Leader Self-Regulation

Disentangling Concepts, Measurement Issues, and the Consequences of Deficits in Emotion Regulation and Self-Leadership

A Dissertation

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Summary

In this dissertation, I discuss leader self-regulation from several perspectives, with a specific focus on leader emotion regulation and leader self-leadership. Firstly, I develop a theoretical framework, which is based on both control theory (Carver & Scheier, 1998) and the four levels of self-regulation described by Lord et al. (2010). This framework serves to disentangle the four related concepts of self-regulation, emotion regulation, self-control, and self-leadership by delineating several key attributes that describe the similarities and differences between the four concepts. Secondly, I use the framework to provide a clear definition of successful self-leadership, which is based on the concept of successful emotion regulation (e.g., Aldao et al., 2015; Bonanno & Burton, 2013).

Thirdly, I describe a new rationale for operationalizing successful self-regulation, which I then apply to both successful emotion regulation and successful self-leadership within the work context. Following this, the two new scales measuring emotion regulation and self-leadership are examined and partially validated through two separate studies. Both scales showed mostly satisfactory psychometric properties, test-retest reliabilities, and convergent and discriminant validity. Additionally, both scales demonstrated significant positive correlations with constructive leadership styles and significant negative correlations with destructive leadership styles.

Fourthly, I report the results of a mixed-source study in which the two new scales were used to assess the consequences of leaders' emotion regulation and self-leadership skills. Using a sample of N = 315 leader–follower dyads, I found that both leader emotion regulation and self-leadership had significant positive associations with the constructive leadership style of instrumental leadership, as well as having significant negative associations with active destructive leadership. Additionally, self-leadership had a significant negative association with passive destructive leadership (i.e., laissez-faire leadership). Furthermore, both types of leader self-regulation were indirectly associated with follower job satisfaction via instrumental leadership.

Finally, I examined the potential relationships between three heart rate variability measures, including cardiac coherence, and self-reported emotion regulation in a sample of N = 37 students. However, even though the model of neurovisceral integration predicts a positive association between heart rate variability measures and the capacity for emotion regulation (Thayer & Lane, 2000, 2009), I could not detect any associations between emotion regulation and the three heart rate variability measures used in this study.

In summary, this dissertation provides a theoretical and empirical foundation for future studies examining leader self-regulation. In particular, the concept of emotion regulation can serve as a more neutral and more clearly defined alternative to the controversial (Ashkanasy & Humphrey, 2011; Cherniss, 2010; Dasborough et al., 2021; Locke, 2005) concept of emotional intelligence.

Zusammenfassung

In dieser Dissertation betrachte ich das Thema Selbstregulation von Führungskräften aus unterschiedlichen Perspektiven. Zunächst entwickle ich ein theoretisches Rahmenmodell, welches auf der Selbstregulationstheorie (Carver & Scheier, 1998) und den vier Ebenen der Selbstregulation von Lord et al. (2010) basiert. Das Rahmenmodell beschreibt zentrale Attribute der vier verwandten Konstrukte Selbstregulation, Emotionsregulation, Selbstkontrolle und Selbstführung, wodurch die Konstrukte voneinander abgegrenzt werden können. Anschließend nutze ich das Rahmenmodell, um das Konstrukt der flexiblen Selbstführung präzise zu definieren, welches an die flexible Emotionsregulation (z. B. Aldao et al., 2015; Bonanno & Burton, 2013) angelehnt ist. Daraufhin beschreibe ich eine Möglichkeit, flexible Selbstregulation zu operationalisieren, welche ich auf die Emotionsregulation und die Selbstführung im Arbeitskontext anwende. Die Eigenschaften der beiden resultierenden Skalen zur Messung von Emotionsregulation bzw. Selbstführung untersuche ich in zwei separaten Studien. Beide Skalen zeigten zufriedenstellende psychometrische Eigenschaften, Test-Retest-Reliabilitäten sowie konvergente und diskriminante Validität. Zudem korrelierten sie positiv mit konstruktiven Führungsstilen und negativ mit destruktiven Führungsstilen.

Darüber hinaus berichte ich die Ergebnisse einer Studie, die auf N = 315 Führungskraft-Mitarbeitenden-Dyaden basiert, in der die beiden neuen Skalen verwendet wurden. Sowohl die Emotionsregulation als auch die Selbstführung der Führungskräfte hingen in dieser Studie positiv mit dem konstruktiven Führungsstil der instrumentellen Führung sowie negativ mit aktiver destruktiver Führung zusammen. Außerdem gab es einen signifikanten negativen Zusammenhang zwischen der Selbstführung und passiver destruktiver Führung (d. h. Laissez-Faire). Beide Formen der Selbstregulation hingen indirekt über den Mediator instrumentelle Führung mit der Arbeitszufriedenheit der Mitarbeitenden der Führungskräfte zusammen.

Ergänzend untersuchte ich mögliche Zusammenhänge zwischen drei Maßen für die Herzratenvariabilität (darunter die sog. cardiac coherence) und der selbstberichteten flexiblen Emotionsregulation in einer Stichprobe mit N = 37 Studierenden. Obwohl das Modell der neuroviszeralen Integration für Emotionsregulation (Thayer & Lane, 2000, 2009) einen Zusammenhang zwischen der Herzratenvariabilität und der Emotionsregulationsfähigkeit vorhersagt, konnte ich jedoch keine entsprechenden Zusammenhänge in dieser Studie feststellen.

Zusammengefasst bietet diese Dissertation eine theoretische und empirische Grundlage für zukünftige Studien, die sich mit der Selbstregulation von Führungskräften befassen. Insbesondere das Konstrukt der Emotionsregulation kann hierbei als eine neutrale, klarer definierte Alternative zum umstrittenen (Ashkanasy & Humphrey, 2011; Cherniss, 2010; Dasborough et al., 2021; Locke, 2005) Konstrukt der emotionalen Intelligenz dienen.

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List of Abbreviations

ASLQ	Abbreviated Self-Leadership Questionnaire
ASQ	Affective Style Questionnaire
BAT	Burnout Assessment Tool
BEIS-10	Brief Emotional Intelligence Scale
BFI-S	Big Five Inventory-SOEP
CERQ	Cognitive Emotion Regulation Questionnaire
CoERS	Contextual Emotion Regulation Scale
DERS	Difficulties in Emotion Regulation Scale
EISRS	Emotional Intelligence Self-Regulation Scale
ERQ	Emotion Regulation Questionnaire
ERSQ	Emotion Regulation Skills Questionnaire
GSLQ	German Self-Leadership Questionnaire
HFERST	Heidelberg Form for Emotion Regulation Strategies
HRVAS	Heart Rate Variability Analysis Software
LAMP	leader activation - member propagation
NMR	Negative Mood Regulation
RMSSD	Square root of the mean squared differences between adjacent R-R intervals
RSLQ	Revised Self-Leadership Questionnaire
SDNN	Standard deviation of all N-N intervals
SREIS	Self-Rated Emotional Intelligence Scale
SSLQ	Successful Self-Leadership Questionnaire
TMMS	Trait Meta Mood Scale
vmHRV	vagally mediated heart rate variability

1 Introduction

"Self-control is at the root of much that is good in people and society" (Inzlicht & Berkman, 2015, p. 511).

Every day, leaders face countless situations in rapid succession, some of which are bound to be negative and can, thus, elicit negative emotions such as anger and frustration (R. H. Humphrey, 2012). For example, a leader may have a fight with their spouse before work, a promising deal may be cancelled at the last minute, or—more trivially—the coffee bought on the way to the office may turn out to be only lukewarm upon arrival. How leaders react to such events depends on a number of factors, such as the frequency with which the events occur (Weiss & Cropanzano, 1996) or their self-regulation skills (Barnes et al., 2015). For example, when faced with bad news, leaders may bear it stoically, cope with the news by trying to tackle the underlying issue, or vent their frustration by harshly rebuking a follower for a trivial mistake, which could be interpreted as a form of destructive leadership by the follower.

In this dissertation, I argue that destructive leadership can be the unintentional, but nonetheless harmful, result of a leader's lack of control over their negative emotional reactions to events occurring at work or even outside work (see also Bakker & Demerouti, 2013; Barnes et al., 2015; R. H. Humphrey et al., 2016). Destructive leadership is known to have numerous negative consequences such as higher levels of follower counterproductive work behaviors and lower job satisfaction (Schyns & Schilling, 2013). Leaders' lack of self-regulation, however, has received much less attention, despite its potential adverse effects on the followers through destructive leadership.

Additionally, I use affective events theory (Weiss & Cropanzano, 1996) to argue that leaders who show high levels of self-regulation can be a source of positive events for followers, whereas leaders who show low levels of self-regulation can be a source of negative events for followers (cf. Dasborough, 2006). According to affective events theory, the followers' reactions to these events influence their job satisfaction. More specifically, I propose that leader self-regulation has an influence on follower job satisfaction and that this influence is mediated by both constructive and destructive leadership styles. So far, only few studies exist in which the effects of constructive and destructive leadership have been analyzed simultaneously (Glasø et al., 2018).

According to Baumeister et al. (2001), negative events (e.g., an unfounded accusation) have a greater impact on persons than equally strong positive events (e.g., being praised by the leader), because stronger reactions to negative events are evolutionarily adaptive. For example, avoiding possibly bad outcomes (e.g., being injured or killed) increases the chances to pass along one's genes whereas missing out on good outcomes (e.g., eating tasty food) may lead to regret, but should only rarely result in lowered chances of procreation. Reviewing a large number of studies from different

fields, Baumeister et al. (2001) found support for their “bad is stronger than good” hypothesis, as people generally react more strongly to negative events compared to positive ones, and negative events have longer-lasting adverse effects on people. By including both constructive and destructive leadership styles in my research model, this dissertation therefore also provides an indirect test of this “bad is stronger than good” hypothesis of Baumeister et al. (2001).

Importantly, negative emotions can spread within organizations (Clarkson et al., 2020) and have been associated with lower task performance (Kaplan et al., 2009; Shockley et al., 2012). Therefore, emotion regulation seems to be a particularly important skill for leaders which merits further research (see also Haver et al., 2013; R. H. Humphrey et al., 2016; Torrence & Connelly, 2019). Furthermore, self-leadership—commonly defined as influencing oneself to work on tasks that may be naturally motivating or not (Manz, 1986)—is generally viewed as a necessary precursor skill or resource for leading others (e.g., Furtner et al., 2013). Therefore, I focus on these two specific forms of leader self-regulation in this dissertation.

However, the concept of self-leadership is notoriously difficult to define and distinguish from related concepts such as self-regulation or self-control. In the past decades, the definition of self-leadership has been extended to encompass the general control of one’s behavior (Neck & Houghton, 2006) and even higher-level personal standards such as authenticity and responsibility (Manz, 2015). Previous attempts at increasing conceptual clarity focused largely on what self-leadership, self-regulation, self-control, and emotion regulation have in common (Furtner & Hiller, 2013) or on the components of self-regulation (Vancouver & Day, 2005). Whereas examining similarities is one step toward distinguishing these four concepts, a more thorough analysis is needed to establish conceptual clarity (Podsakoff et al., 2016). Achieving conceptual clarity is desirable, because a lack of conceptual clarity creates serious problems for empirical research: Firstly, discriminant validity is difficult to establish if concepts overlap. Additionally, antecedents, correlates, and consequences of a concept that is not clearly defined may be difficult to distinguish. Finally, measures and manipulations of a concept may be deficient and/or contaminated if it is unclear to what precisely they refer (Podsakoff et al., 2016).

Therefore, *the first aim of this dissertation* is to systematically analyze existing definitions and theories of self-leadership and related concepts, and to identify those concept elements that allow researchers to clearly distinguish between these concepts. This is done in Chapter 3, after a brief review of the literature on constructive and destructive leadership in Chapter 2. More specifically, four major types of self-regulation—general self-regulation, self-control, emotion regulation, and self-leadership—are discussed in Chapter 3, before focusing on emotion regulation and self-leadership in Chapter 4, which describes the research model of this dissertation.

Apart from the proposed associations of leader emotion regulation and self-leadership with follower job satisfaction, the research model also includes potential physiological antecedents of emotion regulation. Therefore, it connects the affective events theory (Weiss & Cropanzano, 1996) with the neurovisceral model of integration (Thayer & Lane, 2000, 2009). More specifically, I hypothesize that resting heart rate variability (i.e., the variance in the time intervals between two consecutive heartbeats) and a related measure (cardiac coherence, McCraty & Shaffer, 2015) can be used as indicators of the capacity for successful emotion regulation.

Apart from a lack of conceptual clarity with regard to the concept of self-leadership, existing measures for both emotion regulation and self-leadership mostly capture strategy use (Aldao, 2013; Furtner et al., 2015; Torrence & Connelly, 2019), but not whether the use of emotion regulation or self-leadership strategies is successful. This creates a series of problems that are also discussed in Chapter 3.

The second aim of this dissertation is thus to develop two new scales for measuring emotion regulation and self-leadership that overcome some of these problems. This follows the requests of several authors (e.g., Furtner et al., 2015; Grandey & Melloy, 2017) for new measures that are more context-sensitive and closer to the concept definitions presented in Chapter 3. In Chapter 5, I review existing measures of emotion regulation and self-leadership, which is followed by a description of the rationale that was used to develop the two new scales and the items of the new scales. Initial efforts toward validating these two new scales are presented in Studies 1 (Chapter 6) and 2 (Chapter 7), before using the new measures to empirically test the research model, which is *the third aim of this dissertation*. The research model is tested in two separate studies. First, the consequences of leader self-regulation are assessed in a sample of leader–follower dyads in Study 3 (Chapter 8). After this, the potential physiological indicators of emotion regulation are assessed in a student sample in Chapter 9. Finally, in Chapter 10, I discuss the central findings and limitations of this dissertation.

Therefore, the overarching goal of this dissertation is to examine (leader) self-regulation from several angles: first, theoretically at the concept level; then, regarding potential operationalizations of two subtypes of self-regulation, emotion regulation and self-leadership; and finally, empirically with a focus on physiological antecedents and on the consequences of leader self-regulation for leadership and follower job satisfaction.

2 Leadership

"The essence of leadership lies in identifying goals and influencing followers to pursue those goals" (Krasikova et al., 2013, p. 1311).

According to Kafetsios et al. (2012), *leadership* can be defined as a social influence process involving *leadership behaviors* that a *leader* uses to influence the behaviors, perceptions, and feelings of others (i.e., their *followers*). Unlike other definitions (e.g., House et al., 2001; Paglis, 2010; Paglis & Green, 2002), this definition does not specify the goal of the leader (e.g., a shared goal vs. a leader's personal goal) for influencing their followers nor whether this goal is beneficial or harmful for the organization or their followers. Additionally, this definition does not refer to any initiation of organizational change by leaders. Influencing followers to continue doing the tasks that need to be done is included in this definition, whereas some other authors (e.g., Paglis & Green, 2002) use change-related behaviors to distinguish between leaders, who are dedicated to change, and mere managers.

According to Graen and Uhl-Bien (1995), three domains within the construct of leadership are particularly important, and these are the characteristics, behaviors, attitudes, perceptions, etc. of leaders and followers, as well as the characteristics of the dyadic relationships between the leader and their individual followers (e.g., mutual trust and influence processes). In this dissertation, I predominantly focus on the first aspect, which refers to the characteristics of the leaders and the leaders' behaviors.

2.1 Leadership Effectiveness

Leadership effectiveness "concerns judgments about a leader's impact on an organization's bottom line" (Ali et al., 2018, p. 22), such as the profit or service quality achieved by a team or organization (Ali et al., 2018). As these authors further highlighted, leader effectiveness is often difficult to measure, and it is usually dependent not only on the leader's behavior but also on factors beyond the leader's control. As this definition does not specify how leaders achieve such impact, it is necessary to distinguish between constructive leadership behaviors and destructive leadership behaviors. Specifically, *constructive* leadership behaviors are those that benefit the organization or the followers without harming the other, whereas *destructive* leadership behaviors cause direct or indirect harm to followers, the organization, or both (Einarsen et al., 2007; Kaluza et al., 2020). Importantly, constructive and destructive leadership behaviors are not mutually exclusive, as the same leader can show both of these types of leadership behaviors (Einarsen et al., 2007). Often, sets of leadership behaviors are grouped and examined together as *leadership styles* (Bormann & Rowold, 2018).

2.2 Constructive Leadership

Constructive leadership comprises three meta-categories: task-oriented, relations-oriented, and change-oriented behaviors (Yukl et al., 2002). Yukl et al. (2002) grouped different leadership behaviors into these three categories based on their objectives, which can be summarized as achieving task completion, good interpersonal relationships, and successful organizational change, respectively. Importantly, these categories are not mutually exclusive, as specific leadership behaviors can be utilized to achieve more than one of these objectives (Yukl et al., 2002) or to achieve different objectives depending on the circumstances.

2.2.1 Task-Oriented Leadership

The goal of *task-oriented* leadership behaviors is the efficient and reliable completion of tasks (Lee & Carpenter, 2018; Yukl et al., 2002). This is achieved by clarifying, planning, and organizing followers' tasks, as well as by monitoring task fulfillment (Kaluza et al., 2020; Lee & Carpenter, 2018; Yukl et al., 2002).

The early leadership style of *initiating structure* also focuses on goal attainment and includes very similar leadership behaviors to those mentioned above (Antonakis & House, 2014; Fleishman, 1953), so it is strongly task-oriented (Kaluza et al., 2020). Other task-oriented leadership styles include the transactional leadership dimensions of contingent reward and management-by-exception (active), which are described in Section 2.4.2.

2.2.2 Relations-Oriented Leadership

The goal of *relations-oriented* leadership behaviors is to support positive interpersonal interactions within the work group, thus ensuring high levels of mutual trust and cooperation and a strong commitment to the work group and its aims (Lee & Carpenter, 2018; Yukl et al., 2002). Example behaviors in this category include improving relationships with, supporting, and empowering employees, as well as recognizing their achievements (Kaluza et al., 2020; Yukl et al., 2002).

An early relations-oriented leadership style is *consideration* (Kaluza et al., 2020), which is very similar to the transformational leadership dimension of individual consideration (Antonakis & House, 2014) described in Section 2.4.3. Consideration focuses on supporting followers by showing consideration and concern for their needs (Fleishman, 1953; Yukl et al., 2002). Another example of a relations-oriented leadership style is participative leadership (Kaluza et al., 2020).

2.2.3 Change-Oriented Leadership

Change-oriented leadership behaviors aim to make significant innovative improvements to the processes or services of the organization and to ensure successful adaptation to changing circumstances (Yukl et al., 2002). Example behaviors include envisioning and facilitating change,

encouraging innovative thinking in followers, and monitoring and analyzing the environment for both risks and opportunities (Kaluza et al., 2020; Yukl et al., 2002).

Transformational leadership (see Section 2.4.3) is a predominantly change-oriented leadership style. Other change-oriented leadership styles include charismatic and visionary leadership (Kaluza et al., 2020).

2.2.4 Empirical Support and Outcomes of Constructive Leadership

Borgmann et al. (2016) confirmed the taxonomy of constructive leadership proposed by Yukl et al. (2002) using a meta-analytic structural equation model. Supporting the theoretical arguments above, both initiating structure and transactional leadership (comprising contingent reward and management-by-exception (active); see Section 2.4.2 for the three dimensions of transactional leadership) loaded[1] onto the task-oriented leadership factor (Borgmann et al., 2016). Conversely, consideration loaded positively onto the relations-oriented leadership factor and passive/non-leadership (i.e., laissez-faire and management-by-exception passive, see Sections 2.4.1 and 2.4.2) loaded negatively onto this same factor. Finally, transformational leadership loaded onto the change-oriented leadership factor of the model.

Borgmann et al. (2016) further found that all three categories of leadership behaviors positively influenced follower commitment, with relations-oriented leadership showing the strongest effect. Task-oriented leadership behaviors were positively related to follower job performance but negatively related to follower job satisfaction. By contrast, relations-oriented leadership behaviors had a positive effect on both job performance and job satisfaction. Finally, change-oriented leadership behaviors had a positive influence on follower job satisfaction but only a marginal effect on follower job performance. Therefore, relations-oriented leadership had the most positive effects on followers.

In a meta-analysis investigating health-related follower outcomes, Montano et al. (2017) found that relations-oriented leadership styles were negatively correlated with adverse mental health states (e.g., stress) and physical complaints and positively correlated with well-being and psychological functioning. For task-oriented leadership, the pattern was similar, but only few studies were available. Additionally, change-oriented leadership was not studied separately, but transformational leadership also showed a similar pattern of health outcomes as relations-oriented leadership. By contrast, destructive leadership (see Section 2.3) was positively associated with adverse mental health states and negatively associated with well-being and psychological

[1] As initiating structure and transactional leadership are strongly positively correlated, the negative sign for the factor loading of transactional leadership is most likely a typographical error. The third author of the article agreed with this interpretation but did not have access to the original data for verification (K. C. Bormann, personal communication, January 15, 2021).

functioning (Montano et al., 2017). Kaluza et al. (2020) concluded in their review and meta-analysis that the same pattern applies to leader well-being, as constructive leadership was positively related to leader well-being, whereas destructive leadership was negatively related to leader well-being.

Finally, in a meta-analysis, Legood et al. (2021) found that constructive leadership styles were associated with follower job performance, positive relationships between the leaders and their followers (leader-member exchange; Graen & Uhl-Bien, 1995), with the followers trusting their leaders, and that both leader-member exchange and trust mediated the associations between the leadership styles and follower performance. By contrast, destructive leadership had a detrimental effect on both trust and performance, and, again, leader-member exchange and trust mediated the effect of destructive leadership on performance.

2.3 Destructive Leadership

According to Schilling (2009), *negative leadership* includes leadership behaviors that are *ineffective*, meaning they do not produce the desired organizational outcomes, or *destructive*, meaning they cause harm to the follower, the organization, or both (Schyns & Schilling, 2013). Both *active* and *passive* leadership behaviors are included in this broad definition. Therefore, an omission of required leadership behaviors, such as a lack of support for the employees or the organizational goals (Einarsen et al., 2007; Kaluza et al., 2020), is also part of negative leadership. In practice, purely ineffective but not destructive leadership behaviors may be rare, as ineffective behaviors are, by definition, likely to waste time and other resources and are thus indirectly harmful to the organization.

For reasons of symmetry, the term *destructive leadership* is used in this work as an umbrella term referring to both ineffective and destructive leadership behaviors, similar to the term negative leadership used by Schilling (2009). A more precise definition of destructive leadership is developed in the following section.

Examples of destructive leadership behaviors according to this broad definition include ignoring requests for support by followers, using organizational resources for personal gain, taking personal credit for followers' achievements, and verbally or physically abusing followers. Specifically, examples of passive destructive leadership styles include laissez-faire leadership (see Section 2.4.1) and management-by-exception passive (see Section 2.4.2). By contrast, an example of an active destructive leadership style is abusive supervision (see Section 2.3.1; Kaluza et al., 2020).

2.3.1 Active and Passive Destructive Leadership

Mackey et al. (2020) identified 21 definitions of destructive leadership and related constructs in the literature. The most commonly used definition was proposed by Einarsen et al. (2007), which is discussed in detail below. Another frequently used term for this construct is *abusive*

supervision, which is defined as "subordinates' perceptions of the extent to which supervisors engage in the sustained display of hostile verbal and nonverbal behaviors, excluding physical contact" (Tepper, 2000, p. 178).

Therefore, the focus of abusive supervision is on followers' individual perceptions or evaluations of the leaders' behavior, which may differ across both observers and contexts (Tepper, 2000). The explicit exclusion of physical violence (Tepper, 2000) is a distinguishing feature of the term abusive supervision, as this is not excluded in most other definitions of destructive leadership. The term abusive supervision has been widely used in empirical studies of destructive leadership (Mackey et al., 2020), but the term destructive leadership is more common in recent theoretical works.

Einarsen et al. (2007) defined destructive leadership as "the systematic and repeated behaviour by a leader, supervisor or manager that violates the legitimate interest of the organisation by undermining and/or sabotaging the organisation's goals, tasks, resources, and effectiveness and/or the motivation, well-being or job satisfaction of subordinates" (Einarsen et al., 2007, p. 208).

Since leaders are fallible human beings, isolated incidents of destructive behaviors should not be interpreted as representing destructive leadership (Einarsen et al., 2007), especially if the leader notices the consequences of their behavior, tries to rectify them, and attempts to avoid engaging in the same behaviors in the future. Consequently, most current definitions of destructive leadership require repetition of the behaviors to classify them as destructive (e.g., Einarsen et al., 2007; Itzkovich et al., 2020; Schyns & Schilling, 2013), with the more recent definition by Krasikova et al. (2013) representing a prominent exception to this rule.

However, the requirement of not only repeated, but systematic occurrences of such behaviors in the definition from Einarsen et al. (2007) may be too rigid. Indeed, a leader who repeatedly but erratically behaves in a way that harms their followers, especially if this behavior is interspersed with supportive behaviors, may be even more difficult for followers to tolerate, as the unpredictability would make it impossible to know what to expect and how to behave toward the leader (Tepper et al., 2017).

Although some definitions either implicitly or explicitly limit destructive leadership to intentional, active leader behaviors (i.e., any behaviors, whether or not they seek to influence others; Itzkovich et al., 2020; Tepper, 2000) or active leadership behaviors (Krasikova et al., 2013; Schyns & Schilling, 2013), Einarsen et al. (2007) also included passive behaviors in their definition. Therefore, a clear distinction between active and passive destructive leadership may be warranted to avoid confusion, rather than restricting destructive leadership to only active behaviors.

Apart from the definition provided by Itzkovich et al. (2020), intent to harm is usually not necessary for a behavior to qualify as destructive. By contrast, the perceived or actual consequences of the behaviors are sufficient (as in the definition from Einarsen et al., 2007), meaning that incompetence and thoughtless behaviors can also qualify as destructive if they otherwise fulfill the definition criteria. As Einarsen et al. (2007) highlighted, which behaviors are considered destructive varies depending on the society and point in time. For example, physical violence (e.g., pulling an ear) toward young apprentices was deemed socially appropriate in West Germany in the 1950s[2], but such behavior would be considered physical abuse and punishable under German criminal law today.

Based on the argument that the consequences of the behavior are crucial, any behaviors of leaders rather than solely leadership behaviors should be evaluated to determine their destructiveness. For example, verbal harassment of a follower may occur simply because it makes the leader feel powerful rather than with the aim of consciously influencing the follower.

The rather broad definition by Einarsen et al. (2007) further includes behaviors that harm the organization, the followers, or both. Again, this view is not shared by all researchers; some authors agree with this notion, such as Itzkovich et al. (2020) and Krasikova et al. (2013), whereas others do not (e.g., Schyns & Schilling, 2013; Tepper, 2000). This dissertation focuses on behaviors that harm the followers regardless of whether they also cause harm to the organization, as these destructive leader behaviors are likely to evoke stronger reactions in the followers than those that harm the organization (Schmid et al., 2018).

Drawing on the definitions cited in this section and the terminology used by Schmid et al. (2018), *(follower-directed) active destructive leadership* can thus be defined as repeated, active leader behaviors that intentionally or unintentionally harm the motivation, well-being, or job satisfaction of followers. Equivalently, *(follower-directed) passive destructive leadership* refers to repeated intentional or unintentional omission of behaviors by the leader that intentionally or unintentionally harm the motivation, well-being, or job satisfaction of followers. Ineffective leader behaviors, such as hosting numerous meetings without clear results, that impede project progress are also included in these definitions if they have adverse effects on the followers (e.g., causing them frustration and thus lowering their job satisfaction).

2.3.2 Prevalence of Destructive Leadership

In a representative Norwegian sample (Aasland et al., 2010), 84% of the participants reported exposure to at least some active or passive destructive leader behaviors (including both

[2] An illustrative example is the casual portrayal of physical violence toward young employees in the children's book by Roeder-Gnadeberg (1956).

isolated incidents and organization-directed destructive leadership), 34% reported frequent exposure to one or more types of destructive leadership, and 21% were frequently exposed to passive destructive (laissez-faire) leadership.

In this study, a latent class cluster analysis revealed that only 39% of the participants did not experience any systematic destructive leadership behavior patterns. Importantly, 11% faced a variety of destructive leadership behaviors some of the time, and 6% showed an experience pattern labeled as “highly abusive”, with high exposure to several follower-directed active and passive destructive leadership types. Finally, three other clusters were characterized by experiencing passive or organization-directed destructive leadership behaviors (Aasland et al., 2010).

2.3.3 Consequences of Destructive Leadership

Several meta-analyses (Mackey et al., 2017; Mackey et al., 2020; Schyns & Schilling, 2013; Zhang & Liao, 2015) have comprehensively documented the numerous adverse consequences of destructive leadership for followers. Follower perceptions of destructive leadership were found to be moderately to strongly related to the most proximal outcomes of follower affective reactions, such as anger, frustration, and fear of the leader (Mackey et al., 2020). Interestingly, the correlations between destructive leadership and more distal outcomes, such as counterproductive work behaviors (Mackey et al., 2020; Zhang & Liao, 2015), turnover intentions, job satisfaction (Mackey et al., 2020), and burnout (Harms et al., 2017) were of a similar magnitude in the more recent meta-analyses (Harms et al., 2017; Mackey et al., 2017; Mackey et al., 2021; Zhang & Liao, 2015). Even the most distal behavioral outcomes with the highest relevance for organizational performance, including individual task performance (Mackey et al., 2020) and organizational citizenship behavior (Mackey et al., 2017; Mackey et al., 2020; Zhang & Liao, 2015), showed low to moderate significant negative correlations with destructive leadership.

It should be noted that some of the effects of abusive supervision on follower behavior were dependent on the cultural factor of power distance (i.e., the acceptance and maintenance of unequal distributions of power, Javidan & House, 2001). The effects were stronger in samples with low power distance (i.e., North America) compared to samples with high power distance (i.e., Asian samples), but no moderation effects of power distance were identified for affective consequences (Zhang & Liao, 2015).

Tepper et al. (2006) estimated that U.S. employers suffer a loss of $23.8 billion annually due to abusive leadership through factors such as reduced productivity and increased employee turnover, which amounts to almost 0.2% of the U.S. GDP for that year (U.S. Bureau of Economic Analysis, 2021). The costs of destructive leadership may be lower in other countries due to aspects such as lower legal fees or higher tolerance of destructive leadership in some cultures (Zhang & Liao,

2015). However, the current global damage caused by destructive leadership is likely to be significantly higher than the previous, relatively dated estimate for the United States from Tepper et al. (2006).

2.3.4 Antecedents of Destructive Leadership

In order to avoid the numerous negative consequences of destructive leadership that have been summarized in Section 2.3.3, practitioners must understand the antecedents of destructive leadership (Tepper et al., 2017). Krasikova et al. (2013) theorized that perceived or actual goal blockage is a key antecedent of destructive leadership, as blocked goals are likely to cause frustration, which, in turn, may cause aggression, according to the frustration-aggression hypothesis (Miller, 1941), or—more generally—counterproductive work behaviors (Fox & Spector, 1999).

Krasikova et al. (2013) posited that a leader's goals can be blocked by opposing organizational goals (e.g., purchasing new technical devices may be prevented by budget cuts) or thwarted by followers (e.g., a leader's goal may be to impress their own supervisor in a presentation, but the slides provided by the team may not meet the leader's personal standards). They further argued that perceptions of goal blockage are influenced by certain leader characteristics (e.g., those that negatively bias the interpretation of events or tendencies to emphasize self-interest over interests of others) as well as by the organizational context (e.g., a scarcity of resources or an organizational climate that promotes or condones destructive behaviors; see Figure 1).

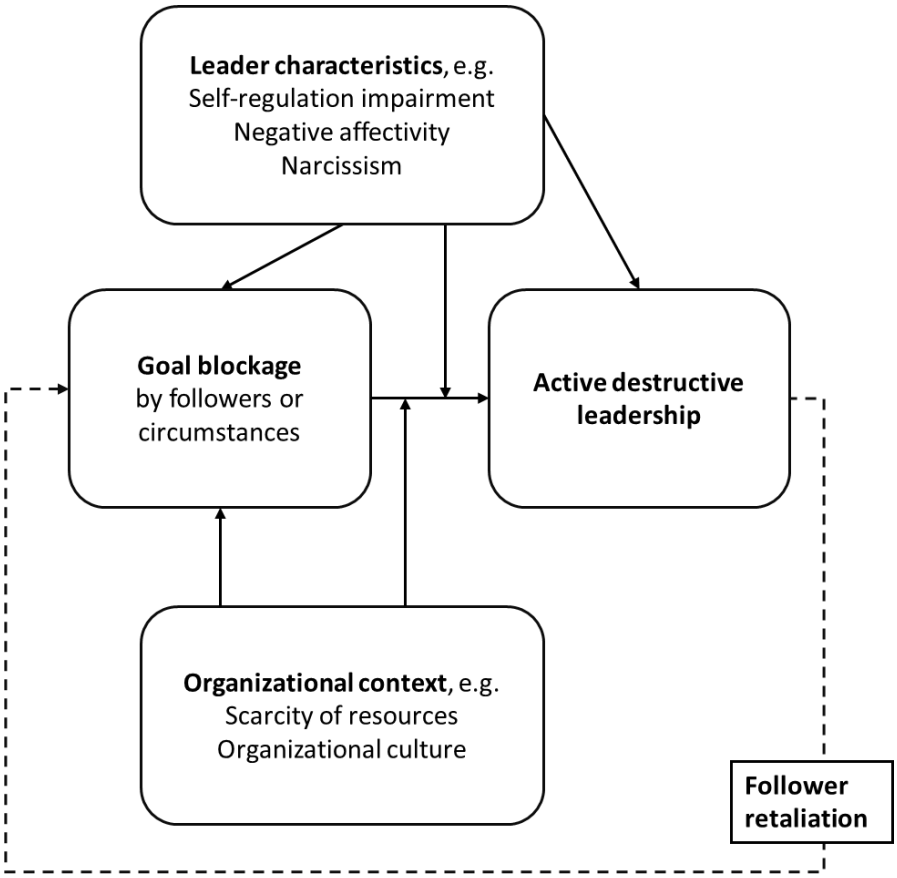
For the sake of brevity, the distinction between choosing to engage in destructive leadership and acting upon such a choice as well as the parts of the model that refer to organization-directed destructive leadership and to the organizational responses to follower- and organization-directed destructive leadership are omitted in Figure 1 and not discussed here.

As indicated by the dotted arrow in Figure 1, followers can react to follower-directed destructive leadership by retaliating toward the leader (e.g., calling in sick), which can cause further blockage of leader goals (Krasikova et al., 2013). One of the leader characteristics that moderates the path between goal blockage and destructive leadership is impaired self-regulation, which has both temporary forms (e.g., ego-depletion; see Section 3.2.5) and dispositional forms (e.g., low self-control; see Section 3.3).

Similarly, Tepper et al. (2017) described three interrelated categories of direct antecedents of abusive supervision, including a) social learning, which causes leaders to deem destructive leadership as acceptable and includes, but is not limited to, organizational culture and family experiences of aggression, b) threats to the leader's identity, which can arise from provocations by followers, and c) impaired self-regulation, which may result from ego depletion.

Figure 1

Simplified Version of the Theoretical Model of Destructive Leadership by Krasikova et al. (2013)



Note. Adapted from "Destructive Leadership: A Theoretical Review, Integration, and Future Research Agenda" by D. V. Krasikova, S. G. Green, and J. M. LeBreton, 2013, *Journal of Management*, *39*(5), p. 1316 (https://doi.org/10.1177/0149206312471388). Copyright 2013 by the authors.

Focusing only on studies that were based on the concept of abusive supervision defined by Tepper (2000), Zhang and Bednall (2016) conducted a meta-analysis to examine the antecedents of abusive supervision. Both supervisors' negative experiences (e.g., relationship conflicts) and aggressive norms in the organization showed significant moderate positive associations with abusive supervision, which supports the antecedent category of social learning. However, few effect sizes were available for analysis for both factors.

Regarding the category of self-regulation impairment, Zhang and Bednall (2016) found a significant moderate negative relationship between supervisors' emotional intelligence (very loosely defined as also including self-control, wisdom, and political skill; see Section 3.4.1 for more information on the concept) and abusive supervision. In this case, emotional intelligence represents the opposite of self-regulation impairment, as it refers to the ability to regulate negative emotions to

prevent undesirable impulsive behaviors, such as abusive supervision. However, despite the very broad definition of emotional intelligence, only five effect sizes could be included in the analysis.

Tepper et al. (2017) narratively reviewed several other studies that lend more direct support to the category of self-regulation impairment, three of which are briefly summarized here. Firstly, leaders' self-reported resource depletion—operationalized as depressive symptoms, anxiety, and workplace alcohol consumption—was associated with lower levels of follower-rated transformational leadership and higher levels of follower-rated abusive supervision in a sample in the United States and Canada (Byrne et al., 2014). In another sample in the United States, self-reported supervisor stress was related to higher follower-rated abusive supervision. This relationship was moderated by self-reported supervisor exercise levels, as there was no significant relationship between stress and abusive supervision for supervisors who engaged in physical exercise at least twice per week (Burton et al., 2012). Finally, in a fixed-interval experience sampling study in Italy conducted over 10 days, leader sleep quality (but not quantity) had an indirect effect on follower and work-group level work engagement via ego depletion and abusive leadership (Barnes et al., 2015). Taken together, impaired leader self-regulation appears to be related to higher levels of destructive leadership.

2.4 Selected Leadership Styles

Most leadership styles that are discussed in this section are covered by the extended full range of leadership model (Antonakis & House, 2014): This model includes the three leadership styles outlined in the original full range of leadership model from (Bass, 1999), which are laissez-faire leadership (Section 2.4.1), transactional leadership (Section 2.4.2), and transformational leadership (Section 2.4.3), with the addition of instrumental leadership (Section 2.4.4). However, the different conceptions of destructive leadership that are described in Section 2.3.1 are not included. This has been amended recently in the complete full range of leadership model (Itzkovich et al., 2020), which categorizes leadership styles as active or passive and as constructive or destructive.

Examples of *active constructive leadership* styles mentioned by Itzkovich et al. (2020) are transformational leadership and contingent reward. Although instrumental leadership was not explicitly mentioned in the article, it can also be added to this category. The concept of *passive constructive leadership* is new in this full model and refers to delegation characterized by low direction and low levels of leader support for the followers, which is only possible if the leader trusts their followers and if the followers do not require assistance from the leader to complete the delegated tasks. *Passive destructive leadership* styles include laissez-faire leadership and both forms of management-by-exception. Finally, the active forms of destructive leadership described in Section 2.3.1 are referred to as *active destructive leadership*.

In this model, the four categories described above are ranked based on their effectiveness from active constructive leadership (highly effective) to active destructive leadership (highly ineffective). Passive constructive leadership (moderately effective) and passive destructive leadership (moderately ineffective) rank second and third, respectively, between their active counterparts (Itzkovich et al., 2020).

2.4.1 Laissez-Faire Leadership

Laissez-faire leadership is a form of non-leadership. In this leadership style, leaders avoid making decisions, ignore their responsibilities, are unavailable when needed, and generally hesitate to act, thus leaving their followers to manage any tasks at hand even when they actively seek guidance from the leader (Bass, 1990; Judge & Piccolo, 2004). Laissez-faire leadership is a form of passive destructive leadership, because avoiding decisions is likely to harm the organization, for example, through missed business opportunities due to leader inaction. Furthermore, it may also harm the motivation and job satisfaction of followers when they are unable to complete certain tasks due to a lack of decisions or guidance from the leaders (Einarsen et al., 2007).

In a meta-analysis, laissez-faire leadership was shown to be negatively correlated with follower satisfaction with the leader, leader effectiveness ratings, and follower job satisfaction, although few correlations were available when the meta-analysis was conducted (Judge & Piccolo, 2004). Further to this, laissez-faire leadership has been shown to be correlated with higher role ambiguity, role conflict, and psychological distress of followers (Skogstad et al., 2007).

2.4.2 Transactional Leadership

According to Bass (1985), *transactional* leaders identify both the tasks that their followers must accomplish and the needs and wants of their followers. Subsequently, they use this information to clearly communicate what they expect from their followers and what their followers can expect to receive in return if they do or do not fulfill those expectations (e.g., praise, bonuses, pay rises). *Contingent reward* is the most active and prototypical form of transactional leadership, encompassing the exchange of rewards for effort as described above (Bass, 1985, 1990).

Management-by-exception (active) involves actively monitoring potential deviations from clearly specified standards with the aim of anticipating potential problems and taking corrective action if required. Its counterpart, *management-by-exception (passive)*, refers to situations when a leader chooses to intervene only after a failure has already occurred. Additionally, the leader tends to wait until a task is completed before evaluating the followers' performance and communicating to them whether they have met the leader's expectations (Bass, 1990; Howell & Avolio, 1993).

As management-by-exception (passive) does not provide timely support for the followers nor clearly communicates to the followers what is required of them, it can be categorized as a

passive destructive leadership style (Kaluza et al., 2020), that is only weakly related to the core idea of transactional leadership. By contrast, contingent reward and management-by-exception (active) can be characterized as task-oriented leadership styles (Kaluza et al., 2020).

In their meta-analysis, Judge and Piccolo (2004) found that contingent reward and management-by-exception (active) positively correlated with different leadership criteria (e.g., follower satisfaction with the leader, leader effectiveness) and that these effects tended to be stronger for contingent reward. However, the correlations for management-by-exception (passive) were either negative or not significant. In another meta-analysis, contingent reward was also found to be positively associated with follower performance, job satisfaction, and other criteria (Podsakoff et al., 2006).

2.4.3 Transformational Leadership

Transformational leadership refers to a "transform[ation] … [of] the basic values, beliefs, and attitudes of followers so that they are willing to perform beyond the minimum levels specified by the organization" (Podsakoff et al., 1990, p. 108). Example behaviors for this leadership style include inspiring and intellectually stimulating followers, motivating followers to strive for the benefit of the group, and meeting followers' emotional needs (Bass, 1990). Bass (1999) summarized the differences between transformational and transactional leaders as follows: "Whereas transformational leaders uplift the morale, motivation, and morals of their followers, transactional leaders cater to their followers' immediate self-interests" (Bass, 1999, p. 9).

In a literature review, Podsakoff et al. (1990) identified six key dimensions of transformational leadership: a) *identifying and articulating a vision,* which refers to the creation and communication of an inspiring vision of the future for the team or company; b) *providing an appropriate model,* which refers to the leader setting an example for the followers by acting in line with their values; c) *fostering the acceptance of group goals,* which refers to promoting cooperation among followers and encouraging collaborative work toward a common goal; d) *high performance expectations*, which involves communicating such expectations to the followers; e) *providing individualized support,* which refers to respecting followers and showing concern for their needs and feelings; and f) *intellectual stimulation,* which refers to challenging followers to find novel ways to manage and complete their work.

The dimension of providing individualized support is very similar to the leadership style consideration, meaning this dimension can be categorized as relations-oriented leadership. Clearly, fostering the acceptance of group goals is also relations-oriented. However, the other four dimensions, as well as the global concept of transformational leadership, are better categorized as change-oriented leadership (Bass, 1985; Kaluza et al., 2020).

In their meta-analysis, G. Wang et al. (2011) reported that transformational leadership (and contingent reward) showed small to moderate positive correlations with individual, team, and organizational performance. Piccolo et al. (2012) further demonstrated that the concepts of transformational leadership, consideration, and initiating structure can be distinguished both conceptually and empirically. For example, when all three leadership styles were entered together into a meta-analytical regression model, transformational leadership and consideration predicted follower job satisfaction, whereas transformational leadership and initiating structure predicted leader effectiveness (Piccolo et al., 2012).

2.4.4 Instrumental Leadership

Instrumental leadership can be defined as a combination of *monitoring* the environment and the followers' performance and *facilitating* the implementation of goals (Antonakis & House, 2014). Specifically, instrumental leadership comprises four dimensions that are grouped into two categories. Firstly, *strategic leadership* consists of a) environmental monitoring and b) strategy formulation and implementation and secondly, *follower work facilitation* comprises the two dimensions of c) path-goal facilitation and d) outcome monitoring (Antonakis & House, 2002, 2014).

