belief in achieving distant goals (higher goal expectancy) and reduces perceived time pressure, making ambitious, long-term projects more manageable and motivating. This approach proves particularly advantageous for setting and achieving far-off objectives, leveraging benefits such as increased motivation and reduced stress. Regardless of goal distance, neither planning method significantly affects motivation or plan clarity. Therefore, individuals and organizations can choose backward and forward planning methods based on task complexity and personal preference, knowing that plan clarity remains consistent. However, it is essential to consider that backward planning may introduce higher perceived difficulty, especially in complex situations. For project management and goal setting, incorporating backward planning can help teams stay motivated and focused on critical milestones. However, to maintain efficiency, it is advisable to balance these strategies with forward planning, particularly for nearer-term goals or when simplicity in execution is paramount. Ultimately, these findings underscore the importance of thoughtful planning approaches tailored to specific goals and contexts to optimize success in goal execution and planning processes.

6 Conclusion

To conclude, the research presented in this thesis underscores the pivotal role of strategic planning in pursuing personal and professional goals. Through a structured examination of backward planning, particularly in event management, this study illuminates the influence of goal distance as a critical boundary condition. The findings indicate that backward planning, when coupled with an appropriate understanding of goal distance, can significantly enhance goal attainment’s clarity, motivation, and success.

The experimental approach adopted in this research, building on the foundational work of Park, Lu, and Hedgcock (2017), highlights the critical role of strategic planning in achieving personal and professional aspirations. The findings demonstrate that

while backward planning can offer significant benefits, such as increased goal expectancy and reduced perceived time pressure, these advantages are predominantly observed in scenarios involving distant goals. Specifically, backward planning for long-term objectives enhances individuals' confidence in achieving their goals and alleviates the urgency associated with time constraints.

However, the investigation also reveals that backward planning does not inherently improve plan clarity or reduce planning difficulty compared to forward planning. Forward planning, in contrast, tends to be associated with lower perceived planning difficulty, making it a potentially more straightforward approach for complex or near-term goals.

In practical terms, the implications of these findings are multifaceted:

1. **Optimizing Long-Term Goal Planning**: Individuals and organizations should consider using backward planning when dealing with ambitious, long-term projects. This approach can help maintain motivation and manage time pressure effectively, making achieving distant goals more manageable.
2. **Choosing the Right Planning Method**: Forward planning may be preferable for more immediate or complex goals due to its associated lower planning difficulty. This approach can simplify the planning process and make the steps toward goal attainment more transparent and actionable.
3. **Balancing Planning Strategies**: It is essential to balance backward and forward planning based on the specific context of the goals. While backward planning can enhance motivation and reduce stress for distant goals, forward planning may be more suitable for immediate objectives or when minimizing planning difficulty is a priority.
4. **Application in Project Management**: Project managers and teams should leverage backward planning to outline critical milestones and necessary steps for long-term projects. This can help align activities and resources effectively, ensuring that all efforts contribute toward the desired end goals.
5. **Consideration of Individual Preferences**: Ultimately, the choice between backward and forward planning should consider individual preferences and the specific demands of the task. Individuals must weigh the benefits of higher goal expectancy and reduced time pressure against the potential increase in planning difficulty.

The findings underscore the importance of planning order in enhancing goal motivation and performance. Reverse chronological planning can provide a clearer view of tasks and improve performance in various goal pursuits, such as academic achievements, career choices, and financial planning.

In conclusion, this research provides valuable insights into the nuanced effects of backward planning, particularly in the context of goal distance. By understanding these dynamics, individuals and organizations can adopt more effective planning strategies, enhancing their ability to achieve complex and long-term goals.

Future research could explore several additional areas. Investigating the effects of backward and forward planning on different types of goals, such as learning goals versus performance goals or personal goals versus organizational goals, would provide valuable insights. Additionally, examining how these planning strategies work in group settings, including the roles of team cohesion, communication, and leadership, would be beneficial.

Considering individual differences, such as personality traits, cognitive styles, and prior experiences, could reveal how personal characteristics moderate the effectiveness of backward and forward planning. It is also essential to assess how different contexts, such as organizational culture, industry type, and environmental uncertainty, impact the success of these planning methods. Cross-cultural comparisons could further highlight how cultural differences influence the preference for and effectiveness of backward versus forward planning.

Another critical area of research is evaluating the efficacy of backward and forward planning in crises or high-pressure environments, where decision-making and strategic adjustments are critical. Comparing backward and forward planning with other strategic planning methods, such as scenario or contingency planning, could determine their relative strengths and weaknesses. Finally, studying the long-term effects of backward and forward planning on goal attainment, satisfaction, and overall success would contribute to a more comprehensive understanding of these processes.