The dimension of *environmental monitoring* refers to monitoring the internal (e.g., developing internal conflicts) and external (e.g., new laws, activities of competitors) environments of the organization to identify the opportunities, strengths, and weaknesses of the organization (Antonakis & House, 2014; Rowold, 2014). Therefore, this dimension is clearly change-oriented.

Strategy formulation and implementation involves developing specific strategies, goals, and sub-goals that explicate and support the abstract strategic vision or mission of the organization (Antonakis & House, 2014; Rowold, 2014). To some extent, this dimension is also change-oriented, as developing and implementing new strategies necessarily entails at least some change in procedures, even if the mission may be to provide the same standard of service that has been delivered for a long period of time. However, the supporting function of this dimension (e.g., by clarifying goals), can be viewed as more task- rather than change-oriented.

Path-goal facilitation consists of "giving direction, support, and resources, removing obstacles for goal attainment and providing path-goal clarifications" (Antonakis & House, 2014, p. 750). Therefore, this dimension focuses on supporting followers not emotionally, but with practical and cognitive support, thus enabling them to solve problems they encounter and complete their tasks, without an emphasis on rewards or punishments (Antonakis & House, 2014; Rowold, 2014).

Outcome monitoring refers to providing followers with constructive and timely feedback during the work process, enabling them to enhance their performance and achieve their goals

(Antonakis & House, 2014; Rowold, 2014). The two dimensions of path-goal facilitation and outcome monitoring are both predominantly task-oriented as they focus on supporting task completion. However, the relations-oriented leadership behaviors of supporting and empowering followers also play a role in these dimensions, which probably led Rowold et al. (2017) to describe the category of follower work facilitation as “focus[ing] on followers” (Rowold et al., 2017, p. 233).

In summary, instrumental leadership is predominantly a task-oriented leadership style (Bormann & Rowold, 2018), which also includes some behaviors from the other two meta-categories of relations-oriented and change-oriented leadership. It has been viewed as a link between transformational and transactional leadership, as instrumental leadership can be used to translate a transformational vision into smaller, more manageable goals for the followers, which subsequently may be handled in a more transactional manner (Rowold, 2014).

Empirically, there are strong correlations between the four dimensions of instrumental leadership and other constructive leadership behaviors (i.e., transformational leadership dimensions and management-by-exception active). Despite this, instrumental leadership also explains additional variance in leader effectiveness, satisfaction with the leader (Antonakis & House, 2004, 2014), follower job satisfaction, and objective team performance of technicians (Rowold, 2014) above and beyond transformational, transactional, and laissez-faire leadership. Notably, instrumental leadership has also consistently been shown to have a moderately negative correlation with passive leadership styles (Antonakis & House, 2004, 2014; Rowold, 2014). Furthermore, instrumental leadership, but not transformational leadership, has also been found to be significantly related to follower hair cortisol and saliva cortisol levels in the evenings, such that instrumental leadership can be associated with lower levels of follower stress (Rowold et al., 2017).

3 Self-Regulation and Related Concepts

"Civilized human life is not compatible with expressing every feeling and enacting every impulse" (Baumeister, 2014, p. 315).

In this chapter, I summarize the literature on emotion regulation (e.g., Thompson, 1994) and develop a clear definition of the concept of self-leadership (e.g., Manz, 1986) for this dissertation. To achieve the latter goal, I first define several basic concepts that are used as building blocks for the definitions that follow (Section 3.1). Then, I introduce self-regulation as an umbrella concept that encompasses emotion regulation, self-leadership, and the related concept of self-control (Section 3.2), before discussing the latter three constructs in detail (Sections 3.3 to 3.5).

Methodologically, I follow Boss and Sims (2008), who distinguished emotion regulation from self-leadership based on *what* is being regulated in each case. Here, I extend this basic idea to self-regulation and self-control, while adding a few more attributes, such as the degree of consciousness, to differentiate between the concepts that are involved in self-regulatory processes.

3.1 Basic Concepts

Even though nearly everyone has an intuitive grasp of the terms emotions, goals, tasks, and actions, all four terms are notoriously difficult to define for scientific purposes (e.g., Elliot & Fryer, 2008; Gross, 2015; Vallacher & Wegner, 2011; Wood, 1986). However, as these terms are vital for the definitions that follow in the subsequent sections, working definitions of the terms are required.

3.1.1 Emotions

"Saying what emotions are not (e.g., not stress responses, not moods) turns out to be a lot easier than saying what emotions are" (Gross, 2015, p. 3).

Emotions are rather intense and relatively short-lived reactions to an event that is interpreted as relevant to one's goals, values, or needs (Braunstein et al., 2017; Gooty et al., 2010). The term event is used in the broadest sense in this definition. For example, one can react to persons who say or do something, to thoughts that occur, or to objects that one encounters. The reactions to such events include positively or negatively valenced subjective experiences, cognitions, behavioral tendencies, behaviors (e.g., facial expressions, taking a step back), and physiological changes that support or result from the behaviors (Braunstein et al., 2017; Gross, 2015). An *emotion episode* (cf. Gibson & Callister, 2010) can be defined as a combination of the emotion-eliciting event and the emotion(s) caused by the event as defined above.

A *mood* (also: *state affect*) is less intense, broader, more diffuse, and longer-lasting than an emotion. Moods typically lack a specific target; however, they may be the consequence of one or several events that caused emotional reactions, which are reflected in the mood after the initial emotions have waned (George, 2000; Gooty et al., 2010; Gross, 2015; Weiss & Cropanzano, 1996).

Trait affect is defined as an individual's predominant mood under various circumstances, that is, an "emotional baseline" that is more positive for some and more negative for others (Gooty et al., 2010; Weiss & Cropanzano, 1996). *Positive affectivity* refers to the level of positive emotions (e.g., feeling enthusiastic and full of energy) a person typically feels across time, while *negative affectivity* refers to the typical level of negative emotions (e.g., anger, disgust, fear) of a person (Kaplan et al., 2009; Watson et al., 1988). Positive and negative affectivity are viewed as two separate dimensions, not as opposites. Low levels of positive affectivity are associated with feeling lethargic and sluggish, whereas low levels of negative affectivity are related to feeling calm and serene (Kaplan et al., 2009; Watson et al., 1988). The term *affect* (without any qualifications) is used as an umbrella term in this dissertation, referring to emotions, moods, and trait affect.

In a meta-analysis by Joseph et al. (2015), leaders' positive affectivity was positively related to leader effectiveness (after controlling for extraversion), while leaders' negative affectivity was negatively related to leader effectiveness (after controlling for neuroticism). Other meta-analyses found associations between affect and performance in employees that held for both state affect and affectivity: negative affect was negatively related to task performance and positively related to counterproductive work behavior, whereas positive affect was positively related to task performance (Kaplan et al., 2009; Shockley et al., 2012).

3.1.2 Goals

Based on a literature review, Elliot and Fryer (2008) arrived at the following definition: "A *goal* is a cognitive representation of a future object that the organism is committed to approach or avoid" (p. 244). The *object* of a goal can be any entity, event, experience, characteristic, etc., that the goal is focused on. Goal objects can be abstract or concrete and are positively or negatively valenced (Elliot & Fryer, 2008).

Goals range from broad and abstract (e.g., to become a better person) to small and very specific (e.g., to elegantly pour a cup of tea), with some goals serving as subgoals for bigger goals (e.g., pouring the tea elegantly to prove that one is a competent host), whereas other goals are independent of each other (Carver & Scheier, 1998; Weiss & Cropanzano, 1996).

One's commitment to a goal varies in intensity across time and goals, but it needs to be conscious (Elliot & Fryer, 2008). Therefore, a goal can be suggested, but not set by others, as the person—to whom the goal is suggested—needs to commit to the goal to make it their own. Once a person has consciously committed to a goal, this goal can later be activated automatically and subsequently operate outside conscious awareness (Elliot & Fryer, 2008).

Approach goals have a positively valenced object that a person wants to maintain or move closer to, whereas *avoidance goals* have a negatively valenced object that a person wants to stay or

move away from (Coats et al., 1996). In both cases, movement may include physical movement or psychological activity (Elliot & Fryer, 2008).

3.1.3 Tasks and Actions

According to Wood (1986), a *task* has three components: a product, the required actions to create the product, and information cues that need to be processed while performing these actions. In this context, *products* are observable results of actions. They include an object, which can also take the form of an event, and attributes, such as type, quantity, quality, deadline, and cost, that further define the product. For example, the object "scientific article" can be further specified to cover a certain topic while adhering to the formal requirements of a scientific journal.

When a person commits to a task, the product of the task becomes the object of a goal, because the person wants to create (i.e., approach) the product. Therefore, a task can be viewed as a goal with additional information on how to reach the goal. This additional information is what distinguishes tasks and goals, because not every goal specifies actions by which it can be completed (Carver & Scheier, 1998). For instance, one cannot "become a better person" without first specifying actionable subgoals such as "setting up monthly donations to the local animal shelter." Once the product of a task is clearly defined, one can proceed to identify the necessary actions and information cues to create the product (Wood, 1986).

Wood (1986) defines an act (or action) as "the pattern of behaviors with some identifiable purpose or direction" (Wood, 1986, p. 65). Hence, actions can be described as "doing something"; for example, performing an ANOVA for a scientific article.

The purpose or direction of an action can likewise be viewed as the object of a goal. For example, when performing an ANOVA, one wishes to obtain the results of the ANOVA (goal object), which is also the purpose of the ANOVA. Therefore, *actions* can be defined as goal-directed behavior (cf. Zacher & Frese, 2018), and a hierarchical goal structure emerges, with actions leading to the completion of subgoals that are in turn necessary for the goal of task completion.

Information cues refer to properties of the task-related stimuli which allow the individual performing the task to make necessary decisions (Wood, 1986). For example, while performing an ANOVA, a wrong variable listed in the output of the statistics program is an information cue that leads to the decision to redo the calculations with the correct variable.

Not every *task input* (i.e., the task's actions and information cues) can be known in advance, as both depend on the environment (Wood, 1986). For example, the unexpected information cue "the computer is broken" may add the action of finding a replacement to the list of the required actions. Different ways of performing actions (e.g., making an error or identifying a new way of doing something) can further change the task inputs.

3.2 Self-Regulation

Social cognitive theory (Bandura, 1991) defines self-regulation as a self-motivation process: people motivate themselves to behave as desired by creating incentives for themselves in the forms of a) *evaluative self-reactions*, which are the positive or negative ways people feel about their current or anticipated future behaviors or b) *tangible self-reactions*, which are self-rewards and self-punishments. Goals and personal standards (e.g., moral standards) clarify which conditions need to be met to achieve a positive self-evaluation, whereas self-observation provides the necessary information for judging the current progress toward a goal and whether a personal standard was met or violated.

Setting a goal for oneself (i.e., committing to the goal) creates a *discrepancy* between the current state of a person and a desirable future state (Locke & Latham, 2006) because the person committing to the goal seeks to approach or avoid something (Elliot & Fryer, 2008). Both setting a new goal and making an existing goal more difficult to achieve are referred to as *discrepancy production* processes. Persons with high self-efficacy expectations tend to increase their efforts upon observing (negative) discrepancies while striving to attain a goal, whereas persons with low self-efficacy expectations tend to be discouraged from pursuing their goal further in such a case (Bandura, 1991).

Discrepancy reduction occurs when a person comes closer to goal attainment (Bandura, 1991). For instance, a person can modify their current state (e.g., by studying for a test one wishes to pass), or they can revise a goal so that it is closer to the current state (e.g., by studying for a B instead of an A). According to Bandura (1991), self-regulation encompasses both discrepancy production and discrepancy reduction.

Discrepancy production has been widely studied in the context of goal setting theory (Locke & Latham, 2002, 2006). According to this theory, specific and difficult goals—unlike urging people to do their best—improve performance because such goals direct attention, effort, and energy toward goal-relevant thoughts and behaviors (and away from irrelevant thoughts; see also R. E. Johnson et al., 2006). Feedback about one's progress toward a goal and personally important goals increase the effectiveness of specific and difficult goals (Locke & Latham, 2002). In short, according to the goal setting theory, certain forms of discrepancy production subsequently cause successful discrepancy reductions. Discrepancy reduction, which is the focus of control theories of self-regulation, is discussed further in the next section (Section 3.2.1).

3.2.1 Control Theory

Feedback loops are at the core of cybernetic or control theories (Carver & Scheier, 1998; Edwards, 1992). A *negative feedback loop* consists of four elements: a) an input or current state, b) a

reference value, c) a comparator, which compares the input to the reference value, and d) an output. The output remains unchanged if the comparator finds no difference between the input and the reference value, but changes when it does find a difference. More specifically, the output of a negative feedback loop seeks to influence the environment or the components of the feedback loop, so that the input matches the reference value, for example, by modifying the environment or by adjusting the reference value (Carver & Scheier, 1998; Lord et al., 2010). *Disturbances* are other factors that influence the current state. The most widely used example of a negative feedback loop is that of a thermostat, which monitors the temperature and adjusts the heat emitted by a heater to reach and maintain a predefined temperature, with open windows causing a disturbance in this system (Carver & Scheier, 1998).

Unlike a negative feedback loop, which seeks to reduce or avoid discrepancies between the input and the reference value, a *positive feedback loop* seeks to create or enlarge a discrepancy. Therefore, the reference value in a positive feedback loop is an undesirable aspect that the system seeks to move away from. While negative feedback loops can be stable systems, if the output does not "overreact" to discrepancies, positive feedback loops on their own are unstable, as they push the system ever further away from the reference value without a condition that states when the discrepancy is large enough (Carver & Scheier, 1998). For example, a person who wants to avoid the appearance of being lazy may feel compelled to work ever longer hours, especially if others follow suit and also work longer hours.

The *reference value* in a feedback loop can be a goal, but also any other reference value suitable to the system (Carver & Scheier, 1998). For example, many negative feedback loops exist within the body; these regulate parameters (e.g., body temperature and blood sugar levels) by monitoring the current levels and comparing them to the optimal levels.

3.2.2 Feedback Loops, Goal Attainment, and Emotions

According to control theory (Carver & Scheier, 1998), emotions are caused by a *meta-feedback loop* M that monitors the progress in a regular feedback loop R. M specifies a desirable rate of progress toward (if R is a negative feedback loop) or away from (if R is a positive feedback loop) the reference value of R. If the progress toward the reference value of R happens at a rate that is equal to the desired rate in M, affect will be neutral or slightly positive. If the progress is slower, non-existent, or even negative (i.e., it moves opposite to the desired direction), negative emotions ensue. If the progress surpasses the reference value of M, positive emotions follow. In negative feedback loops, the resulting positive emotions are posited to be elation or joy, whereas the negative emotions take the form of sadness or depression. In positive feedback loops, the positive

emotions are relief or contentment, and the typical negative emotion is anxiety (Carver & Scheier, 1998).

The actual progress rate toward a goal fluctuates due to changes in motivation, tiredness, external factors, or different difficulty levels for different subgoals. Therefore, very short cycle lengths of M may lead to emotional instability because every variation in progress speed will be noticed. However, timeframes that are too long may reduce the usefulness of M as an indicator of current performance (Carver & Scheier, 1998). For example, checking one's progress toward completing a PhD thesis only once per year may jeopardize timely completion of the thesis, if one's progress turns out to be too slow. Hence, the time frame that is used to determine the current progress rate by M is important.

According to Carver and Scheier (1998), goal attainment results in elation, if it enables one to make progress toward attaining other goals (e.g., by freeing up resources). However, if goal attainment halts progress because there are no further or alternative goals to be achieved, the resulting emotion may be less positive or even negative. For example, a student finishing high school with no plans for their future may feel rather anxious than happy about their graduation.

Mixed feelings can result from different progress rates on simultaneous goals. Carver and Scheier (1998) argue that progress monitoring happens even for goals that are currently outside consciousness. As most people prefer a tidy home, if only to conform to social norms, this may explain why clutter makes people unhappy (Rogers & Hart, 2021) even if they do not realize that the clutter is the reason for their unhappiness, as is currently being propagated in popular culture.

Kruglanski et al. (2000) provide another perspective: persons who prefer *locomotion* (i.e., focusing on the progress toward goal attainment) over *assessment* (i.e., evaluating states, goals, and means for goal pursuit by comparing them to alternatives) may feel uncomfortable after attaining a major goal if they do not keep moving, so they are likely to quickly pursue a new (major) goal instead of taking a well-deserved break. Therefore, they may enjoy goal attainment less than those who prefer assessment over locomotion.

3.2.3 Automatic Versus Conscious Self-Regulation

Self-regulation processes can be described on a continuum ranging from fully automatic (also: nonconscious, implicit) to fully conscious (also: deliberate, controlled, explicit, reflective) processes (Lord et al., 2010; Mauss, Bunge, & Gross, 2007). *Automatic* self-regulation is triggered by sensory inputs that directly activate both relevant knowledge structures and feedback loops, with neither of them reaching conscious awareness. *Deliberate* self-regulation begins with a conscious goal, and all elements and processes within the feedback loop are conscious, thus requiring attention and volition (Gyurak et al., 2011; Mauss, Bunge, & Gross, 2007).

The position of a self-regulation process on this continuum can change over time (Gyurak et al., 2011). For example, if a problem occurs within an automatic process, it may require conscious attention. Additionally, as mentioned above, previously conscious goals can be subconsciously primed, and goal pursuit may proceed automatically if the necessary behaviors are habitual.

Additionally, not all elements of a feedback loop have to be conscious at once. For example, a person taking their sweater off because they feel too warm, was likely alerted to this fact by a nonconscious comparator that used a nonconscious reference value, but whose output (feeling warm) reached consciousness, because their body could no longer automatically regulate the body temperature. Lord et al. (2010) further stress the importance of emotions as automatic indicators to the conscious self-regulation systems, which signal that attention needs to be directed to important new information, and self-regulation adjusted accordingly.

3.2.4 Hierarchical Organization of Negative Feedback Loops

Negative feedback loops can be organized in hierarchies. The output of a superordinate feedback loop can modify the reference value of a subordinate feedback loop instead of directly influencing the environment or its elements. The output of the subordinate loop then directly or indirectly feeds back into the input of the superordinate feedback loop (Carver & Scheier, 1998). Pursuing a goal by working toward subgoals is an example of hierarchical feedback loops.

Lord et al. (2010) describe four loosely connected hierarchical levels of self-regulation that encompass self-regulation processes with any degree of consciousness (see Section 3.2.3). Besides top-down control processes, where a higher-level feedback loop influences a lower-level feedback loop, bottom-up control and horizontal influence processes (i.e., among goals on the same level) are also included in their theoretical model.

An important distinction between the hierarchical model by Carver and Scheier (1998), in which feedback loops directly feed into each other, and the model by Lord et al. (2010) is the idea of *cross-level constraints*, which operate both top-down and bottom-up. These constraints do not directly link feedback loops across levels. Rather, one feedback loop increases or decreases the likelihood of the activation of another feedback loop, if one or more constraints are met. For example, the long-term goal of becoming a better person will not influence behavior all the time, but rather create constraints that will activate or inhibit certain behaviors under certain circumstances such as giving money to a street musician if the person encounters one.

Of course, the constraints created by higher-level goals are not always sufficient to guide behavior. For example, one may give in to temptation rather than resist it, as would be prompted by the higher-level goal to eat less sugar, if a colleague brings their delicious chocolate cake to the

office. This is especially likely to occur under ego depletion (Baumeister & Vohs, 2016), a topic that is discussed in Section 3.2.5.

The four levels of self-regulation according to Lord et al. (2010) are described as follows: At the *micro* cycle level, self-regulation processes (i.e., negative feedback loop cycles) occur within tens of milliseconds. The *low* cycle level covers processes occurring within seconds, whereas processes at the *intermediate* cycle level span minutes, hours, or days. Meanwhile, processes at the *high* cycle level span months or even years. As before, higher levels of self-regulation indicate higher levels of abstraction. For example, pursuing the goal of successfully completing a PhD thesis is an example of self-regulation with a cycle length of years and thus on the high cycle level. Completing significant parts of the thesis (e.g., a chapter) also likely falls in the same category (Lord et al., 2010).

Self-regulation that focuses on completing smaller tasks related to the thesis (e.g., writing a paragraph, looking up a source quoted elsewhere) occurs on the intermediate cycle level. This level includes both conscious and unconscious processes. For example, goal activation, the shielding of a goal against distraction, and the monitoring of one's process toward goal attainment can all occur automatically (Lord et al., 2010).

Self-regulation at the low cycle level concerns short behaviors that take only a few seconds to complete; for example, typing a word, or pouring oneself a cup of tea. These behaviors often require little attention and are mostly knowledge-dependent. The behavior sequences that are necessary to complete a routine task or habitual behaviors are typically regulated at this level (Lord et al., 2010). For example, when folding a basket of laundry, one typically picks up a piece of clothing, folds it the way one always folds it, puts it aside, and repeats this pattern until the basket is empty and all the clothes are folded.

Whereas the task of folding all of the clothes in the basket would be situated on the intermediate level, the execution of the task by a skilled person would be regulated on the low cycle level in most cases, because folding an individual piece takes mere seconds and occurs without much conscious thought unless the person chooses to think about it (e.g., as a way of being mindful). This example also illustrates that subsequent behaviors are typically cued automatically at this level—after folding one piece, one picks up the next, and picking up the first piece is cued by the superordinate goal of folding the laundry in the basket.

This automatic cueing of subsequent behaviors has been successfully used to improve the efficacy of conscious, higher-level self-regulation. By formulating *implementation intentions* (Gollwitzer & Brandstätter, 1997) with the pattern "I will do X when I encounter Y." (e.g., "I will go running first thing in the morning when I see my running shoes in the bathroom"), the desired behavior is coupled with a cue that is easier to produce (or will be encountered automatically) than

the behavior itself. The behavior is then facilitated by the cue. Thus, self-regulation ideally occurs with less conscious effort at the low cycle level rather than at a higher level (Lord et al., 2010).

The lowest level of self-regulation involves the largely unconscious regulation of movements, affect, or the physiological processes of knowledge access or inhibition, all of which are necessary for executing the subtasks specified by the higher levels (e.g., automatically hitting keys with the fingers to type a word; Lord et al., 2010).

The prefrontal cortex actively maintains and shields the activation patterns that describe higher-level goals and related information while ensuring that critical information is attended to if needed (i.e., if the self-regulation process does not run smoothly). Since the micro cycle level operates at high speed, emotions—rather than slow conscious deliberations—are theorized to regulate information access. For instance, when things are running smoothly, a person usually feels good, and this positive affect helps activate goal-relevant knowledge while inhibiting goal-irrelevant information. The opposite happens when discrepancy reduction does not go as planned. In that case, alternative goals or new information may cease to be inhibited (Lord et al., 2010).

3.2.5 Ego Depletion

Baumeister and Vohs (2016) define *ego depletion* as "a state of diminished self-regulatory resources" (p. 70) that increases the likelihood of both lazy passivity and impulsive, disinhibited behaviors. The basic idea of the (original) strength model of self-regulation is that (effortful) self-regulation requires a limited resource (similar to energy) that is used and thus depleted by acts of self-regulation. As a result, the capacity of a person for self-regulation fluctuates and depends on previous acts of self-regulation (Baumeister & Vohs, 2016; Schmeichel & Baumeister, 2004).

Baumeister and Vohs (2016) updated the strength model of self-regulation in view of the empirical and theoretical works published since the original model was proposed (e.g., Inzlicht & Berkman, 2015). Drawing on the arguments made by Evans et al. (2016), they proposed that glucose serves as the energy for self-regulation, but that ego depletion occurs long before glucose stores are depleted (similar to muscle fatigue) because the body strives to conserve energy. Therefore, rather than an absolute depletion of glucose, ego depletion only indicates that the rate at which the glucose is used for self-regulation would be unsustainable in the long run.

In a meta-analysis (Hagger et al., 2010), ego depletion was reported to significantly reduce task performance and effort during subsequent self-control tasks compared to non-depleted control groups. It also led to higher fatigue, negative affect, and perceived task difficulty.

Studies have also shown that (mild) ego depletion can be overcome by a) a dose of glucose, but not artificial sweeteners, b) inducing positive affect, c) priming religion or the self, or d) the belief that one's self-regulation capacities are unlimited (Baumeister & Vohs, 2016; see also Hagger

et al., 2010). There is also some evidence that one's general capacity for self-regulation can be trained (Baumeister & Vohs, 2016; Hagger et al., 2010).

3.2.6 Summary and Definition

To sum up the previous sections, *self-regulation* can be described as a partially hierarchically ordered[3] system of negative feedback loops[4] within a person, which seeks to bring an individual closer to the reference values specified within the system (see also Vohs & Baumeister, 2004). The reference values in these feedback loops can be, but are not limited to, goals and tasks as defined above. They also include physiological parameters, personal values, ideal selves, emotions, etc. (Carver & Scheier, 1998; Lord et al., 2010; Vohs & Baumeister, 2004).

Both approach and avoidance goals are possible reference values as long as they result in a negative feedback loop. This is possible if a clear reference for that which a person wants to avoid can be established (e.g., "not to laugh" at a funeral) rather than the "avoid as much as possible" notion in a positive feedback loop.

The self-regulatory system spans the four levels described by Lord et al. (2010), thus conscious and unconscious processes that have cycle times varying between tens of milliseconds and years can be summarized under the term self-regulation. Importantly, the system includes both discrepancy-reducing (e.g., striving to attain a goal) and discrepancy-producing (e.g., setting a new goal) processes.

Therefore, self-regulation in this sense is a very broad construct. The other three constructs can be distinguished from self-regulation by narrowing the scope of the self-regulatory processes that they cover, as discussed in Sections 3.3 to 3.5.

3.3 Self-Control

Some authors use the terms self-regulation and self-control interchangeably (Baumeister & Vohs, 2016; Vohs & Baumeister, 2004), thereby sometimes limiting self-regulation to a more narrow concept that refers to impulse control, which is referred to as self-control in this dissertation. Tangney et al. (2004) consider "the ability to override or change one's inner responses, as well as to interrupt undesired behavioral tendencies (such as impulses) and refrain from acting on them" (p. 274) as central to their conceptualization of self-control. This definition includes regulating one's thoughts, emotions, and impulses to (not) behave in certain ways with a focus on impulse control in a broad sense (cf. Ridder et al., 2012). Put differently, the focus is on not doing one thing and possibly also doing another, more sensible thing instead. Tangney et al. (2004) further explicitly stated that their focus was on the discrepancy-reducing processes of self-regulation.

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[3] This means that feeback loops can be hierarchically ordered or exist side-by-side on the same level.
[4] Positive feedback loops are omitted due to their inherent instability.

Examples of self-control in this sense are continuing to study for an important test rather than giving in to the temptation of watching another episode of one's favorite TV series, not eating a second piece of cake even though one would like to, or focusing on a task instead of daydreaming about an upcoming vacation.

Baumeister and Vohs (2016) offer a similar definition, with two important additions: intention and effort. With these, automatic self-regulation is excluded from the definition.

Therefore, *self-control* can be defined as a subsystem of the self-regulation system, which only includes conscious, effortful discrepancy-reducing self-regulation processes that are linked to goals related to the inhibition of impulses.

Since only conscious processes are considered, the restriction of the reference values to goals is appropriate. The term impulse refers to any behavior, thought, emotion, etc. that occurs naturally, but is not desirable in the eyes of the person. This also means that typically, only the highest two levels of self-regulation of Lord et al. (2010) apply to self-control, with reference values that can be consciously held. Physiological reference values are still possible (e.g., having a calm pulse), but limited to those that can be consciously held and assessed (i.e., goals). Of course, subprocesses of self-control processes do occur on lower levels and with little or no consciousness (e.g., movements of limbs), but the focus of self-control is on the higher-level processes.

3.4 Emotion Regulation

"Emotion regulation can take a bewildering variety of forms, including … punching a pillow, texting a friend, going for a run, having a drink, taking a nap, reading a book, quitting one's job, [or] biting one's lip" (Gross, 2015, p. 7).

Gooty et al. (2010) share my perception that the most widely used definition of emotion regulation is the one by Gross (1998), who defined it as "the processes by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions" (p. 275). Gross later stated that the activation of a goal to influence one's emotions is at the core of emotion regulation, with the goal being either an end in itself (e.g., to feel less angry) or a means to another end (e.g., feeling less angry to avoid aggressive behavior against others; Gross, 2015).

Thompson (1994) views emotion regulation as the "processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goals" (p. 27-28). This definition includes maintaining, enhancing, and inhibiting or reducing emotional arousal, as well as *internal* (by the person themselves) and *external* emotion regulation. An example of the latter would be a parent soothing an upset child. However, external emotion regulation will not be considered further here.

In some cases, a discrete emotion may be changed by emotion regulation. For example, relief that nothing worse has happened can replace the initial anger about an accident caused by another person. More often, however, emotion regulation aims at modifying an emotion's intensity, timing, or stability over time (Thompson, 1994). For example, a person who wants to confront a trespasser may purposefully work up their anger at the trespassing (*upregulation*) to have the courage to talk to the trespasser or seek to reduce their anger (*downregulation*) because they want to be firm but civil (see also Aldao, 2013; Bonanno & Burton, 2013; Gross, 2015).

This example also illustrates that emotion regulation according to Thompson (1994) must match the person's goals for the situation. Whereas some forms of emotion regulation may be more socially desirable in a certain situation than others, the success of emotion regulation is judged by the goal of the person regulating their emotion in that situation. If a person always dreamed of yelling back at their rude boss after yet another personal insult, then doing so would be a successful, albeit not a very socially desirable, form of emotion regulation. Therefore, (successful) emotion regulation is context-dependent, a point that is stressed further in Section 3.4.6.

Other authors emphasize that emotion regulation includes the ability to control impulsive behaviors resulting from negative emotions and that it should enable one to act in accordance with both personal goals and situational demands (Cole et al., 1994; Gratz & Roemer, 2004).

Like self-regulation (see Section 3.2.3), emotion regulation includes processes that range from automatic to fully conscious (Gross, 1998; Gyurak et al., 2011; Koole & Rothermund, 2011; Mauss, Bunge, & Gross, 2007). Braunstein et al. (2017) distinguish between two orthogonal dimensions: a) the level of consciousness of the emotion regulation goal and b) the level of consciousness of the change process (i.e., the output of the negative feedback loop). Similarly, Koole et al. (2015) argue that not only emotion regulation goals but also the strategies used to regulate an emotion can be activated automatically by environmental cues. For example, a person may habitually reach into their desk drawer and eat a chocolate bar if they feel annoyed at work, but vent their annoyance to their partner at home instead.

Experimental and correlational studies found that automatic emotion control and the use of specific emotion regulation strategies (see Section 3.4.2) can be primed (Mauss, Cook, & Gross, 2007; L. E. Williams et al., 2009). Additionally, automatic emotion regulation has been associated with a more adaptive cardiovascular response (Mauss et al., 2006) and is thus less costly than explicit, effortful emotion regulation (Martínez-Iñigo et al., 2007) or at least equally adaptive as a suitable conscious emotion regulation strategy (L. E. Williams et al., 2009). In their meta-analysis, Webb, Schweiger Gallo, et al. (2012) found that implementation intentions (see Section 3.2.4) facilitated emotion regulation and were superior to setting emotion regulation goals alone.

In sum, *emotion regulation* can be defined as a subsystem of the self-regulation system, which includes all negative feedback loops with goals or reference values that refer to one's emotional reactions to potential or transpired emotion-eliciting events (see Section 3.1.1).

As both conscious and nonconscious processes are included, all four levels of self-regulation (Lord et al., 2010) are relevant to emotion regulation. Completely automatic processes, such as instinctively turning from vomit on the floor to avoid disgust (see also Gross, 2015), occur at the lower two levels. By contrast, most conscious processes occur at the intermediate cycle level within minutes or hours, although quick conscious attempts at emotion regulation, such as balling one's fists, also occur at the low cycle level. An example of emotion regulation at the high cycle level is the goal of overcoming a fear of public speaking, which sparks subgoals on the intermediate cycle level whenever the person is faced with relevant situations (i.e., when they need to speak in public).

Before discussing emotion regulation strategies, related theories, and results in more detail, the concept of emotional intelligence needs to be discussed briefly to distinguish it from the concept of emotion regulation.

3.4.1 Emotional Intelligence

Many different definitions, models, and measures for the concept of emotional intelligence exist (Cherniss, 2010; Walter et al., 2011). Both this lack of conceptual clarity and the conceptualization as an intelligence have led to much controversy around the concept (Ashkanasy & Humphrey, 2011; Cherniss, 2010; Dasborough et al., 2021; Locke, 2005).

Cherniss (2010) suggested the use of the definition by Mayer et al. (2000), as it has been the most commonly accepted one. Mayer et al. (2000) define *emotional intelligence* as "the ability to perceive and express emotion, assimilate emotion in thought, understand and reason with emotion, and regulate emotion in the self and others" (Mayer et al., 2000, p. 396). Therefore, emotional intelligence is a set of different abilities related to perceiving, understanding, and dealing with emotions (Mayer et al., 2016; Walter et al., 2011), and it includes the more narrow concept of emotion regulation. Some models of emotional intelligence include traits (e.g., self-esteem) and other variables that are not covered by this definition and are not deemed appropriate by several authors for defining emotional intelligence (e.g., Cherniss, 2010; Côté, 2014).

Despite widely differing operationalizations of the construct and several methodological issues (e.g., Dasborough et al., 2021), meta-analyses and reviews have found leaders' emotional intelligence to be positively related to leadership effectiveness (Walter et al., 2011), follower job satisfaction (Miao et al., 2016), follower job performance, organizational citizenship behaviors (Miao et al., 2018), constructive leadership styles (Harms & Credé, 2010), as well as negatively related to laissez-faire leadership (Harms & Credé, 2010). In their meta-analysis, O'Boyle et al. (2011) further

found a generally positive relationship between emotion regulation and job performance, with an effect size that was comparable to that of conscientiousness, although cognitive ability was by far the strongest predictor of job performance.

3.4.2 Emotion Regulation Strategies

Whereas goal setting theory (Locke & Latham, 2002) sparked much research on self-regulation that focused on discrepancy production (see Section 3.2), the process model of emotion regulation (Gross, 1998) led to an opposite focus on discrepancy reduction through emotion regulation strategies. The term *emotion regulation strategies* refers to both conscious and unconscious attempts at regulating one's emotions (Gross, 2015), and people use countless emotion regulation strategies (Gross, 2002; see also Goubet & Chrysikou, 2019; Heiy & Cheavens, 2014).

The basic idea of the process model of emotion regulation is that it takes time for an emotion to fully unfold and that different types of emotion regulation strategies can be employed in different stages of this process (Gross, 1998). This idea is used to categorize different emotion regulation strategies. *Antecedent-focused* emotion regulation strategies occur "before the emotion is generated" (Gross, 1998, p. 282), "concern whether or not emotion response tendencies *are triggered*" (Gross, 2002, p. 283), or "refer to things we do before the emotion response tendencies have become fully activated and have changed our behavior and our peripheral physiological responding" (John & Gross, 2004, p. 1303).

By contrast, *response-focused* emotion regulation strategies, occur "after the emotion is generated" (Gross, 1998, p. 282), "concern how emotion response tendencies *are modulated once they have been triggered*" (Gross, 2002, p. 283), or "refer to things we do once an emotion is already underway, after the response tendencies have already been generated" (John & Gross, 2004, pp. 1303–1304). The term *emotion response tendencies* refers to the subjective experiences, physiological changes, and behaviors mentioned in the definition of emotion in Section 3.1.1.

Four sets of emotion regulation strategies are classified as antecedent-focused in the process model of emotion regulation. First, *situation selection* refers to choosing one anticipated situation over another (e.g., staying at home and watching a movie vs. going out to party) to avoid some emotions or to elicit others. This strategy involves much guesswork, as it is not yet clear how a situation will actually unfold (Gross, 1998, 2015). Once a situation unfolds, *situation modification* can be used to modify a situation, if it is within one's power to do so (Gross, 1998). For example, a student in a mandatory but highly boring class has fewer options to change the situation, while a bored professor has more options to make their class more engaging. *Attentional deployment* refers to choosing which aspects of a situation a person focuses their attention on. For example, one can use distraction as an emotion regulation strategy and focus on something unrelated to an undesired

emotion (Gross, 1998). The fourth and last antecedent-focused category is *cognitive change*. This category refers to strategies that influence the meaning that a person attaches to the situation (Gross, 1998). One example is the emotion regulation strategy *reappraisal*, which refers to thinking differently about a situation to change its emotional impact (Gross, 1998). For example, the bored student may excuse the professor's boring presentation because the professor has a young child that keeps them up at night and thus feel pity rather than annoyance. This strategy has been studied extensively, and the term reappraisal is now often used as a synonym for the entire category of cognitive change strategies (Gross, 2015).

Response modulation is the only set of emotion regulation strategies that are classified as response-focused. Response modulation strategies seek to influence the experiential, physiological, or behavioral responses after the responses have been triggered. For example, drugs like alcohol or food can be used to influence physiological or experiential responses. Another example is *(expressive) suppression*, meaning that one hides the experienced emotions from others (Gross, 1998, 2015; McRae & Gross, 2020). For example, the bored student may maintain a neutral face so as not to offend the professor. Sometimes, suppression also refers to inhibiting the experience rather than the expression of an emotion (Bonanno & Burton, 2013).

The process model of emotion regulation predicts that different emotion regulation strategies have different consequences for the emotions, thoughts, and behaviors of a person both in the short and long run due to their timing within the emotion-generating process and their different cognitive demands (Gross, 2015). Before this assumption is challenged in Section 3.4.4, the concept of emotional labor, which is a different conceptualization of emotion regulation specific to the work context, needs to be discussed.

3.4.3 Emotional Labor

Hochschild (1983) described how some organizations prescribe certain emotional displays toward customers or clients for their service employees, which result in *emotional labor* for the employees. For example, shop assistants may be expected to always greet customers with a smile. Such emotional *display rules* can prescribe *integrative* emotions that unify groups (e.g., pride), *differentiating* emotions that cause or emphasize group differences (e.g., fear), or *emotional masking*, that is, showing restraint and neutrality (Wharton & Erickson, 1993).

Whereas leaders may feel or even be less obligated to follow explicit organizational display rules compared to service workers (Diefendorff et al., 2010; Gardner et al., 2009), they may face similar tasks, when attempting to influence their followers (R. H. Humphrey et al., 2008). For example, they may have to unite their team with integrative emotions, use differentiating emotions to energize their team to compete with a rival company, or mask their emotions if expressing them

would obstruct their goals, such as when showing their fear in the face of restructuring would cause excessive worry or unrest in their team.

Glasø et al. (2006) confirmed this in a small qualitative study with eight leaders and eight followers, who were working for different leaders. All participants in the study agreed that display rules, such as not expressing anger, exist for leaders. Leaders experienced emotional labor as a natural part of their role, and all but one reported only short-term negative consequences of sometimes having to suppress their feelings when interacting with followers. Leaders used emotional labor as a strategy to influence their followers (e.g., to take on extra work), to preserve their status as leaders, and to maintain a good atmosphere at work.

Hochschild described two ways of achieving the desired emotional displays when a person experiences *emotional dissonance,* that is, a different emotion than the one described by a display rule (Middleton, 1989). When s*urface acting*, a person mimics the desired emotion despite feeling differently. The opposite strategy, *deep acting*, is to try to feel the desired way so that the felt emotion is the same as the displayed emotion. As Ashforth and Humphrey (1993) later highlighted, the two strategies are only needed if a person's current emotions differ from those they are expected to display. For example, a shop assistant may be genuinely happy to see their favorite customer and thus smile naturally at them. This third emotional labor strategy is called *expressing natural* (or genuine) *emotions* (Ashforth & Humphrey, 1993). The congruence between emotional state and display rule is called *emotional consonance* (Mesmer-Magnus et al., 2012).

R. H. Humphrey et al. (2008) argue that effective leaders need to show a wide range of positive and negative emotions across situations. This notion is supported by Brotheridge and Grandey (2002), who found that leaders' levels of emotional labor were comparable to those of service and sales workers in several ways, including the variety and intensity of emotional expressions as well as the use of surface and deep acting. In a study by Glasø and Einarsen (2008), 95% of the leaders reported having faked emotions, and 98% of the leaders reported having suppressed emotions when interacting with followers. In this study, faked emotions were typically positive (e.g., interest), while suppressed emotions were typically negative (e.g., disappointment).

The difference between emotional labor and emotion regulation strategies is the focus on conforming with display rules within a work-related context by the former (Grandey & Melloy, 2017). Conceptually, surface acting is similar to expressive suppression (Kafetsios et al., 2012) if the display rule is emotional masking. In fact, Grandey and Melloy (2017) later integrated the use of any emotion regulation strategies into their emotional labor as emotion regulation model.

3.4.4 The Extended Process Model of Emotion Regulation

Whereas intuitively appealing, there are several problems with the distinction between antecedent- and response-focused strategies in the process model of emotion regulation that were already anticipated by Gross (1998), but mostly ignored in later works by others (for an exception, see Koole, 2009). First, all antecedent-focused emotion regulation strategies can be used after an emotion is already fully generated (see also Augustine & Hemenover, 2009). For example, situation selection not only allows a person to choose a situation that is likely to elicit desired emotions but also is a way to manage negative emotions that are already fully generated (e.g., leaving the room during a heated fight with one's partner). Conversely, some response-focused strategies can also be employed in advance, for example, taking a sedative prior to a dreaded medical examination. Therefore, even sorting the strategies by the phase "in which they first intervene" (McRae & Gross, 2020, p. 3) is difficult to achieve. Second, multiple emotion regulation processes can occur simultaneously (Gross, 2015), especially in dynamic situations that elicit different emotions in rapid succession. Finally, emotional responses often modify situations, thereby acting as "antecedent-focused" emotion regulation strategies and starting new emotion regulation processes (Gross, 2015).

The extended process model of emotion regulation (Gross, 2015) addresses some of these points, while also trying to provide answers to the questions of why a person chooses one emotion regulation strategy over another and why emotion regulation is sometimes successful and sometimes not. The model combines the original process model and a hierarchical control theory similar to the one described in Section 3.2.4, so it is only briefly described here.

Gross (2015) distinguishes between several types of negative feedback loops. First, any negative feedback loop has the potential to create emotions (cf. Section 3.2.2). A second feedback loop at the *identification stage* monitors whether any emotions need to be regulated. If this is the case, a subordinate feedback loop is triggered at the *selection stage*, which has the goal of finding a suitable emotion regulation strategy for the current situation, and it leads to the selection of a specific emotion regulation strategy from the categories described in the original process model of emotion regulation. This activates the goal of implementing the chosen strategy, which happens at the *implementation stage*. In this stage, the abstract strategy is applied to the current situation, so a new feedback loop needs to monitor the success of the implementation of the strategy.

According to the extended process model of emotion regulation, emotion regulation failure can be caused at any step within each stage. At the identification stage, one may lack awareness of an emotion that should be regulated, fail to see the importance of an emotion regulation goal, or fail to trigger a new emotion regulation goal due to inertia. At the selection stage, one may fail to

identify enough appropriate emotion regulation strategies; misinterpret contextual factors, leading to a wrong strategy choice; or lack the self-efficacy to implement the chosen strategy. At the implementation stage, one may fail to identify (suitable) implementations of the abstract emotion regulation strategy, fail again to take relevant contextual factors into account (e.g., tiredness), or fail to successfully implement the specific strategy. For example, a person may fail to maintain the implementation long enough (e.g., due to impatience or a distraction). Other difficulties arise across the different stages. For example, one may fail to recognize that the current strategy is not working and thus fail to switch to a more appropriate strategy or strategy implementation. Finally, on some occasions, a person may fail to stop emotion regulation on time, which may lead to awkward social situations or other problems (Gross, 2015).

Webb, Schweiger Gallo, et al. (2012) presented a similar action control theory of emotion regulation, which adds three further possibilities for failure: one may fail to adequately monitor the progress toward an emotion regulation goal; one may believe that emotions cannot be modified; and one may have insufficient resources to implement a chosen emotion regulation strategy.

3.4.5 On the Adaptiveness of Different Emotion Regulation Strategies

"One pressing question is whether some emotion regulation strategies have more to recommend them than others. Are there better and worse ways to regulate emotion?" (Gross, 2002, p. 283)

This question by Gross and the works by Hochschild on emotional labor sparked a large number of studies on the adaptiveness of different emotion regulation (or emotional labor) strategies. In these studies, usually, one or more emotion regulation strategies were compared with each other or with a no-regulation control condition (Gross, 2015). Research following the Gross tradition frequently compared reappraisal and suppression, generally showing that reappraisal is more effective and adaptive than expressive suppression (Bonanno & Burton, 2013; Gross, 2015; John & Gross, 2004).

Further, in meta-analyses, surface acting was significantly related to lower job satisfaction (Hülsheger & Schewe, 2011; Kammeyer-Mueller et al., 2013; Mesmer-Magnus et al., 2012), higher levels of stress (Hülsheger & Schewe, 2011; Kammeyer-Mueller et al., 2013), psychosomatic complaints (Hülsheger & Schewe, 2011), burnout, and turnover intentions (Mesmer-Magnus et al., 2012), but not significantly related to job performance (Kammeyer-Mueller et al., 2013; Mesmer-Magnus et al., 2012).

Deep acting, conversely, was unrelated to job satisfaction (Hülsheger & Schewe, 2011; Kammeyer-Mueller et al., 2013; Mesmer-Magnus et al., 2012), stress (Hülsheger & Schewe, 2011; Kammeyer-Mueller et al., 2013), and burnout (Mesmer-Magnus et al., 2012). It showed a weaker

relationship with psychosomatic complaints compared to surface acting (ρ = .18 vs. ρ = .44; Hülsheger & Schewe, 2011), a small positive association with job performance (Kammeyer-Mueller et al., 2013; Mesmer-Magnus et al., 2012), and a small negative association with turnover intentions (Mesmer-Magnus et al., 2012). Most of the effects found by Mesmer-Magnus et al. (2012) were more pronounced in customer service samples compared to education and healthcare samples.

Similarly, Webb, Miles, and Sheeran (2012) showed in their meta-analysis, that the effectiveness of different emotion regulation strategies in experimental studies, which manipulated strategy use, varied considerably not only between strategy categories (e.g., attentional deployment vs. cognitive change) and between specific strategies (e.g., distraction vs. concentration as two examples of attentional employment) but also depending on the valence of the emotions to be regulated, the type of emotion induction, and a number of other factors. For example, suppressing the expression of emotion was effective, whereas suppressing the emotion itself—or thoughts related to the emotion-eliciting event—was not (Webb, Miles, & Sheeran, 2012).

These last two results already hint at an important point that is discussed more in detail in the following section (Section 3.4.6), namely that the success of a certain emotion regulation strategy is context-dependent. This idea was briefly mentioned in the early works by Thompson (1994), Gross (2002), and others (e.g., Gratz & Roemer, 2004), but the empirical research only recently caught up with this idea. As the theoretical aspects were already briefly discussed in Section 3.4.4 in the context of emotion regulation failure, the following section provides empirical evidence for this idea, which challenges the earlier view that reappraisal and deep acting are universally more adaptive than suppression and surface acting.

3.4.6 Emotion Regulation and Context

"Sometimes with family members I will lose my temper. When I am at work, I am very reserved with my emotions. It just depends on the circumstances." (Matthew, United States)[5]

"I usually try not to show my emotions publicly. I try to have a poker face when in public. I find it best to blend in as much as possible. … At home or in private, I find it much easier to let out my emotions. I feel freer when I'm by myself or with people that I truly feel comfortable being around." (Jeremy T., United States)

These two unsolicited comments by participants in Study 1, were prompted by a traditional emotion regulation scale that assessed the use of (only) two emotion regulation strategies without taking the context into account. Studies specific to the work context are still mostly lacking. However, there is some evidence that one's social status and the controllability of a situation

[5] Permission to use these statements was obtained from the respective participants via the anonymous messaging system provided by Prolific. The participants were free to choose how they would like to be credited or if they would rather remain anonymous.

influence the adaptiveness of emotion regulation strategies, as is detailed below, after briefly reviewing more general results regarding the context-dependency of emotion regulation.

Studies showed that participants preferred distraction as an emotion regulation strategy over reappraisal when asked to regulate strong emotions and that they preferred reappraisal over distraction when the emotion had a low intensity (Scheibe et al., 2015; Sheppes et al., 2011). Likewise, distraction was preferred when the goal of emotion regulation was short-term relief, but reappraisal was preferred for goals with a longer timeframe (Sheppes et al., 2014).

When offered twenty, rather than the typical one to three, emotion regulation strategies to choose from, students reported using approximately 15 different emotion regulation strategies within 10 consecutive days. Importantly, neither reappraisal nor expressive suppression ranked among either of the top ten strategies for dealing with positive or negative emotions (Heiy & Cheavens, 2014).

Not surprisingly then, experience sampling and diary studies consistently showed that the within-person variance in emotion regulation strategy use was high for different emotion regulation strategies (Brans et al., 2013; Catterson et al., 2017; English et al., 2017; Haines et al., 2016; Scott et al., 2012).

Catterson et al. (2017) found that people used less suppression when they felt that they ranked higher on social status and that the negative effects of suppression on situational well-being virtually disappeared in situations where people felt that they ranked lower on social status (e.g., when talking to their superior). Likewise, European-Americans (i.e., the majority population with the highest social status) were found to use less suppression than minority groups in the United States (Gross & John, 2003).

Similarly, Troy et al. (2017) reported that the ability to use reappraisal was only related to lower levels of depression in persons with a low socioeconomic status. Persons with a high socioeconomic status did not benefit from their ability to use reappraisal. Since both social status and a high socioeconomic status typically confer higher control over one's environment or social interaction partners (Troy et al., 2017), the controllability of a situation may be at the core of these findings.

In support of this, Haines et al. (2016) and Troy et al. (2016) further found that the use of reappraisal in controllable situations was related to lower overall well-being, while the use of reappraisal in less controllable situations was related to higher overall well-being. A similar effect was found for surface acting among customer service representatives in Singapore (Uy et al., 2017). In this sample, surface acting was negatively related to next-day work engagement, but only if the employees did not help their colleagues during the workday, which implies some degree of control

and a higher social status as helpers. Receiving help from colleagues, however, did not buffer the negative effects of surface acting, possibly because one feels less in control when in need of help.

Apart from social status differences, the mere presence of others, especially non-close others such as colleagues and acquaintances, led to more attempts at emotion regulation in a diary study by English et al. (2017).

Finally, while the use of suppression can be related to negative social consequences (e.g., being less liked by others; Butler et al., 2003) in samples with a European cultural background, these effects are less pronounced in persons identifying with Asian values (Butler et al., 2007). Ford and Mauss (2015) reviewed the literature regarding cultural effects in emotion regulation. In their review, they distinguished between *interdependent* cultures (i.e., cultures focused on relationships and interpersonal harmony) and *independent* cultures (i.e., cultures focused on individual differences and individual uniqueness). They found that both at the individual and country levels, interdependent cultural values were associated with higher levels of suppression use compared to independent cultural values. Whereas adverse effects of suppression on well-being and psychological and social functioning were reported for persons identifying with independent cultural values, the effects were significantly weaker or disappeared for persons identifying with interdependent cultures. By contrast, reappraisal use was found not to vary across cultures (Ford & Mauss, 2015).

3.4.7 Summary and Definition

In summary, *successful emotion regulation* (also called *flexible emotion regulation*) requires the flexible use of different and potentially multiple emotion regulation strategies that are adaptive in a given context (Aldao et al., 2015; Barnow et al., 2020; Bonanno & Burton, 2013; Gross, 1998, 2002, 2015). Importantly, when observing others, successful emotion regulation can be difficult to distinguish from non-regulation if the observed person did not emotionally respond to a potentially emotion-eliciting event (Gross, 1998).

3.5 Self-Leadership

Self-leadership is generally viewed as a self-influence process (Neck & Houghton, 2006) that "concerns leading oneself toward performance of naturally motivating tasks as well as managing oneself to do work that must be done but is not naturally motivating" (Manz, 1986, p. 589). This self-influence process is typically described as sets of cognitive and behavioral self-influence strategies (Manz, 1986; Neck & Houghton, 2006) that are described in Section 3.5.1. Self-leadership has been associated with higher levels of job performance in different cultural contexts (e.g., Furtner et al., 2015; Ho & Nesbit, 2014), innovative behaviors (Carmeli et al., 2006), and a number of other desirable outcomes (Manz, 2015).

Some theoretical articles on self-leadership treat the concept of self-leadership as a catch-all concept that includes elements from a range of different theories (see Section 3.5.2) and that can be expanded to include a wide range of self-regulation objects (e.g., emotions, healthy behaviors, collaborative processes) as well as other aspects (e.g., Manz, 2015; Manz et al., 2016; Stewart et al., 2019). This tradition began with the earliest works on self-leadership that sought to distinguish self-leadership from self-management (e.g., Manz, 1986). This process is briefly described in Sections 3.5.3 and 3.5.4 before an attempt is made in Section 3.5.5 to disentangle self-leadership from related constructs and to fit it into the self-regulation framework of this dissertation.

3.5.1 Self-Leadership Strategies

Typically, self-leadership strategies are grouped into three sets of strategies: a) constructive thought pattern strategies, b) natural reward strategies, and c) behavior-focused strategies (Goldsby et al., 2021; Harari et al., 2021; Neck & Houghton, 2006). Neck and Houghton (2006) see these strategies at the core of self-leadership theory, claiming that self-leadership is a normative theory that prescribes the use of these self-leadership strategies to achieve higher levels of performance.

Constructive thought pattern strategies aim to create and habitually maintain thought processes that have a positive impact on performance (Manz, 2015; Neck & Houghton, 2006). Example strategies are identifying and replacing dysfunctional assumptions and beliefs (e.g., replacing “I will never get this right” with “I can learn from my mistakes”), self-talk, and mental imagery, that is, envisioning success before attempting to succeed at a task (Neck & Houghton, 2006).

Natural reward strategies, in contrast, aim to make a task enjoyable, that is, to create intrinsic motivation for a task that is not already intrinsically motivating for the person. This can be achieved by either modifying the task to make it more enjoyable (e.g., by adding a friendly competition among colleagues) or by focusing on the enjoyable rather than the unpleasant aspects of a task, for example by talking to an elderly person while caring for them (Neck & Houghton, 2006).

Behavior-focused strategies refer to strategies that are closely linked to conscious self-regulation in the shape of negative feedback loops (Furtner et al., 2015). They include a) self-observation, b) setting goals for oneself, c) rewarding, constructively criticizing, or punishing oneself for certain behaviors with thoughts (e.g., “Well done!”, “You could have done better!”) or more tangible rewards or punishments (e.g., with chocolate or by putting money into a swear jar), and d) facilitating the desired behavior using environmental cues such as reminders or motivating posters (Neck & Houghton, 2006; see also Georgianna, 2007).

However, this categorization has been challenged. As Boss and Sims (2008) highlighted, the category natural reward strategies can be split and merged with the other two categories. Task

modifications can be viewed as behavior-focused strategies and focusing one's attention on the pleasant aspects of a task is a form of cognitive reframing and can thus be added to the constructive thought pattern strategies.

3.5.2 Theoretical Foundations of Self-Leadership

Self-leadership is theoretically grounded in control theory (Manz, 1986; Stewart et al., 2019), which was described in Section 3.2. Other theoretical foundations include self-determination theory (Deci & Ryan, 2000, 2008), the literature on self-efficacy (e.g., Bandura, 1977, 1982; Eden & Zuk, 1995), and social cognitive theory (Bandura, 1991; see also Manz, 1986; Neck & Houghton, 2006). The self-leadership strategies of self-rewards, self-punishments, self-observation, and goal setting can all be derived directly from social cognitive theory (Bandura, 1991; see Section 3.2).

Self-determination theory describes different types of extrinsic motivation for goal pursuit (*extrinsic regulation*), which are characterized by the degree to which external goals are internalized (Deci & Ryan, 2000, 2008). In this context, the term *external goals* refers to goals that are set by others or by one's circumstances.

According to self-determination theory, people will strive to meet three basic needs—the needs for autonomy, competence, and relatedness—by pursuing related goals when the needs are not met, as this increases their well-being. For example, a teenager who perceives a lack of autonomy because they still live with their parents may seek to spend as much time as possible with friends, without adult supervision. A student who obtains poor grades in math may focus on their sports or video game skills, to feel more competent, and an elderly person who feels lonely may take up volunteer work to have more opportunities for social interactions. If this is not possible, overcompensation, substitute needs, or defensive behaviors, such as avoiding being alone, overeating to comfort oneself, and avoiding social situations altogether to avoid potential social rejection, may occur (Deci & Ryan, 2000).

While their needs are satisfied, persons are theorized to turn to intrinsically motivating tasks, or those that are deemed important, which may also be well-internalized extrinsically motivated tasks (Deci & Ryan, 2000). Contexts that are conducive to the satisfaction of the three basic needs are thus theorized to also be conducive to the development of intrinsic motivation and well-internalized extrinsic motivation (Deci & Ryan, 2000).

In self-determination theory, *external regulation* refers to cases in which a person's behavior is fully controlled by external rewards or punishments (Deci & Ryan, 2000). For example, a soldier may follow an order by their superior even if they think that the order is wrong. Per definition, this is the exact opposite of self-leadership.

Introjection refers to cases in which a person controls their behavior by self-leadership strategies (i.e., self-reward and self-punishment), but without internalizing the goal itself (Deci & Ryan, 2000), which is a basic way of engaging in self-leadership with respect to not intrinsically motivating tasks (Neck & Houghton, 2006; see also Stewart et al., 2019).

Identification refers to cases in which a person accepts the value of their behavior and makes the behavior part of their identity, albeit without integrating it fully with other aspects of their identity (e.g., eating healthy food as a measure to fight obesity).

When the behavior is fully integrated with other aspects of their identity in a personally meaningful way, such as eating healthy food as an integral part of a healthy lifestyle with enough exercise, sleep, and relaxation, *integration* occurs. Despite the high level of internalization in identification and integration, both usually remain forms of extrinsic motivation, as the behaviors remain a means to an end and are not inherently enjoyable (Deci & Ryan, 2000).

Cognitive thought pattern strategies and self-cueing can be used to actively facilitate the internalization of behaviors that are only extrinsically motivating, for example by reminding oneself of the health benefits of physical exercise to motivate oneself to exercise.

With the natural reward strategies, self-leadership goes one step further by seeking to make extrinsically motivated behaviors intrinsically motivating (Manz, 1986). According to self-determination theory, one way of doing so is modifying the tasks or task-related thoughts in a way that increases one's perceptions of autonomy and competence (Neck & Houghton, 2006).

Autonomous regulation refers to identified, integrated, and intrinsic regulation of behavior, which feels like one's personal choice as opposed to the controlled regulation forced upon one by external forces (i.e., external, and introjected regulation). Autonomous regulation is related to enhanced performance and well-being (Deci & Ryan, 2008), which is why it is central to self-leadership theory (Neck & Houghton, 2006).

Importantly, self-leadership theory posits that self-leadership increases self-efficacy expectations, which in turn lead to higher levels of performance (Manz, 1986; Neck & Houghton, 2006). In a recent meta-analysis (Harari et al., 2021), this path was empirically supported.

3.5.3 Self-Management and Self-Leadership

Similar to self-leadership, *self-management* refers to influencing oneself by using behavioral strategies to perform tasks that one should do but does not enjoy doing (Manz, 1986, 2015; Neck & Houghton, 2006). Therefore, the focus of self-management is on introjected (extrinsic) regulation rather than on fostering intrinsic motivation for tasks. Intrinsic motivation is central to self-leadership (Manz, 1986; Neck & Houghton, 2006), although setting oneself suitable goals and subgoals is also part of self-management (Manz, 1986).

Self-leadership thus encompasses self-management (Manz, 1986; Markham & Markham, 1995). Self-management focuses on facilitating discrepancy-reducing behavior in negative feedback loops at intermediate cycle levels (see Section 3.2.4). By contrast, self-leadership also includes self-regulation processes at high cycle levels, which can add personal meaning to one's behavior by the internalization of external goals, self-setting higher-level goals, or by developing intrinsic motivation for a task (Manz, 1986, 2015). This is achieved by the constructive thought pattern and natural reward strategies, which were added to the behavior-focused self-management strategies in the self-leadership literature (Furtner et al., 2015; Neck & Houghton, 2006).

3.5.4 Recent Extensions of Self-Leadership

Similar to the extension of self-management to self-leadership in 1986, Manz (2015) introduced the concept of *higher-level self-leadership*, which concerns the extent to which self-influence processes are characterized by responsibility (the concern for virtue or the wider good within an organizational context), personal authenticity (reflecting one's personal values), and expanding one's personal capacity for self-leadership, which in turn facilitates responsible and authentic ways of self-leadership.

For the expansion of one's self-leadership capacity, Manz (2015) suggests strategies such as influencing one's physiology (e.g., taking deep breaths), emotion regulation strategies, collaboration with others (e.g., to access and use others' knowledge), behaviors supporting a healthy lifestyle (e.g., regular exercise), avoiding toxic and fostering positive relationships, and influencing one's mood by modifying one's environment (e.g., using colors, scents, or music to induce a positive mood). These strategies are theorized to expand one's self-leadership capacity by influencing one's health and well-being either directly (e.g., leading a healthy lifestyle) or indirectly (e.g., ending a toxic relationship). Therefore, any conscious behavior that is beneficial to one's well-being or general capacity to execute other self-leadership strategies likely falls into this category.

Only a year later, Manz et al. (2016) elaborated on the propositions made by Manz (2015) by introducing *emotional self-leadership* as "a comprehensive set of prescriptive strategies aimed at increasing individual effectiveness in regulating emotions and shaping emotional experiences" (Manz et al., 2016, p. 376). This definition is slightly redundant, as emotion regulation is expressly concerned with shaping one's emotional experiences (see Section 3.4).

The emotional self-leadership strategies are divided into five categories that include three categories with similar names as the three basic categories of self-leadership strategies (cognitive-focused strategies, behavioral strategies, and natural reward strategies) as well as two categories that were adapted from the process model of emotion regulation (Gross, 1998): *environmental-focused strategies* (i.e., situation selection and situation modification) and *physiological-focused*

strategies (e.g., listening to calming music). Manz et al. (2016) also mention listening to music as an example of environmental-focused strategies, so the categories in this model are not mutually exclusive.

Cognitive-focused strategies include some constructive thought pattern self-leadership strategies (i.e., self-talk, mental imagery, and identifying and replacing dysfunctional assumptions or beliefs), as well as meditation, when applied to emotion regulation goals. *Behavioral strategies* refer to actions that are likely to elicit positive or prevent negative emotions (e.g., addressing a potential issue early on rather than waiting for it to escalate into a conflict).

Interestingly, Manz et al. (2016) recategorize the two traditional natural rewards strategies (i.e., modifying a task to make it more enjoyable and focusing on the desirable aspects of a task or situation) as environmental-focused strategies. *Natural reward-focused* emotional self-leadership strategies now include strategies that "focus on connections with naturally occurring intrinsic affective experiences" (Manz et al., 2016, p. 377). However, what the authors mean by this definition remains rather unclear. One of their examples is emphasizing deep acting rather than surface acting, which is quite the opposite of "naturally occurring intrinsic affective experiences" (see Section 3.4.3).

Manz et al. (2016) further propose a theoretical model in which emotional self-leadership results in favorable emotional experiences (which should be the case per definition), which lead to increased workplace effectiveness mediated by both well-being and favorable receiver responses due to more authentic emotional displays resulting from successful emotion regulation. Additionally, favorable receiver responses lead to further favorable emotional experiences.

While these extensions of self-leadership provide interesting avenues for future research, they, unfortunately, do little to improve the clarity of the concept of self-leadership, as suggested above. Therefore, in the next section, I first review previous arguments regarding the relationships between self-leadership and related constructs, before integrating the information presented in this chapter into a theoretical framework that distinguishes between the four concepts of self-regulation, emotion regulation, self-control, and self-leadership in Section 3.5.6.

3.5.5 Self-Leadership and Related Constructs

Several authors have argued that emotion regulation facilitates self-leadership (e.g., Furtner et al., 2015; Manz, 2015; Stewart et al., 2011). One argument is that the emotion regulation strategies described in the process model of emotion regulation (see Section 3.4.2) can be used to create intrinsic motivation, for example, by selecting an intrinsically motivating task, which is a form of situation selection (Furtner et al., 2015). Furtner and Hiller (2013), however, argued that emotion regulation and self-leadership influence each other reciprocally.

Manz et al. (2016) distinguished emotional self-leadership from emotion regulation and emotional intelligence by claiming that emotional self-leadership a) has a wider theoretical foundation, b) prescribes a larger number of strategies compared to the emotion regulation literature, c) includes both strategies and a growing capacity for their use, d) has special relevance in work-related situations, e) is connected to a wider network of self-leadership components related to the five strategy groups, and f) focuses on a person's values and standards as the reasons of using emotional self-leadership strategies.

While the last two points are indeed specific to (emotional) self-leadership, their immediate benefits remain unclear. Given the rather large number of emotion regulation strategies studied besides those of the Gross and emotional labor traditions (e.g., Garnefski et al., 2001; Goubet & Chrysikou, 2019; Heiy & Cheavens, 2014), the claim of a larger or broader set of strategies is unconvincing. Similarly, the special relevance to work-related situations relative to emotion regulation and emotional intelligence does not hold up to scrutiny, as both emotional intelligence (see Section 3.4.1) and emotional labor (see Section 3.4.3) have been widely studied in the work context. Therefore, the benefit of this new construct remains yet to be demonstrated.

Furtner et al. (2015) further regarded self-regulation as "an integral part" (Furtner et al., 2015, p. 107) of self-leadership. They viewed self-regulation processes as mostly automatic and unconscious and further highlight the similarities between self-regulation and behavior-focused self-leadership strategies (see Section 3.5.1).

Neck and Houghton (2006) and Markham and Markham (1995), conversely, argued that self-regulation encompasses self-leadership and not vice versa. This is clearly the case if one focuses less on self-leadership as a collection of self-leadership strategies and more on self-leadership as a self-influence process to execute tasks (Manz, 1986), as tasks are one of the types of reference values that are included in the definition of self-regulation (see Section 3.2.6).

Interestingly, Furtner et al. (2015) viewed self-leadership as an acquirable skill and self-regulation as a disposition, which is in direct contrast to the literature on ego depletion (Baumeister & Vohs, 2016; Hagger et al., 2010). They also repeat the claim made by Neck and Houghton (2006)—that self-leadership can be distinguished from related constructs by its normative nature of prescribing effective self-influence strategies, even though similar lists of strategies exist for emotion regulation (e.g., Gross, 1998), and emotional labor (Ashforth & Humphrey, 1993).

According to Furtner and Hiller (2013), self-regulation, self-control, self-leadership, and emotion regulation have in common that goals are needed to specify desired changes and that a monitoring mechanism is needed to observe one's progress toward attaining the goals. In other words, they too use control theory as a theoretical framework for all four constructs. They

distinguish between the constructs by highlighting that each has a different regulatory focus, that is, different types of reference values for the negative feedback loops.

Further, for Furtner and Hiller (2013), self-regulation is the (mostly) unconscious regulation of one's behavior, while self-control refers to the conscious regulation of one's thoughts, emotions, and behaviors. Emotion regulation is both conscious and nonconscious and obviously aims at regulating one's emotions, while self-leadership refers to the conscious regulation of one's thoughts and behaviors. Furtner and Hiller (2013) also note that all four self-influence processes are related to impulse control. They posit that self-control has a positive influence on self-regulation and emotion regulation and that self-leadership increases the effectiveness of self-control.

Finally, a similarity between self-leadership and conscientiousness has been noted by Markham and Markham (1995). If one follows the argument by Furtner et al. (2015) that self-leadership is a skill, conscientiousness may be viewed as the disposition to acquire and use similar skills, which is not the same as the skill itself, even though the operationalizations of the constructs may be similar, which was the point made by Markham and Markham (1995).

This was supported by Stewart et al. (1996), who conducted a self-leadership training program that only improved supervisor-rated self-directed work behavior in employees who scored low on conscientiousness. Harari et al. (2021) further argued that conscientious persons are more likely to use self-leadership strategies due to their tendencies to control their impulses in goal pursuit (i.e., their higher levels of self-control). Finally, similar arguments can be made regarding emotion regulation and emotional stability, as well as self-regulation, self-control, and conscientiousness.

3.5.6 Summary and Definition

As can be gathered from the sections on self-regulation, self-control, emotion regulation, (Sections 3.2 to 3.4) and from this section on self-leadership, all four constructs can be studied within control theory. Importantly, the degree of consciousness involved in each type of self-influence process is useful to differentiate between the constructs, but it is not a sufficient criterion. This is because both self-regulation and emotion regulation include conscious and unconscious processes, whereas self-control and self-leadership focus on conscious processes.

Instead, when combining the arguments by Furtner and Hiller (2013) that the constructs can be distinguished by what is being regulated, and by Markham and Markham (1995), that self-regulation encompasses self-leadership rather than the other way around, *self-leadership* can be defined as a subsystem of the self-regulation system that includes only those conscious self-regulation processes that occur within negative feedback loops with tasks as reference values.

As only conscious processes are considered, typical self-leadership processes occur on the highest two levels of self-regulation according to Lord et al. (2010). Only subprocesses occur on the lower two levels, and the focus is on the intermediate cycle level because the completion of a large task (e.g., writing a thesis) mainly depends on the completion of smaller subtasks that can be tackled directly (e.g., writing a section of the thesis).

The similarities and differences between self-regulation, self-control, self-leadership, and emotion regulation are summarized in Table 1. As can be seen in the table, self-regulation encompasses the three other concepts. While the types of strategies that are used are not very helpful in distinguishing self-control, self-leadership, and emotion regulation, the content of the reference values (i.e., the *regulatory focus*) is both necessary and sufficient for this purpose. The other attributes serve to describe the concepts in more detail but are evidently also not sufficient to distinguish the concepts, even if they are combined. For instance, a self-influence process with a goal as a reference value that is approached by a conscious behavioral strategy on the intermediate level could be an example of both self-control or self-leadership.

Importantly, self-leadership, self-control, and emotion regulation are not mutually exclusive categories, but rather overlapping areas of self-regulation with distinct features. For example, a person working on an unpopular task (e.g., cleaning a toilet) may need to regulate their emotions to finish the task. Whether this act of regulating one's emotions is viewed as self-leadership or as emotion regulation depends on why the emotion was regulated. If it were regulated simply to feel better about having to clean a toilet, this would be an example of emotion regulation. If the person regulated their emotion to complete said task (rather than doing something else instead), the same behavior can be interpreted as self-leadership. Likewise, inhibiting the impulse to curse after a frustrating event can be viewed as either an obvious example of self-control or as an expression of emotion regulation, if the focus is on the way a person deals with their emotions.

However, self-leadership, self-control, and emotion regulation are neither isomorphic nor can they be subsumed by one another. First, emotion regulation includes unconscious processes, so self-control or self-leadership cannot subsume emotion regulation. Second, self-control refers to the inhibition of any (i.e., not just affective) impulses, so it cannot be subsumed by emotion regulation either. Third, as an important part of self-leadership is getting oneself to act (instead of refraining from acting on impulses), self-control cannot subsume self-leadership. Fourth, as self-leadership includes regulating behaviors that are not caused by emotion-eliciting events (e.g., working on a task one feels indifferent about), emotion regulation cannot subsume self-leadership. Fifth, the inhibition of impulses in self-control may or may not be related to completing a task. For instance, one may

resist the temptation to eat another brownie, because one knows that this would lead to nausea. Therefore, self-leadership cannot subsume self-control.

Table 1

Similarities and Differences Between Self-Regulation, Self-Control, Self-Leadership, and Emotion Regulation

Attribute	**Self-regulation**	**Self-control**	**Self-leadership**	**Emotion regulation**
Types of reference values	No restriction	Goals	Goals	Emotional states
Regulatory focus	No restriction	Inhibition of impulses	Tasks	Emotions
Types of strategies	Behavioral, cognitive, and affective	Behavioral, cognitive, and affective	Mainly cognitive and behavioral	Mainly affective and cognitive
Degree of consciousness	Conscious and unconscious	Only conscious	Only conscious	Conscious and unconscious
Main self-regulation levels (Lord et al., 2010)	Micro to high	Intermediate	Intermediate	Low to intermediate

Note. Regulatory focus refers to the content of the reference values. Types of strategies refers to what a person seeks to influence, i.e., the output, not the reference value of the feedback loop.

Finally, self-leadership, self-control, and emotion regulation do not sum up to self-regulation. Both self-regulation at the high and micro levels is mostly distinct from the other three concepts. For example, both the automatic regulation of one's body temperature and the general aspiration to become a good person are unique to self-regulation, as neither impulses, tasks, nor emotions are directly targeted by the latter high-level feedback loop.

The arguments made regarding the context-dependency of the adaptiveness of emotion regulation strategies in Section 3.4.6 also hold for related constructs such as self-leadership. In fact, in summarizing the literature, Bonanno and Burton (2013) stated: "that the use and … benefits of any … self-regulatory strategy will tend to vary across people and situations and … that the most efficacious use of self-regulatory strategies is likely to be one that is most flexible" (p. 593).

Similar to Gross (2015), Bonanno and Burton (2013) argue that persons need to be sensitive to the context to be able to determine the most appropriate strategy. They further need to be able to use a wide range of strategies to deal with different situations. Finally, persons need the ability to monitor the effectiveness of a chosen strategy so that they can adjust their strategy use if needed (see also Section 3.4.4).

Therefore, *successful self-leadership* includes not only the application of generally effective self-leadership strategies (Müller, 2006b) but also the flexible use of different and potentially multiple self-leadership strategies that are adaptive in a given context.

4 Research Model

In this chapter, I present a research model that focuses on two specific forms of self-regulation: leaders' emotion regulation and self-leadership. This research model connects the affective events theory (Weiss & Cropanzano, 1996) with the neurovisceral model of integration (Thayer & Lane, 2000, 2009). Firstly, I describe the potential links between self-leadership and emotion regulation, and different leadership styles in Sections 4.1 and 4.2. Following this, I focus on how both forms of self-regulation are related to follower job satisfaction in Section 4.3 and identify two potential physiological antecedents of emotion regulation in Section 4.4. Finally, I combine all hypotheses into a research model that is presented in Section 4.5.

4.1 Leader Self-Leadership and Leadership Styles

As self-leadership is associated with higher levels of job performance (e.g., Furtner et al., 2015; Harari et al., 2021; Ho & Nesbit, 2014), leaders' self-leadership should promote effective leadership behaviors (Brown & Fields, 2011; Furtner et al., 2015) and simultaneously reduce ineffective leadership behaviors, such as laissez-faire leadership. Müller (2006b) further proposed that leaders' successful self-leadership could lead to an increase in expert power (i.e., power based on perceptions that a person is highly skilled), meaning that the leaders do not need to rely solely on their legitimate power (i.e., power based on their formal position) to influence their followers.

In previous studies, leader self-ratings of (global) self-leadership positively correlated with self-rated transformational and transactional leadership but negatively correlated with laissez-faire leadership (Furtner et al., 2013; Furtner et al., 2015; likely based on the same sample despite different reported sample sizes). By contrast, two mixed-source studies reported inconsistent results for self-rated self-leadership and follower-rated leadership, with some non-significant and even counterintuitive findings (Brown & Fields, 2011; Crossen, 2015). Similarly, no significant correlations between self-rated self-leadership and other-rated transformational, transactional, or laissez-faire leadership were found by Furtner et al. (2013). Importantly, in all four studies, self-leadership was assessed in terms of strategy use. Conversely, self-regulation impairment during a mathematical test was found to be positively associated with supervisor-rated abusive supervision and negatively associated with supervisor-rated proactivity and transformational leadership (Collins & Jackson, 2015).

Therefore, measuring self-leadership strategy use may not be a promising avenue for examining the relationship between leader self-leadership and leadership effectiveness. A new measure for successful self-leadership, that was developed for this dissertation, is thus presented in Chapter 5 and examined in Study 2 (Chapter 7). Additionally, the following two hypotheses are examined in Study 3 (Chapter 8):

Hypothesis 1: Higher levels of (successful) leader self-leadership are associated with higher levels of constructive (i.e., instrumental) leadership.

Hypothesis 2: Higher levels of (successful) leader self-leadership are associated with lower levels of destructive (i.e., laissez-faire) leadership.

Instrumental and laissez-faire leadership were chosen as representatives of constructive and destructive leadership, respectively, because both leadership styles have been found to be related to leader emotional exhaustion after 24 months, even after controlling for leader job demands and other variables (Zwingmann et al., 2016). Firstly, these results suggest that transformational leadership may be harmful to leaders. A less exciting and less change-oriented leadership style, such as instrumental leadership, may thus be a better choice for day-to-day leadership, at least in the absence of major organizational changes. Additionally, a previous meta-analysis reported that change-oriented leadership was only marginally related to follower job performance (Borgmann et al., 2016). Therefore, I focus on the three predominantly task- and relations-oriented dimensions of instrumental leadership: strategy formulation and implementation, path-goal facilitation, and outcome monitoring.

As the cross-sectional relationship between laissez-faire leadership and emotional exhaustion has also been found to be positive (Zwingmann et al., 2016), laissez-faire leadership may be caused by exhaustion. For instance, a leader may simply be too exhausted to care. In such cases, self-regulation may also be impaired, thus leading to spurious correlations between self-leadership and laissez-faire leadership. However, individuals with high levels of self-leadership should be able to avoid or overcome exhaustion and, thus, avoid such adverse consequences of exhaustion.

4.2 Leader Emotion Regulation and Leadership Styles

As some individuals believe that aggressive behaviors (venting) can improve their mood and, thus, act on these catharsis beliefs (Bushman et al., 2001), it is not just an anecdotal phenomenon that leaders with low mood may lash out at their followers. Indeed, S.-Y. Pan and Lin (2018) found a mixed-source correlation between leaders' negative affect and abusive supervision.

Followers with tendencies toward venting may restrain themselves while their leader is around and only vent their anger in the leader's absence to avoid negative consequences (Marcus-Newhall et al., 2000; Miller, 1941). By contrast, leaders have fewer social restraints in this respect due to their higher social status and the social perception that moderate expressions of anger (especially in men) signal power (Gibson & Callister, 2010). Depending on the frequency and form of such occurrences, a leader's venting may fall into the category of destructive leadership, especially if the venting is directed at the followers rather than at inanimate objects (e.g., punching the printer). Additionally, Krasikova et al. (2013) theorized that leaders can become frustrated by perceived goal

blockage, which may lead to destructive leadership if they are unable to downregulate their negative emotions.

In a small meta-analysis, emotional intelligence and related constructs were moderately negatively related to abusive supervision (Zhang & Bednall, 2016). Further, in a study not included in this meta-analysis, self-reported leader self-control was moderately negatively related to follower-rated abusive supervision (Yam et al., 2016). Finally, in another study not covered by Zhang and Bednall (2016), leader emotional intelligence had a positive influence on follower trust in the leader, which was partially mediated by the negative influence of emotional intelligence on abusive supervision (Xiaqi et al., 2012). Therefore, I propose the following hypothesis, which is examined in Studies 1 (Chapter 6) and 3 (Chapter 8):

Hypothesis 3: Successful leader emotion regulation is associated with lower levels of (follower-directed) active destructive leadership.

Successful emotion regulation requires the flexible use of different emotion regulation strategies that are adaptive in the context in which emotion regulation occurs (see Section 3.4.6). However, no suitable measure of this construct previously existed in the literature (see Section 5.1). Therefore, a new scale assessing successful emotion regulation in the work context was developed for this dissertation (see Section 5.3.1) and examined in Study 1 (Chapter 6).

4.3 Leader Self-Regulation and Job Satisfaction

Job satisfaction refers to "an evaluative state that expresses contentment with, and positive feelings about, one's job" (Judge & Kammeyer-Mueller, 2012, p. 347). Specifically, job satisfaction comprises both affect and cognition that result from an evaluation of the characteristics of one's job (Judge & Kammeyer-Mueller, 2012; Weiss & Cropanzano, 1996). Job satisfaction was found to be moderately related to job performance in two large meta-analyses (Bowling et al., 2015; Judge et al., 2001). In a smaller meta-analysis of only longitudinal studies (Riketta, 2008), job satisfaction had a small but significant effect on subsequent job performance, but previous job performance had no effect on job satisfaction (Riketta, 2008). Based on this, follower job satisfaction is an important outcome to consider when studying leader behaviors.

According to affective events theory (Weiss & Cropanzano, 1996), emotion-eliciting events play an important role in determining follower job satisfaction. Therefore, after first describing affective events theory in Section 4.3.1, I elaborate on how leaders may be the source of affective events for followers in Section 4.3.2.

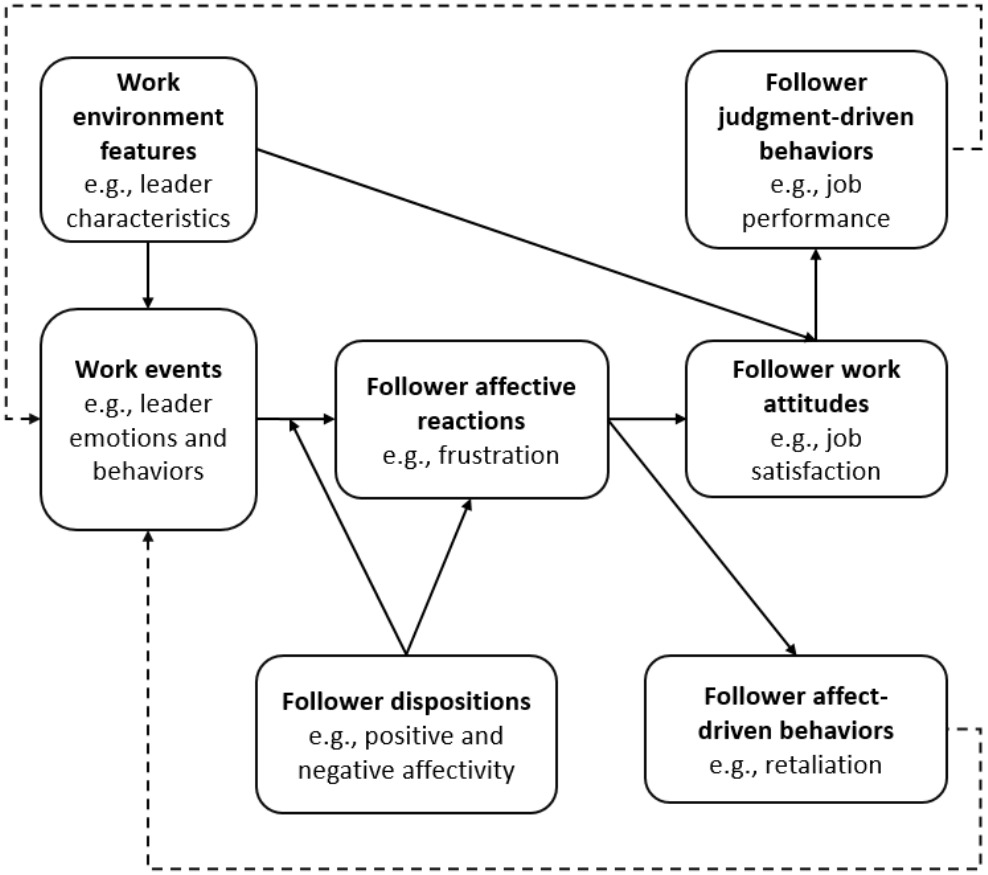
4.3.1 Affective Events Theory (Weiss & Cropanzano, 1996)

A slightly modified version of affective events theory (Weiss & Cropanzano, 1996) is depicted in Figure 2. According to affective events theory, two mechanisms explain work attitudes, such as

job satisfaction. Firstly, cognitive evaluations of one's work environment (e.g., how good the pay is for the job) have a direct influence on work attitudes. The second mechanism focuses on emotion-eliciting (or affective) work events, which influence work attitudes via the individual's affective reactions to these events.

Figure 2

Affective Events Theory from the Follower Perspective



Note. Adapted from "Affective Events Theory: A Theoretical Discussion of the Structure, Causes and Consequences of Affective Experiences at Work," by H. M. Weiss, and R. Cropanzano, 1996, in B. M. Staw and L. L. Cummings (Eds.), *Research in Organizational Behavior: An Annual Series of Analytical Essays and Critical Reviews*, p. 12, JAI Press. Copyright 1996 by JAI Press Inc. The dashed arrows have been added to indicate that both the judgment-driven and affect-driven behaviors of followers (particularly in response to leader behavior) can lead to new work events (cf. Grandey & Melloy, 2017).

Some features of the work environment make it more or less likely that certain work events occur (Weiss & Cropanzano, 1996). For example, in formerly all-male work environments, such as

the military, in which lewd jokes and pin-up posters in lockers were previously considered the norm, a young woman may likely hear more lewd remarks than in work environments focused on small children, such as preschools. However, other features of the work environment, such as a white ceiling in an office, are unlikely to foster affective work events or changes in work attitudes.

The way that a person reacts to an affective event depends on their dispositions and the context of the event (Weiss & Cropanzano, 1996). For example, a person with high levels of neuroticism is more likely to experience strong negative affective reactions to comparatively minor negative events than a person with a low neuroticism score. Similarly, a series of small events can lead to stronger reactions than would be warranted by the individual events (Weiss & Cropanzano, 1996). For instance, a person may become increasingly frustrated with a colleague who frequently makes minor mistakes that create more work for both of them.

Finally, affective events theory also explains affect-driven and judgment-driven behaviors at work, with the former resulting directly from strong affective reactions to affective work events and the latter resulting from work attitudes (Weiss & Cropanzano, 1996). In their revised model of emotional labor as emotion regulation, Grandey and Melloy (2017) argued that both types of behavior can lead to new affective work events.

For example, if a follower asks for a vacation and the leader denies the request, the follower may leave the room muttering an unfriendly remark in anger (affect-driven behavior), or they may refrain from discourtesy but purposefully reduce their work speed for the rest of the week (judgment-driven behavior). If the leader then notices this, they may also become angry, meaning that the follower's behavior represents an affective event for the leader. Additionally, if the leader rebukes the follower for the inappropriate behavior, this leader behavior may, in turn, elicit new emotions in the follower. These cyclical relationships have been indicated by dashed arrows in Figure 2.

Affective events theory has received substantial empirical support (Ashkanasy & Humphrey, 2011). For example, Dalal et al. (2009) found that within-person variations in affect were related to different work behaviors; positive affect was related to organizational citizenship behavior and negative affect was related to counterproductive work behaviors. In a different study with students working on group projects, negative mood had a negative influence on team performance (Jordan et al., 2006). Similarly, another study found that sales representatives who were frustrated by their leader's leadership behavior showed lower work performance (McColl-Kennedy & Anderson, 2002). Additionally, Koning and van Kleef (2015) reported that the experimental manipulation of leaders' displays of anger led to a decrease in motivation and a reduced willingness to engage in organizational citizenship behavior if the anger was perceived to be inappropriate. Finally, Wegge et

al. (2006) found that favorable work environments (e.g., autonomy, supervisory support) were positively associated with follower job satisfaction and that positive emotions at work mediated this relationship.

4.3.2 Leaders as Sources of Affective Events

"Leaders serve as a primary source of affective events" (Sy & Choi, 2013, p. 128).

Applying affective events theory (Weiss & Cropanzano, 1996) to leader–follower interactions, Dasborough (2006) argued that leaders are a source of both positive and negative affective events for followers. In a quantitative analysis of qualitative interviews conducted with both leaders and followers, Dasborough showed that "leaders are ongoing sources of employee hassles and uplifts in the workplace" (p. 170), and that this view was supported by both leaders and followers. Specifically, when leaders behaved as expected, positive emotions such as calmness and satisfaction were evoked in the followers, and this was also the case when leaders showed constructive leadership behaviors. Such positive interactions with leaders resulted in motivation to work harder, organizational citizenship behavior, and higher levels of job satisfaction among the followers (Dasborough, 2006).

By contrast, leaders who behaved inappropriately or differently than expected evoked negative emotions in the followers. Although such incidents did not occur daily, the resulting negative emotions were more intense than the positive emotions caused by the positive events. Employees not only spoke about negative interactions with their leaders significantly more often, but they also mentioned a negativity bias, meaning that negative affective events were more easily recalled and remembered for longer times compared to positive events (Dasborough, 2006). Therefore, these results support the "bad is stronger than good" hypothesis (Baumeister et al., 2001).