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Appendix: Online Survey

Büsra's Master Thesis: Research on Planning

Hello,

I (and my parents) appreciate you a lot for helping me finally complete my Master's Degree. This survey should not take longer than 15 minutes. The topic of my thesis is on different kinds of planning and the way it affects the planner's feelings. As part of this research you're taking part in an experiment, in which you have to plan an event in a certain way.

Thank you for your time!

PLEASE READ:

There are several kinds of planning that can effect goal completion in different ways. My thesis is focused on two specific ones: backward and forward planning.

Forward Planning: how people usually plan, by starting at the present and deciding the next step *chronologically.* Starting at today, planning towards the future goal.

Example: You're planning a vacation - you start with *1. book flight tickets, 2. book a place to stay, 3.plan sightseeing* ... up to ending with the goal *Vacation*

Backward Planning: on the contrary to common planning, you start with the "goal"/ "result" in the future and continue planning *backwards* with the step you would have to do right before the event. Then proceed moving step by step towards today.

Example: You're planning a vacation - you start planning with *1. Vacation (= Goal), 2.get on the plane, 3. drive to the airport* ....up to ending with the last point *book flight tickets*

About No.1: THE TASK

You're working in the marketing/sales team of the company "PapaClips" selling paperclips. In your last team meeting you got the task from your manager to **organise a speaker's event for your customers**.

You have **1 month** to plan this event. Your tasks include: define a topic, find speakers, organise catering, invite guests etc. You have a **set budget** for this event. You're planning this event **alone**.

In the following question all the steps you need to plan for this event are written down in alphabetical order.

Your task is to plan the event with these steps in **reverse chronological order (backward planning as explained above).** You can either use pen and paper or plan directly in the box below by dragging the different steps. There is no right or wrong answer.

1

1 Plan in reverse chronological order (backward planning) how you will organise the event in 1 month.

Question instructions: *What would the last task right before the event be? Start by moving that task to the second place.*

EVENT (start here)	
create attendee list	
check budget goal	
check on responses to invitations	
confirm catering	
confirm speakers	
confirm venue	
update your team on planning progress/ organisational steps	
define budget	
design invitations	
design "save the date" mails	
create list of guests	
organise speakers	
search for catering	
search for venue	
send invitations	
send "save the date" invitations	
set date & time of event	

set topic/theme of event ☐

2 Did you as instructed plan the event backwards (starting with the event and step by step getting closer to today)?

Question instructions: *Select one answer*

◯ yes ◯ no

3 To what extent do you feel that the things you need to do in order to prepare for the event are clear to you?

Question instructions: *from "1 - not at all" to "7 - very much"*

☆☆☆☆☆☆☆ ☐ / 7

4 How much effort will you allocate in planning this event?

Question instructions: *from "1 - a little bit" to "7 - very much"*

☆☆☆☆☆☆☆ ☐ / 7

5 How much will you strive to have a successful event?

Question instructions: *from "1 - a little bit" to "7 - very much"*

☆☆☆☆☆☆☆ ☐ / 7

6 What is the probability that you will have a successful event in 1 month?

Question instructions: *from "1 - not at all" to "7 - definitely"*

☆☆☆☆☆☆☆ ☐ / 7

7 Are you optimistic about having a successful event in 1 month?

Question instructions: *from "1 - not at all" to "7 - definitely"*

☆☆☆☆☆☆☆ ☐ / 7

8 Do you feel you are short of time in organising this event?

Question instructions: *from "1 - not at all" to "7 - definitely"*

☆☆☆☆☆☆☆ ☐ / 7

9 Do you think you have sufficient time to complete all the steps in 1 month?*

Question instructions: *from "1 - not at all" to "7 - definitely"*

☆☆☆☆☆☆☆ ☐ / 7

10 It was difficult to plan things to do in reverse chronological order.

Question instructions: *from "1 - strongly disagree" to "7 - strongly agree"*

☆☆☆☆☆☆☆ ☐ / 7

11 Why?

12 It was easy to establish the event plan in reverse chronological order.*

Question instructions: *from "1 - strongly disagree" to "7 - strongly agree"*

☆☆☆☆☆☆☆ ☐ / 7

13 Why?

14 Do you like organising/planning things? (in professional and/or private life)

Question instructions: *1 - not at all up to 7 - I love it*

☆☆☆☆☆☆☆ ☐ / 7

15 What gender do you identify as?

Question instructions: *Select one answer*

◯ female ◯ male

◯ other... ☐

16 What is your age?

Question instructions: *Select one answer*

◯ 17 or younger ◯ 18-20 ◯ 21-29 ◯ 30-39 ◯ 40-49 ◯ 50 or older

17 What is the highest degree or level of education you have completed?

Question instructions: *Select one answer*

◯ High School or equivalent ◯ Bachelor's Degree ◯ Master's Degree ◯ Ph.D. or higher

◯ Other... ☐