In the same study, the most frequently mentioned sources of negative emotions were ineffective (e.g., providing incomplete information) or inappropriate (e.g., yelling) communication, followed by a lack of awareness or respect and a lack of empowerment. Frequent negative affective events led to a loss of respect or even hatred toward the leaders, low levels of commitment, and desires for revenge and leaving the position altogether (Dasborough, 2006). In their review, Gibson and Callister (2010) also found that leaders can be a source of affective events, as followers who perceived their leader's behavior as unjust showed higher levels of anger (Gibson & Callister, 2010).

I posit that successful leader self-regulation may increase the number of positive affective events and decrease the number of negative affective events for followers. My first argument is that successful self-regulation improves the leader's own affect, and this should apply to both self-leadership and emotion regulation. Progress toward task completion or actual task completion,

which indicate successful self-leadership, should generally result in relief, if the task was necessary but unpleasant, or even stronger positive emotions, such as joy or pride, if the task was important to the leader (Carver & Scheier, 1998; Locke & Latham, 2006), especially as leaders should not lack further tasks or goals to complete when they complete one task. Additionally, successful emotion regulation typically also results in higher levels of positive emotions and lower levels of negative emotions (Gross, 1998; Schraub et al., 2014).

My second argument is that leaders' emotions can then be passed on to their followers via a process called *emotional contagion*. This transmission of emotions from one person to another can happen either implicitly or explicitly. *Implicit* or *automatic emotional contagion* is defined as "the tendency to automatically mimic and synchronize facial expressions, vocalizations, postures, and movements with those of another person's and, consequently, to converge emotionally" (Hatfield et al., 1992, as cited in Hatfield et al., 1994, p. 5). This process can even occur virtually via textual and behavioral cues (Barsade et al., 2018), such as if a person suddenly omits the cheerful emoji that they usually use when messaging colleagues. *Explicit or deliberate emotional contagion* is the conscious and deliberate process of transferring emotions to another person (Tee, 2015), such as if a leader tries to regulate their emotions to be as cheerful as possible despite difficult circumstances in order to uplift and encourage their followers. Additionally, observing an emotion such as anger in the leader can cause a different emotion in the followers, such as fear or even amusement, in a process called *emotional countercontagion* (Hatfield et al., 1994). Importantly, people vary in their individual susceptibility to emotional contagion (Barsade et al., 2018; Tee, 2015).

In their leader activation-member propagation (LAMP) model, Sy and Choi (2013) argued that leaders are a key source of mood contagion due to their social status and the salience of their emotions for the followers. Once activated by the leader, a mood or emotion spreads among the followers via emotional contagion processes, especially if the followers are highly susceptible to emotional contagion.

Studies have demonstrated the existence of emotional contagion between leaders and followers (Clarkson et al., 2020). Additionally, it was found that leaders who were able to transfer positive emotions to their followers were judged to be effective, charismatic, and transformational leaders by the followers (Bono & Ilies, 2006; Tee, 2015).

There is some empirical evidence that negative emotions spread more easily than positive emotions (Clarkson et al., 2020), and that both positive and negative emotional contagion within teams can influence team behaviors (e.g., cooperation) and team performance (Barsade, 2002; Kelly & Barsade, 2001). Based on this, a lack of emotion regulation that results in more negative emotions in a leader may have a stronger influence on follower emotions than successful leader self-

regulation, which is also consistent with the “bad is stronger than good” hypothesis (Baumeister et al., 2001).

My third argument is that leader moods and emotions can also cause affective reactions in followers via a different pathway that does not rely on emotional contagion. This pathway occurs when a follower interprets the leader’s mood or emotion as either favorable or unfavorable for their goals (see also Schraub et al., 2014). For example, a follower may understand that it is futile to ask their leader for a day off when the leader is in a bad mood. In turn, being unable to obtain approval for their day off due to the leader’s mood may cause negative emotions in the follower, even if the follower is not susceptible to emotional contagion.

In conclusion, leader self-leadership and leader emotion regulation represent part of the work environment within affective events theory (Weiss & Cropanzano, 1996), as they increase the likelihood of affective work events for the followers (see also Schraub et al., 2014).

4.3.3 The Effects of Leader Self-Regulation on Follower Job Satisfaction

According to affective events theory, the follower’s emotional reactions to affective work events, which are in part caused by their leaders’ (lack of) self-regulation, influence the followers’ job satisfaction, meaning leader self-regulation is indirectly related to follower job satisfaction. Moreover, the direct path from the work environment to job satisfaction in the model may also be relevant, as followers may cognitively evaluate their leaders more favorably if the leaders appropriately regulate their negative emotions and complete their tasks on time.

The empirical relationships between successful self-leadership or successful emotion regulation of leaders and follower job satisfaction have not yet been studied directly. However, one study showed that school directors’ use of reappraisal as an emotion regulation strategy was negatively related to follower job satisfaction, and directors’ use of suppression was positively related to followers’ positive affect, although not to job satisfaction (Kafetsios et al., 2012). Fisk and Friesen (2012) studied the effects of followers’ perceptions of their leaders’ emotional labor strategy use on the followers’ job satisfaction. They found a strong negative correlation between perceived leader surface acting frequency and job satisfaction, as well as a moderate positive correlation between perceived leader deep acting frequency and job satisfaction (Fisk & Friesen, 2012). Taken together, the types of emotion regulation strategies used by leaders may affect follower job satisfaction. Finally, leaders’ emotion regulation ability, as assessed by a scenario-based multiple-choice test, has been found to be positively related to follower job satisfaction (Kafetsios et al., 2014). In conclusion, I formulate the following two hypotheses:

Hypothesis 4: Successful leader emotion regulation is associated with higher levels of follower job satisfaction.

Hypothesis 5: Higher levels of (successful) leader self-leadership are associated with higher levels of follower job satisfaction.

4.3.4 The Mediating Role of Constructive and Destructive Leadership Styles

As illustrated by the qualitative study conducted by Dasborough (2006), constructive leadership styles, such as instrumental leadership, should also lead to positive affective events from the perspective of the followers. For example, the instrumental leadership behavior of providing constructive and timely feedback (i.e., outcome monitoring) may assure them that they are on time with their project. Similarly, path-goal facilitation should lead to positive emotions, such as a follower receiving a better laptop that then enables them to use specialized software for a project. According to affective events theory (Weiss & Cropanzano, 1996), these positive affective events should enhance levels of follower job satisfaction.

By contrast, both active and passive destructive leadership are likely to elicit negative affective events. For example, leaders who avoid making critical decisions (laissez-faire leadership) are likely to cause frustration among their followers. Furthermore, leaders who shout at followers (active destructive leadership) may provoke a variety of negative emotions, such as anger or fear. In both cases, affective events theory predicts lower levels of follower job satisfaction (Weiss & Cropanzano, 1996). Empirically, negative associations between both active (Mackey et al., 2021) and passive (Judge & Piccolo, 2004) destructive leadership and job satisfaction and a positive association between instrumental leadership and job satisfaction (Rowold, 2014) have previously been reported in the literature.

Therefore, I argue that the hypothesized influences of leader self-regulation on follower job satisfaction (see Section 4.3.3) are partially mediated by different leadership behaviors (see also Sections 4.1 and 4.2). However, full mediation cannot be expected due to the influence of the three other factors described above: a) emotional contagion, b) appraisals of leader emotions, and c) cognitive appraisals of leader self-regulation. Direct empirical tests of these mediation effects have not previously been conducted. However, in a field study by Chi et al. (2011), positive leader mood had a significant positive effect on individuals' satisfaction with their work team (*team satisfaction*), which forms a part of job satisfaction (Judge & Kammeyer-Mueller, 2012). Additionally, Chi et al. (2011) reported that both transformational leadership and positive group affect mediated the effect of leader mood on follower team satisfaction. However, in this study, team satisfaction and group affect were measured at the team level, so the results cannot be directly translated to the individual level that is considered in this dissertation.

Despite this, the first mediation pathway via transformational leadership illustrates that successful leader self-regulation may be related to constructive leadership, which is in turn related

to job satisfaction. Additionally, the second path supports the argument that leadership does not fully mediate the relationship between leader self-regulation and job satisfaction if a group affect congruent with leader affect is interpreted as an indicator of emotional contagion.

In summary, I hypothesize the following:

Hypothesis 6: Destructive leadership partially mediates the relationship between successful leader emotion regulation and follower job satisfaction.

Hypothesis 7: Both a) laissez-faire and b) instrumental leadership partially mediate the relationship between leader self-leadership and follower job satisfaction.

4.4 Potential Physiological Indicators of Self-Regulatory Processes

In recent years, organizational neuroscience has gained popularity (Massaro & Pecchia, 2019). However, previous efforts in this area have mainly focused on using brain imaging methods, despite cardiovascular measures being more easily acquired (Massaro & Pecchia, 2019). In fact, wearable electrocardiography (ECG) devices even allow the collection of physiological data in organizational settings, which would increase the ecological validity of these measures (Massaro & Pecchia, 2019).

The model of neurovisceral integration in emotion regulation and dysregulation (Thayer & Lane, 2000, 2009) delineates the physiological structures that enable inhibitory control and proposes that certain indices of heart rate variability can be used as physiological indicators of emotion regulation ability. As the model has received empirical support (e.g., Thayer et al., 2012) and considering the goal of achieving ecological validity, this dissertation, thus, focuses on three cardiovascular measures that could also be acquired within organizational contexts. In this section, the concepts of heart rate variability and cardiac coherence are briefly introduced before summarizing the model of neurovisceral integration and related empirical works.

4.4.1 Heart Rate and Heart Rate Variability

"A healthy heart is not a metronome" (Shaffer & Ginsberg, 2017, 258:1).

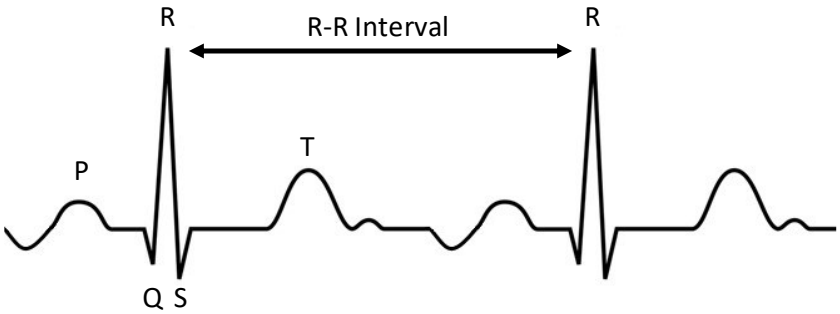
Put simply, *heart rate variability* is the variance in the time intervals between two consecutive heartbeats (*R-R interval*, see Figure 3; Task Force of The European Society of Cardiology and The North American Society of Pacing and Electrophysiology, 1996). The events that occur within the heart between one heartbeat and the next, such as the contraction and relaxation of the heart muscles, are called the *cardiac cycle*.

Figure 3 illustrates the shape of a normal cardiac cycle when recorded by an ECG. The QRS complex corresponds to the contraction of the heart ventricles (Appelhans & Luecken, 2006; Massaro & Pecchia, 2019), that is, with what is perceived as heartbeats. *Normal* heartbeats and their corresponding QRS complexes are caused by sinus node depolarizations within the heart (Task Force

of The European Society of Cardiology and The North American Society of Pacing and Electrophysiology, 1996), which is why (true) R-R intervals are sometimes referred to as N-N or NN (normal to normal) intervals (Appelhans & Luecken, 2006).

Figure 3

Standard ECG Waveform and Inter-Beat (R-R) Interval



The R-R (or inter-beat) intervals are measured in milliseconds (ms). The number of R-R intervals per minute represents the mean *heart rate*, with the unit of beats per minute (bpm). The heart rate of healthy adults typically ranges between 60 and 100 bpm (Massaro & Pecchia, 2019). The series of R-R intervals can be used to calculate different indices of heart rate variability. However, as abnormal heartbeats distort these measures, any ECG data must be carefully screened and cleaned before calculating heart rate variability indices (Appelhans & Luecken, 2006; Massaro & Pecchia, 2019).

Time Domain Measures of Heart Rate Variability. Time domain measures of heart rate variability quantify the overall variation in the R-R intervals. For example, the SDNN is the standard deviation of all R-R intervals and the RMSSD is the square root of the mean squared differences between adjacent R-R intervals. Both the SDNN and the RMSSD utilize milliseconds as their basic units unless transformed to a different scale (Task Force of The European Society of Cardiology and The North American Society of Pacing and Electrophysiology, 1996).

By definition, the SDNN captures all the variance within the R-R intervals and is thus a global measure of heart rate variability. Therefore, the SDNN increases when the length of the ECG recording increases, meaning SDNN values and similar measures cannot be compared across different recording durations. Due to this, short-term recordings of 5 minutes and long-term recordings of 24 hours are suggested for assessing heart rate variability. The RMSSD is recommended for assessing short-term variations in heart rate that occur at high frequencies (Task Force of The European Society of Cardiology and The North American Society of Pacing and

Electrophysiology, 1996), which are those variations that are relevant for this dissertation, as is explained in the following sections.

Frequency Domain Measures of Heart Rate Variability. The time series of the R-R intervals can also be studied in terms of the frequency domain. For this, the original time series is decomposed into a number of overlapping sine-wave or sine-wave-like oscillations (Sosnowski, 2010). Each sine wave has a *frequency*, which represents the number of its oscillations or cycles per second, and an *amplitude*, which represents the largest difference of the wave from zero. Various methods can be used for this transformation, but autoregressive modeling and the fast Fourier transform are the most commonly used techniques (Appelhans & Luecken, 2006).

In frequency analyses, the time series is converted into a curve representing the amplitudes of the sine waves at different frequencies, which is referred to as the *power spectrum*. The area under the power spectrum is the *total power,* and this value is mathematically equivalent to the total variance in the R-R intervals (Sosnowski, 2010). The *power* of a frequency band is defined as the amount of variance in the time series within this frequency band, and this is equal to the area under the curve above this frequency band (Appelhans & Luecken, 2006). The basic unit of power is ms^2 (Task Force of The European Society of Cardiology and The North American Society of Pacing and Electrophysiology, 1996).

For an ECG, the power spectrum typically shows three to four major peaks, depending on the ECG duration, within the following frequency ranges (Sosnowski, 2010):

- *High frequency* (HF) range: 0.15 Hz to 0.4 Hz (cycle length 2.5 to 6.7 seconds)
- *Low frequency* (LF) range: 0.04 Hz to 0.15 Hz (cycle length 6.7 to 25 seconds)
- *Very low frequency* (VLF) range: 0.003 Hz to 0.04 Hz (cycle length 25 seconds to 5.5 minutes)
- *Ultra low frequency* (ULF) range: < 0.003 Hz (cycle length of 5.5 minutes or more)

To examine a particular frequency band, the ECG recording time should be at least ten times as long as the cycle length of the lowest frequency. Therefore, only the HF and LF ranges can be reliably assessed during the standard 5-minute short recordings, even though three peaks within the HF, LF, and VLF often appear in such recordings (Sosnowski, 2010; Task Force of The European Society of Cardiology and The North American Society of Pacing and Electrophysiology, 1996).

The power distribution across the HF and LF peaks and their exact positions vary depending on the influence of the autonomic nervous system on the heart, meaning that frequency domain measures are particularly appropriate for analyzing short-duration ECG recordings (Task Force of The European Society of Cardiology and The North American Society of Pacing and Electrophysiology, 1996).

Heart Rate Variability and the Autonomic Nervous System. The autonomic nervous system comprises three parts: the sympathetic branch (“fight or flight“), the parasympathetic branch (“rest and digest“), and the enteric branch, which controls the gastrointestinal tract (Langley, 1921; Palumbo et al., 2017). The sympathetic and parasympathetic branches dynamically influence the heart to enable adaptive responses to varying environmental conditions (Palumbo et al., 2017).

The sinus (or sinoatrial) node is the primary pacemaker in the heart, which causes the coordinated contraction of the heart muscles (Appelhans & Luecken, 2006). In the absence of any influence from either the sympathetic or the parasympathetic branches (e.g., in a newly transplanted heart), the intrinsic heart rate generated by the sinus node is approximately 100 bpm (McCraty & Shaffer, 2015).

Generally, the heart rate increases in response to sympathetic influences, which results in shorter R-R intervals, and the heart rate decreases in response to parasympathetic influences, which results in longer R-R intervals. Similarly, a reduction in sympathetic activity leads to a lower heart rate, whereas a reduction of parasympathetic activity leads to a higher heart rate. At rest, the parasympathetic influence is dominant, meaning that the heart rate usually remains well below the intrinsic heart rate of approximately 100 bpm (Appelhans & Luecken, 2006; McCraty & Shaffer, 2015). Breathing in temporarily stops the parasympathetic influence on heart rate, thereby increasing the heart rate, whereas breathing out restores the parasympathetic influence, thus leading to a lower heart rate (Appelhans & Luecken, 2006).

The sympathetic influences on the heart are mediated by norepinephrine, and these effects take several seconds to occur. Conversely, parasympathetic influences, which are mediated by acetylcholine, reach their peak effect within half a second and are, thus, much faster. These speed differences explain some of the different frequencies at which heart rate variability occurs (Appelhans & Luecken, 2006). Consequently, the changes in R-R intervals that occur at high frequencies are primarily mediated by parasympathetic vagal influences on the sinus node (Berntson et al., 1997).

Age Effects and Sex Differences in Heart Rate Variability. Heart rate variability is highest in late adolescence to early adulthood and declines with age in different patterns. Specifically, the RMSSD and HF power calculated using short ECG recordings tend to decline exponentially with age, with the largest reductions occurring between young adulthood and middle age (Sosnowski, 2010).

In their meta-analysis, Koenig and Thayer (2016) identified significant sex differences in heart rate variability. Although women had shorter mean R-R intervals, lower SDNN values, and lower total power, they also showed significantly greater HF power compared to men, thus indicating that the parasympathetic influences on the heart may be stronger in women. However,

most of the effect sizes in this meta-analysis were small and, regarding the RMSSD, there was only a slight trend toward lower RMSSD values in men compared to women with very small effect sizes (Hedge's $g \leq 0.08$) that mostly did not reach statistical significance.

4.4.2 Heart Rate Variability and Emotion Regulation

Both the sympathetic and the parasympathetic branches of the nervous system are involved in generating the physiological changes that are related to emotions (Appelhans & Luecken, 2006; Gross, 2015). Having a flexible autonomic nervous system enables the body to respond quickly to changing situational demands with appropriate levels of arousal, whereas a rigid autonomic nervous system would lower the individual's capacity to produce appropriate responses (Appelhans & Luecken, 2006). The model of neurovisceral integration (Thayer & Lane, 2000, 2009) suggests that heart rate variability reflects the flexibility of the autonomic nervous system in response to environmental demands, meaning it can thus be used as an index of general self- and emotion regulation capacities.

More specifically, the model of neurovisceral integration views the human organism as a complex distributed system of oscillating sub-systems that are organized in negative feedback loops. In this system, emotions result from combinations of both internal and external conditions, which activate related behavioral patterns. Internal and external affective information must be processed efficiently to achieve appropriate, self-regulated, responses to environmental demands. This means that information that is meaningful in terms of one's well-being must be selected, and irrelevant information must be disregarded. Furthermore, attention needs to be shifted and sustained as required by the situation (Thayer & Lane, 2000). Therefore, any inflexibility within the system may prevent the selection of an appropriate response to a situation or may lead to an inability to inhibit inappropriate responses.

The model proposes that the central autonomic network (Benarroch, 1993), a brain structure that includes, among others, the amygdala, the anterior cingulate cortex, and parts of the prefrontal cortex, modulates both attention and physiological arousal. Additionally, this network generally selects and organizes autonomic and behavioral responses to environmental demands. The central autonomic network is connected to the sinus node via the parasympathetic vagus nerve and sympathetic neurons. Therefore, its output directly influences heart rate variability (Appelhans & Luecken, 2006; Thayer & Lane, 2000). As sympathetic influences on the heart rate are comparatively slow, it is theorized that parasympathetic influences indicate greater flexibility in responding to environmental demands. Therefore, the model specifically predicts that vagally mediated (i.e., HF) heart rate variability indicates the individual's ability to successfully self-regulate and adapt to changing circumstances (Thayer & Lane, 2000; see also Thayer & Lane, 2009, for the specific neural

structures, and see Thayer et al., 2012, for a meta-analysis regarding the connections between heart rate variability and brain region activations).

Empirically, high *resting* (i.e., measured at rest) or trait vagally mediated heart rate variability (vmHRV) has been found to be positively related to positive affectivity and negatively related to depression (Balzarotti et al., 2017). Additionally, high vmHRV has been found to be related to greater use of adaptive emotion regulation strategies and lower use of maladaptive strategies, whereas low vmHRV has been related to more rigid and, thus, less adaptive responses to negative stimuli (Balzarotti et al., 2017).

A fairly recent meta-analysis (Holzman & Bridgett, 2017) reported significant, albeit small, correlations between heart rate variability and emotion regulation (r = .10) and behavioral self-regulation (r = .09), and the correlations between self-regulation and heart rate variability were stronger in samples with older participants. However, in the primary studies summarized in this meta-analysis, emotion regulation was typically assessed in terms of strategy use, so the results cannot be directly translated to the concept of successful emotion regulation.

Similarly, a meta-analysis focusing on resting heart rate variability and self-control performance in laboratory tasks in healthy adults found a small but significant overall effect of r = .15, with a similar effect of r = .17 reported specifically for self-control tasks related to emotion regulation (Zahn et al., 2016). This meta-analysis was criticized for including 5 (out of 132) effects that were based on the SDNN, which measures overall heart rate variability, rather than vmHRV (Laborde & Mosley, 2016). However, the effect sizes for HF, RMSSD, and SDNN were virtually identical (r = .17 to .18), so it is likely that this did not bias the overall effects.

In a recent study, lower vmHRV was associated with greater self-reported difficulties in emotion regulation, especially in terms of a lack of impulse control and emotional clarity, even after controlling for trait anxiety, rumination, peak HF, and several demographic variables (D. P. Williams et al., 2015). In an extension of this study, it was found that the association between low vmHRV and emotion regulation difficulties was much more pronounced in women compared to men (D. P. Williams et al., 2019). The authors argued that the greater frontal brain activation found on average in women may compensate for their generally higher amygdala activity, thus making women more vulnerable to emotion regulation failures in the case of lower general self-regulation capacity, as assessed by vmHRV.

In conclusion, the model of neurovisceral integration and the existing empirical results suggest the following hypothesis, which is examined in Study 4:

Hypothesis 8: Resting vmHRV is positively associated with successful emotion regulation.

4.4.3 Cardiac Coherence

McCraty and Shaffer (2015) define *coherence* as "the degree of synchronization between different oscillating systems" (McCraty & Shaffer, 2015, p. 55), with *auto-coherence* referring specifically to coherence within a single oscillating system. For example, a system that can be approximated by a single sine wave rather than using a large number of overlapping sine waves is highly auto-coherent. High auto-coherence is further characterized by a high degree of stability in the cycle length (or frequency), amplitude, and shape of the oscillations (McCraty & Shaffer, 2015).

Cardiac coherence concerns the pattern of the variability in the heart rate, which means the pattern of the changes in heart rate over time (McCraty et al., 2009). Coherent patterns can occur at both high and low heart rates (McCraty et al., 2009). More specifically, cardiac coherence is defined as a form of auto-coherence, in which the power spectrum of an ECG shows a very narrow, high peak in the LF range at around 0.1 Hz and no large peaks in the HF or VLF ranges. Cardiac coherence is calculated by identifying the highest peak within the 0.04 Hz to 0.26 Hz range of the power spectrum, which includes the LF range and part of the HF range, and then calculating the power of this peak over a 0.03 Hz wide range centered on this peak. The resulting peak power is then divided by the power distributed outside the peak using the formula:

$$cardiac\ coherence = \frac{peak\ power}{total\ power - peak\ power}$$

(McCraty & Shaffer, 2015). This formula is similar to other formulas for calculating heart rate variability in *normalized units* (nu) instead of the raw values in ms^2, such as the Italian formula,

$$LF\ (nu) = \frac{LF}{total\ power - VLF}$$

which is also a measure of relative power (Koenig & Thayer, 2016).

Cardiac coherence is associated with the experience of positive rather than negative emotions, improved social performance, high well-being, and increased heart rate variability (McCraty & Shaffer, 2015). Cardiac coherence can be induced by paced breathing at a 10-second rhythm (McCraty & Shaffer, 2015), meaning it is a particularly interesting concept for practitioners as this intervention could be very simple to implement in trainings. A second method for generating cardiac coherence is the intentional generation of positive emotions with low arousal (e.g., appreciation, but not excitement), which is a form of conscious emotion regulation (McCraty et al., 2009).

Finally, Mather and Thayer (2018) argued that cardiac coherence promotes functional connectivity between the brain regions involved in emotion regulation via its influence on cerebral blood flow, as well as via stimulating heartbeat-evoked potentials in the brain and phasic

suppression of sympathetic influences. This effect is accompanied by an increase in parasympathetic influences, thus improving emotion regulation.

Therefore, successful emotion regulation, which often aims to increase positive emotions (Gross, 1998), may be positively related to cardiac coherence and vice versa.

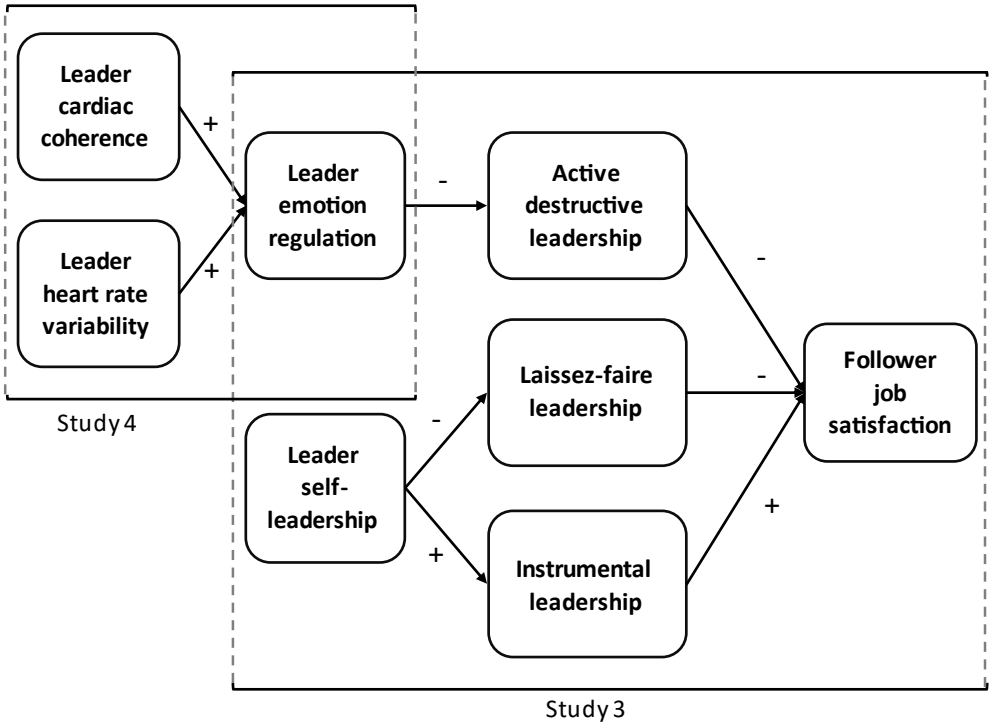
Hypothesis 9: Cardiac coherence is positively related to successful emotion regulation.

4.5 Summary: Research Model

Figure 4 summarizes the research model for this dissertation. Studies 1 and 2 include the development and initial validation of the two measures for successful emotion regulation and successful self-leadership. The methodological considerations regarding the development of these two scales are described in Chapter 5.

Figure 4

Research Model for Studies 3 and 4



Study 3 is a questionnaire study with leader–follower dyads that assesses Hypotheses 1 to 7, representing all hypotheses except Hypotheses 8 and 9, which are depicted on the left side of Figure 4. These two hypotheses refer to the two physiological measures of vmHRV and cardiac coherence and their relationship with self-reported successful emotion regulation, and they are examined in Study 4, which is a laboratory study with a student sample.

5 Methodological Considerations

"Measurement is in many ways, the first, last, and most important concern in science. If we cannot measure the constructs in our theories, then we cannot test them" (Dasborough et al., 2021, 101539:4).

As described above, it is not sufficient to measure strategy use in order to assess successful self-regulation, because successful self-regulation is not only context-specific but also situation-specific. Even if it were possible to identify a small set of universally adaptive strategies for the work context, measuring strategy use would not suffice, as attempting to use a strategy is not equivalent to successfully using it (Bertrams & Dickhäuser, 2009; Gross, 2015; Troy et al., 2017).

Previous operationalizations of emotion regulation as the variability of strategy use across situations or as the ability to implement a certain strategy when instructed to do so (Aldao et al., 2015) also do not suffice. In both cases, the ability to successfully select and use strategies that are adaptive in a certain situation is not captured.

A final argument against utilizing some form of strategy use to operationalize successful self-regulation relates specifically to follower perceptions of leaders' self-regulation. Emotion regulation strategies, such as reappraisal or the constructive thought pattern self-leadership strategies, are virtually unobservable by others unless the person openly speaks about their self-regulation attempts. Therefore, another person's use of such strategies is difficult to rate accurately, especially if the rater does not have a close relationship with the ratee.

Empirically, this problem has been demonstrated in a study by Gross and John (2003), in which self- and peer-ratings of suppression among undergraduate students were strongly correlated (r = .53), but the self- and peer-ratings of reappraisal were only weakly to moderately correlated (r = .24). It is possible to study follower beliefs about leader strategy use, as was done by Fisk and Friesen (2012) if desired. However, items such as "My supervisor resists expressing his/her true feelings" (Moin, 2018) require knowledge about the leader's true feelings, which would again require a more intimate leader–follower relationship than can typically be expected.

More abstractly, the realistic accuracy model (Funder, 1995, 2012) provides four conditions that must be met for an observer to accurately judge or describe a trait of an observed person. Firstly, the observed person must behave in a way that corresponds to the trait. Secondly, this behavior must occur in the presence of the observer or must be accurately reported to them by others. Thirdly, the observer must be capable of detecting the behavior when present or when given relevant information by others. Finally, the information regarding the behavior must be interpreted correctly by the observer as related to the trait.

Therefore, the two criteria for identifying suitable measures of successful emotion regulation and successful self-leadership for this dissertation were:

1. The measure should not involve the assessment of strategy use.
2. Followers should have adequate opportunities to make the observations necessary for them to confidently answer the items within the work context.

In Sections 5.1 and 5.2, I briefly describe existing measures for emotion regulation and self-leadership with regard to these two criteria. Freely available measures of emotional intelligence were also included, but ability measures were excluded as they cannot be used for other-ratings.

5.1 Existing Emotion Regulation Measures

The Emotion Regulation Questionnaire (ERQ; English original: Gross & John, 2003; German adaptations: Abler & Kessler, 2009; Stadelmaier, 2014) does not fulfill the criteria for emotion regulation measures in this dissertation, as it measures the two emotion regulation strategies of reappraisal and suppression. Similarly, the Cognitive Emotion Regulation Questionnaire (CERQ; Dutch original: Garnefski et al., 2001; Garnefski & Kraaij, 2007; short version: Garnefski & Kraaij, 2006; German adaptation: Loch et al., 2011) measures the habitual use of nine cognitive strategies for coping with negative life events (e.g., putting the event into perspective). Similarly, the recently published Heidelberg Form for Emotion Regulation Strategies (HFERST; German original with English translation: Izadpanah et al., 2019) measures eight emotion regulation strategies. Therefore, all three measures do not fulfill the first criterion of not measuring strategy use.

The Affective Style Questionnaire (ASQ; English original: Hofmann & Kashdan, 2010; German adaptation, with one translation error acknowledged by the authors: Graser et al., 2012) measures three broad emotion regulation styles, namely a) *concealing*, which is a combination of the strategies of suppression and surface acting; b) *adjusting*, which is conceptually similar to successful emotion regulation; and c) *tolerating* one's emotions (especially negative ones), which also includes the natural expression of emotions. From these three subscales, adjusting is the most promising for this dissertation as it mostly fulfills the first criterion of not assessing strategy use. However, only some of the items, which are all variations of the item "I can calm down very quickly", can be observed by others. The other items of the subscale refer to a person's knowledge of successful emotion regulation strategies, the ease of improving their mood, and their ability to avoid becoming upset by changing their perspective (i.e., the ability to use a certain emotion regulation strategy successfully), all of which are difficult for others to observe.

The Negative Mood Regulation Scale (NMR Scale; English original: Catanzaro & Mearns, 1990; German version: Backenstrass et al., 2008; Backenstrass et al., 2010) attempts to measure self-efficacy expectations with regard to negative mood regulation. More specifically, the scale

includes items that refer to the individual's general beliefs about being able to regulate their negative emotions, as well as items that refer to beliefs regarding the efficacy of certain emotion regulation strategies, such as "When I'm upset, I believe that seeing a movie won't help me feel better." Although self-efficacy expectations regarding emotion regulation should predict successful emotion regulation, it may be difficult and artificial for followers to attempt to assess their leader's self-efficacy expectations.

The Emotion Regulation Skills Questionnaire (ERSQ; Berking & Znoj, 2008, English translation: Grant et al., 2018) assesses nine skills that are related to emotion regulation: a) conscious awareness of one's emotions, b) physical sensations related to emotions, c) clarity about felt emotions, d) understanding the reasons for felt emotions, e) the ability to modify one's emotions, f) acceptance of one's emotions, g) the ability to tolerate feelings, h) the readiness to confront difficult situations when necessary, and i) self-support (e.g., self-encouragement) in difficult situations, each of which is assessed with three items. The first four skills are necessary, but not sufficient, antecedents of successful emotion regulation, whereas the last three skills support effective emotion regulation (Berking & Znoj, 2008). Therefore, only the three items measuring the ability to modify one's emotions are potentially relevant to this dissertation. However, the items are rather abstract (e.g., "I was able to influence my negative feelings.") and a person could also agree with this sample item if they unintentionally make themselves feel worse rather than better, meaning the scale is not ideal for operationalizing successful emotion regulation. Furthermore, at least one item, which refers to the individual's knowledge about their ability to influence their feelings, would be difficult for others to rate.

Most of the items on the Difficulties in Emotion Regulation Scale (DERS; English original: Gratz & Roemer, 2004; German version: Gutzweiler & In-Albon, 2018) begin with the item stem "When I'm upset …" from the NMR Scale (Catanzaro & Mearns, 1990). However, the content of the items differs. The DERS assesses six subscales that can be described as a) nonacceptance of emotional responses, which means having negative feelings about feeling upset; b) a lack of emotional awareness; c) a lack of emotional clarity, such as "I am confused about how I feel"; d) difficulties related to goal pursuit, such as difficulties concentrating when upset; e) impulse control difficulties; and f) insufficient access to emotion regulation strategies, such as beliefs that there is nothing one can do to feel better. Importantly, the DERS does not assess strategy use.

However, the first three dimensions, including the (non)acceptance of emotions, (a lack of) emotional awareness, and (a lack of) emotional clarity, are only antecedents of or supplemental to successful emotion regulation (Berking & Znoj, 2008). Furthermore, the items describing difficulties in goal pursuit refer to difficulties in concentrating on other things and completing work when upset.

Although both difficulties may be observable by co-workers who share an office, this is rarely the case for leaders and followers. Additionally, leaders can always claim that something important arose that prevented them from completing their tasks, which may or may not be true.

Additionally, the items on this scale regarding difficulties with impulse control have some problems in German, because the term “upset” cannot be directly translated into German. Gutzweiler and In-Albon (2018) examined a previously unpublished translation by other authors (Ehring et al., 2013, as cited in Gutzweiler & In-Albon, 2018), who chose to translate being upset as “having negative feelings”. This includes feeling upset but also negative feelings that are not characterized by agitation and disturbance, such as melancholy or boredom[6]. Consequently, the items that refer to feeling out of control potentially make less sense in German depending on which negative emotions the person thinks about. Finally, the last subscale can be described as low self-efficacy expectations for emotion regulation, which is also an antecedent of successful emotion regulation and unlikely to be observable by others who are not close to the individual.

Other scales that should be considered are the emotion regulation subscales of emotional intelligence scales. The Trait Meta Mood Scale (TMMS, English original: Salovey et al., 1995; German version: Otto et al., 2001) measures the individual’s attention to emotional cues, emotional clarity, and beliefs regarding the regulation of negative emotions (Otto et al., 2001). The subscale referring to emotion regulation comprises items that measure the emotion regulation strategy of thinking positively, as well items measuring optimism when facing adverse events. Therefore, the concepts measured by this scale have little resemblance with successful emotion regulation as defined in this dissertation.

The Emotional Intelligence Self-Regulation Scale (EISRS; Martinez-Pons, 2000) measures motivation, goal-setting, and strategy use in relation to a) being in touch with one’s emotions, b) sorting out one’s emotions, and c) emotion regulation. This scale also measures the respondent’s general evaluation of their self-monitoring and strategy adjustment, but not successful emotion regulation.

The regulation of emotion subscale of the emotional intelligence measure by Wong and Law (2002) consists of four items. One of the items is double-barreled (“I am able to control my temper and handle difficulties rationally”). Two of the items refer to the respondent’s general ability to control their emotions, and the fourth item refers to being able to calm down quickly when angry. Both of these aspects are observable by others, with the caveat that successful regulation cannot

[6] Backenstrass et al. (2008) used “feeling sad and depressed” for the German version of the NMR Scale, which is more specific but lacks the aspect of agitation.

always be distinguished from non-regulation (Gross, 1998). However, that caveat applies to most emotion regulation items.

The Self-Rated Emotional Intelligence Scale (SREIS; English original: Brackett et al., 2006; German adaptation: Vöhringer et al., 2020) also includes a subscale referring to managing one's emotions. From the four items, two refer to keeping calm in stressful situations, one to handling upsetting problems, and the final item to having problems with managing anger, which is reverse coded. Although the first three items are conceptually closer to coping with stress than emotion regulation, the fourth item is promising, as angry outbursts are easily observable by others.

Whereas the original Emotional Intelligence Scale (Schutte et al., 1998) does not contain subscales, the Brief Emotional Intelligence Scale (BEIS-10; Davies et al., 2010) identifies two items that relate to an individual's regulation of their own emotions. One of these items is "I have control over my emotions", which is more concise than the two similar items in the scale developed by Wong and Law (2002). The other item refers to seeking out activities that make one happy, which is an emotion regulation strategy.

A final scale to consider is the work-related emotional impairment subscale of the Burnout Assessment Tool (BAT). The BAT was originally developed in Dutch (Schaufeli et al., 2020a) but is available in several languages (e.g., in English, Schaufeli et al., 2020b). Additionally, a German version of the scale is currently being validated (Beer et al., 2020; Seubert & Glaser, 2021). The emotional impairment subscale avoids measuring strategy use. However, three of the items refer to thoughts and feelings, which are difficult for others to observe. One item refers to unintentional overreactions, which would require the observers to infer the degree of intent behind a reaction. However, the final item ("During my work I become irritable when things don't go my way") fulfills both criteria, as such a reaction to obstacles should be observable by followers or colleagues at work if the individuals involved have collaborated for a sufficient period of time.

In summary, none of the (sub-)scales reviewed in this section fulfill the two criteria developed in the previous section. However, four items could be extracted as a starting point for scale development in this dissertation: a) "I can calm down very quickly" from the ASQ (Hofmann & Kashdan, 2010), b) "I have control over my emotions" from the BEIS-10 (Davies et al., 2010), c) "I have problems dealing with my feelings of anger" from the SREIS (Brackett et al., 2006), and d) "During my work I become irritable when things don't go my way" from the BAT (Schaufeli et al., 2020b).

5.2 Existing Self-Leadership Measures

The frequently used Revised Self-Leadership Questionnaire (RSLQ; English original: Houghton & Neck, 2002; German adaptation: Andreßen & Konradt, 2007) includes nine subscales

that measure the self-leadership strategies of self-goal setting, self-reward, self-punishment, self-observation, self-cueing, natural rewards, visualizing successful performance, self-talk, and evaluating beliefs and assumptions. Following its development, the RSLQ was later shortened to the Abbreviated Self-Leadership Questionnaire (ASLQ; Houghton et al., 2012), in which the subscale of self-punishment was omitted, as excessive self-criticism cannot be considered conducive to self-leadership. The items from the original natural rewards and self-cueing subscales were also omitted because they failed to load onto interpretable factors in an exploratory factor analysis. From the 35 original items, nine were retained and grouped into three factors. These factors refer to behavioral awareness and volition (self-goal setting and self-observation), task motivation (visualizing successful performance and self-reward), and constructive cognition (self-talk and evaluating beliefs and assumptions; Houghton et al., 2012). However, it is clear that neither the RSLQ nor the ASLQ matches this dissertation's criterion of not assessing strategy use.

Information on the German Self-Leadership Questionnaire (GSLQ; Müller, 2005, as cited by Müller, 2006a; Müller, 2006a) is limited. According to Müller (2006a), the questionnaire includes four subscales, which assess a) time planning and will-power activation, b) action planning, c) intrinsic task commitment, and d) behavioral context modification. The questionnaire supposedly measures self-leadership strategies (Müller, 2006a), but two of the four sample items available for the scale do not refer to strategy use. Instead, the first item refers to successful self-leadership ("I am able to organize my time very well"), and the second refers to goal commitment ("I am committed to goals that challenge me personally"). Successful time management is crucial for successful self-leadership, as successful task completion means that the tasks should be finished on time. Additionally, poor time management is easily observable. Therefore, the item referring to successful time management represents a starting point for the development of a scale measuring successful self-leadership.

Georgianna (2007) used five items from the GSLQ item pool to assess self-leadership. These items measured self-awareness, behavior, volition, cognition, and motivation. Self-awareness can be interpreted as an antecedent of successful self-leadership, and this aspect is, at least partially, difficult for followers and co-workers to observe. Additionally, the item for behavior ("When engaging in new behavior, I am aware that relapses into old habits can happen occasionally") also refers to self-awareness, so neither of these items are helpful for assessing successful self-leadership. Moreover, the item referring to volition ("When I have made up my mind, I rarely give up, even if external circumstances should hinder me") is problematic, as the ability to disengage from unattainable goals is crucial for both successful self-regulation (Wrosch et al., 2003) and self-leadership. The item for cognition ("I try to put the knowledge that I acquire into concrete actions as

much as possible") is difficult to answer as not all knowledge (e.g., about celebrity gossip) can be translated into concrete actions. Finally, the item for motivation refers to the strategy of sub-goal setting, meaning that none of these five items were useful for scale development.

Yun et al. (2006) used a six-item scale to assess self-leadership, which focuses on proactive, autonomous work behaviors. However, the scale is specifically tailored to follower self-leadership (e.g., "I find solutions to my problems at work without seeking my supervisor's direct input") and, thus, cannot be easily modified for the assessment of leader self-leadership.

5.3 Item Construction

Aside from the two criteria that the items should not measure strategy use and that the followers must be able to confidently answer the items based on observations within the work context, several technical guidelines were also followed during item and scale construction. Firstly, the scales had to be kept as short as possible, as they were designed for use in studies measuring multiple constructs. Individuals are more likely to participate in studies with an estimated completion time of 10 minutes rather than 20 or 30 minutes, and response quality decreases toward the end of longer studies (Galesic & Bosnjak, 2009). As a result of this, alongside anecdotal evidence that the practice is not very popular among participants, I refrained from asking the same question several times with only slight variations in the item wording, even though this strategy increases the internal consistency scores of a scale (Streiner, 2003).

Secondly, I aimed to create straightforward items that were easy to understand, as recommended by Clark and Watson (1995). This includes avoiding overly complex language and double-barreled items that may not have a clear answer (Clark & Watson, 1995). For example, a person who likes cherries but detests apples, and who is faced with the item "I like apples and cherries", may choose the answer "not at all" or pick a neutral category.

Thirdly, items that either almost everybody or almost nobody endorses are not very informative (Clark & Watson, 1995; Kelava & Moosbrugger, 2012), so these were avoided in scale development. Specifically, as self-regulation within the work context is likely to be socially desirable, special care was taken to ensure that reverse-coded items, which indicated instances of self-regulation failure, were phrased in a way that would encourage the respondents to admit a potential lack of self-regulation.

Fourthly, as the endorsement of the absolute end-points of a Likert scale depends on a number of cultural, social, cognitive, and personality factors that are not necessarily related to the content of the items (Al-Mosaiwi & Johnstone, 2018; Batchelor & Miao, 2016; Zettler et al., 2016), absolute phrasings were avoided in the scale development. This was done by adding words that qualified the statements; for example, the phrase "I am always …" was substituted by "I am (almost)

always …". This permits people to choose "fully agree" on the Likert scale, even when they can think up rare, but not very relevant, exceptions that would ordinarily prevent them from endorsing an absolute statement.

In contrast to common practice and advice (e.g., Clark & Watson, 1995), I refrained from constructing large item pools that are later empirically reduced to a smaller number of items. As such analyses are sample-dependent (cf. Costello & Osborne, 2005), this method can produce scales that are too well-fitted to one sample. Additionally, a large number of mediocre items unnecessarily puts strain on the several hundred participants that are necessary for empirical item selection. Instead, I eliminated the vast majority of the several dozen initial items and alternative item wordings using an iterative process before the first data collection. I repeatedly checked the items for intelligibility and clarity, as well as for comprehensiveness and suitability for my purposes, thus retaining only the most promising items. In addition, the opinions of several colleagues and student research assistants were gathered regarding the clarity of the language and any missing aspects in order to further improve the quality of the items.

5.3.1 Emotion Regulation

In line with the focus on negative affective events in this dissertation and to keep the scale short, item construction mainly focused on the downregulation of the negative emotions that may adversely impact other individuals within the work context. To ensure that participants focused on situations at work, the following instruction was chosen: "Please think about situations *at work* while answering the questions on this page", which was also reinforced by several references to the work context within the items. In this way, the context would be apparent even to those persons who do not take the time to read instructions in questionnaires. The items were developed in German (see Appendix A) and translated into English by a certified translator with previous experience in scale translations. The translator was instructed to give preference to more natural and, thus, clearer wordings rather than exact but artificial translations. The translator and I discussed a few nuances of the first draft of the translation to ensure that the content of the scale was the same in the English and German versions. Both the self- and other-rating versions of the Contextual Emotion Regulation Scale (CoERS) are presented in Table 2.

Items 1 and 2 are specific versions of the more abstract item "I have problems dealing with my feelings of anger" from the SREIS (Brackett et al., 2006). Item 1 provides an example of using wording to make it easier for respondents to admit to raising their voice, by adding the qualifier "occasionally".

Items 3 and 4 are related to previous scales that measure expressive suppression (e.g., the ERQ, Gross & John, 2003). Unfortunately, Item 3 was not reformulated to a less absolute statement,

but there are no direct linguistic markers of absoluteness such as “always” or “never” (cf. Al-Mosaiwi & Johnstone, 2018). Item 4 is a qualified version of the sample item “I have control over my emotions” from the BEIS-10 (Davies et al., 2010), as it specifically refers to the work context and includes the qualifier “(almost)”.

Item 5 arose from anecdotal reports from individuals who found it difficult to work under a leader whose mood was unpredictable as they never knew how to behave in the presence of their leader. On a good day, the leaders were friendly toward the followers, but on bad days, the leaders showed aggressive behaviors and verbally abused their followers. The item is not double-barreled because a person who does not have severe mood swings should disagree with this item, and a person who has severe mood swings should either agree or disagree depending on their ability to deal with the mood swings. However, this item was difficult to qualify without compromising the clarity of the phrasing.

Table 2

Items of the Contextual Emotion Regulation Scale (CoERS)

Item	Coding	Self-Rating	Other-Rating
1	-	I occasionally raise my voice if somebody makes a serious mistake.	...sometimes raises their voice if somebody makes a serious mistake.
2	-	In heated discussions, I sometimes say things that I regret later on.	...sometimes says inappropriate things in heated discussions.
3	+	I do not let it show if I am in a bad mood.	...does not let it show if they are in a bad mood.
4	+	When I am at work, I am (almost) always in control of my emotions.	...is (almost) always in control of their emotions while at work.
5	-	I suffer from severe mood swings, and there is little I can do about this.	...has severe mood swings that are clearly noticeable.
6	-	I sometimes react harshly if I am disturbed while I am working.	...sometimes reacts harshly if they are disturbed while working.

Note. Scale instruction: “Please think about situations *at work* while answering the questions on this page.” Scale anchors: 1 = *fully disagree* to 7 = *fully agree*. Item stem for the other-ratings: “The supervisor I am assessing...”.

Item 6 has a similar theme to the item “During my work I become irritable when things don’t go my way” from the BAT (Schaufeli et al., 2020b). The situation relating to this item was a common, pre-pandemic work situation where a follower needs something (e.g., advice or a signature) from their leader and, thus, calls them or knocks on their office door. Some individuals react in a friendly manner to such disruptions of their work process, whereas others may show their annoyance at the intrusion.

The sample item “I can calm down very quickly” from the ASQ (Hofmann & Kashdan, 2010) was omitted, because different persons may have different ideas of the timeframe meant by the term “very quickly”, and a very stoical person would not need to calm down in the first place.

As can be seen in Table 2, the wordings for the self-rated and other-rated items of Item 2 and Item 5 are not fully isomorphic. This is because regret (Item 2) may not always be noticeable by others. Additionally, it may be difficult for others to determine whether a person is unable or unwilling to regulate their emotions (Item 5). Similarly, the sentence structure for the other-ratings was modified on occasion to enhance the clarity of the language (e.g., Item 4).

5.3.2 Self-Leadership

To identify indicators of successful self-leadership, several brainstorming sessions were conducted with colleagues, which led to the conclusion that people showing successful self-leadership a) meet deadlines, b) do not procrastinate, c) keep appointments, d) work in an organized rather than a chaotic manner, and e) work in a self-determined way, as opposed to being controlled by the demands of others. Therefore, the aspect of successful time management included in Müller (2006a) was converted into the two outcomes of meeting deadlines and keeping appointments.

Following this process, 12 items were developed to capture these five aspects of individuals with successful self-leadership. As before, the items were first developed in German. As the number of items was later empirically reduced to five items (see Study 2 for details), only these items were professionally translated into English, and the translation procedure was identical to that described in Section 5.3.1 for the emotion regulation items. The original 12-item version of the German scale can be found in Appendix B. The final 5-item versions of the English Successful Self-Leadership Questionnaire (SSLQ) are presented in Table 3.

Items 1 and 4 refer to working in an organized fashion, whereas Items 2 and 3 refer to meeting deadlines and keeping appointments, respectively. Item 5 refers to avoiding procrastination. Therefore, four of the five aspects that were identified as potential indicators of successful self-leadership were included in this 5-item version of the scale.

There is a slight asymmetry between the self-reported and other-reported versions of Item 1, because followers and co-workers may not be able to judge the extent of the ratee’s knowledge in

relation to all of the ratee's tasks. However, followers and co-workers are likely to notice if the ratee loses track of tasks that involve both the rater and the ratee. Special care was taken to ensure that the items could be answered by the widest possible range of leaders, but it was not possible to only include items that every follower could answer about their leader. Therefore, a response option of "cannot say" (coded as a missing value) was added for the other-ratings version.

Table 3

Items of the Successful Self-Leadership Questionnaire (SSLQ)

Item	Coding	Self-Rating	Other-Rating
1	+	I know exactly, which jobs (that I am involved in) are due in the near future.	… knows exactly which jobs (that we are both involved in) are due in the near future.
2	+	I (almost) always manage to meet my deadlines.	… (almost) always meets their deadlines.
3	+	I am (almost) always on time.	… is (almost) always on time.
4	+	I am very well-organized.	… is very well-organized.
5	+	I take care of any important jobs right away if I can.	… takes care of important jobs as soon as possible.

Note. Scale instruction: "Please think about situations *at work* while answering the questions on this page." Scale anchors: 1 = *fully disagree* and 7 = *fully agree*. The other-rating also included a missing value option: -99 = *cannot say*. Item stem for the other-ratings: "The supervisor I am assessing...".

6 Study 1: Validation of the Contextual Emotion Regulation Scale

In this study, firstly the psychometric properties and the factor structure of the German version of the new measure for successful emotion regulation, the CoERS, are analyzed. Secondly, the convergent and discriminant validity of the CoERS, that is, its relationships with measures that assess related and unrelated constructs, respectively, are examined. Thirdly, criterion validity, that is, the relationships between the scale and the three outcomes of instrumental leadership, destructive leadership, and follower trust in the leader, is analyzed. Fourthly, I assess the incremental validity above and beyond an established measure of reappraisal and suppression. Finally, I attempt to replicate known group differences in emotion regulation between obese and normal-weight individuals using the English version of the scale.

Regarding convergent and discriminant validity, only moderate correlations between successful emotion regulation and emotion regulation strategy use can be expected, as strategy use does not mean successful strategy use, as discussed in Section 3.4. Reappraisal and suppression are two emotion regulation strategies that have been widely studied (Gross, 2015), so they were chosen as example strategies for this study.

Even though reappraisal is usually considered to be a more adaptive strategy than suppression (see Section 3.4.5), suppression may be an appropriate short-term emotion regulation strategy at work. For example, interpersonal conflict situations may not allow sufficient time for reappraisal or other cognitive strategies, only giving time for the suppression of emotional expressions. Therefore, both reappraisal and suppression should be moderately correlated with successful emotion regulation. Gross and John (2003) measured overall successful emotion regulation using one item, and they found that both reappraisal and suppression had low to moderate associations with successful emotion regulation (r = .20 and r = .18, respectively, ps < .05), so similar values may be expected in this study:

Hypothesis 10: Successful emotion regulation should have low to moderate (.15 ≤ r ≤ .35) positive correlations with both a) reappraisal and b) suppression.

Based on the conceptual similarities between emotion regulation and self-control, which result in a partial overlap of the two constructs (see Section 3.5.6), I expect a moderate correlation between emotion regulation and self-control:

Hypothesis 11: Successful emotion regulation is moderately positively correlated with self-control (.25 ≤ r ≤ .45).

Susceptibility to emotional contagion should make successful emotion regulation more difficult to achieve, because highly susceptible individuals are faced with more emotion-eliciting events, as the emotions of others may become emotion-eliciting events for them. Therefore, highly

susceptible persons have more opportunities to fail at emotion regulation. Additionally, as successful emotion regulation cannot be distinguished from non-regulation (Gross, 1998), not having to regulate emotions caused by others (i.e., as a result of low susceptibility to emotional contagion) could be interpreted as successful emotion regulation because the individual would not fail to regulate their emotions. However, since there are many other types of emotion-eliciting events (e.g., disappointments or losses), only a moderate negative correlation between susceptibility to emotional contagion and successful emotion regulation can be expected:

Hypothesis 12: Susceptibility to emotional contagion is moderately negatively correlated with successful emotion regulation ($-.45 \leq r \leq -.25$).

There is some evidence that older adults (approximately 60 years and older) have better emotion regulation than young adults (approximately 18 - 35 years; Kliegel et al., 2007; Larcom & Isaacowitz, 2009; Zimmermann & Iwanski, 2014), but the results in the past literature are mixed (Brady et al., 2018; Winecoff et al., 2011). As the percentage of older adults (aged 65 to 74) in the German workforce was only 2.8% in 2019 (own calculation; Statistisches Bundesamt, 2020), no age effects are expected to emerge in relation to successful emotion regulation at work.

Men and women differ in their emotion regulation strategy use (Goubet & Chrysikou, 2019; Zimmermann & Iwanski, 2014). For example, men tend to use more suppression than women (Goubet & Chrysikou, 2019; Graser et al., 2012; Gross & John, 2003; Zimmermann & Iwanski, 2014). Additionally, women have been found to be able to identify significantly more emotion regulation strategies for dealing with hypothetical negative emotion-eliciting events compared to men (Goubet & Chrysikou, 2019). However, little is known about sex or gender differences in successful emotion regulation so, as for age, no gender effects are expected to emerge in relation to successful emotion regulation.

Regarding criterion validity, the correlations between successful emotion regulation in leaders and destructive leadership, instrumental leadership, and follower trust are examined. As argued in Section 4.2, successful leader emotion regulation is expected to be negatively related to destructive leadership (Hypothesis 3).

Specifically, for the relationship between emotion regulation and instrumental leadership, I apply affective events theory (Weiss & Cropanzano, 1996; see also Section 4.3.1) to the perspective of the leader. Leaders who have the ability to successfully regulate their emotions, which can be interpreted as a leader's disposition, should be able to react appropriately to emotion-eliciting work events. This would prevent them from developing negative work attitudes and, consequently, enable them to show constructive leadership behaviors such as instrumental leadership. As a result, such leaders may utilize supportive leadership behaviors such as path-goal facilitation and outcome

monitoring, which are two dimensions of instrumental leadership (Antonakis & House, 2014), when their followers struggle to complete their assigned tasks. By contrast, leaders who are unable to regulate their frustration when experiencing goal blockade due to their struggling followers may be more likely to react with destructive, affect-driven leadership behaviors (Krasikova et al., 2013). To my knowledge, the relationship between successful emotion regulation and instrumental leadership has not previously been studied. Therefore, the following hypothesis is examined:

Hypothesis 13: Successful leader emotion regulation is positively related to instrumental leadership.

Trust can be defined as "a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another" (Rousseau et al., 1998, p. 395). In the case of follower trust in the leader, this other person, that the followers have expectations about, is their leader. Follower trust in the leader is a highly relevant outcome in organizations because it mediates the relationship between leadership behaviors and follower performance (see Legood et al., 2021, for a meta-analysis).

Gardner et al. (2009) proposed that leaders who display situationally appropriate emotional reactions to affective events may be perceived more favorably by their followers compared to those leaders who react inappropriately. They further suggested that these favorable impressions may, in turn, increase follower trust in the leader. As successful emotion regulation is defined as emotion regulation that is adaptive in a given context, it should, thus, be positively related to follower trust in the leader. Empirically, the related concept of perceived self-control has been shown to predict the perceived trustworthiness of a person (Righetti & Finkenauer, 2011). Therefore, the following hypothesis is examined:

Hypothesis 14: Successful leader emotion regulation is positively related to follower trust in the leader.

Difficulties in emotion regulation can lead to emotional (Willem et al., 2020) or binge (Leehr et al., 2015) eating when a person experiences negative emotions. This may explain why obesity (Willem et al., 2019; Willem et al., 2020) and eating disorders, such as binge eating (Dingemans et al., 2017), are associated with difficulties in emotion regulation. Therefore, the final hypothesis of Study 1 concerns a known group difference in emotion regulation:

Hypothesis 15: Individuals with normal weight are more successful at emotion regulation than obese individuals.

6.1 Method

Four independent samples were used in Study 1. In order to achieve the necessary sample size for conducting confirmatory factor analyses and testing the known group difference, two of the

samples consisted of employees only. The other two samples included leader–follower dyads and leaders with three of their team members. All samples are described in the next section, and the results for all samples are reported together in Section 6.2. As some of the raw data in this study were of poor quality, the data cleaning procedure is reported in detail in Section 6.1.3. Additionally, the usual information on the measures (Section 6.1.2) and analytical methods (Section 6.1.4) that were used in this study are provided.

6.1.1 Samples and Procedure

Data for all four samples was acquired via anonymous, secure online surveys. To improve the quality of the data, care was taken to keep the surveys as short as possible, as long surveys tend to increase careless responding (Goldammer et al., 2020; Meade & Craig, 2012), which can bias reliability estimates, factor loadings, and other estimates (Goldammer et al., 2020).

Where possible, instructed response items asking participants to choose a certain response option to prove that they had read the item were included in the surveys. Such items allow the identification of inattentive participants without adversely affecting the overall response behavior (Breitsohl & Steidelmüller, 2018). Furthermore, in Sample 3, the participants were asked to provide their age and gender in both waves of the survey. In this way, discrepancies could be screened to determine whether they were serious enough to warrant exclusion from the analyses. Similarly, in both Samples 3 and 4, the demographic data provided by the online research platform Prolific was compared to that collected via the surveys. As all the surveys were rather short and individual differences in response times can be large (Meade & Craig, 2012), I did not use response times to assess careless responding.

Sample 1. This sample included 85 leader–follower dyads that were recruited by students in Germany in exchange for partial course credit or partial credit toward their theses. Written consent for the use of this data was obtained from all students. Separate links to the questionnaires for leaders and for followers were provided. The participants were asked to generate a code to match the anonymous leader and follower data. They were further informed that their participation in the study was voluntary and could be stopped at any time, as well as that the students would not receive the codes or any other information (e.g., business sector) that would enable them to identify the recruited participants. This procedure was utilized to ensure the full anonymity of the participants, alongside the necessary pseudonymization procedure. No incentives were offered to the participants for their participation in the study. The data collection took place between October 2019 and April 2020.

In the survey, the leaders were asked to provide self-ratings regarding reappraisal, suppression, and successful emotion regulation. The followers were asked to indicate the extent of

their trust in their leader and to provide other-ratings of leader suppression, leader successful emotion regulation, instrumental leadership, and destructive leadership[7].

Of the leaders, 64% identified as male, 34% as female, and 2% as non-binary. The leaders were between 23 and 65 years old, with an average of 45 years (*M* = 45.48, *SD* = 10.81), and they worked between 12 and 70 hours per week, with an average of 45 hours per week (*M* = 45.20, *SD* = 9.96). More than half (54%) of the leaders had a university degree, and two-thirds (67%) had more than five years of leadership experience. Half of the leaders (51%) supervised 1 to 10 followers, 27% supervised 11 to 20 followers, and 21% supervised more than 20 followers.

Of the followers, 54% identified as male, 45% as female, and 1% as non-binary. The followers were between 18 and 62 years old, with an average age of 34 years (*M* = 33.53, *SD* = 11.96). The followers worked between 10 and 80 hours per week, with an average of 37 hours (*M* = 36.83, *SD* = 11.64). Two-fifths (40%) of the followers had a university degree, and 28% reported vocational training as their highest level of education.

Sample 2. This sample was provided by my colleague Kai N. Klasmeier. It included data from 62 leaders, as well as team-ratings for 33 of the leaders made by three of their team members. As for Sample 1, students received partial course credit for recruiting participants. In the survey, the leaders provided self-ratings and the followers provided other-ratings of successful leader emotion regulation. Both types of ratings were collected twice, and there were approximately four weeks between the two survey waves.

Of the 62 leaders, 61% identified as male and 39% as female. The leaders were between 24 and 66 years old, with an average age of 43 years (*M* = 42.69, *SD* = 11.23), and they worked between 20 and 60 hours per week, with an average of 42 hours per week (*M* = 42.81, *SD* = 7.87). The majority of the leaders (69%) had a university degree. Of the 99 followers who provided the team-ratings for 33 of the leaders, 59% identified as female and 41% as male. The followers were between 18 and 65 years old, with an average age of 38 years (*M* = 38.17, *SD* = 11.81). They worked between 8 and 55 hours per week, with an average of 34 hours (*M* = 33.75, *SD* = 10.25).

Sample 3. This sample was recruited via the online participant pool Prolific. Originally, Prolific members were eligible for the study if German was their first language, they were at least 18 years old, they worked at least 10 hours per week, they reported having a supervisor, and they had successfully participated in at least two previous studies. As only 510 persons fulfilled these pre-

[7] In all student-recruited samples, other constructs were also assessed that are not reported here. The students used the data for class assignments or for their unpublished bachelor or master's theses. Data acquired via seminars and bachelor theses is also used by my colleague Nele Hartmann for her own PhD thesis, but care was taken to ensure that the overlap in the constructs used was as small as possible.

screening criteria, not all of whom were ready to participate[8], the study was later opened to those whose first language was not German but who reported being fluent in German, as well as meeting the other criteria for participation. Following this, a final sample of 386 employees was obtained.

The data were collected in two waves that were approximately three weeks apart (*Mdn* = 21 days, *Min* = 15 days, *Max* = 33 days) between August 20, 2020, and September 23, 2020. Participants were paid £0.63 for the first wave, which had an estimated completion time of five minutes, and £0.25 for the shorter second wave, which had an estimated completion time of two minutes. Non-native speakers who took longer to complete the survey received a small bonus to ensure that the average hourly rate was at least £7.50. Due to economic reasons, the sample was used for both Study 1 and Study 2 and was randomly split at t_2 to reduce costs. The drop-out between the two waves for Study 1 was low, as 90% (*N* = 177) of the 197 eligible individuals participated in the second wave of Study 1. In the survey, the participants were asked to provide self-ratings of successful emotion regulation (at t_1 and t_2), self-control (at t_1), and emotional contagion (at t_2; see Section 7.1.2 for the measures that were used in Study 2).

Of the *N* = 386 employees in the full final sample, 62% identified as female, 37% as male, and 1% as non-binary. The participants were between 18 and 60 years old, with an average age of 31 years (*M* = 30.58, *SD* = 7.62), and they worked between 10 and 72 hours per week, with an average of 37 hours per week (*M* = 36.72, *SD* = 9.89). Individuals of 27 different nationalities participated in the study, with two-thirds (66%) of the sample being German, 9% Polish, 5% British, 4% Austrian, and 2% each for Greek, Italian, American, and Swiss. Approximately half of the participants (55%) lived in Germany, 12% in the United Kingdom, 9% in Poland, and 5% in Austria. Finally, approximately one-third (35%) of the participants were students who also worked part- or full-time.

Sample 4. As with Sample 3, this sample was also recruited via Prolific. To ensure the independence of the four samples that were used in Study 1, I recruited *N* = 139 monolingual, English-speaking, US residents who worked full-time and were either normal weight, with a body-mass index (BMI) between 20.0 and 24.9, or obese, with a BMI of 30.0 or higher. To achieve roughly equal sample sizes for these two subsamples, two studies using an identical questionnaire were published on Prolific that differed only in their pre-screening criterion for BMI. The participants were offered £0.40 for their participation in the study. The estimated completion time for potential participants was 3 minutes, and the median completion time for the study was 129 seconds.

The study was advertised as “A short study about eating and emotion regulation”, and four items relating to eating behavior were included to provide a plausible basis for asking for the participants’ consent to use their BMI data. However, these items were not used in the present

[8] The response rate was about 60% within the first week.

study. The participants were debriefed at the end of the survey that their BMI range had been collected via Prolific for the purposes of the study and were given the opportunity to withdraw from the study if they did not consent to this use of their data. Additionally, the participants were asked to rate their successful emotion regulation, as well as their reappraisal and suppression strategy use. The data collection for this sample was completed within a few hours on September 18, 2020.

The participants were residents of 37 different US states (TX: 15, NY: 12, NC: 8, CA: 7, VA: 6, all other states 5 or less), and 135 of them were born in the United States (UK: 2, Canada and Germany: 1 each). All participants except three were US citizens, and the remaining held the British, Irish, or Malaysian citizenship. In the final sample, *n* = 71 had a normal weight and *n* = 68 were classified as obese. Of the latter group, *n* = 39 had a BMI of 30 to 34.9, *n* = 13 had a BMI of 35 to 39.9, and *n* = 16 had a BMI of 40 or higher.

In the obese sub-sample, the average age was 37 years (*M* = 36.97, *SD* = 10.24, range: 22-67), which was significantly older than the normal weight subsample, which had an average age of 32 years (*M* = 32.45, *SD* = 6.94, range: 22-55; Welch's *t*(117.19) = 3.04, *p* = .003). This age difference reflects the higher prevalence rates of obesity in middle age compared to younger adults in the United States (Centers for Disease Control and Prevention, 2021). In the normal weight subsample, 55% identified as male and, in the obese subsample, 54% identified as male. None of the participants identified as non-binary.

6.1.2 Measures

Emotion Regulation. Self-ratings of reappraisal and suppression use were acquired using the German (Sample 1; Abler & Kessler, 2009) and English (Sample 4; Gross & John, 2003) versions of the ERQ. Reappraisal was measured with six items (Cronbach's α = .85 / .90 for Samples 1 and 4, respectively). A sample item for reappraisal is "I control my emotions by changing the way I think about the situation I'm in". Suppression was measured with four items (α = .71 / .77), and a sample item for suppression is "I control my emotions by not expressing them".

For Sample 1, other-ratings of suppression use were constructed from the German self-rating items of the ERQ provided by Abler and Kessler (2009), which were similar to the peer-ratings used by Gross and John (2003). Unlike Gross and John (2003), who used a single item for reappraisal and suppression each, all four items of the ERQ suppression subscale were used (α = .76). Reappraisal use was not assessed by other-ratings, because this cognitive strategy is more difficult to observe than suppression (Gross & John, 2003), especially in less close relationships such as leader–follower relationships. The item stem for all four suppression items was "The supervisor who I am rating …", and a sample item is "… keeps their feelings to themself". The response format for all

versions of the scale was a 7-point Likert scale (1 = *not at all correct*, 4 = *neutral*, 7 = *completely correct*).

Successful emotion regulation was assessed with the German (Samples 1 to 3) and English versions (Sample 4) of the CoERS, which is the new six-item measure presented in Section 5.3.1. For the self-ratings, the Cronbach's α values ranged between .66 and .77 in both languages. For the German other-ratings, Cronbach's α was .85 and .88.

Self-Control. Self-control was assessed with the German adaptation (Bertrams & Dickhäuser, 2009) of the 13-item short version of the Self-Control Scale (α = .85; Tangney et al., 2004). A sample item is "I am good at resisting temptation". The items were answered on a 5-point Likert scale ranging from 1 = *not at all true* to 5 = *completely true*.

Susceptibility to Emotional Contagion. Individual susceptibility to emotional contagion was measured with three items that were loosely based on the items reported in Doherty (1997): "When someone around me is in a poor mood, my mood also suffers.", "When others around me are grumpy, my own mood suffers.", and "When someone gets upset about something, I often get upset myself." (α = .77). The scale response format used was similar to that used for self-control, with a 5-point Likert scale ranging from 1 = *not true at all* to 5 = *exactly true*.

Instrumental and Destructive Leadership. To assess instrumental and destructive leadership, other-ratings from a preliminary version of the second edition (Rowold et al., in press) of the German leadership inventory published by Rowold and Poethke (2017) were used. All items shared the item stem of "The supervisor who I am rating …" and were rated on a 5-point Likert scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*.

Active destructive leadership was assessed using the five-item destructive leadership subscale (α = .85). A sample item is "…takes their negative feelings (anger, annoyance, frustration) out on their employees."

To assess instrumental leadership, three of the four 4-item subscales were used (see Section 4.1 for the rationale behind this choice): strategy (α = .86; sample item: "…derives concrete goals and tasks for individual employees from the mission"), path-goal facilitation (α = .88; sample item: "…supports their followers in reaching their respective goals and completing their tasks."), and outcome monitoring (α = .85; sample item: "… helps their followers to learn from their previous mistakes."). The overall Cronbach's α for instrumental leadership was α = .94.

Follower Trust in the Leader. Follower trust in the leader was measured with six items from the nine-item supervisor trust subscale of the German Workplace Trust Survey (α = .90; Lehmann-Willenbrock & Kauffeld, 2010). The items were adapted to allow the use of the same gender-neutral item stem as in Rowold et al. (in press). Three items were excluded because they referred to the

leader's trust in their followers, the leader's willingness to listen to their followers, and the leader's appreciation of a follower's extra effort rather than the follower's trust in their leader. The items were answered on a 6-point, fully labeled, Likert scale ranging from 1 = *not at all true* to 6 = *completely true*.

Table 4

Overview of the Samples and Measures Used in Study 1

Measure	Sample 1 [b]	Sample 2 [c]		Sample 3 [d]		Sample 4 [d]
		t_1	t_2	t_1	t_2	
Reappraisal	LS	-	-	-	-	ES [e]
Suppression	LS + LO	-	-	-	-	ES [e]
Successful emotion regulation	LS + LO	LS + LO	LS + LO	ES + LO	ES	ES [e]
Self-control	-	-	-	ES	-	-
Emotional contagion [a]	-	-	-	-	ES	-
Instrumental leadership	LO	-	-	-	-	-
Destructive leadership	LO	-	-	-	-	-
Follower trust in the leader	ES	-	-	-	-	-

Note. LS = leader self-rating; LO = leader other-rating by followers; ES = employee self-rating. [a] Susceptibility to emotional contagion. [b] Leader–follower dyads. [c] Leaders and teams. [d] Employees. [e] English version of the scale.

Overview of the Samples and Measures. Table 4 presents an overview of the samples and measures used in Study 1. Sample 1 was mainly used to assess self-other agreement, factor structure (exploratory factor analysis), and the convergent, discriminant, and criterion validity of the CoERS with respect to leaders. Sample 2 was used to assess test-retest reliability within the leaders and the interrater agreement within teams. Sample 3 was used to examine the factor structure with confirmatory factor analyses, the test-retest reliability, and the convergent and discriminant validity with employees. Finally, Sample 4 was used to assess the convergent and discriminant validity, as well as a known-group difference in emotion regulation, with US employees.

6.1.3 Data Cleaning Procedures

When tasked with recruiting participants for a survey, some students may be tempted to provide fake data rather than recruiting genuine participants in order to receive their course credit for less effort. Additionally, well-meaning others (e.g., family members) may also provide fake data for the students, either with or without their knowledge, to help them with their studies. Therefore, my colleague Nele Hartmann and I developed an algorithm to identify cases that were likely to be fake. It should be noted that such an algorithm cannot determine authenticity with absolute certainty. Instead, our algorithm gives a score, and higher scores indicate a greater probability of the data being fake. This algorithm was only used for Sample 1, as Sample 2 did not include the relevant data for running the algorithm.

Sample 1 originally included data from 147 leader–follower dyads that completed both questionnaires. Firstly, 51 cases were excluded as having potentially fake data. Following this, eight further cases were removed as either the leader or the follower failed different attention checks in the questionnaire. Finally, three additional cases were removed because the leader indicated that they had no leadership experience. This resulted in a final sample of $N = 85$ leader–follower dyads in Sample 1.

Sample 2 initially included data from 276 team members, who were part of 71 work teams, together with data from the team leaders. Teams without leader data, teams with leaders who indicated that they had no leadership experience, and teams whose leaders failed the attention check were excluded. Similarly, inattentive team members, one team member who was not of age and thus not eligible for participation, and team members who had worked at the organization for less than half a year, were excluded. Furthermore, teams that included fewer than three team members following data cleaning were omitted. For teams that had more than three team members, three members were chosen for the analysis. In this process, to ensure that the three chosen team members knew their leaders well enough to provide accurate other-ratings, I selected those members with the fewest missing values, the longest team membership, and, in case of a tie, the most work hours per week. The final sample consisted of 62 leaders and 33 teams.

For Sample 3, only those participants who confirmed the pre-screening data provided by Prolific became part of the final sample, thus meaning that only participants who worked under a supervisor for at least 10 hours per week were included. Participants who failed attention checks, whose self-rated knowledge of German was insufficient (level B2 or lower), or whose demographic data differed between the two waves were also excluded from further analyses. Differences in demographic information can result from inattentiveness or unwillingness to provide accurate data, which are both problematic factors for data quality. Small age discrepancies of up to 1 year were

tolerated, as the participants may have become a year older between the two waves or may have forgotten that they recently had their birthday. Initially, 461 cases were available for t_1. However, this included a few individuals who had not completed the survey or had revoked their consent, as well as some duplicate cases. After data cleaning, 386 cases remained. Of the 177 participants who took part in Study 1 at t_2, 172 cases could be used. The magnitude of careless responding in Sample 3 was similar to the minimum of 10% of the cases that would be expected (Goldammer et al., 2020).

The procedure for Sample 4 was similar to that of Sample 3. Inattentive participants or those with discrepancies between their pre-screening and survey data were excluded from analyses. As for Sample 3, small age discrepancies of up to 1 year were tolerated. The percentage of excluded cases was within expectations (Goldammer et al., 2020), as the sample initially included 153 cases, of which 139 could be used for the final sample.

6.1.4 Statistical Analyses

Unless otherwise specified, analyses were performed using IBM SPSS Statistics 25 and 27. Microsoft Excel was used to identify the ranges and calculate the means of several psychometric statistics. Item difficulties were calculated with R (version 4.0.2; R Core Team, 2020), using the package performance (version 0.7.3; Lüdecke et al., 2021). McDonald's omega coefficients were estimated using the R package MBESS (version 4.8.0; Kelley, 2020).

As has been recommended for data that does not meet the assumption of multivariate normality, principal factor analysis was used for the exploratory factor analyses (cf. Costello & Osborne, 2005). Since the eigenvalues greater than one method for factor extraction is relatively inaccurate (Costello & Osborne, 2005; O'Connor, 2000), and the scree test is not always easy to interpret (O'Connor, 2000), parallel analysis and the empirical Kaiser criterion were also used. Both of these were calculated with a web application[9] provided by Braeken and van Assen (2017).

Confirmatory factor analyses were performed in R using the packages lavaan (version 0.6.7; Rosseel, 2012) for model testing and MVN (version 5.8; Korkmaz et al., 2014) for assessing multivariate normality. Chi-square difference testing for robust maximum likelihood estimation with Satorra-Bentler correction was conducted via an online calculator[10] (Colwell & Carter, 2013). This online calculator implemented the scaled difference chi-square test proposed by Satorra and Bentler (2001) in the simplified version of Satorra and Bentler (2010). This simpler version is preferable over the strictly positively scaled difference chi-square test proposed by Satorra and Bentler (2010), as

[9] https://cemo.shinyapps.io/EKCapp/
[10] https://thestatisticalmind.com/calculators/SBChiSquareDifferenceTest.htm

the strictly positive version is only necessary when the original scaled difference tests result in improper values (Pavlov et al., 2020).

Significance tests for comparing correlation coefficients were carried out using the online tool[11] provided by Lenhard and Lenhard (2014). Finally, relative weights analyses (J. W. Johnson, 2000) were conducted using the online calculator[12] described in Tonidandel and LeBreton (2015).

6.2 Results

6.2.1 Psychometric Properties and Internal Consistencies

After recoding the four reverse-coded items, the item difficulties for the leader self-ratings in Sample 1 (see Table 5) ranged from .59 to .87 with only Item 5 being easier than the commonly recommended cut-off value of .80 (Kelava & Moosbrugger, 2012). The item difficulties for the follower-ratings ranged from .58 to .77 and were thus within the recommended range. In Sample 3 (see Table 6), the item difficulties for the follower self-ratings ranged from .60 to .79 and the item difficulties for the leader other-ratings by the same followers ranged from .59 to .71 at t_1. Therefore, all item difficulties were within the recommended range in Sample 3.

Table 5

Means, Standard Deviations, Item Difficulties, Inter-Item Correlations, and Item-Total Correlations of the Six Items of the CoERS in Sample 1

Item	*M*	*SD*	P_i	1	2	3	4	5	6
1	4.75/5.40	1.94/1.80	.59/.77	(.48/.68)	.60	.35	.49	.65	.61
2	4.96/5.32	1.54/1.75	.71/.76	.32	(.50/.73)	.37	.62	.70	.59
3	4.75/4.04	1.77/1.79	.68/.58	.29	.27	(.55/.49)	.36	.53	.41
4	5.35/4.87	1.56/1.70	.76/.70	.20	.23	.47	(.35/.67)	.64	.55
5	6.08/5.35	1.27/1.79	.87/.76	.35	.48	.44	.11	(.53/.83)	.69
6	4.94/4.93	1.76/1.87	.71/.70	.49	.46	.42	.19	.41	(.59/.72)

Note. Sample 1. *N* = 85. Below the diagonal: Leader self-ratings. Above the diagonal: Leader other-ratings by followers. All items were rated on a scale from 1 to 7. Items 1, 2, 5, and 6 were recoded prior to the analyses. Values in parentheses denote corrected item-total correlations. Means, standard deviations, item-difficulties, and item-total correlations are denoted as self/other.

In Sample 1, the inter-item correlations for the self-ratings ranged between .11 and .49, with an average of .34. Only 1 of the 15 intercorrelation was outside the range of .15 to .50 that was

[11] http://www.psychometrica.de/correlation.html
[12] https://relativeimportance.davidson.edu/multipleregression.html

recommended by Clark and Watson (1995). By contrast, the inter-item correlations for the other-ratings ranged between .35 and .70, with an average of .54. In this case, 10 of the 15 inter-item correlations exceeded the upper limit of .50, indicating some redundancy of the items (Clark & Watson, 1995). In Sample 3, the inter-item correlations for the self-ratings ranged between .25 and .57, with an average of .36 and only one coefficient larger than .50. The inter-item correlations for the other-ratings ranged between .18 and .74, with an average of .50 and 9 of the 15 coefficients exceeding the upper limit of .50.

In Sample 1, the corrected item-total correlations ranged between .35 and .59 (self-ratings) and .49 and .83 (other-ratings), respectively. One self-rated item (Item 4) and three other-rated items (Items 2, 5, and 6) were outside the desirable range of .40 to .70 (Kelava & Moosbrugger, 2012), as can be seen in Table 5. In Sample 3, the corrected item-total correlations ranged from .43 to .59 (self-ratings) and from .34 to .77 (other-ratings), respectively. None of the self-rated items, but four other-rated items (Items 2, 3, 5, and 6) were outside the desirable range. However, the deviations were not grave, especially for Items 5 and 6 with corrected item-total correlations of .71 and .72, respectively.

Table 6

Means, Standard Deviations, Item Difficulties, Inter-Item Correlations, and Item-Total Correlations of the Six Items of the CoERS in Sample 3 at t_1

Item	*M*	*SD*	P_i	1	2	3	4	5	6
1	5.22/4.96	1.50/1.88	.75/.71	(.43/.66)	.74	.18	.48	.56	.57
2	4.52/4.62	1.66/1.96	.65/.66	.33	(.55/.77)	.29	.59	.61	.67
3	4.73/4.13	1.45/1.84	.68/.59	.27	.33	(.45/.34)	.39	.28	.27
4	5.56/4.91	1.14/1.62	.79/.70	.25	.45	.39	(.59/.69)	.61	.56
5	5.36/4.91	1.57/1.82	.77/.70	.27	.41	.36	.57	(.55/.71)	.66
6	4.21/4.41	1.62/1.74	.60/.63	.39	.41	.29	.36	.35	(.52/.72)

Note. Sample 3. Below the diagonal: *N* = 386 follower self-ratings. Above the diagonal: *n* = 193 leader other-ratings by followers with up to two missing values per item. All items were rated on a scale from 1 to 7. Items 1, 2, 5, and 6 were recoded prior to the analyses. Values in parentheses denote corrected item-total correlations. Means, standard deviations, item-difficulties, and item-total correlations are denoted as self/other.

The average score for the leader self-ratings (*M* = 5.14, *SD* = 1.11) did not differ significantly from the average other-rating (*M* = 4.98, *SD* = 1.41; *t*(84) = 1.08, *p* = .28, *d* = 0.13) for the leader–follower dyads in Sample 1. Therefore, the slightly higher self-ratings were not overly positive

compared to the other-ratings. For suppression, the self-ratings were also higher than the other-ratings (M = 4.09, SD = 1.24 vs. M = 3.78, SD = 1.30) and this difference was marginally significant ($t(84) = 1.98$, $p = .051$, $d = 0.24$).

As the assumptions for calculating Cronbach's α are rarely met, McDonald's ω has been proposed as an alternative measure of internal consistency (Dunn et al., 2014). As many readers are more familiar with α, both values are presented here. However, the differences in magnitude are negligible in all samples (see Table 7).

The internal consistency for the CoERS self-ratings in the German samples ranged between ω = .65 (Sample 2, t_1) and ω = .77 (Sample 3, t_1). For the other-ratings, the internal consistencies were ω = .88 (Sample 1) and ω = .86 (Sample 3). Apart from the values for Sample 2, the internal consistencies were acceptable, especially given the short length of the scale and the avoidance of nearly identical items (Streiner, 2003). As internal consistency is a necessary, but not sufficient criterion for unidimensionality (Streiner, 2003), exploratory and confirmatory factor analyses were performed.

Table 7

Internal Consistencies of the CoERS Across Samples

Sample	*N*	Rating	α	ω	95%-CI for ω
Sample 1					
	85	leader-self	.75	.76	[.61, .85]
	85	leader-other	.88	.88	[.83, .92]
Sample 2					
t_1	62	leader-self	.66	.65	[.48, .78]
t_2	60	leader-self	.66	.67	[.48, .76]
Sample 3					
t_1	386	follower-self	.77	.77	[.72, .80]
t_2	172	follower-self	.72	.73	[.64, .79]
t_1	193	leader-other	.85	.86	[.83, .89]

Note. Leader-self: leader self-ratings; leader-other: leader ratings by followers; follower-self: follower self-ratings.

6.2.2 Factor Structure

For the CoERS leader self-ratings in Sample 1, the Kaiser-Meyer-Olkin measure of sampling adequacy was .69 (thus above the commonly recommended value of .60) and Bartlett's test of sphericity was significant ($\chi^2(15) = 123.18$, $p < .001$). For the other-ratings in this sample, the corresponding values were *KMO* = .89 and $\chi^2(15) = 246.23$, $p < .001$. Therefore, exploratory factor analyses were performed despite the rather small sample size of *N* = 85 to examine whether all items loaded onto one or more factors (e.g., depending on their coding). For all analyses, principal axis factoring and promax-rotatation with Kaiser normalization (if more than one factor was extracted) were used.

Table 8

Factor Loadings and Communalities of the Six Items of the CoERS

	CoERS-Self (2 factors)			CoERS-Self (1 factor)		CoERS-Other	
	Factor loadings			Factor		Factor	
Item	Factor 1	Factor 2	Communalities	loadings	Communalities	loadings	Communalities
Item 1	.56	.02	.33	.56	.32	.73	.54
Item 2	.66	-.04	.41	.61	.37	.79	.63
Item 3	.18	.66	.60	.62	.39	.52	.27
Item 4	-.12	.71	.42	.38	.14	.72	.51
Item 5	.68	-.02	.44	.64	.41	.90	.81
Item 6	.73	.01	.53	.71	.51	.78	.60

Note. Sample 1, *N* = 85. Items 1, 2, 5, and 6 were recoded prior to the analyses, so that higher values indicate more successful emotion regulation. Correlation between the two factors in the two-factor solution: *r* = .57.

Regarding the self-ratings, the liberal (Costello & Osborne, 2005) eigenvalues-greater-than-one criterion and the scree plot suggested the extraction of two factors. With the empirical Kaiser criterion (Braeken & van Assen, 2017), two factors were extracted, but only just so, as the second eigenvalue was 1.043 and the corresponding EKC was 1.041. Parallel analysis, however, suggested the extraction of only factor.

The two-factor solution explained 45.4% of the variance and shows a clear method factor as the items loading on factor one (Items 1, 2, 5, and 6) are all reverse coded while the items loading on factor 2 (Items 3 and 4) are not, as can be seen in Table 8. Consequently, a second analysis was performed with the forced extraction of only one factor. The one-factor solution explained 35.6% of

the variance. All six items loaded substantially on the single factor, with factor loadings ranging between .38 and .71. However, the communality of Item 4 was low (.14) whereas the other communalities were above .30 (see Table 8).

For the other-ratings, all four extraction criteria suggested the extraction of a single factor that explained 56.0% of the variance. The six items loaded strongly on the single factor, with factor loadings ranging from .52 to .90 and the communalities ranged between .27 and .81 (see Table 8).

Based on the results of the exploratory factor analysis, two models were tested with confirmatory factor analyses for each version of the scale in Sample 3: In Model 1, all six items load on one factor; in Model 2, the four reverse-coded items load on one factor and the two other items load on a correlated second factor.

The assumption of multivariate normality was violated for both versions of the scale (self/other: Mardia skewness = 241.13/119.52, Mardia kurtosis = 2.54/5.17, Henze-Zirkler = 2.11/2.13, all *ps* < .001). Outlier analyses classified a large proportion of the cases as "outliers", so further data cleaning was not an option. Instead, robust maximum likelihood estimation with Satorra-Bentler correction was used for the confirmatory factor analyses.

Table 9

Confirmatory Factor Analyses for the Two Versions of the CoERS

Scale	Model	*N*	χ^2	*df*	χ^2/df	CFI	TLI	RMSEA [90%CI]	SRMR	$\Delta\chi^2$
Self		386								0.11
	Model 1		30.11***	9	3.35	.95	0.92	.08 [.05, .12]	.04	
	Model 2		29.97***	8	3.75	.95	0.91	.09 [.06, .13]	.04	
Other		188								9.23**
	Model 1		37.16***	9	4.13	.94	0.90	.14 [.09, .19]	.05	
	Model 2		28.09***	8	3.51	.96	0.93	.11 [.06, .16]	.04	

Note. Sample 3. Self-ratings refer to followers. Other-ratings refer to the followers' leaders and were only obtained from a random subset of the participants. CFI = Robust Comparative Fit Index. TLI = Robust Tucker-Lewis Index. RMSEA = Robust Root Mean Square Error of Approximation. SRMR = Standardized Root Mean Square Residual.

**p < .01. ***p < .001.

Table 9 displays the fit-indices for all four confirmatory factor analyses that were conducted (Model 1 vs. Model 2 for both the self- and the other-ratings). For the other-ratings, the RMSEA may

not be a suitable fit index due to the combination of a rather small sample size and few degrees of freedom (Kenny et al., 2015): Despite otherwise comparable fit indices, the RMSEA values for the other-ratings are much higher and the 90%-confidence intervals are much wider than those for the self-ratings. Apart from the potentially misleading values for the RMSEA, overall model fit was satisfactory for all four models (CFI: .94 to .96., TLI: 0.90 to .93, SRMR: .04 to .05).

Regarding the self-ratings, no significant difference in model fit could be found between the two models ($\chi^2(1) = 0.11$, $p = .73$). Regarding the other-ratings, the two-factor solution showed a significantly better model fit ($\chi^2(1) = 9.23$, $p = .002$), when considering the χ^2-values. For the other fit indices, the absolute differences were no larger than .02. Therefore, while some method effects due to the coding of the items occurred in Sample 1 (leader self-ratings) and 3 (other-ratings), they do not appear to be strong enough to prohibit the computation of a mean score, especially in view of the factor loadings for the confirmatory factor analyses reported in Table 10, which are all highly significant ($p < .001$).

Table 10

Factor Loadings of the CoERS-Self and CoERS-Other for the Unidimensional Models

	CoERS-Self			CoERS-Other		
Item	Factor loadings	*SE*	Standardized factor loadings	Factor loadings	*SE*	Standardized factor loadings
1	1.00		0.46	1.00		0.77
2	1.54	.20	0.64	1.16	.09	0.86
3	1.12	.17	0.53	0.45	.12	0.35
4	1.20	.17	0.72	0.79	.09	0.71
5	1.60	.21	0.69	0.96	.10	0.77
6	1.34	.17	0.56	0.95	.09	0.79

Note. Sample 3. All unconstrained factor loadings are significant at $p < .001$.

6.2.3 Reliability

The CoERS self- and other-ratings were moderately to strongly correlated in Sample 1 ($r = .45$, $p < .001$). By comparison, the self- and other-ratings of suppression were moderately correlated ($r = .36$, $p = .001$) in this sample. The inter-rater agreement (LeBreton & Senter, 2008) in Sample 2 was good with ICC(1,3) = .81 at t_1 and ICC(1,3) = .84 at t_2.

For the $n = 60$ leaders in Sample 2 who participated in both waves, the test-retest-reliability across four weeks was satisfactory, $r = .71$ ($p < .001$). A similar value was obtained for the follower

self-reports in Sample 3 across three weeks (*Mdn* = 21 days, range: 15 to 33 days): *r* = .69 (*n* = 172, *p* < .001). Strictly speaking, correlation coefficients are not fully suitable for assessing test-retest reliability, because perfect test-retest reliability not only requires a perfect correlation of 1.00, but also that the values are equal at t_1 and t_2. The second constraint means that, when plotting the values of t_1 and t_2 against each other, the values are not only on a straight line, but on the diagonal of the identity function (Aldridge et al., 2017). As recommended (Aldridge et al., 2017; Koo & Li, 2016), the ICC with a two-way mixed effects model for single measures and absolute agreement was also calculated for both samples (Sample 2: ICC = .71, 95%-CI: [.56, .81], Sample 3: ICC = .69, 95%-CI: [.60, .76]), which also indicated an acceptable test-retest reliability.

6.2.4 Convergent and Discriminant Validity

Overall, the results presented in Table 11 largely support Hypothesis 10, which predicted low to moderate correlations of successful emotion regulation with reappraisal and suppression. However, the correlations with reappraisal were statistically not significant due to the relatively small sample size. Furthermore, some of the correlations with suppression were slightly larger than expected.

Table 11

Means, Standard Deviations, Bivariate Correlations, and Internal Consistencies of the Emotion Regulation Scales Used in Sample 1.

	M	*SD*	1.	2.	3.	4.	5.
1. Reappraisal (self)	4.63	1.10	(.85)				
2. Suppression (self)	4.09	1.24	.30**	(.71)			
3. Suppression (other)	3.78	1.30	.32**	.36**	(.76)		
4. CoERS (self)	5.14	1.11	.19	.36**	.36**	(.75)	
5. CoERS (other)	4.98	1.41	.16	.22*	.38***	.45***	(.88)

Note. Sample 1, *N* = 85 leader–follower dyads. All ratings refer to the leaders' emotion regulation. Values in parentheses denote Cronbach's α.

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

No significant bivariate correlations could be observed between several demographic variables and any of the leader emotion regulation measures in Sample 1 (see Table 12), except for a small to moderate negative correlation between the hours a leader reported to work per week and self-reported reappraisal (r = -.23, p = .03). Therefore, a leader working more hours reported less reappraisal strategy use.

In particular, I could not observe any significant age or gender effects for any emotion regulation measure. However, women compared to men tended to show higher scores on reappraisal (M = 4.90, SD = 1.16 vs. M = 4.48, SD = 1.06, t(81) = 1.69, p = .09, d = 0.39, 95%-CI [-0.07, 0.84]) and lower scores on suppression (M = 3.91, SD = 1.24 vs. M = 4.20, SD = 1.26, t(81) = -0.99, p = .34, d = -0.23, 95%-CI [-0.67, 0.22]), as has been reported in the previous literature (Abler & Kessler, 2009, see also Gross & John, 2003).

Table 12

Bivariate Correlations Between Demographic Variables and Leader Emotion Regulation

	N	CoERS (self)	CoERS (other)	Reappraisal (self)	Suppression (self)	Suppression (other)
Gender (leader) [a]	83	.12	.03	-.18	.11	-.07
Age (leader)	85	.03	-.08	-.18	-.03	-.12
Weekly work hours (leader)	83	.04	-.02	-.23*	.12	-.08
Leadership experience [b]	83	-.08	-.05	-.22	-.05	-.21
Gender (follower) [a]	84	-	.19	-	-	-.05
Age (follower)	85	-	-.18	-	-	-.12

Note. Sample 1, N = 85 leader–follower dyads. Correlations between follower characteristics and leader self-rating were intentionally omitted as they provide no relevant information.

[a] 1 = female, 2 = male. Non-binary genders were excluded from analyses. [b] 2 = up to 5 years, 3 = more than 5 years.

*p < .05.

The follower self-ratings of emotion regulation with the CoERS were moderately correlated with self-control at both t_1 and t_2 (r = .44 and r = .42, respectively, ps < .001), lending support to Hypothesis 11.

Table 13

Convergent and Discriminant Validity of the CoERS in Sample 3

Variable	*N*	*M*	*SD*	1.	2.	3.	4.	5.	6.	7.
1. CoERS (follower, t_1)	386	4.93	1.02	(.77)						
2. CoERS (leader, t_1)	193	4.66	1.39	.25***	(.85)					
3. CoERS (follower, t_2)	172	4.77	0.97	.69***	.32***	(.72)				
4. Self-control (t_1)	193	3.28	0.65	.44***	.25**	.42***	(.85)			
5. Emotional contagion (t_2)	172	3.01	0.86	-.22**	-.20*	-.43***	-.24**	(.77)		
6. Age	386	3.58	7.62	.04	.11	.14	.19**	-.05	-	
7. Gender [a]	382	-	-	.10	.12	.09	.19**	.08	.12*	-
8. Nationality [b]	386	-	-	.11*	-.02	.12	-.16*	.05	-.02	-.11*

Note. Sample 3. All ratings were made by followers: CoERS (follower) refers to follower self-ratings and CoERS (leader) refers to other-ratings by the followers of their leaders. Values in parentheses denote Cronbach's α.

[a] 1 = male, 2 = female. Non-binary genders were excluded from analyses. [b] 1 = German, 0 = other

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

The factor structure of the short version of the German Self-Control Scale tends to be somewhat unstable (Bertrams & Dickhäuser, 2009), which could be confirmed with an exploratory factor analysis in Sample 3 that yielded up to three factors, depending on the extraction criteria. However, when adding the items of the CoERS to the self-control items, all six items of the CoERS loaded onto the same factor and only one item of the Self-Control Scale also loaded strongly on this factor. This item refers to one's inability to stop oneself from saying inappropriate things and is thus similar in content to Item 2 of the CoERS. Likewise, Item 2 was the only item of the CoERS with a strong cross-loading on one of the three self-control factors in the unconstrained analysis. When

forcing the extraction of two factors, none of the items of the CoERS showed a strong cross-loading on the self-control factor, which further supports the discriminant validity of the CoERS.

Susceptibility to emotional contagion was also moderately correlated with follower self-ratings with the CoERS, but unlike the effect sizes for self-control, the effect sizes were stronger for the cross-sectional correlation at t_2 (r_{t1} = -.22, p = .004, r_{t2} = -.43, p < .001). Although the first coefficient is slightly smaller than expected, the results largely support Hypothesis 12.

Again, neither age nor gender effects could be found for the CoERS. Nationality coded as 1 = German vs. 0 = other showed a small correlation with the CoERS-Self at t_1 (r = .11, p = .04) and the same effect size at t_2 (r = .12, p = .11), which was only significant at t_1 due to the smaller sample size at t_2. Therefore, Germans reported higher levels of successful emotion regulation compared to persons with other nationalities.

6.2.5 Criterion Validity

In Sample 1, both the self- and other-ratings of successful emotion regulation were significantly positively correlated with instrumental leadership as well as with follower trust in the leader (see Table 14), lending support to both Hypothesis 13 and Hypothesis 14.

Table 14

Bivariate Correlations of Leader Emotion Regulation with Instrumental and Destructive Leadership as well as Trust in the Leader (Sample 1).

Outcome	*N*	*M*	*SD*	α	CoERS (self)	CoERS (other)	z_{diff}	Reappraisal (self)	Suppression (self)	Suppression (other)
Instrumental leadership	85	3.83	0.75	.94	.33**	.68***	3.81***	.20	.20	.29**
Destructive leadership [a]	85	1.63	0.82	.85	-.32**	-.70***	-4.19***	-.03	-.10	-.11
Destructive leadership [b]	85	1.59	0.80	.81	-.27*	-.64***	-3.84***	.04	-.04	-.06
Trust in the leader	73	5.14	0.89	.90	.44***	.65***	2.16*	.05	-.02	.05

Note. Sample 1. All leadership styles are follower-ratings. The difference values refer to the differences between the correlations of the CoERS-Self and CoERS-Other with each criterion.
[a] Full scale. [b] Scale shortened by one item that explicitly refers to emotion regulation.
*p < .05. **p < .01. ***p < .001.

For the correlations between emotion regulation and active destructive leadership, I used both the full scale for destructive leadership as well as a reduced version of the scale, because one of the items explicitly refers to a leaders' lack of emotion regulation. For the shortened scale, the size of the correlations reduced significantly, but not substantially, as the magnitude of the effect sizes remained moderate and high, respectively (CoERS-Self: r = - .32 vs. r = -.27, z = -2.37, p = .009; CoERS-Other: r = -.70 vs. r = -.64, z = -3.68, p < .001). Therefore, Hypothesis 3 was supported.

Across all criteria, the other-ratings of the CoERS correlate significantly more strongly with the follower-rated criteria than the self-ratings (see Table 14). Whereas the self-ratings were moderately correlated with the criteria ($|r|$ = .27 to .44, ps < .05), the other-ratings were strongly correlated with the criteria ($|r|$ = .64 to .70, ps < .001). Interestingly, this pattern could not be observed for the self- vs. other-ratings of suppression, as the self-ratings of suppression were not significantly related to any of the criteria. Additionally, the differences in the effect sizes were not statistically significant.

6.2.6 Incremental Validity and Relative Importance

As reappraisal and suppression showed only small, non-significant, correlations with destructive leadership and follower trust in the leader, incremental validity and relative importance were only calculated for instrumental leadership. Before conducting the analyses, the correlations between the demographic variables and instrumental leadership were examined. Only the followers' age was significantly correlated with instrumental leadership (r = -.24, p = .03). Additionally, the correlation between the leaders' age and instrumental leadership was the only other effect size that was larger than $|r|$ = .10, with r = -.18, p = .11, thus leader and follower age were used as control variables.

The two control variables explained 6% of the variance in instrumental leadership (p = .07). The self-ratings of reappraisal and suppression, that were added in the second step, explained an additional 4% of the variance in instrumental leadership (p = .15), whereas the CoERS-Self, that was added in the third step, explained an additional 7% (p = .009) of the variance above and beyond the control variables, reappraisal, and suppression (Table 15).

No other-ratings for reappraisal were available, but the other-ratings of suppression explained 7% (p = .02) of the variance in instrumental leadership beyond leader and follower age. By contrast, the CoERS-Other explained an additional 35% (p < .001) of the variance in instrumental leadership above and beyond the control variables and other-rated suppression (Table 17).

Table 15

Regression of Instrumental Leadership on Self-Rated Leader Emotion Regulation

		Model 1					Model 2					Model 3				
Step	Variable	*B*	*SE*	β	*t*	*p*	*B*	*SE*	β	*t*	*p*	*B*	*SE*	β	*t*	*p*
1	Constant	4.52	0.36		12.71	< .001	3.69	0.56		6.54	< .001	3.05	0.59		5.16	< .001
	Leader age	-0.01	0.01	-.08	-0.70	.48	0.00	0.01	-.07	-0.60	.55	-0.01	0.01	-.09	-0.76	.45
	Follower age	-0.01	0.01	-.20	-1.68	.10	-0.01	0.01	-.17	-1.45	.15	-0.01	0.01	-.18	-1.52	.13
2	Reappraisal						0.08	0.08	.12	1.07	.29	0.06	0.07	.09	0.82	.42
	Suppression						0.09	0.07	.14	1.28	.20	0.03	0.07	.05	0.41	.68
3	CoERS											0.20	0.07	.29	2.68	.009
		R^2	*p*	ΔR^2	F_{diff}	p_{diff}	R^2	*p*	ΔR^2	F_{diff}	p_{diff}	R^2	*p*	ΔR^2	F_{diff}	p_{diff}
		.06	.07	.06	2.76	.07	.11	.06	.04	1.97	.15	.18	.007	.07	7.19	.009

Note. Sample 1. *N* = 85.

Table 16

Relative Weight Analysis for Self-Rated Leader Emotion Regulation and Instrumental Leadership

Variable	Raw relative weight	95% CI	Rescaled relative weight	Bias-corrected 95% CI	95% CI for comparison with the CoERS
Reappraisal	.025	[.001, .119]	18.9	[-.052, .135]	[-.238, .042]
Suppression	.020	[.001, .089]	14.9	[-.063, .085]	[-.240, .041]
CoERS	.087	[.005, .258]	66.2	[-.035, .249]	

Note. Sample 1. *N* = 85.

Table 17

Regression of Instrumental Leadership on Other-Rated Leader Emotion Regulation

		Model 1					Model 2					Model 3				
Step	Variable	*B*	*SE*	β	*t*	*p*	*B*	*SE*	β	*t*	*p*	*B*	*SE*	β	*t*	*p*
1	Constant	4.52	0.36		12.71	< .001	3.84	0.44		8.70	< .001	2.50	0.39		6.41	< .001
	Leader age	-0.01	0.01	-.08	-0.70	.48	0.00	0.01	-.06	-0.53	.60	-0.01	0.01	-.08	-0.90	.37
	Follower age	-0.01	0.01	-.20	-1.68	.10	-0.01	0.01	-.18	-1.55	.13	-0.01	0.01	-.08	-0.91	.36
2	Suppression						0.15	0.06	.26	2.46	.02	0.01	0.05	.02	0.27	.79
3	CoERS											0.34	0.05	.64	7.30	< .001
		R^2	*p*	ΔR^2	F_{diff}	p_{diff}	R^2	*p*	ΔR^2	F_{diff}	p_{diff}	R^2	*p*	ΔR^2	F_{diff}	p_{diff}
		.06	.07	.06	2.76	.07	.13	.01	.07	6.06	.02	.48	< .001	.35	53.29	< .001

Note. Sample 1. *N* = 85.

Table 18

Relative Weight Analysis for Other-Rated Leader Emotion Regulation and Instrumental Leadership

Variable	Raw relative weight	95% CI	Rescaled relative weight	Bias corrected 95% CI	95% CI for comparison with the CoERS
Suppression	.042	[.003, .120]	9.2	[-.007, .139]	[-.533, -.207]
CoERS	.416	[.246, .548]	90.9	[.269, .557]	

Note. Sample 1. *N* = 85.

Therefore, both the CoERS-Self and the CoERS-Other showed incremental variance above and beyond the ERQ (Abler & Kessler, 2009) and the other-ratings of suppression, respectively, in explaining the variance in instrumental leadership. This lends further support to the association between successful emotion regulation and instrumental leadership that was predicted by Hypothesis 13.

In addition to the hierarchical regression analyses, relative weight analyses were performed to examine the relative importance of the different measures of emotion regulation. This measure expresses the proportions of the variance in instrumental leadership that the measures explain (J. W. Johnson & LeBreton, 2004). The leader self-ratings of reappraisal and suppression contributed 19% and 15% of the variance in instrumental leadership, that was explained by the three measures of emotion regulation (R^2 = .13), and the CoERS-Self contributed 66% of this variance. However, due to the small sample size, the confidence intervals for the raw relative weights were rather wide. For the same reason, neither of the relative weights was significantly different from zero nor did the relative weights for reappraisal and suppression differ from that of the CoERS, as the bias corrected confidence intervals for hypothesis testing all included zero (see Table 16).

Table 19

Means, Standard Deviations, and Item Difficulties of the Six Items of the English Version of the CoERS

	M			*SD*			P_i		
	Total	Obese	Normal weight	Total	Obese	Normal weight	Total	Obese	Normal weight
Item 1	4.37	3.90	4.83	1.72	1.77	1.56	.56	.48	.64
Item 2	4.17	4.03	4.31	1.74	1.83	1.65	.53	.50	.55
Item 3	4.21	3.97	4.44	1.70	1.74	1.63	.53	.50	.57
Item 4	5.50	5.34	5.65	1.39	1.51	1.24	.75	.72	.77
Item 5	5.45	5.34	5.56	1.66	1.79	1.52	.74	.72	.76
Item 6	4.51	4.41	4.61	1.73	1.76	1.71	.59	.57	.60

Note. Sample 4, *N* = 139 US residents working full-time. Obese: BMI ≥ 30, *n* = 68. Normal weight: 20 ≤ BMI ≤ 24.9, *n* = 71. All items were rated on a scale from 1 to 7. Items 1, 2, 5, and 6 were recoded prior to the analyses, so that higher values indicate more successful emotion regulation.

Together, the other-ratings of suppression and the CoERS explained 46% of the variance in instrumental leadership. Suppression contributed 9% of this explained variance and the CoERS 91%. Whereas the relative weight of suppression was not significantly different from zero, the relative

weight of the CoERS was both significantly different from zero and significantly larger than the relative weight of suppression.

6.2.7 Psychometric Properties of the English CoERS

As can be seen in Table 19, the means, and thus also the item-difficulties, for all six items of the CoERS were consistently lower in the obese subsample (P_j = .48 to .72) compared to the normal-weight subsample (P_j = .55 to .77) of Sample 4. All values were within the recommended range.

As can be seen in Table 20, the inter-item correlations between the (recoded) items ranged between .13 and .56 with only the smallest and the largest coefficient being outside the recommended range of .15 to .50 (Clark & Watson, 1995). The corrected item-total correlations ranged between .31 and .58 (see Table 20) with Items 1 and 3 being below the desirable range of .4 to .7 (Kelava & Moosbrugger, 2012).

Table 20

Inter-Item Correlations and Item-Total Correlations of the Six Items of the English CoERS

	1	2	3	4	5	6
Item 1	(.34)					
Item 2	.30	(.46)				
Item 3	.16	.17	(.31)			
Item 4	.15	.35	.42	(.58)		
Item 5	.23	.40	.13	.56	(.51)	
Item 6	.30	.30	.23	.39	.38	(.49)

Note. Sample 4, *N* = 139 US residents working full-time. Items 1, 2, 5, and 6 were recoded prior to the analyses. Values in parentheses denote item-total correlations.

As can be seen in Table 21, the CoERS showed an adequate internal consistency (ω = .71, α = .71) in Sample 4, which was comparable to that of the German CoERS self-ratings in Samples 1 to 3. All intercorrelations between reappraisal, suppression and the CoERS were close to zero, except for the correlations between the CoERS and suppression in the normal weight (r = .24, p = .04) and obese (r = -.20, p = .09) subsamples, where the opposite signs of the correlation coefficients lead to a total correlation close to zero as well.

No age effects emerged for the three emotion regulation measures (see Table 22). There were no significant gender effects for the CoERS, but a weak gender effect for reappraisal and a moderate to strong effect for suppression emerged: Women had higher scores for reappraisal compared to men (M = 5.30 vs. M = 4.86, t(137) = -2.38, p = .02, d = -0.40, 95%-CI [-0.74, -0.07]),

while women scored lower on suppression compared to men (*M* = 3.67 vs. *M* = 4.73, *t*(137) = 5.26, *p* < .001, *d* = 0.89, 95%-CI [0.54, 1.24]). The gender effect for suppression was more pronounced in the normal weight group (*M* = 3.50 vs. *M* = 4.83, *p* < .001, *d* = 1.32, 95%-CI [0.80, 1.83]) than in the obese group (*M* = 3.85 vs. *M* = 4.61, *d* = 0.57, 95%-CI [0.08, 1.05]), even though the interaction effect in the corresponding ANOVA was not significant (*F*(1,135) = 1.98, *p* = .16).

Table 21

Means, Standard Deviations, Internal Consistencies, and Intercorrelation of the Emotion Regulation Scales.

Scale	*M*	*SD*	ω	Reappraisal	Suppression	CoERS
Reappraisal	5.06 [5.07/5.04]	1.10 [1.05/1.16]	.90	**.90 [.90/.90]**		
Suppression	4.25 [4.26/4.23]	1.29 [1.39/1.20]	.77	-.06 [-.07/-.05]	**.77 [.81/.74]**	
CoERS	4.70 [4.50/4.90]	1.06 [1.13/0.95]	.71	.04 [.04/.05]	-.02 [-.20/.24*]	**.71 [.73/.67]**

Note. Sample 4, *N* = 139 US residents working full-time. Values in square brackets are the corresponding values for the obese (BMI ≥ 30, *n* = 68) vs. normal weight (20 ≤ BMI ≤ 24.9, *n* = 71) subsamples. The bold diagonal values denote Cronbach's α.

*$p < .05$.

The obese subsample (*M* = 4.50, *SD* = 1.13, 95%-CI [4.22,4.77]) scored significantly lower on the CoERS than the normal-weight subsample (*M* = 4.90, *SD* = 0.95, 95%-CI [4.67, 5.12]), Welch's *t*(130.95) = -2.25, *d* = -0.38, 95%-CI [-0.72, -0.05], *p* = .03, *r* = -.19. When controlling for age, the effect remained stable (*r* = -.21, *p* = .01). Therefore, Hypothesis 15 was supported by the data. By contrast, no significant differences between the obese and the normal weight subsamples could be found for reappraisal (*M* = 5.06, *SD* = 1.04 vs. *M* = 5.04, *SD* = 1.16, Welch's *t*(136.53) = .14, *p* = .89) or suppression (*M* = 4.26, *SD* = 1.39, *M* = 4.23, *SD* = 1.19, Welch's *t*(132.24) = .15, *p* = .88).

6.2.8 Explorative Analyses

For three countries—Germany, the United Kingdom, and Poland—sample sizes were large enough to compare the means on the three CoERS measures. As can be seen in Table 23, the means for Germany and the UK were comparable in size and consistently higher than the means in the Polish subsample.

Table 22

Bivariate Correlations Between Demographic Variables and Emotion Regulation

		CoERS	Reappraisal	Suppression
	total	**.01**	**.20***	**-.41*****
Gender [a]	obese	.09	.20	-.28*
	normal weight	-.08	.20	-.56***
	total	**.06**	**.09**	**-.05**
Age	obese	.10	.18	-.06
	normal weight	.13	-.02	-.03

Note. Sample 4, *N* = 139 US residents working full-time. Obese: BMI ≥ 30, *n* = 68. Normal weight: 20 ≤ BMI ≤ 24.9, *n* = 71.

[a] 1 = male, 2 = female.

*$p < .05$. ***$p < .001$.

Table 23

Country Differences in Mean Values on the CoERS-Self and CoERS-Other

Scale	Country	*N*	*M*	*SD*	*SE*	95%-CI	*Min*	*Max*
	Germany	214	5.06	1.02	.07	[4.92, 5.20]	2.00	7.00
CoERS-Self, t1	Poland	35	4.31	.89	.15	[4.01, 4.62]	2.83	5.67
	UK	48	5.00	.92	.13	[4.74, 5.27]	2.67	6.67
	Germany	88	4.81	.97	.10	[4.61, 5.02]	2.50	7.00
CoERS-Self, t2	Poland	17	4.00	.84	.20	[3.57, 4.43]	1.67	5.00
	UK	25	4.87	.83	.17	[4.52, 5.21]	3.33	6.67
	Germany	102	4.66	1.41	.14	[4.39, 4.94]	1.00	7.00
CoERS-Other, t1	Poland	17	4.19	1.40	.34	[3.47, 4.91]	1.83	6.67
	UK	28	4.79	1.49	.28	[4.21, 5.37]	1.50	7.00

Note. Sample 3.

These descriptive differences were significant for the CoERS-Self at both t_1 ($F(2,294) = 8.62$, $p < .001$) and t_2 ($F(2,127) = 5.89$, $p = .004$), but not for the CoERS-Other ($F(2,144) = 1.03$, $p = .36$). As the assumption of equal variances was not violated (all *p*s > .42), no correction was applied to the

ANOVA. Post-hoc comparisons with the Tukey-Kramer method for unequal sample sizes for the CoERS-Self confirmed that the means for Poland were significantly lower than those for Germany (t_1: $p < .001$, t_2: $p = .003$) and the UK (t_1: $p = .005$, t_2: $p = .01$).

6.3 Discussion

The aim of Study 1 was to develop a measure for assessing successful emotion regulation within the work context with both self- and other-ratings. The initial results concerning the validation of the CoERS show satisfactory psychometric properties across four samples for the German (self- and other-ratings) and the English (self-ratings) versions of the scale. As hypothesized, the German CoERS-Self was moderately correlated with suppression, self-control, and emotional contagion, but unrelated to demographic variables, supporting the convergent and discriminant validity of the scale. For leaders, both German versions of the scale were significantly related to instrumental leadership, destructive leadership, and follower trust in the leader in the expected directions, providing evidence of criterion and incremental validity above and beyond reappraisal and suppression use. With the English CoERS self-ratings, known group differences between normal-weight and obese participants could be confirmed.

The internal consistencies of the CoERS were mostly acceptable, especially given the length of the scale and the heterogeneity of the items (Streiner, 2003). The inter-rater agreement within work teams rating their leader was good. Test-retest reliability for leader and follower self-ratings across four and three weeks, respectively, were satisfactory and similar in magnitude to the two-week test-retest reliability reported for the German ERSQ emotion regulation subscale (Berking & Znoj, 2008).

German leader self-ratings correlated moderately to strongly with follower-ratings, which is substantially higher than the estimate (based on three studies) for the correlation between self- and other-ratings of leader emotional intelligence ($\rho = .16$) reported by Harms and Credé (2010). As followers can usually observe only a limited number of work situations in which their leader is involved, leaders may base their self-ratings on a larger number of situations than their followers (Lee & Carpenter, 2018), so perfect correlations of self- and other-ratings cannot be expected.

There was only a small, statistically nonsignificant, discrepancy between the means of the leader self-ratings and the follower-ratings of the leaders, with leaders portraying themselves slightly more, but not overly positive. This may be a first indication that the careful wording of the items, which should allow a person to admit to occasional emotion regulation failures, may have been successful. Similarly, Lee and Carpenter (2018) found that self-ratings of leadership styles were not overly positive compared to follower ratings, with the notable exceptions of ethical and servant

leadership, for which the authors suggested more neutral wordings of the items to reduce the mean discrepancies.

Exploratory and confirmatory factor analyses mostly supported a unidimensional factor structure, although there was some evidence of a method factor resulting from the reverse-coded items. The CoERS-Self was significantly positively correlated with self-rated suppression both in a German sample and in the normal-weight subsample of the U.S. sample. In the German sample, the correlation with self-rated reappraisal was similar in magnitude to the one reported by Gross and John (2003), who used a one-item measure for successful emotion regulation, but statistically non-significant due to the smaller sample size. However, in the U.S. sample, the CoERS-Self and reappraisal were unrelated for both subsamples.

Even though the results from Sample 1 need to be taken with a grain of salt due to the modest sample size and potential problems with data quality (see Section 6.1.3), it is important to note that the students who recruited the participants were blind to the purposes of this study and only used the measures for reappraisal and suppression. Lindebaum and Cartwright (2010) found that only same-source, but not mixed-source ratings of leader emotional intelligence were significantly related to transformational leadership. Similarly, Harms and Credé (2010) found stronger relationships between same-source versus mixed-source correlations of leader emotional intelligence and the leadership styles transformational leadership ($\rho = .56$ vs. $\rho = .12$), contingent reward ($\rho = .35$ vs. $\rho = .13$), and laissez-faire leadership ($\rho = -.37$ vs. $\rho = -.17$). By contrast, the mixed-source correlations between the CoERS and instrumental leadership, destructive leadership, and follower trust in the leader in this study were also significantly smaller than the same-source correlations, but still moderate in size and statistically significant.

Importantly, the operationalization of emotion regulation seems to matter: Even the other- (i.e., same-source) ratings of suppression were unrelated to destructive leadership and trust in the leader, as were the self-ratings of both reappraisal and suppression. This study thus supports the notion of Spector (2006), that common methods do not automatically produce significant correlations.

Finally, as hypothesized, obese persons reported significantly lower levels of successful emotion regulation than normal weight persons, which supports previous findings that difficulties in emotion regulation may be one of the causes of obesity, because emotional eating is used as an emotion regulation strategy when a person feels unable to regulate their emotions more adaptively (Willem et al., 2019; Willem et al., 2020).

6.3.1 Strengths, Limitations, and Future Research

With the CoERS, a promising new scale for assessing successful emotion regulation within the work context is available for applied organizational studies. Of course, it is possible to infer successful emotion regulation from the flexible, adaptive use of different emotion regulation strategies in different situations (Aldao et al., 2015), for example, with experience sampling studies. However, such an approach is not feasible if the target population is under time pressure, as is often the case with leaders or with employees who juggle work and family responsibilities. Furthermore, as Barnow et al. (2020) highlighted, such studies often require a high level of introspection of the participants.

Of course, the research question determines the appropriateness of an operationalization. Especially for clinical populations, information regarding the consequences of a habitual use of certain emotion regulation strategies can be highly valuable as this permits the development of clinical interventions that enable the patient to respond more adaptively in different emotion-eliciting situations. For such studies, measures assessing emotion regulation strategy use rather than a broad measure of successful emotion regulation, such as the CoERS, are more suitable.

However, when studying potential antecedents of constructive and destructive leadership behaviors, as in Study 3, measuring habitual self-reported emotion regulation strategy use with existing measures such as the popular ERQ (Gross & John, 2003), is unlikely to yield relevant information, as has been demonstrated in this study. Likewise, organizational studies examining antecedents of leader-member exchange, organizational trust, or team climate, may benefit from including self- or other reports regarding the successful emotion regulation of relevant individuals (e.g., Gardner et al., 2009; Sy & Choi, 2013), as successful emotion regulation is key for positive social interactions (e.g., Lopes et al., 2011), especially in difficult and, thus, potentially emotion-eliciting situations such as under high work pressure.

Whereas the four independent samples—that were recruited via two different sources—are a strength of this study, student-recruited samples (Sample 1 and 2) pose several problems. First, participants may feel obligated to participate as a favor to the student who recruited them (e.g., if they are a relative or family friend), but may not be very motivated to answer accurately. Second, as students gained partial course credit for recruiting participants, some may have been motivated to fake data by completing the surveys themselves multiple times. While care was taken to deter such unethical behavior and to remove data that was likely fake, it is impossible to fully prevent such incidents while also adhering to the German data privacy laws and ensuring the anonymity of the participants. The removal of the data that was marked as probably faked by an algorithm reduced

the sample size more drastically compared to regular data cleaning that only targets inattentive participants, thereby reducing the power of the sample.

Regarding the samples recruited via Prolific, some participants may have been more motivated to receive the small monetary compensation as quickly as possible rather than to carefully answer the questions. Even though the study description for Sample 3 clearly stated that the study was about employees and their supervisors and participants were pre-filtered accordingly, not all of the participants still had supervisors at the time of their participation, and some may have answered with "yes" to the related question for fear of not receiving the compensation, so this data source is not ideal either.

Therefore, further validation studies with larger samples collected via different sources (e.g., in cooperation with large companies) are highly desirable to confirm the results of Study 1. Additionally, all relationships studied here are only correlational in nature, even if some of them were assessed by mixed-source data. As trainings for improving emotion regulation skills are available (e.g., Berking, 2010), it would be desirable to use the CoERS within an experimental training study to examine whether improvements in emotion regulation skills can be detected with this broad measure by the participants and others. Of course, the instructions for the CoERS would have to be adapted for the use in training studies, to refer to the weeks or months before and after the training.

Women and men differ in their emotion regulation strategy use (Goubet & Chrysikou, 2019; Graser et al., 2012; Zimmermann & Iwanski, 2014), which could be partially confirmed in this study. Additionally, there are sex differences in the physiological correlates of emotion regulation (Koenig & Thayer, 2016; D. P. Williams et al., 2019). However, no significant gender differences in successful emotion regulation could be found in this study. Therefore, further examinations of potential sex or gender differences in successful emotion regulation pose an interesting venue for future research. Possibly, the previous sex and gender differences are only relevant to the ways in which emotions are regulated, with different means resulting in similar results.

Potential cultural differences are another aspect which warrants further research. Matsumoto et al. (2008) reported differences in reappraisal and suppression scores for 23 countries. While the U.K. was not included, Germany scored substantially higher on reappraisal (M = 4.48, SD = 1.01, N = 110) than Poland (M = 3.24, SD = 1.00, N = 162), d = 1.23, 95%-CI: [0.97, 1.50].[13] By contrast, Germany (M = 3.53, SD = 1.05) scored lower on suppression than Poland (M = 4.40, SD = 1.37): d = -0.70, 95%-CI: [-0.95, -0.45]. Notably, the country-level cultural values power distance

[13] Cohen's d corrected for different sample sizes was calculated from the data provided in Matsumoto et al. (2008) with an online calculator (https://www.psychometrica.de/effect_size.html) provided by Lenhard and Lenhard (2016).

(i.e., the acceptance and maintenance of unequal distributions of power, Javidan & House, 2001) and collectivism (vs. individualism) were strongly positively correlated with country-level suppression (Matsumoto et al., 2008).

According to the 2004 Global Leadership and Organizational Behavior Effectiveness (GLOBE) study (GLOBE, 2004), Poland scores higher than (former West-) Germany and England on power distance (3.12 vs. 2.54 and 2.80, respectively) and higher on (in-group) collectivism (5.74 vs. 5.18 and 5.55, respectively), which would suggest higher levels of suppression according to Matsumoto et al. (2008).

The CoERS-Self followed the pattern for reappraisal, with significantly lower means in the Polish sample compared to the German sample. Matsumoto et al. (2008) argued that countries with a high power distance demand greater social order and thus greater restraint in emotion expression. Similarly, in collectivist cultures, group harmony is to be preserved while conflict is to be avoided (Javidan & House, 2001), which would also result in higher levels of expressive suppression due to cultural norms (Matsumoto et al., 2008). Therefore, the standards for successful emotion regulation may be higher in countries high in power distance and collectivism, so that the lower scores in the Polish subsample might have been caused by stricter cultural standards and not by comparatively worse emotion regulation.

Consequently, the CoERS or any other emotion regulation measure should be carefully adapted to other cultural contexts and potential cultural effects need to be considered when studying culturally mixed samples such as Sample 3 in this study. Interestingly, Ford and Mauss (2015) reported only differences for suppression, but not for reappraisal use in their review of individual and country-level cultural differences between interdependent and independent cultures.

In this study, potential biasing cultural and language effects in Sample 3 are difficult to determine due to the small subsamples from different countries. Additionally, potential cultural effects are of particular relevance for further investigations of the links between leader emotion regulation, destructive leadership, and behavioral follower outcomes, as power distance also seems to influence the effects of destructive leadership on follower behaviors (Zhang & Liao, 2015).

Theoretically, perceived authenticity is one of the mediators between leader emotional labor and follower trust in the leader in the model proposed by Gardner et al. (2009). Whereas successful emotion regulation judged by followers should not include leader surface acting that is so obvious as to be observable by others, the question remains, whether leaders who are very successful at emotion regulation such as the former German chancellor Angela Merkel—whose rare emotional speeches were always widely commented upon in the press—may be perceived as less

authentic or as too cold and thus as less effective than leaders with high, but not very high levels of emotion regulation.

6.3.2 Practical Implications

Pending further validation studies, the CoERS other-ratings might used as a brief screening measure in employee surveys. Inadequate emotion regulation in leaders appears to be related to destructive leadership, which has serious adverse effects on the followers and the organization, such as higher rates of counterproductive work behaviors and turnover intentions (Schyns & Schilling, 2013). Therefore, it may be beneficial to identify leaders who are less effective in their emotion regulation.

Several trainings exist for improving reappraisal skills (for a review, see Cohen & Ochsner, 2018). However, as successful emotion regulation at work requires the flexible use of different emotion regulation strategies that are adaptive in different work situations (e.g., Aldao et al., 2015), a more complex training approach may prove to be more effective. For example, the Affect Regulation Training (Berking, 2010; Berking & Whitley, 2014), which was initially developed for use in clinical settings, has been adapted to the work context (Berking et al., 2010; Buruck et al., 2016). The training is based on the same theoretical model as the ERSQ (Berking & Znoj, 2008), which was briefly described in Section 5.1. The modified version for the work context reported by Buruck et al. (2016) included 8 or 9 training sessions of approximately 90 minutes each, that were conducted within 8 to 12 weeks. After an introduction of the theoretical model, seven skills were trained: 1) muscle relaxation, 2) breathing relaxation, 3) nonjudgmental perception of emotions, 4) acceptance and tolerance of emotions, 5) effective self-support, meaning emotionally supporting oneself as one would support a friend, 6) analyzing the causes of one's emotions, and 7) modification of emotions. Importantly, the trainers should communicate clearly that the participants do not need to learn everything from scratch, but that they already have skills in these areas that they can build on (Berking, 2010).

Ideally, this approach could be extended to tailor the training to the specific individual training needs of non-clinical populations, which could be evaluated with the ERSQ (Berking & Znoj, 2008) in the first training session. Suggesting specific sessions to individual participants rather than expecting all participants to attend all sessions, would lower the costs for both the participants and the organization as the participants' time would not be used for training sessions of little relevance to them. Therefore, further training studies within the work context, utilizing an adaptive training approach, are highly encouraged.

6.3.3 Conclusion

In conclusion, the operationalization of successful emotion regulation within the work context not as the overall use of specific emotion regulation strategies, but by six observable indicators of emotion regulation success and failure at work, appears to be promising. Further validation studies are required to confirm the results of Study 1 due to some difficulties with data quality, but the initial results reported here show that leader emotion regulation is related to both destructive and instrumental leadership, even when using data from two different sources, illustrating opportunities for leadership development beyond traditional leadership trainings.

7 Study 2: Validation of the Successful Self-Leadership Questionnaire

In Study 2, I first examine the psychometric properties and factor structure of the self- and other-ratings of the new measure for assessing successful self-leadership, the SSLQ. After this, I examine the convergent, discriminant, and criterion validity of the SSLQ, comparing it with a traditional measure of self-leadership as self-leadership strategy use. Regarding criterion validity, I examine the relationships of leaders' self-leadership and their leadership behaviors in leading others, the followers' trust in their leader, and the follower's job satisfaction. Additionally, I examine the correlation between employees' self-leadership and well-being. Finally, I compare the levels of self-leadership of students studying different subjects (subjects that require higher math skills, such as physics, versus subjects that are high in creativity, such as drama).

With respect to convergent and discriminant validity, the first hypothesis concerns the relationship between successful self-leadership and self-leadership strategy use. Analogous to the arguments made in Study 1 regarding successful emotion regulation and emotion regulation strategy use, only a moderate correlation can be expected, despite the previous conceptualizations that equated self-leadership with self-leadership strategy use (e.g., Neck & Houghton, 2006):

Hypothesis 16: Successful self-leadership is weakly to moderately ($.15 \leq r \leq .35$) positively correlated with overall self-leadership strategy use.

As discussed in Section 3.5, self-leadership, self-control, and emotion regulation are all overlapping but distinct concepts that are included in the broad concept of self-regulation. Therefore, I expect moderate correlations between self-leadership, self-control, and emotion regulation. In previous studies, the emotional intelligence dimension of emotion regulation has been found to be moderately positively correlated with overall self-leadership strategy use in a Korean sample ($r = .33$; Kim, 2018[14]) and with the use of the three categories self-leadership strategies (behavior-focused, constructive thought pattern, and natural reward strategies) in a study by Wang et al. (2016). However, in a different study (Furtner & Rauthmann, 2010), only overall emotional intelligence, but not the dimension of emotion control was positively correlated with self-leadership strategy use.

Hypothesis 17: Successful self-leadership is moderately positively correlated with a) self-control and b) emotion regulation ($.25 \leq r\text{s} \leq .45$).

More precisely, self-leadership and self-control are more closely related on a conceptual level, than self-leadership and emotion regulation, because self-control and self-leadership both have goals as reference values and only include conscious self-regulation with similar types of self-

[14] This number is taken from Table 4 in the article, which is in English. The meaning of the article's Korean text can be roughly determined by using Google Translate.

regulation strategies. By contrast, emotion regulation also includes unconscious self-regulation processes, emotional states as reference values, and its focus is on affective and cognitive self-regulation strategies (see Section 3.5.6 for a detailed comparison of the three concepts). Therefore, I hypothesize that successful self-leadership is more closely correlated with self-control than with emotion regulation:

Hypothesis 18: The correlation between successful self-leadership and self-control is significantly larger than the correlation between successful self-leadership and emotion regulation.

If the argument made in Section 3.5.5 holds, that conscientiousness is the disposition to acquire and use self-leadership skills, successful self-leadership and conscientiousness should be moderately to strongly related, as using a skill tends to improve skill-related performance ($.45 \leq r \leq .49$ for deliberate practice of sports, music, and games; Macnamara et al., 2014). Additionally, self-leadership strategy use and conscientiousness were found to be moderately correlated in a recent meta-analysis ($\rho = .38$; Harari et al., 2021).

Hypothesis 19: Successful self-leadership is moderately to strongly positively correlated with conscientiousness ($.40 \leq r \leq .55$).

As Manz et al. (2016) argued with respect to emotional self-leadership, successful self-leadership should lead to higher well-being by creating favorable (emotional) experiences. By definition, self-leadership is successful when progress toward task completion is being made and when tasks are completed. Successful goal striving has been theoretically linked to positive affect (Lord et al., 2010) and well-being (Deci & Ryan, 2000). Additionally, the relationship between successful goal striving and increased well-being has been demonstrated in a meta-analysis (Klug & Maier, 2015).

Of course, the positive emotions associated with well-being may also lead to improved self-leadership: According to broaden-and-build theory (Fredrickson, 2004), positive emotions encourage behaviors that lead to an increase in personal resources, which may in turn increase one's ability to self-lead. Empirically, overall self-leadership strategy use was significantly positively related to psychological well-being in a Korean sample ($r = .20$; Kim, 2018[15]). Self-leadership strategy use was further negatively related to strain via higher levels of positive affect and general self-efficacy in a study by Unsworth and Mason (2012), supporting the theoretical arguments made above. Therefore, I propose the following hypothesis:

Hypothesis 20: Successful self-leadership is moderately positively correlated with general well-being ($.25 \leq r \leq .45$).

[15] See the previous footnote on Kim (2018).

To further assess criterion validity, the correlations between leader self-regulation and transactional, instrumental, and destructive leadership as well as with follower trust in the leader and follower job satisfaction are examined.

As argued in Section 4.1, leader self-leadership should promote effective leadership behaviors such as transactional leadership and instrumental leadership (Hypothesis 1) while decreasing ineffective leadership behaviors. As argued above, leaders who successfully lead themselves, should experience more positive work events. According to affective events theory (Weiss & Cropanzano, 1996; see also Section 4.3.1), the positive emotions resulting from positive work events should in turn lead to more favorable job attitudes, such as viewing their followers in a positive light or higher job satisfaction of the leaders. Consequently, the likelihood of constructive judgment-driven behaviors, such as constructive leadership behaviors, increases. When negative work events do occur, successful self-leaders should be able to deal with them more successfully than persons with a low ability to self-lead, so that negative emotions can be kept to a minimum, which reduces negative affect-driven behaviors such as active destructive leadership (Weiss & Cropanzano, 1996).

As described more in detail in Section 4.1, the previous empirical results have been mixed, with only same-source cross-sectional data resulting in positive associations between global self-leadership strategy use and transactional leadership (Furtner et al., 2013; Furtner et al., 2015), while self-regulation impairment was positively related to abusive supervision, which is a form of active destructive leadership (Collins & Jackson, 2015). Because of the difference between successful self-leadership and self-leadership strategy use, I thus base the following hypotheses mainly on the theoretical arguments presented above:

Hypothesis 21: Higher levels of (successful) leader self-leadership are associated with higher levels of transactional leadership.

Hypothesis 22: Higher levels of (successful) leader self-leadership are associated with lower levels of active destructive leadership.

As follower trust in the leader involves positive expectations regarding the leader's behavior (Rousseau et al., 1998), leaders high in self-leadership, who can be expected to complete their tasks on time and thereby keeping their word, should be perceived as more reliable and trustworthy by followers (see Bligh et al., 2006, for a similar, but more detailed argument regarding the emergence of trust in self-leading teams). Therefore, I hypothesize the following:

Hypothesis 23: Successful leader self-leadership is positively related to follower trust in the leader.

Using affective events theory (Weiss & Cropanzano, 1996) from a follower perspective (see Section 4.3.1), the behavior of a leader high in successful self-leadership should be appraised positively by a follower with similar success at self-leadership, because if their leader delivers necessary information and resources on time, the follower can continue their work as planned. By contrast, a more chaotic leader who forgets what they promised to do or takes much longer than anticipated to complete their tasks, is likely to cause disappointment, annoyance, or even frustration in followers who manage to do their part as planned, because their leader is blocking their further goal pursuit (cf. Krasikova et al., 2013).

By contrast, followers who struggle to organize and self-lead themselves, may be more understanding toward a chaotic leader and may not even notice some delays or broken promises, because they also forgot about them. Therefore, persons accustomed to a similar level of chaos should experience fewer negative emotions in reaction to such work events that are caused by the leader.

Consequently, followers should react positively to leaders with a similar level of success in self-leadership and more neutrally if the leader's level of success in self-leadership does not match their own level. According to affective events theory (Weiss & Cropanzano, 1996), these affective reactions to the leader's success or failure at self-leadership determine follower job attitudes such as job satisfaction. Therefore, I propose:

Hypothesis 24: The positive association between successful leader self-leadership and follower job satisfaction is stronger in followers who are successful self-leaders themselves.

Similar to Study 1, the final hypothesis for Study 2 also concerns a known group difference: I expect that university students who study subjects with classes that require higher mathematics need higher levels of self-leadership to succeed in their studies compared to students who study more creative subjects, that are less characterized by strict rules, because inspiration and creativity are valued more than precise results and meeting deadlines.

Hypothesis 25: Students who study subjects that require a substantive amount of higher mathematics report higher levels of successful self-leadership than students who study subjects that require high levels of creativity.

7.1 Method

As in Study 1, four independent samples were used in Study 2. The first sample included leader–follower dyads, while two other samples consisted of employees due to practical reasons. The fourth sample was used to test the known group hypothesis regarding differences in students who study different subjects and, thus, consisted of university students. As in Study 1, all samples are described in the next section (Section 7.1.1), because the results are reported together in

Section 7.2. The remaining subsections of this section provide details on the measures (Section 7.1.2), data cleaning procedures (Section 7.1.3), and statistical methods used for data analysis in this study (Section 7.1.4).

7.1.1 Samples and Procedure

Again, data for all four samples was acquired via anonymous, secure online surveys that were kept as short as possible. Due to technical problems, no instructed response items were included in the samples, but one bogus item (see Section 8.1.1) was included in the survey for Sample 2. For Samples 3 and 4, which were both recruited via Prolific, the demographic data provided by Prolific was once again compared to that collected through the surveys.

Sample 1. This sample included 81 leader–follower dyads that were recruited by students in Germany in exchange for partial course credit or partial credit toward their theses. The formal procedure for data collection was identical to that of Sample 1 in Study 1. The data collection for Sample 1 took place between April 2020 and July 2020.

The leaders in this sample were asked to provide self-ratings regarding their successful self-leadership, self-leadership strategy use, emotion regulation, and self-control. The followers were asked to indicate the extent of their trust in their leader and to provide other-ratings of leader successful self-leadership as well as of transactional, instrumental, and active destructive leadership.

Of the leaders, 67% identified as male and 33% identified as female. No leader identified as non-binary. The leaders were between 20 and 65 years old, with an average age of 46 years (M = 46.44, SD = 10.60) and they worked between 18 and 60 hours per week, with an average of 44 hours per week (M = 43.68, SD = 7.35; 2 missing values). More than half (61%) of the leaders had a university degree, 59% reported having more than five years of leadership experience (1 missing value), and more than half (62%) supervised 1 to 10 followers, 17% supervised 11 to 20 followers, and 20% supervised more than 20 followers (1 missing value).

Of the followers in this sample, 62% identified as male, 37% identified as female, and 1% (n = 1) preferred not to answer this question. The followers were between 18 and 64 years old, with an average age of 33 years (M = 33.13, SD = 13.03) and they worked between 10 and 60 hours per week, with an average of 32 hours (M = 32.01, SD = 10.66). One-third (34%) of the followers reported a university entrance qualification as their highest education level and another third (33%) had a university degree.

Sample 2. This sample consisted of N = 171 members of the general workforce who were recruited by a student for her unpublished master thesis. The student provided written consent for the use of the data for this dissertation. She collected her data between mid-March and early April 2021. In this sample, the participants rated their (successful) self-leadership and general well-being.

The majority of the participants (60%) identified as female and the remaining 40% identified as male. None of the participants identified as non-binary. The participants were between 18 and 68 years old, with an average age of 35 years (*M* = 35.23, *SD* = 13.53) and they worked between 7.5 and 65 hours per week, with an average of 37 hours per week (*M* = 37.13, *SD* = 10.96). Half of the participants (51%) had a university degree.

Sample 3. This sample is the same sample as Sample 3 of Study 1 (see Section 6.1.1). As mentioned above, the sample was randomly split for t_2. The participants who received the questionnaire for Study 2 were equally paid £0.25 for their participation in the second wave. Of the 193 persons who were eligible to participate in the second wave of Study 2, 179 (93%) completed the questionnaire at t_2, so the drop-out between the two waves was comparable to that of Study 1. Of the 179 persons who completed the questionnaire for Study 2 at t_2, 171 cases could be used.

The participants were asked to provide self-ratings of their (successful) self-leadership (at t_1 and t_2), their job satisfaction (at t_2), and their leader's (successful) self-leadership (at t_1). The (successful) emotion regulation and self-control ratings from Study 1 at t_1 were reused in Study 2.

Sample 4. This sample was also recruited via Prolific. To be eligible for participation in this study, the participants had to be at least 18 years old, enrolled at university, and part-time or full-time employed. They also had to speak German as their first language and had to have indicated their subject(s) of study to Prolific. The participants were offered £0.25 for their participation in the study. The study was advertised as "a study on personality and work behavior". The estimated completion time for potential participants was 2 minutes. The median completion time for the survey was 108 seconds. The data was collected between August 6 and August 9, 2021, almost a year after the data collection for the first wave of Sample 3. In this sample, the participants were asked to rate their conscientiousness, extraversion, agreeableness, and neuroticism, as well as their successful self-leadership at work. The field of study of the participants was acquired via the pre-screening data provided by Prolific.

The final sample included *N* = 190 students, of which *n* = 13 had also participated in Sample 3. In the entire sample, 66% identified as female, 31% identified as male, and 3% (*n* = 6) as non-binary. The participants were between 18 and 43 years old, with an average age of 24 years (*M* = 23.84, *SD* = 4.76). They worked between 2.5 and 70 hours per week, with an average of 22 hours per week (*M* = 21.87, *SD* = 13.07). The majority of the participants were German (78%) or Austrian (15%) nationals, and a minority were Swiss (3%), Italian (2%), Belgian, Serbian, or American nationals (1% each). Most of the participants lived in either Germany (75%) or Austria (16%) at the time of the study.

7.1.2 Measures

Self-Leadership. Successful self-leadership was assessed with the new measure that was presented in Section 5.3.2, the SSLQ. In Sample 1, the original 12-item version of the scale was included, but shortened to the final 5-item version of the scale (see Section 7.2 for more details). This short version was then used in the three other samples. For the 5-item self-ratings, Cronbach's α ranged between .72 and .83, and for the 5-item other-ratings, Cronbach's α was .87 and .90 in Samples 1 and 3, respectively.

Self-leadership strategy use was assessed with a 7-item version of the RLSQ-D (α = .66; Andreßen & Konradt, 2007), which was constructed as follows. First, two of the nine subscales were omitted. Evaluating beliefs and assumptions was omitted, because items such as "I think about and evaluate the beliefs and assumptions I hold." appear to be less related to completing tasks, but rather to self-regulation at higher levels. Whereas it may sometimes be useful to remind oneself of one's values (e.g., to help others) when faced with an unpleasant task (e.g., when having to clean an infected wound), merely thinking about and evaluating one's beliefs can also lead to rumination rather than action, which would not promote task completion. The subscale natural rewards was omitted, because it was unrelated to any of the school grades used to validate the RSLQ-D and only weakly correlated with the other subscales (Andreßen & Konradt, 2007).

Second, of the remaining seven subscales, one of the three items per subscale was selected. This selection was based on the factor loadings reported in Andreßen and Konradt (2007) and on the clarity of the item wordings, because the three items of each subscale were mostly similar in wording and content. The resulting 7-item scale included Items 1, 5, 7, 10, 17, 19, and 25 of the RSLQ-D (Andreßen & Konradt, 2007). The items were answered on a 5-point Likert scale ranging from 1 = *not at all true* to 5 = *always true*.

A subsample with n = 62 leaders of Sample 1 from Study 1 was used for a preliminary study to compare the 7-item version of the RSLQ-D to the 21-item version that included all items from the selected seven subscales. The internal consistencies for the 21-item and 7-item versions of the RSLQ-D in this sample were α = .89 and α = .71, respectively. The two versions of the scales were very strongly correlated (r = .95) and while the 7-item version showed slightly weaker correlations with each of the 7 subscales (r = .52 to .78) compared to the 21-item version (r = .55 to .81), only the difference for the subscale visualizing successful performance was statistically significant (z_{diff} = 2.17, p = .02; see Table 51 in Appendix C for all values).

Emotion Regulation and Self-Control. Successful emotion regulation was measured with the CoERS self-ratings (leader self-ratings: α = .70, follower self-ratings: α = .77; see Section 5.3.1). As in Study 1, self-control was assessed with the German adaptation (Bertrams & Dickhäuser, 2009) of the

13-item short version of the Self-Control Scale (leader self-ratings: α = .81, follower self-ratings: α = .85; Tangney et al., 2004). Again, the self-control items were answered on a 5-point Likert scale ranging from 1 = *not at all true* to 5 = *completely true*.

Transactional, Instrumental and Destructive Leadership. As in Study 1, other-ratings from a preliminary version of the second edition (Rowold et al., in press) of the German leadership inventory published by Rowold and Poethke (2017) were used to assess instrumental (α = .92) and active destructive leadership (α = .85). Again, the subscale instrumental leadership subscale environmental monitoring was not used here. Transactional leadership was measured with the 5-item contingent reward subscale of the leadership inventory (α = .76). All items share the item stem "The supervisor who I am rating …" and were rated on a 5-point Likert scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*. A sample item for contingent reward is "…expresses their appreciation when my performance exceeds expectations."

Follower Trust in the Leader and Job Satisfaction. Follower trust in the leader was measured with the same adapted six items of the supervisor trust subscale of the German Workplace Trust Survey (α = .92; Lehmann-Willenbrock & Kauffeld, 2010) that there also used in Study 1, using the same Likert scale.

Job satisfaction was measured with eight items (α = .85) from the job description questionnaire published by Neuberger and Allerbeck (1978). A sample item is "How satisfied are you with your colleagues?". The participants indicated their answers on a 5-point Likert scale with the scale anchors 1 = *very dissatisfied*, 2 = *dissatisfied*, 3 = *neither* [dissatisfied] *nor* [satisfied], 4 = *satisfied*, 5 = *very satisfied*.

Well-Being. General well-being was assessed with the German version (α = .82; Brähler et al., 2007) of the WHO-5 Well-Being Index (see Topp et al., 2015, for a clinical review and the current English version). The participants were asked to indicate how they had felt during the past two weeks ("Over the past 2 weeks …"). A sample item is "… I have felt cheerful and in good spirits". The five items of the measure were assessed on a 6-point Likert scale ranging from 1 = *never* to 6 = *always*[16].

Conscientiousness. Conscientiousness, extraversion, agreeableness, and neuroticism were measured with a modified version of the Big Five Inventory-SOEP (BFI-S; Schupp & Gerlitz, 2014). The subscale openness to experience was excluded from the survey, because of concerns with the content validity of the three items ("I am someone who … is original, brings forward new ideas", "… appreciates artistic experiences", "… has a lively imagination"). Five of the remaining items were double-barreled or included unnecessary repetitions (e.g., "I am someone who … is communicative,

[16] The labels of the remaining scale points were accidentally omitted.

talkative") and were thus adapted to increase the clarity of the item wordings by leaving out the aspect that was less characteristic of the underlying concept or that was more difficult to understand. The four subscales included three items each. The item stem for all items was "I am someone who …". Sample items are: "… is rather lazy" (conscientiousness, reverse-coded; α = .61), "… is talkative" (extraversion; α = .80), "… can forgive" (agreeableness; α = .26), and "… copes well with stress" (neuroticism, reverse-coded; α = .75). Because the internal consistency for agreeableness was inacceptable and all intercorrelations between the three items were low (*r* = .04 to *r* = .27), only one of the items ("… treats others in a friendly manner") was used as a one-item-measure for agreeableness. All items were rated on a 7-point Likert scale ranging from 1 = *fully disagree* to 7 = *fully agree*.

Table 24

Overview of the Samples and Measures Used in Study 2

Measure	Sample 1 [a]	Sample 2 [b]	Sample 3 [b]		Sample 4 [c]
			t_1	t_2	
Self-leadership strategy use	LS				
Successful self-leadership	LS + LO	ES	ES+LO	ES	ES
Successful emotion regulation	LS		ES		
Self-control	LS		ES		
Transactional leadership	LO				
Instrumental leadership	LO				
Destructive leadership	LO				
Job satisfaction				ES	
Follower trust in the leader	ES				
Well-being		ES			
Conscientiousness [d]					ES

Note. LS = leader self-rating; LO = leader other-rating by followers; ES = employee self-rating.
[a] Leader–follower dyads. [b] Employees. [c] Working students. [d] Agreeableness, neuroticism, and extraversion were also included.

Table 24 presents an overview of the samples and measures used in Study 2. Sample 1 was mainly used to assess the self-other agreement, factor structure (exploratory factor analysis), convergent, discriminant, and criterion validity of the SSLQ with respect to leaders. Sample 2 was used to assess the relationship between successful self-leadership and well-being in employees. Sample 3 was used to further examine the factor structure with confirmatory factor analyses, and the test-retest reliability, convergent, discriminant, and criterion validity in employees. Finally, Sample 4 was used to assess convergent and discriminant validity as well as a known group difference in a working student sample.

7.1.3 Data Cleaning Procedures

The algorithm for detecting potentially fake data that was mentioned in Study 1 could not be used in Sample 2 as not enough suitable data for such analyses was available for this sample. Therefore, the algorithm was only used in Sample 1.

Sample 1 initially included data from 135 leader–follower dyads with completed questionnaires for both leaders and followers. Forty-seven cases were excluded as having potentially fake data. Two cases were excluded, because the leaders indicated that they did not have any leadership experience. Two further cases were excluded, because of followers with inattentive answering patterns, and three additional cases were excluded, because the followers worked less than 10 hours per week for their leader and were thus not eligible for participation in the study. This last condition was introduced, because the followers who worked less than 10 hours per week may not have had enough opportunities to observer their leader to provide accurate other-ratings. Therefore, the final sample size was *N* = 81 leader–follower dyads.

Sample 2 originally included data from *N* = 177 completed questionnaires. Three cases were excluded, because they failed to answer the bogus item (attention check) correctly. One case was excluded, because the person had indicated that they were not yet of age and two were excluded, because they did not provide their age, resulting in a final sample size of *N* = 171. The data cleaning procedure for Sample 3 was described in Study 1 (see Section 6.1.3).

For Sample 4, *N* = 200 questionnaires were completed. Two cases were excluded due to inconsistent data regarding their gender and one case was excluded because of age discrepancies of more than a year. Additionally, five cases were excluded because they indicated that they currently did not work, which was contrary to the study eligibility criteria and pre-screening data. One case each was excluded because they could answer less than four of the self-leadership items or because they were not currently enrolled at university, resulting in a final sample of *N* = 190.

7.1.4 Statistical Analyses

Unless otherwise specified, analyses were performed using IBM SPSS Statistics 27. As in Study 1, Microsoft Excel was used to identify the range and to calculate the means of several psychometric statistics. Item difficulties were calculated with R (version 4.1.2; R Core Team, 2021), using the package performance (version 0.8.0; Lüdecke et al., 2021). McDonald's omega coefficients were estimated using the R package MBESS (version 4.8.1; Kelley, 2020).

Again, principal factor analysis was used for exploratory factor analyses with a combination of the eigenvalues greater than one method, the scree test, parallel analysis, and the empirical Kaiser criterion as extraction criteria. For the latter two, the web application[17] provided by Braeken and van Assen (2017) was used. Confirmatory factor analyses were performed in R, using the packages lavaan (version 0.6.9; Rosseel, 2012) for model testing and MVN (version 5.9; Korkmaz et al., 2014) for assessing multivariate normality. Chi-square difference testing for robust maximum likelihood estimation with Satorra-Bentler correction was conducted via the same online-calculator[18] (Colwell & Carter, 2013) as in Study 1. Significance tests for comparing correlation coefficients were calculated using the online tool[19] provided by Lenhard and Lenhard (2014). Relative weights analyses (J. W. Johnson, 2000) were conducted using the online calculator[20] described in Tonidandel and LeBreton (2015). The moderator analysis was performed using the SPSS macro PROCESS (version 3.5; Hayes, 2018).

7.2 Results

Before conducting any further analyses, the SSLQ was shortened from 12 to 5 items, due to poor psychometric properties of the original scale in Sample 1. For example, as can be seen in Appendix D, 16 of the 66 inter-item-correlations for the leader self-ratings in this sample were smaller than .15 and thus outside the recommended range of .15 to .50 (Clark & Watson, 1995). As can be further seen in Table 25, the item means for all of the reverse-coded items were lower than the lowest item mean for the positively coded items for both the self- and the other-ratings. Additionally, the results of the exploratory factor analyses in Sample 1 were not satisfactory, as is described in Section 7.2.1.

7.2.1 Factor Structure

In Sample 1, the Kaiser-Meyer-Olkin measure of sampling adequacy was .74 and Bartlett's test of sphericity was significant ($\chi^2(66) = 301.64$, $p < .001$) for the (leader) self-ratings and the corresponding values for the other-ratings were *KMO* = .78 and $\chi^2(66) = 332.97$, $p < .001$. Therefore, I

[17] https://cemo.shinyapps.io/EKCapp/
[18] https://thestatisticalmind.com/calculators/SBChiSquareDifferenceTest.htm
[19] http://www.psychometrica.de/correlation.html
[20] https://relativeimportance.davidson.edu/multipleregression.html

conducted exploratory factor analyses with all 12 items, despite the rather small sample size of *N* = 81. As in Study 1, principal axis factoring and promax-rotatation with Kaiser normalization (if more than one factor was extracted) were used.

Table 25

Means and Standard Deviations for the Original 12-Item Versions of the Successful Self-Leadership Questionnaire

		Self-ratings		Other-ratings	
Item	Coding	*M*	*SD*	*M*	*SD*
1	+	5.86	1.25	5.70	1.44
2	-	4.46	1.68	5.13	1.76
3	-	3.88	1.87	4.85	1.90
4	+	5.98	1.24	6.09	1.17
5	+	5.94	1.39	6.07	1.54
6	-	5.34	1.74	5.20	1.95
7	-	4.10	1.70	4.67	1.80
8	+	5.38	1.53	5.43	1.73
9	-	4.58	1.68	5.11	1.79
10	+	5.93	1.36	5.63	1.42
11	-	4.43	1.82	5.26	1.91
12	-	5.16	1.68	4.76	1.99

Note. Sample 1, *N* = 81 leader self-ratings and leader ratings by followers. The five positively coded items were used for the 5-item version of the scale.

Regarding the self-ratings, the eigenvalues-greater-than-one criterion, the scree plot, and the empirical Kaiser criterion (Braeken & van Assen, 2017), suggested the extraction of three factors, while parallel analysis suggested the extraction of two factors. However, the three-factor solution rendered no clearly interpretable factors. When forcing the extraction of two factors, the items mostly loaded onto a factor that was defined by their coding (reverse-coded vs. not). For the other-ratings, parallel analysis suggested the extraction of one factor, while the other three criteria suggested three factors. However, the extraction of three factors failed due to a Heywood case.

As these results were not satisfactory, and it is not advisable to perform empirical item selection based solely on only one rather small sample, I once more discussed the items with colleagues who were familiar with the concept of self-leadership. The goal of this discussion was to

identify the items that were at the same time most central to the operationalization of successful self-leadership and easiest to understand. As the reverse-coded items were clearly not interpreted as opposites of the positively coded items, all reverse-coded items were excluded in this process.

Re-running the exploratory factor analyses for the five-item versions of the scale resulted in a one-factor solution for both the self- and other-ratings which was supported by all four extraction criteria. The single factor explained 51.4% of the variance in the self-ratings and 59.8% of the variance in the other-ratings. Both the self-rated and the other-rated items loaded substantially on their factors, with factor loadings ranging between .57 and .82 (self-ratings) and .61 and .89 (other-ratings), respectively. The communalities were also satisfactory, with a minimum value of .33 (see Table 26 for all values).

Table 26

Factor Loadings and Communalities of the Five Items of the SSLQ for the One-Factor Solutions

		SSLQ-Self		SSLQ-Other	
Item	Item	Factor loadings	Communalities	Factor loadings	Communalities
1	I know exactly, which jobs (that I am involved in) are due in the near future.	.64	.41	.70	.50
2	I (almost) always manage to meet my deadlines.	.82	.67	.89	.80
3	I am (almost) always on time.	.57	.33	.61	.37
4	I am very well-organized.	.81	.66	.83	.70
5	I take care of any important jobs right away if I can.	.71	.50	.79	.63

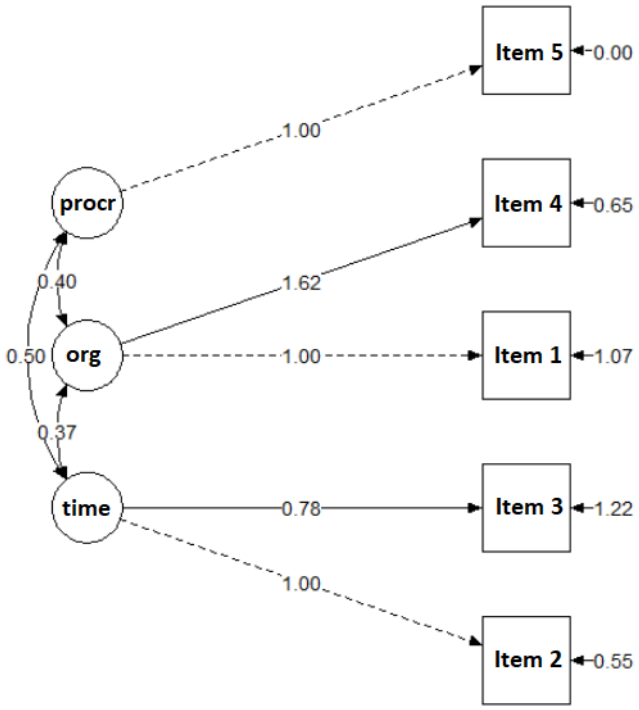
Note. Sample 1, *N* = 81 leader–follower dyads. Both the self- and the other-ratings refer to the leaders' self-leadership. SSLQ = Successful Self-Leadership Questionnaire.

As the sample size of Sample 1 was barely sufficient for exploratory factor analyses even for the final 5-item version of the SSLQ, Sample 3 was used to test this unidimensional model of the scale with confirmatory factor analyses. Despite the small number of items, a three-factor alternative model based on item content was created (see Figure 5): Item 5 refers to (not) procrastinating and creates a single-item factor, as none of the other items also refers to procrastination. The Items 1 and 4 refer to keeping an overview about one's current and upcoming tasks and to being well-organized, respectively, so they were theorized to load onto a common

"being organized" factor. Finally, the Items 2 and 3 refer to meeting one's deadlines and to being punctual, so these were theorized to load onto a time management factor (see Table 26 for the exact item wordings).

Figure 5

Alternative Measurement Model for the Successful Self-Leadership Questionnaire



Note. Sample 3. procr = procrastination, org = being organized, time = time management. The depicted values refer to the self-rating version of the questionnaire.

The assumption of multivariate normality was violated for both versions of the scale (self/other: Mardia skewness = 475.38 / 129.85, Mardia kurtosis = 15.33/ 5.19, Henze-Zirkler = 5.60 / 3.54, all *ps* < .001) in Sample 3. As in Study 1, outlier analyses classified a large proportion of the cases as outliers, so further data cleaning was not an option. Instead, robust maximum likelihood estimation with Satorra-Bentler correction was used for the confirmatory factor analyses.

As can be seen in Table 27, overall model fit was good for all four models ($\chi^2/df < 1.8$, CFI: ≥ .99, TLI: ≥ 0.97, RMSEA: ≤ .05, SRMR: ≤ .03). Furthermore, no significant differences in model fit could be found between the two models for both the self-ratings ($\chi^2(2) = 1.56$, $p = .46$) and the other-ratings ($\chi^2(2) = 5.38$, $p = .07$). Therefore, the unidimensional model, which is nested in the three-dimensional model and has fewer parameters that need to be estimated, can be kept. For

both the self- and other-ratings, all five items loaded significantly onto the single factor of the unidimensional model (see Table 28).

Table 27

Confirmatory Factor Analyses for the Two Versions of the Successful Self-Leadership Questionnaire

Scale	Model	*N*	χ^2	*p*	*df*	χ^2/df	CFI	TLI	RMSEA [90%CI]	SRMR	$\Delta\chi^2$
Self		376									1.56
	Model 1		6.67	.25	5	1.33	.99	0.99	.04 [.00, .10]	.03	
	Model 2		5.19	.16	3	1.73	.99	0.97	.05 [.00, .12]	.03	
Other		188									5.38
	Model 1		6.66	.25	5	1.33	1.00	0.99	.05 [.00, .13]	.02	
	Model 2		1.18	.76	3	0.39	1.00	1.01	.00 [.00, .10]	.01	

Note. Sample 3. Self-ratings refer to followers. Other-ratings refer to the followers' leaders and were only obtained from a random subset of the participants. CFI = Robust Comparative Fit Index. TLI = Robust Tucker-Lewis Index. RMSEA = Robust Root Mean Square Error of Approximation. SRMR = Standardized Root Mean Square Residual.

Table 28

Factor Loadings for the Five-Item SSLQ-Self and SSLQ-Other for the Unidimensional Models

	SSLQ-Self			SSLQ-Other		
Item	Factor loadings	*SE*	Standardized factor loadings	Factor loadings	*SE*	Standardized factor loadings
1	1.00		0.49	1.00		0.72
2	1.14	.19	0.65	1.21	.12	0.86
3	0.92	.17	0.44	1.14	.12	0.76
4	1.55	.22	0.72	1.22	.13	0.84
5	1.22	.17	0.63	1.25	.10	0.85

Note. Sample 3. All unconstrained factor loadings are significant at $p < .001$. SSLQ = Successful Self-Leadership Questionnaire.

7.2.2 Psychometric Properties and Internal Consistencies

The item difficulties for the leader self-ratings in Sample 1 (see Table 29) ranged from .77 to .85 and the item difficulties for the follower-ratings ranged from .78 to .86. In both cases, four of the five items were easier than the commonly recommended cut-off value of .80 (Kelava &

Moosbrugger, 2012). In Sample 3 (see Table 30), the item difficulties for the follower self-ratings ranged from .77 to .87, again with four items that were too easy. The item difficulties for the leader other-ratings by the followers ranged from .70 to .76 at t_1. and were thus very similar to each other, but within the recommended range of .20 to .80.

In Sample 1, the inter-item correlations between the SSLQ-Self items ranged between .32 and .64, with an average of .50 and with 6 of the 10 intercorrelations being larger than .50 and thus outside the recommended range of .15 to .50 (Clark & Watson, 1995). Similarly, the inter-item correlations between the SSLQ-Other items ranged between .36 and .75, with an average of .59, and 8 intercorrelations above .50 (see Table 29). In Sample 3, the inter-item correlations among the SSLQ-Self items ranged between .23 and .46, with an average of .34. By contrast, the inter-item correlations among the SSLQ-Other items ranged between .36 and .75, with an average of .59, and 8 of the 10 coefficients being larger than .50 (see Table 30).

Table 29

Means, Standard Deviations, Item Difficulties, Inter-Item Correlations, and Item-Total Correlations of the Five Items of the Successful Self-Leadership Questionnaire in Sample 1

Item	*M*	*SD*	P_i	1	2	3	4	5
1	5.85/5.66	1.25/1.52	.84/.82	(.58/.64)	.65	.36	.60	.58
2	5.95/6.03	1.25/1.28	.85/.86	.51	(.74/.81)	.54	.69	.75
3	5.93/5.94	1.39/1.63	.85/.86	.32	.57	(.51/.58)	.61	.44
4	5.37/5.46	1.52/1.83	.77/.78	.64	.60	.38	(.72/.78)	.63
5	5.89/5.74	1.39/1.36	.84/.82	.37	.59	.42	.62	(.64/.72)

Note. Sample 1. *N* = 81. Below the diagonal: leader self-ratings. Above the diagonal: leader other-ratings by followers (*n* = 68 due to listwise deletion). All items were rated on a scale from 1 to 7. Values in parentheses denote corrected item-total correlations. Means, standard deviations, item-difficulties, and item-total correlations are denoted as self/other.

In Sample 1, the corrected item-total correlations ranged between .51 and .74 (self-ratings) and .58 and .81 (other-ratings), respectively. None of the values were below .40, but two self-rated items and three other-rated items were above .70 and thus outside the desirable range (Kelava & Moosbrugger, 2012), as can be seen in Table 29. In Sample 3, the corrected item-total correlations ranged from .38 to .58 (self-ratings) and from .68 to .81 (other-ratings), respectively at t_1. Therefore, the values for the self-rated items were within the desirable range of .40 to .70, while the other-

ratings displayed some redundancy in the items as only one item was below .70 and only narrowly so (.68). All values for Sample 3 can be viewed in Table 30.

Table 30

Means, Standard Deviations, Item Difficulties, Inter-Item Correlations, and Item-Total Correlations of the Five Items of the Successful Self-Leadership Questionnaire in Sample 3 at t_1

Item	*M*	*SD*	P_i	1	2	3	4	5
1	5.65/5.15	1.20/1.54	.81/.74	(.42/.68)	.59	.50	.62	.64
2	5.99/5.29	1.03/1.56	.85/.75	.27	(.53/.81)	.70	.71	.72
3	6.08/5.32	1.24/1.66	.87/.76	.27	.31	(.38/.71)	.63	.62
4	5.41/4.91	1.26/1.60	.77/.70	.38	.46	.31	(.58/.79)	.73
5	5.83/5.34	1.14/1.62	.83/.76	.29	.44	.23	.46	(.50/.80)

Note. Sample 3 at t_1. Below the diagonal: follower self-ratings (*n* = 376 due to listwise deletion). Above the diagonal: leader other-ratings by the same followers (*n* = 188). All items were rated on a scale from 1 to 7. Values in parentheses denote corrected item-total correlations. Means, standard deviations, item-difficulties, and item-total correlations are denoted as self/other.

The average score for the SSLQ-Self (*M* = 5.80, *SD* = 1.05) did not differ significantly from the other-rating (*M* = 5.80, *SD* = 1.20; *t*(80) = -0.3, *p* = .98, *d* = -0.00) for the leader–follower dyads in Sample 1, indicating that the self-ratings were not overly positive compared to the other-ratings.

As in Study 1, both McDonald's ω and Cronbach's α are presented here, even though the differences in magnitude are again negligible in all samples (see Table 31). The internal consistency for the SSLQ self-ratings ranged between ω = .71 (Sample 3, t1) and ω = .84 (Sample 1) and were thus overall acceptable. For the other-ratings, the internal consistencies were good: ω = .86 (Sample 1) and ω = .90 (Sample 3).

7.2.3 Reliability

The SSLQ self- and other-ratings were only moderately correlated in Sample 1 (*r* = .30, *p* = .006). For the *n* = 171 employees in Sample 3 who participated in both waves, the test-retest reliability across three weeks was acceptable, with *r* = .72 (*p* < .001). As in Study 1, the ICC with a two-way mixed effects model for single measures and absolute agreement was also calculated: ICC = .72, 95%-CI: [.64, .79], which also indicates an acceptable test-retest reliability. For the 13 persons who participated in both Sample 3 and Sample 4, the one-year (50 weeks) test-retest reliability was *r* = .48 (*p* = .10, ICC = .46, 95%-CI [-.07, .80]).

Table 31

Internal Consistencies of the Successful Self-Leadership Questionnaire Across Samples

Sample	*N*	Rating	α	ω	95%-CI for ω
Sample 1					
	81	leader-self	.83	.84	[.72, .92]
	68	leader-other	.87	.86	[.76, .92]
Sample 2	167	follower-self	.72	.72	[.62, .80]
Sample 3					
t_1	376	follower-self	.72	.71	[.65, .75]
t_2	168	follower-self	.75	.76	[.69, .81]
t_1	188	leader-other	.90	.90	[.88, .93]
Sample 4	182	follower-self	.74	.73	[.65, .79]

Note. Leader-self: leader self-ratings; leader-other: leader ratings by followers; follower-self: follower self-ratings.

7.2.4 Convergent and Discriminant Validity

In Sample 1, the SSLQ self-ratings of the leaders correlated only weakly with self-leadership strategy use (r = .17, p = .23), while the other-ratings were unrelated to self-leadership strategy use (r = -.04, p = .77). Therefore, Hypothesis 16, which predicted a low to moderate correlation between successful self-leadership and self-leadership strategy use, received only weak support from the same-source correlation (which is within the predicted range of .15 ≤ r ≤ .35, but not significant), but was not supported by the mixed-source correlation.

As can be seen in Table 32, self-leadership strategy use was unrelated to self-control (r = .01, p = .94) and significantly negatively correlated with successful emotion regulation (r = -.33, p = .02) in Sample 1. By contrast, self-rated successful self-leadership correlated significantly positively with both self-control and successful emotion regulation, which were also self-rated, for both leaders and followers. For self-control, the correlations were even slightly stronger than the moderate (.25 ≤ r ≤ .45) correlation predicted in Hypothesis 17: r = .52 and r = .46 (ps < .001), while the same-source correlations between successful self-leadership and emotion regulation fell mostly within the predicted range (also .25 ≤ r ≤ .45), with r = .24 to r = .31 (ps < .05). However, the mixed-source correlations between successful self-leadership and self-control (r = .15, p = .17) and emotion regulation (r = .12, p = .30) were smaller than predicted and not statistically significant. Therefore, Hypothesis 17 could only partially be supported.

Table 32

Correlations Between Different Measures of Self-Leadership and Self-Ratings of Self-Control and Emotion Regulation.

Self-leadership measure	*M*	*SD*	Self-control	Emotion regulation
Sample 1				
Self-leadership strategy use (leader self-ratings)	3.51	0.66	.01	-.33*
SSLQ (leader self-ratings)	5.80	1.05	.52***	.25*
SSLQ (other-ratings by followers)	5.80	1.20	.15	.12
Sample 3				
SSLQ (t_1) (follower self-ratings)	5.79	0.80	.46***	.24***
SSLQ (t_2) (follower self-ratings)	5.76	0.86		.31***

Note. SSLQ = Successful Self-Leadership Questionnaire. In Sample 3, emotion regulation was measured at t_1 and self-control was only measured in the subsample for Study 1, while the SSLQ was only presented to the subsample for Study 2 at t_2, so no correlation between self-control and the SSLQ at t_2 could be calculated.

*$p < .05$. **$p < .01$. ***$p < .001$.

Hypothesis 18 predicted that the correlation between successful self-leadership and self-control would be significantly larger than that between successful self-leadership and (successful) emotion regulation, which was supported by the same-source correlations in Sample 1 ($z = 2.22$, $p = .01$) and Sample 3 ($z = 2.87$, $p = .002$).

Sample 4 was used to test Hypothesis 19, which predicted a moderate to strong ($.40 \leq r \leq .55$) correlation between successful self-leadership and conscientiousness. Hypothesis 19 was supported by the data, as self-leadership and conscientiousness were strongly correlated, $r = .51$ ($p < .001$). Successful self-leadership was further unrelated to both extraversion ($r = .00$, $p = .99$) and neuroticism ($r = -.10$, $p = .18$), but moderately positively correlated with agreeableness ($r = .31$, $p < .001$), providing further evidence of the discriminant validity of the SSLQ self-ratings.

Table 33

Gender Differences in Successful Self-Leadership

	Women		Men						
Sample	*M*	*SD*	*M*	*SD*	*t*	*df*	*p*	*d*	95%-CI
1	5.99	0.88	5.70	1.13	1.13	79	.26	0.27	[-0.20, 0.73]
2	5.86	0.92	5.69	0.86	-1.25	169	.21	-0.20	[-0.50, 0.11]
3 (at t_1)	6.06	0.71	5.62	0.81	-5.34	328.82	< .001	-0.56	[-0.78, -0.35]
3 (at t_2)	6.06	0.83	5.61	0.83	-3.40	167	.001	-0.55	[-0.87, -0.22]
4	5.56	1.01	5.42	0.90	-0.89	182	.37	-0.14	[-0.45, 0.17]

Note. The opposite signs for the *t*-values and for Cohen's *d* are due to different codings of gender in different samples.

Table 34

Bivariate Correlations Between Demographic Variables and Leader Self-Leadership

Demographic variable	Self-leadership strategy use (self-ratings) [c]	Successful self-leadership (self-ratings) [d]	Successful self-leadership (other-ratings) [d]
Gender (leader) [a]	.04	-.13	.06
Age (leader)	-.19	.12	.16
Weekly hours (leader)	.15	.22*	.10
Leadership experience [b]	-.12	.03	.18
Gender (follower) [a]			-.10
Age (follower)			-.12

Note. Sample 1, *N* = 81 leader–follower dyads. Correlations between follower characteristics and leader self-ratings were intentionally omitted as they provide no relevant information.

[a] 1 = female, 2 = male. [b] 2 = up to 5 years, 3 = more than 5 years. [c] *n* = 54 to 55. [d] *n* = 79 to 81.

*$p < .05$.

Women consistently scored slightly, but not significantly, higher on self-rated successful self-leadership in Samples 1, 2, and 4 and in Sample 3, this gender difference was significant at both t_1 and t_2 (see Table 33). Furthermore, no significant bivariate correlations could be observed between several demographic variables and any of the leader self-leadership measures in Sample 1, except

for a small to moderate positive correlation between the hours a leader reported to work per week and self-reported successful self-leadership (r = .22, p = .047). Therefore, a leader working more hours reported slightly more success at self-leadership (see Table 34 for all values) in Sample 1. Likewise, there were no significant (linear) age effects (r_{t1} = .06, p = .21, r_{t2} = .10, p = .18) in Sample 3.

7.2.5 Criterion Validity

As predicted by Hypothesis 20, (self-rated) successful self-leadership was significantly positively correlated with general well-being, with a moderate (.25 ≤ r ≤ .45) effect size of r = .29, p < .001, in Sample 2.

Table 35

Bivariate Correlations of Leader Self-Leadership with Contingent Reward, Instrumental and Destructive Leadership, and Trust in the Leader (Sample 1).

Outcome	*M*	*SD*	α	RSLQ [a] (self)	SSLQ (self)	SSLQ (other)	z_{diff}	Self control (self)	Emotion regulation (self)
Contingent reward [a]	3.89	0.67	.76	.13	.29*	.42***	0.87	.32*	.22
Instrumental leadership [a]	3.81	0.68	.92	.22	.30*	.44***	0.95	.23	.22
Destructive leadership	1.49	0.68	.85	.12	-.13	-.38**	-1.97*	-.08	-.27*
Trust in the leader	5.19	0.84	.92	.02	.16	.56***	3.37***	.22*	.23*

Note. Sample 1. RSLQ = Revised Self-Leadership Questionnaire; SSLQ = Successful Self-Leadership Questionnaire. N = 81 unless otherwise indicated. All leadership styles are follower-ratings. The difference values refer to the differences between the correlations of the self- and other-ratings of the SSLQ with each criterion.

[a] n = 55.

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

In Sample 1, self-rated self-leadership strategy use showed only weak correlations with other-rated contingent reward (r = .13, p = .35), instrumental leadership (r = .22, p = 12), and active destructive leadership (r = .12, p = 39), that were not statistically significant. Additionally, the correlation with destructive leadership had a positive, rather than a negative sign. By contrast, self-ratings of successful self-leadership were moderately positively correlated with contingent reward

(r = .29, p = .03) and instrumental leadership (r = .30, p = .02), supporting Hypothesis 1 and Hypothesis 21. The mixed-source correlations of successful self-leadership with destructive leadership (r = -.13, p = .26) and follower trust in their leader (r = .16, p = .15) were too small to reach statistical significance in this rather small sample, so that Hypothesis 22 and Hypothesis 23 were not supported by the mixed-source data. When using only the follower ratings (i.e., same-source data), all four hypotheses mentioned in this paragraph were supported (see Table 35), with a particularly strong relationship between follower perceptions of a leader's success in self-leadership and follower trust in their leader (r = .56, p < .001).

Table 36

Relative Weight Analysis for Self-Rated Leader Self-Regulation and Other-Rated Contingent Reward

Variable	Raw relative weight [95% CI]	Rescaled relative weight	Bias-corrected 95% CI	95% CI for comparison with the SSLQ
RSLQ	.02 [.001, .120]	13.6	[-.16, .11]	[-.18, .07]
SSLQ	.04 [.003, .180]	24.8	[-.13, .17]	-
Self-control	.06 [.002, .201]	38.4	[-.11, .21]	[-.08, .17]
Emotion regulation	.04 [.002, .169]	23.2	[-.11, .18]	[-.18, .15]

Note. Sample 1. N = 55. R^2 = .16. RSLQ = Revised Self-Leadership Questionnaire; SSLQ = Successful Self-Leadership Questionnaire.

As in Study 1, I performed relative weight analyses to examine the relative importance of the four different measures of leader self-regulation of self-leadership strategy use, successful self-leadership, self-control, and successful emotion regulation. Due to the small sample size, none of the relative weights differed significantly from zero. Likewise, no significant differences between the relative weight of successful self-leadership and any of the three other self-regulation measures could be found for any of the criteria (see Table 36 to Table **39**).

Self-control predicted 38% of the variance in contingent reward that was explained by all four measures of leader self-regulation (R^2 = .16). Successful self-leadership contributed 25%, emotion regulation 23%, and self-leadership strategy use only 14% of this variance (see Table 36).

Table 37

Relative Weight Analysis for Self-Rated Leader Self-Regulation and Other-Rated Instrumental Leadership

Variable	Raw relative weight [95% CI]	Rescaled relative weight	Bias-corrected 95% CI	95% CI for comparison with the SSLQ
RSLQ	.06 [.00, .19]	31.1	[-.24, .14]	[-.14, .15]
SSLQ	.05 [.00, .20]	27.4	[-.26, .10]	-
Self-control	.03 [.00, .11]	14.0	[-.27, .03]	[-.16, .04]
Emotion regulation	.05 [.00, .17]	27.5	[-.22, .11]	[-.18, .14]

Note. Sample 1. $N = 55$. $R^2 = .18$. RSLQ = Revised Self-Leadership Questionnaire; SSLQ = Successful Self-Leadership Questionnaire.

Table 38

Relative Weight Analysis for Self-Rated Leader Self-Regulation and Other-Rated Destructive Leadership

Variable	Raw relative weight [95% CI]	Rescaled relative weight	Bias-corrected 95% CI	95% CI for comparison with the SSLQ
RSLQ	.009 [.00, .07]	11.6	[-.04, .14]	[-.10, .09]
SSLQ	.011 [.00, .08]	13.1	[-.05, .15]	-
Self-control	.002 [.00, .01]	2.9	[-.09, .05]	[-.12, .03]
Emotion regulation	.059 [.00, .18]	72.5	[-.01, .22]	[-.05, .19]

Note. Sample 1. $N = 55$. $R^2 = .08$. RSLQ = Revised Self-Leadership Questionnaire; SSLQ = Successful Self-Leadership Questionnaire.

By contrast, self-control contributed the smallest part (14%) of the variance in instrumental leadership that was explained by all measures (R^2 = .18). Self-leadership strategy use contributed the largest portion of this variance (31%), closely followed by emotion regulation (28%) and successful self-leadership (27%; see Table 37).

Regarding destructive leadership, emotion regulation contributed by far the largest share (73%) of the variance explained by the four measures (R^2 = .08), followed by successful self-leadership (13%), self-leadership strategy use (12%) and self-control (3%; see Table 38).

Finally, regarding follower trust in the leader, successful self-leadership and self-leadership strategy use contributed little to the variance explained by all four measures (R^2 = .09), as they only contributed 2% and 4% of this variance. Emotion regulation contributed 50%, while self-control contributed the remaining 35% (see Table 39).

Table 39

Relative Weight Analysis for Self-Rated Leader Self-Regulation and Follower Trust in the Leader

Variable	Raw relative weight [95% CI]	Rescaled relative weight	Bias-corrected 95% CI	95% CI for comparison with the SSLQ
RSLQ	.004 [.00, .02]	4.3	[-.09, .04]	[-.13, .06]
SSLQ	.010 [.00, .06]	1.9	[-.09, .08]	-
Self-control	.031 [.00, .15]	35.1	[-.03, .16]	[-.04, .20]
Emotion regulation	.044 [.00, .16]	49.7	[-.04, .18]	[-.07, .19]

Note. Sample 1. N = 55. R^2 = .09. RSLQ = Revised Self-Leadership Questionnaire; SSLQ = Successful Self-Leadership Questionnaire.

In summary, it appears that self-ratings of successful self-leadership are more relevant for the task-focused leadership styles of contingent reward and instrumental leadership, which is operationalized as mostly task-focused in this dissertation, and less so for destructive leadership and follower trust, despite the strong correlation between follower perceptions of successful leader self-leadership and trust.

Hypothesis 24, which proposed that the positive association between successful leader self-leadership and follower job satisfaction is stronger in followers who are successful self-leaders themselves, was tested in Sample 3. The interaction effect between leader and follower successful self-leadership was statistically significant and explained an additional 5% of the variance in follower job satisfaction (ΔR^2 = .05, p = .002; see Table 40 for the regression results).

Whereas the effect[21] of leader self-leadership on follower job satisfaction was negative and nonsignificant at low levels of follower self-leadership (e.g., θ = -0.14, p = .18, at X = 3.2), the effect was positive and significant at an average level of follower self-leadership (e.g., θ = 0.11, p = .007, at X = 5.29) and grew larger for high levels (e.g., θ = 0.32, p < .001, at X = 7.00). Therefore, Hypothesis 24 was supported, as can also be seen in Figure 6.

Table 40

Follower Self-Leadership as a Moderator of the Relationship Between Leader Self-Leadership and Follower Job Satisfaction

Predictor	*B*	95% CI	*SE*	*t*	*p*
Intercept	5.56	[3.21, 7.91]	1.19	4.68	< .001
Leader self-leadership (t_1)	-0.53	[-0.98, -0.85]	0.23	-2.35	.02
Follower self-leadership (t_1)	-0.51	[-0.92, -0.10]	0.21	-2.45	.02
Leader self-leadership * follower self-leadership	0.12	[0.05, 0.20]	0.04	3.15	.002

Note. Sample 3. N = 171. R^2 = .19.

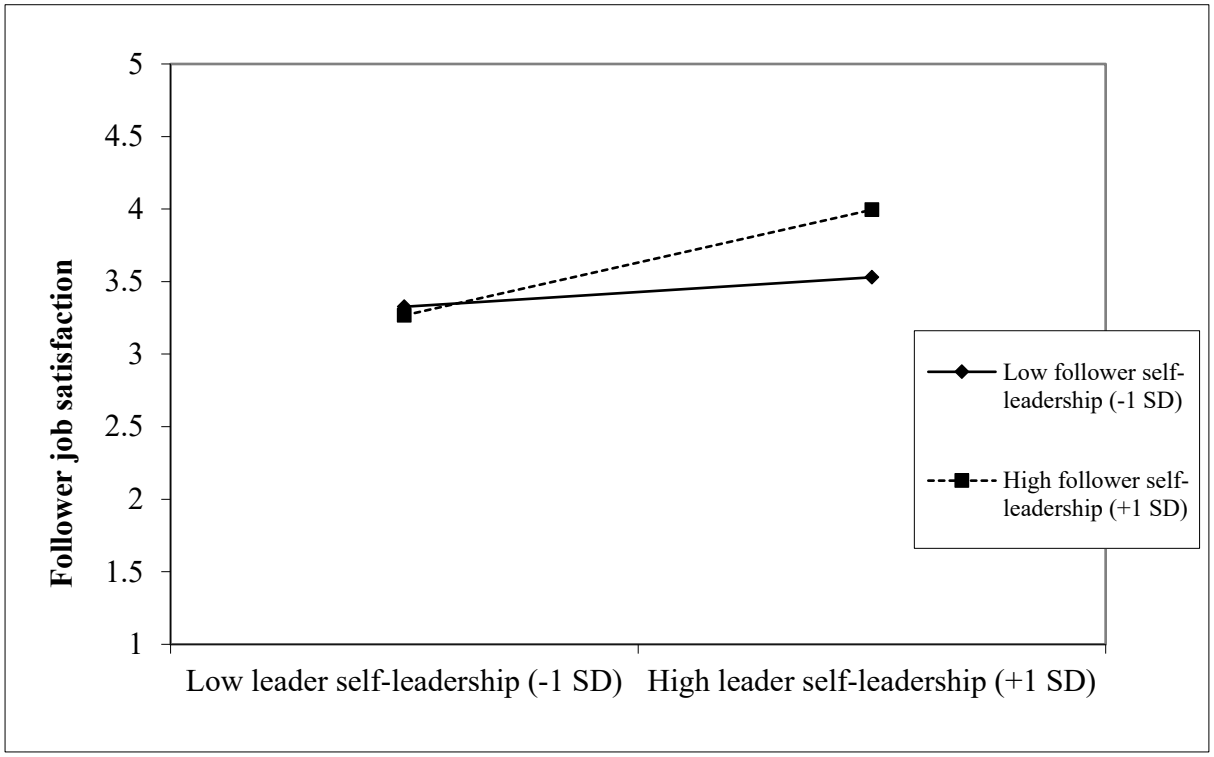
The final hypothesis, Hypothesis 25, stated that students who study subjects that require a substantive amount of higher mathematics report higher levels of successful self-leadership than students who study subjects that require high levels of creativity. Among the subjects represented in Sample 4, mathematics, computer science, engineering, and physics were classified as subjects with high mathematics requirements. The subjects art/design, communication/media, music, and theater/dramatic arts were classified as creative subjects. The subjects accounting, agriculture, archaeology, architecture, biology, business, chemistry, geography, languages, law, marketing, medicine, pharmacology, politics, psychology, social work, sociology, theatre/dramatic arts, travel and tourism (including related subjects) were not used for the group comparison[22].

[21] $\theta = b_1 + b_3M$ where $\hat{y} = b_1X + b_2M + b_3XM + e_y$, with X as the independent variable and M as the moderator variable, see Hayes (2018) for more details.

[22] When using a different categorization of "high attention to detail", meaning all subjects that require higher mathematics, but also subjects such as law and accounting, vs. creative subjects, the results were very similar.

Figure 6

Conditional Effect of Leader Self-Leadership on Follower Job Satisfaction



This classification resulted in *n* = 32 students in the higher mathematics group and *n* = 27 students in the creative subjects group. As hypothesized, students in the higher mathematics group reported significantly higher values in successful self-leadership (*M* = 4.95, *SD* = 0.86 vs. *M* = 4.44, *SD* = 0.85, *t*(57) = 2.26, *p* = .03, *d* = 0.59, 95% CI [0.07, 1.11]). Interestingly, the two groups did not differ in their self-rated conscientiousness (*M* = 4.95, *SD* = 1.17 vs. *M* = 4.94, *SD* = 0.82, *t*(57) = 0.04, *p* = .97, *d* = 0.01, 95% CI [-0.50, 0.52]), providing further support for the distinctness of successful self-leadership and conscientiousness.

7.3 Discussion

The aim of Study 2 was to begin the validation of a new measure for assessing successful self-leadership, the SSLQ, within the work context across four samples. Therefore, this study attempted to answer the call for improved measures of self-leadership by Furtner et al. (2013). The original 12-item version of the scale could not be retained, but the shortened 5-item SSLQ showed satisfactory psychometric properties and a unidimensional factor structure.

In Sample 1, the internal consistencies for the self-ratings were somewhat higher than in the other samples, which could be due to the fact that leaders are often under time-pressure, so they may spend less time on answering each item individually, or because the sample was used to

support item selection, leading to a slight over-fitting to the data. However, the internal consistencies were acceptable (> .70) in all samples.

Leader self-ratings and follower ratings of the leaders were moderately correlated and thus similar to the magnitude of self-other agreement for ratings of leadership styles (Lee & Carpenter, 2018). Additionally, leaders did not rate themselves more positively than their followers. The test-retest reliability of the SSLQ self-ratings across three weeks was acceptable and very similar in magnitude to the results for the successful emotion regulation scale (CoERS) that was examined in Study 1.

Only the self-, but not the other-ratings of successful self-leadership showed a weak, non-significant correlation with self-reported self-leadership strategy use, so the relationship between the two types of self-leadership measures was even weaker than expected. Perhaps successful self-leaders use different strategies from those that were included in the short measure that I used to assess self-leadership strategy use. Additionally, the different indicators of self-leadership success, as measured by the SSLQ, may require a flexible use of different self-leadership strategies. For example, the strategies visualizing success, discussing problems with oneself, or knowing how well one is at doing their job are likely to be of little use for someone who struggles to arrive at meetings on time.

Adding to previous concerns about the RSLQ (Furtner et al., 2013), the short version of the RSLQ that was used in this study was unrelated to self-control and negatively rather than positively correlated with successful emotion regulation. By contrast, the new measure of successful self-leadership showed the expected correlation patterns at least for same-source ratings, with strong positive correlations with self-control and low to moderate positive correlations with emotion regulation. However, the mixed-source correlations were smaller than predicted and statistically non-significant.

As expected, successful self-leadership was strongly positively correlated with conscientiousness. Additionally, the SSLQ correlated moderately positively with agreeableness, but was unrelated to extraversion or neuroticism, providing further support of the convergent and discriminant validity of the scale. By comparison, a meta-analysis based on 4 to 16 samples per personality dimension reported that self-leadership strategy use moderately correlated with conscientiousness and extraversion, while the correlation with agreeableness was low to moderate and neuroticism was unrelated to self-leadership (Harari et al., 2021). S. Williams (1997) argued that the associations between extraversion and optimism (e.g., Kam & Meyer, 2012) as well as self-efficacy (e.g., Barańczuk, 2021) should lead to a positive association between extraversion and self-leadership. However, high levels optimism can also prevent an individual from disengaging from an unreachable goal on time (Carver & Scheier, 1998), thereby lowering the chances for successful self-

regulation and successful self-leadership. This may explain why self-leadership strategy use has been found to be correlated with extraversion (Harari et al., 2021), but not successful self-leadership in this study.

Regarding criterion validity, the SSLQ was significantly related to general well-being, as was hypothesized. Successful self-leadership was moderately positively associated with both other-reported contingent reward and (task-focused) instrumental leadership. These findings demonstrate that leader self-leadership can be empirically associated with leadership behaviors using mixed-source data. Previous studies using mixed-source data for examining the relationships between leader self-leadership strategy use and leadership styles reported mostly non-significant or even counterintuitive results (Brown & Fields, 2011; Crossen, 2015; Furtner et al., 2013). In this study, self-reported self-leadership strategy use was also unrelated to other-reported contingent reward and (task-focused) instrumental leadership.

Regarding destructive leadership and follower trust in their leader, however, the mixed-source relationships were not significant for either self-leadership measure. Instead, (self-rated) leader emotion regulation was significantly related to both (other-rated) criteria, and it also had the largest relative weights for these two criteria. Consequently, successful self-leadership may be more relevant to task-focused leadership styles, while successful emotion regulation is more relevant to more affective outcomes such as (affective) trust and active destructive leadership (which can be considered to be affect-driven behavior, as described above).

Nevertheless, the other-ratings of successful self-leadership were significantly correlated with both active destructive leadership and follower trust in their leader in the expected directions. Therefore, the followers' perceptions of the dependability of their leaders may matter to the followers. Additionally, follower ratings of their leader's degree of successful self-leadership were associated with higher levels of follower job satisfaction, but only for followers who scored at least moderately high on successful self-leadership themselves. Therefore, person-environment fit within the work context may be higher for persons who view their leader as similarly well organized and successful at completing tasks as themselves.

Finally, the hypothesized group differences between students studying subjects requiring a substantial amount of higher mathematics vs. students who studied creative subjects could be confirmed. Students who were enrolled in the first group of subjects reported significantly higher levels of successful self-leadership than those enrolled in the second group of subjects.

7.3.1 Strengths, Limitations, and Future Research

To my knowledge, this study presents the first attempt at operationalizing successful self-leadership not as self-leadership strategy use, but by using indicators of self-leadership success.

Unfortunately, all of the reverse-coded indicators had to be excluded from the analyses due to psychometric problems. In some cases, the item wordings of similar, positively coded items were clearer, so that the exclusion is justifiable and does not considerably narrow the content of the scale. Another excluded item referred to sometimes forgetting appointments if not reminded by others, which may be too specific as to apply to many persons. However, three other aspects of the initial 12-item version of the scale are currently missing in the final scale: a) the feeling of constantly reacting to demands made by others rather than feeling in control of one's work, b) one's inability to say "no" to demands made by others that one does not want to fulfill, and c) the habit of beginning too many tasks at once. Perhaps new items for these aspects could be developed and included in future studies to avoid a too narrow conceptualization of successful self-leadership. After this, the performance of such an extended scale could be compared with the basic five-item SSLQ that was presented in this study.

The inclusion of additional items is also desirable because the item difficulties were quite similar in this study, which decreases the ability of the scale to differentiate between different levels of successful self-leadership (Kelava & Moosbrugger, 2012) and because the other-ratings showed some degree of redundancy such as high intercorrelations and high item-total correlations.

The same limitations that were mentioned in Study 1 regarding the use of student-recruited samples and samples recruited via Prolific or similar services apply to Study 2. Therefore, additional validation studies with samples from more reliable data sources are needed to develop the SSLQ further. Once the scale is fully developed, experimental training studies are advisable for testing the scale further. The issue of non-regulation vs. successful regulation is less relevant for measuring successful self-leadership than for measuring successful emotion regulation as virtually anyone has tasks of some sort or another that they need to complete while at work.

An additional limitation of this study is that the correlation between successful self-leadership and agreeableness is based on a single item as the internal consistency of the subscale was inacceptable. Moreover, openness to experience was not included in the questionnaire, because of a lack of content validity for the measure and several items for the Big Five were modified for improved clarity. Despite the wide use of Big Five measures not only in organizational research, all freely available German scales for the Big Five that I could identify in the literature suffer from similar problems with the item wordings or item content (especially for, but not limited to, the facet of openness to experience). It would, thus, be highly desirable to solve these fundamental problems by developing an existing scale further and to re-validate it before using the scale to validate a new measure such as the SSLQ.

In all samples, women scored higher on the SSLQ compared to men, although these differences were mostly not statistically significant due to their small to moderate effect sizes. Whereas Furtner et al. (2013) found no significant sex differences for self-leadership strategy use, gender differences in successful self-leadership may indeed exist. Women on average not only perform more household chores than men (Leopold et al., 2018), but emerging evidence also suggests that women in heterosexual partnerships are also performing more so-called *life-admin* (Emens, 2015) or cognitive household management tasks than their partners (Daminger, 2019). This includes tasks such as ensuring a consistent supply of groceries and other necessary household items, keeping track of and coordinating the couple's or family's appointments, planning repairs or vacations, and managing hired help such as babysitters or house cleaners (Daminger, 2019). Combining the two fields of self-leadership within the work context and life admin within the private domain may be a fruitful avenue for future research, as the skills developed by performing life admin tasks can be relevant in jobs that require self-leadership skills and that vice versa, improved self-leadership skills may help persons to become more effective when dealing with life admin. Qualitative studies on life admin may be able to identify additional self-leadership strategies than can be used in future self-leadership trainings, if the strategies can be applied in a variety of different contexts.

Interestingly, the hypothesized group differences between students studying subjects requiring a substantial amount of higher mathematics vs. students who studied creative subjects could be confirmed for successful self-leadership, but no such effect could be found for conscientiousness. Regarding succeeding at completing tasks (i.e., successful self-leadership), moderate levels of conscientiousness may actually be more desirable than very high levels of conscientiousness, because very high levels of conscientiousness may be associated with perfectionism (see Smith et al., 2019, for a meta-analysis). Perfectionism, in turn, has been found to be associated with lower efficiency at task completion (Stoeber, 2011; Stoeber & Eysenck, 2008). Therefore, very high levels of conscientiousness or perfectionism may impede successful self-leadership and it might be useful to analyze non-linear relationships between these concepts.

A final avenue for future research is the question whether the person-environment fit effect found for leaders and followers regarding their level of successful self-leadership (with matching high levels predicting higher levels of follower job satisfaction) extends to work teams. For example, anecdotal evidence abounds, that persons who are successful self-leaders tend to take over tasks from less capable or unwilling others within a team to prevent poor team results or missed deadlines (e.g., Hall & Buzwell, 2013). Such behaviors likely first emerge within the school context, persist at college or university, and later occur at work.

Whereas such behavior may be comfortable for the other team members as they need to work less, it often causes frustration in those who are better at self-leadership than their peers or colleagues, because they feel that they would be better off doing the work on their own or because they feel obliged to do more than they should have to (Hall & Buzwell, 2013; Kerr, 1983). Likewise, the other team members may also feel that their contributions or willingness to contribute (once a deadline approaches) is not appreciated by their colleague, which can cause frustration on their part. In support of this, it has been previously argued that members of work teams should have similar levels of conscientiousness to reduce team conflict and to increase team performance (S. E. Humphrey et al., 2007).

7.3.2 Practical Implications

Pending the confirmation of these preliminary findings, practitioners may find it useful to consider hiring workers with a similar level of self-leadership skill as the leaders, and maybe even as the co-workers, to increase follower job satisfaction and thereby the followers' performance (Bowling et al., 2015; Judge et al., 2001).

As self-leadership is an acquirable skill, the negative impact of differences in conscientiousness within an existing work team (S. E. Humphrey et al., 2007) might be mitigated by improving the self-leadership skills of those scoring low on conscientiousness. In fact, this group is also the most likely to benefit from self-leadership training (Stewart et al., 1996). Given the positive association between successful self-leadership and general well-being in this study, self-leadership training (see van Dorssen-Boog et al., 2021, for a recent example) may also have personal benefits, which could be communicated to potential participants to increase the motivation for participation.

As already remarked in Study 1 for emotion regulation trainings, self-leadership trainings should ideally be tailored to the specific training needs of the participants to foster motivation and to lower training costs for the organization. Additionally, as Stewart et al. (2019) highlighted, self-leadership can rarely be taught in a single training session and should always be accompanied by organizational support to apply the skills that were learned in a training session on the job.

7.3.3 Conclusion

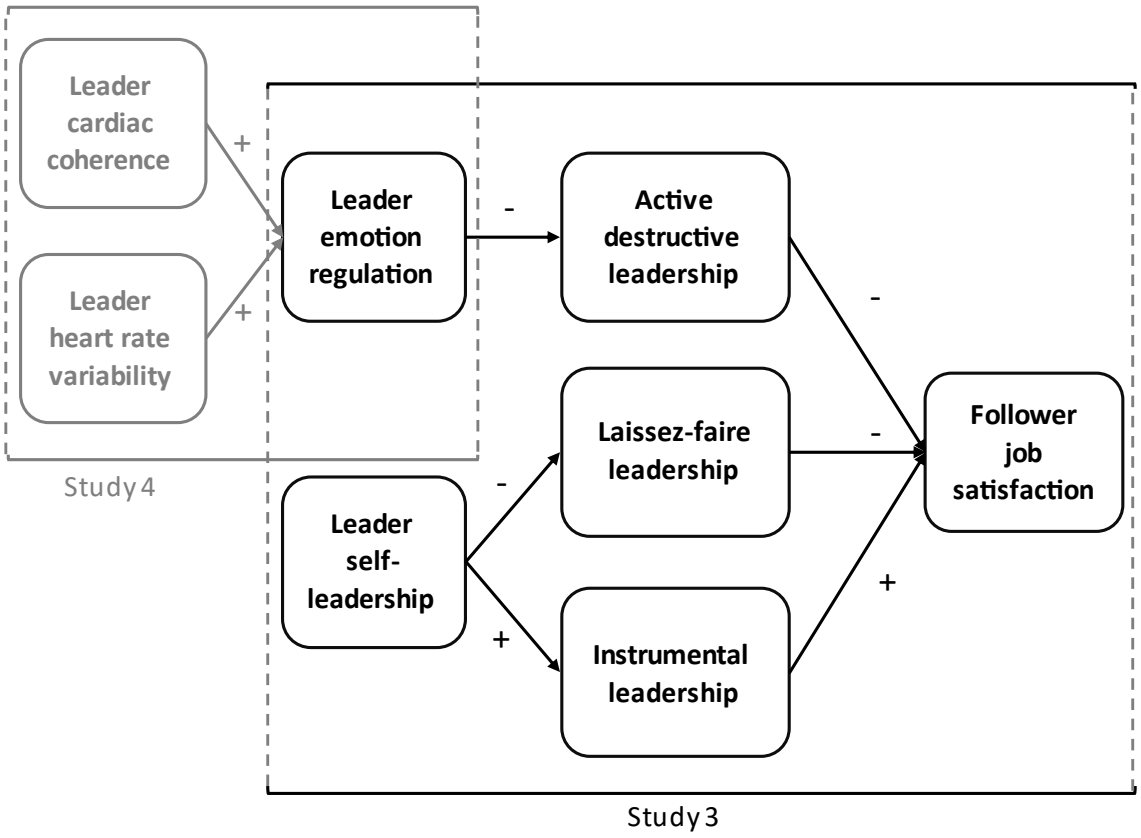
In summary, the operationalization of self-leadership by the five indicators of self-leadership success used in this study seems to be an improvement of self-leadership measurement compared to the operationalization as self-leadership strategy use. However, further validation studies are needed to corroborate the findings and it is strongly suggested that the current scale is extended to include additional aspects of self-leadership success prior to further validation attempts. Future studies addressing potential person-environment fit effects regarding successful self-leadership between leaders and followers as well as within work teams are also encouraged.

8 Study 3: Leader Self-Regulation, Leadership, and Follower Job Satisfaction

After developing measures for successful emotion regulation and successful self-leadership in Studies 1 and 2, these new measures were used to test the research model developed in Chapter 4, which links leader emotion regulation and self-leadership to active and passive destructive as well as instrumental leadership and follower job satisfaction (see Figure 7).

Figure 7

Research Model for Study 3



8.1 Method

8.1.1 Sample and Procedure

Study 3 was a cross-sectional correlational study with two data sources: Leaders provided ratings on their emotion regulation and self-leadership, while followers rated their leaders' active destructive, laissez-faire, and instrumental leadership as well as their own job satisfaction. The final sample consisted of *N* = 315 leader–follower dyads that were recruited by students in Germany in exchange for partial course credit or partial credit toward their bachelor theses.

To be eligible for participation in the study, both leaders and followers had to be at least 18 years old, had to have worked together for at least six months, and had to work at least 10 hours per

week for the organization they shared. The formal procedure for data collection was identical to that of Sample 1 in Study 1. The data collection took place between September 2020 and May 2021.

My colleague Nele Hartmann and I developed three bogus items for this study to identify inattentive participants: “I am currently filling in a questionnaire (and I am reading all of the questions).”, “I have never been on the internet before. (Thank you for reading attentively.)”, and “My mother was born on February 30 (which is impossible, of course, but unfortunately, some persons do not read everything).”. The items were answered on Likert scales with variations of “not at all true” to “completely true” as scale anchors that matched the Likert scales of the surrounding items. As the “correct” responses to the bogus items covered both ends of the scale, persons who routinely agreed or disagreed with all of the items, always selecting the same endpoint of the Likert scales, could not pass the attention checks.

The bogus items used here were more neutrally worded than those reported in Meade and Craig (2012), as completely nonsensical items might confuse participants, especially in non-student samples. The short explanations in parentheses were added to inform participants why these items were included and to provide hints on which answer to choose for the bogus items. Several participants gave unsolicited feedback on the attention checks in the (optional) comment field at the end of the survey, which was uniformly positive (e.g., “nice attention checks”, “made me laugh”).

Breitsohl and Steidelmüller (2018) found that common attention checks such as bogus items and instructed response items did not substantially alter response behaviors, with bogus items having the smallest impact on response behaviors on other items. Meade and Craig (2012) also strongly endorsed the use of bogus or instructed response items, suggesting that three such items are sufficient for identifying most inattentive participants whereas more than three might annoy participants.

Of the leaders, 67% identified as male and 33% identified as female. No leader identified as non-binary. The leaders were between 21 and 67 years old, with an average age of 44 years (M = 43.64, SD = 10.54). They worked between 10 and 75 hours per week, with an average of 44 hours per week (M = 44.29, SD = 8.95). Two leaders provided unrealistically high values of 100 hours and 168 hours in response to this question, which may have been typing errors (e.g., a missing decimal separator), so the two values were treated as missing values. One leader chose not to answer this question. More than half of the leaders (60%) had a university degree (one missing value) and 61% indicated that they had more than five years of leadership experience. Almost half of the leaders (48%) supervised 1 to 10 followers, 26% supervised 11 to 20 followers, and the remaining 26% supervised more than 20 followers.

Of the followers, 57% identified as female and 43% identified as male. No follower identified as non-binary. The followers were between 18 and 66 years old, with an average age of 34 years (M = 33.66, SD = 11.69). They worked between 10 and 55 hours per week, with an average of 33 hours (M = 32.84, SD = 10.98). One-third (33%) of the followers reported a university degree, 28% reported a university entrance qualification, and 26% completed vocational training as their highest education level.

8.1.2 Measures

Emotion Regulation and Self-Leadership. Successful emotion regulation was measured with the CoERS, which was described in Section 5.3.1 and Study 1 (see Chapter 6). Cronbach's α for the leader self-ratings was acceptable with α = .71. Successful self-leadership was assessed with the five-item SSLQ that was presented in Section 5.3.2 and Study 2 (see Chapter 7). Cronbach's α for the leader self-ratings was acceptable with α = .77.

Laissez-Faire, Instrumental and Active Destructive Leadership. As in Study 1, other-ratings from a preliminary version of the second edition (Rowold et al., in press) of the German leadership inventory published by Rowold and Poethke (2017) were used to assess instrumental (α = .93) and active destructive leadership (α = .82). As in Study 1 and 2, the instrumental leadership subscale of environmental monitoring was not used here. Laissez-faire leadership was measured with the 4-item subscale of the same leadership inventory (α = .86). Again, all items share the item stem "The supervisor who I am rating …" and were rated on a 5-point Likert scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*. A sample item for laissez-faire leadership is "…delays responding to urgent questions."

Follower Job Satisfaction. As in Study 2, job satisfaction was measured with eight items (α = .86) from the job description questionnaire published by Neuberger and Allerbeck (1978). The same 5-point Likert scale that was used in Study 2 was also used here.

8.1.3 Data Cleaning Procedures

The initial sample included N = 519 leader–follower dyads with completed questionnaires for both leaders and followers that could be matched via a pseudocode. After removing potentially faked data with the same algorithm that was used in Study 1 and Study 2, n = 408 leader–follower dyads remained. Five dyads took part twice, for whom I kept the more recent data. Fifty-nine dyads were excluded as either the leader or the follower (or both) in the dyad failed to answer correctly to the bogus items described above. Five further dyads were excluded, because either the leader or the follower worked less than 10 hours per week. Six other leaders claimed that they had no leadership experience, so their dyads were excluded as well. Seventeen dyads were excluded, because they did not fulfill the eligibility criterion of having worked together for six months or more. Finally, one

person commented that their company was English-speaking only, that they barely knew any German and had to use Google Translate for filling in the survey, so the corresponding dyad was also excluded. Therefore, the final sample size was *N* = 315.

While this reduction in sample size may seem drastic, the algorithm identified fewer cases as potentially faked in this sample than in the Samples 1 of Studies 1 and 2. Additionally, the number of inattentive participants in the remaining sample was within the expected range for survey studies (Goldammer et al., 2020), especially given that the inattentiveness of either the leader or the follower was enough to exclude the entire dyad.

8.1.4 Statistical Analyses

Unless otherwise specified, analyses were performed using IBM SPSS Statistics 27. Structural equation modeling was performed in R (version 4.1.2; R Core Team, 2021), using the packages lavaan (version 0.6.9; Rosseel, 2012) for model testing and MVN (version 5.9; Korkmaz et al., 2014) for assessing multivariate normality. Chi-square difference testing for robust maximum likelihood estimation with Satorra-Bentler correction was conducted via the same online-calculator[23] (Colwell & Carter, 2013) as in Studies 1 and 2.

8.2 Results

Table 41 reports the descriptive statistics (where applicable) and intercorrelations between the demographic and study variables. Of the demographic variables, only the leaders' and followers' education level as well as follower gender were significantly correlated with any of the dependent variables (i.e., leadership styles and follower job satisfaction). When regressing follower job satisfaction on these three demographic variables, only the leaders' education level and follower gender remain significant, so only these two variables were included as control variables for hypothesis testing.

Two measurement models were compared for this study: In Model 1, all items load directly onto their corresponding latent variables. In Model 2, the items for instrumental leadership load onto three[24] first-order factors representing their respective dimensions of instrumental leadership and these three dimensions load onto a second-order factor representing overall instrumental leadership. In both models, the residual variances for the two reverse-coded items from the emotion regulation scale were allowed to covary to account for potential method effects. No item parceling was used for the confirmatory factor analyses.

[23] https://thestatisticalmind.com/calculators/SBChiSquareDifferenceTest.htm

[24] As mentioned above, only the mostly task- and relations-oriented dimensions of instrumental leadership were used in this dissertation.

Table 41

Means, Standard Deviations, and Intercorrelations of the Demographic and Study Variables

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Gender (leader) [a]	–	–	–															
2. Age (leader)	43.65	10.53	-.12*	–														
3. Education level (leader) [b]	–	–	-.15**	.01	–													
4. Working hours (leader)	44.31	8.94	-.26***	.08	.11	–												
5. Leadership experience [c]	–	–	-.11	.60***	.03	.14*	–											
6. Number of followers [d]	–	–	-.16**	.20***	.04	.25***	.26***	–										
7. Gender (follower) [a]	–	–	.36***	-.02	-.13*	-.18**	.06	-.03	–									
8. Age (follower)	33.68	11.68	-.14*	.30***	.08	.06	.27***	.08	-.01	–								
9. Education level (follower) [b]	–	–	.01	-.07	.24***	.20***	.04	-.06	.01	-.05	–							
10. Working hours (follower)	32.80	10.99	-.13*	.20***	.12*	.06	.14*	.03	-.21***	.16**	.07	–						
11. Emotion regulation (leader)	5.14	0.99	-.00	-.11	.12*	-.07	-.13*	-.01	.02	.02	.08	.02	(.71)					
12. Self-leadership (leader)	5.99	0.81	.15**	.02	-.02	-.18**	.00	.00	-.01	-.10	.03	.01	.19**	(.77)				
13. Instrumental leadership	3.95	0.73	.07	.00	.02	-.09	.06	-.09	.10	.03	-.03	-.01	.15**	.15**	(.93)			
14. Destructive leadership	1.52	0.66	.04	.00	-.14*	.03	-.10	.02	.01	-.06	-.06	-.02	-.21***	-.14*	-.52***	(.82)		
15. Laissez-faire leadership	1.59	0.74	-.01	.02	-.19**	.01	-.09	.01	-.04	.03	-.10	-.03	-.10	-.18**	-.61***	.59***	(.86)	
16. Job satisfaction (follower)	3.89	0.64	.06	-.05	.18**	-.02	.05	-.11	.14*	.06	.11*	.06	.15**	.10	.54***	-.45***	-.47***	(.86)

Note. N = 316 leader–follower dyads. Spearman's rank (for ordinal variables) and Pearson's correlations (for dichotomous and interval scales). Values in parentheses denote Cronbach's α.

[a] 1 = male, 2 = female. [b] 0 = no university degree, 1 = university degree. [c] 2 = less than 5 years, 3 = more than 5 years. [d] 1 = 1-10, 2 = 11-20, 3 = more than 20.

*$p < .05$. **$p < .01$. ***$p < .001$.

As multivariate normality could not be assumed (see Studies 1 and 2), robust maximum likelihood estimation with Satorra-Bentler correction was used for the confirmatory factor analyses and structural equation modeling reported below. As can be seen in Table 42, overall model fit for Model 1 was acceptable, but not good (χ^2/df = 2.03, CFI: = .85, TLI: = 0.84, RMSEA: = .06, SRMR: = .07). Including the second-order factor for instrumental leadership improved most of the fit statistics (χ^2/df = 1.68, CFI = .90, TLI = 0.89, RMSEA = .05, SRMR = .07) and the (corrected) chi-square difference test showed a significant increase in model fit ($\chi^2(3) = 144.67$, $p < .001$). Therefore, Model 2—with the second order factor for instrumental leadership—was used in subsequent analyses. The completely standardized item loadings for Model 2 ranged between .30 and .88, so all item loadings were acceptable.

Table 42

Measurement Models for Study 3

Model	χ^2	*df*	χ^2/df	CFI	TLI	RMSEA [90%CI]	SRMR	$\Delta\chi^2$
Model 1	1468.79***	724	2.03	.85	0.84	.06[.06, .07]	.07	144.68***
Model 2	1210.15***	721	1.68	.90	0.89	.05[.05, .06]	.07	

Note. N = 314. Model 1: No second-order factors. Model 2: One second-order factor for instrumental leadership. CFI = Robust Comparative Fit Index. TLI = Robust Tucker-Lewis Index. RMSEA = Robust Root Mean Square Error of Approximation. SRMR = Standardized Root Mean Square Residual.
***$p < .001$

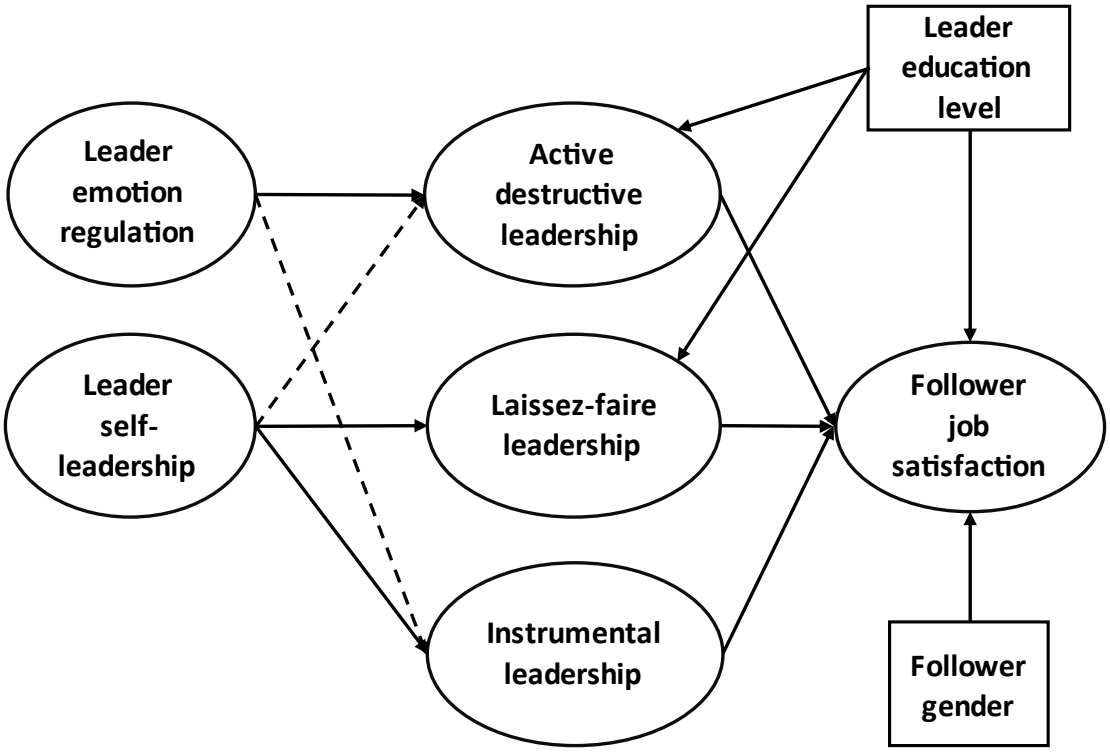
When regressing follower job satisfaction on leader emotion regulation and self-leadership, while controlling for leader education level and follower gender, the resulting model showed an acceptable model fit (χ^2 = 301.86, *df* = 184, χ^2/df = 1.64, robust CFI = .92, robust TLI = 0.91, robust RMSEA = .05, 95% CI [.04, .06], SRMR = .06). Whereas leader emotion regulation was significantly associated with follower job satisfaction (β = 0.16, *p* = .02), leader self-leadership was not significantly associated with follower job satisfaction (β = 0.08, *p* = .17). The same pattern could be observed for the bivariate associations between the variables with *r* = .15, *p* = .007 (emotion regulation) and *r* = .10, *p* = .09 (self-leadership). Therefore, Hypothesis 4, which posited a positive association between leader emotion regulation and follower job satisfaction, was supported, but Hypothesis 5, which posited a positive association between leader self-leadership and follower job satisfaction, was not supported.

Next, two models for testing the remaining hypotheses of this study were generated (see Figure 8): Model 3 consists of the second measurement model with the second-order factor for

instrumental leadership (Model 2) and the structural model described by the paths of the research model (see Figure 7) for this study. In Model 4, two additional paths are included: A path from leader self-leadership to (active) destructive leadership and a path from leader emotion regulation to instrumental leadership. Both new paths are based on the correlation table[25] (see Table 41) of this study and the results of Study 1 and 2[26]. In both models, leader education level and follower gender were added as control variables. As leader gender also correlated with active destructive and laissez-faire leadership, the two corresponding paths were also added to the model (see Figure 8).

Figure 8

Structural Model and Control Variables of Models 3 and 4



Note. The dashed paths are only included in Model 4. Leader education level and follower gender serve as control variables.

The model fit of both Model 3 and Model 4 was acceptable (see Table 43). Adding the two extra paths in Model 4 resulted in a slightly, visible only in χ^2/df and in the third decimal place not

[25] When regressing each of the leadership styles on emotion regulation, self-leadership, and the two control variables, these two associations remained statistically significant while emotion regulation remained unrelated to laissez-faire leadership.

[26] The correlation between leader self-leadership and destructive leadership in Study 2 was not statistically significant, but of the same magnitude as in this sample.

reported here, but significantly ($\chi^2(2) = 12.14$, $p = .002$) improved model fit. Therefore, Model 4 was used for hypothesis testing.

Table 43

Structural Equation Models for Study 3

Model	χ^2	*df*	χ^2/df	CFI	TLI	RMSEA [90%CI]	SRMR	$\Delta\chi^2$
Model 3	1319.07***	800	1.65	.90	0.89	.05[.04, .05]	.07	12.14**
Model 4	1309.99***	798	1.64	.90	0.89	.05[.04, .05]	.07	

Note. N = 313. Model 3: Original research model. Model 4: Original model with two additional paths: One from emotion regulation to instrumental leadership and one from self-leadership to destructive leadership. CFI = Robust Comparative Fit Index. TLI = Robust Tucker-Lewis Index. RMSEA = Robust RMSEA. SRMR = Standardized Root Mean Square Residual.

**$p < .01$. ***$p < .001$

Hypothesis 1 predicted a positive association between leader self-leadership and instrumental leadership, which was supported in Model 4 (β = 0.14, $p = .04$). Likewise, both Hypothesis 2 was supported, as self-leadership was negatively associated with laissez-faire leadership (β = -0.22, $p = .003$) and Hypothesis 3 was also supported, as emotion regulation was negatively associated with active destructive leadership (β = -0.15, $p = .005$). Therefore, all three hypotheses regarding leader self-regulation and leadership styles were supported by the data.

Table 45 displays the indirect and total effects of leader emotion regulation and leader self-leadership on follower job satisfaction. Hypothesis 6 was not supported, as the indirect effect of emotion regulation on job satisfaction via active destructive leadership was not significant (β = 0.03, $p = .19$). Likewise, Hypothesis 7a was not supported, as the indirect of self-leadership on job satisfaction via laissez-faire leadership was not statistically significant (β = 0.02, $p = .43$). Hypothesis 7b received partial support as the indirect effect of self-leadership on job satisfaction via instrumental leadership showed a trend toward statistical significance (β = 0.06, $p = .06$).

Additional analyses using the added paths in Model 4 showed that the indirect path from emotion regulation to job satisfaction via instrumental leadership was statistically significant (β = 0.06, $p = .04$) and that only the total effect of emotion regulation on job satisfaction (β = 0.14, $p = .02$), but not that of self-leadership on job satisfaction (β = 0.08, $p = .17$) was statistically significant.

Table 44

Regression Results in Model 4

Outcome ← Predictor	*B*	*SE*	*z*	*p*	β
Job satisfaction					
Emotion regulation	0.03	0.04	0.92	.36	0.05
Self-leadership	-0.03	0.06	-0.47	.64	-0.03
Leader education [a]	0.20	0.07	2.95	.003	0.14
Follower gender [b]	0.17	0.07	2.67	.008	0.13
Destructive leadership	-0.18	0.11	-1.61	.11	-0.17
Laissez-faire leadership	-0.08	0.10	-0.81	.42	-0.09
Instrumental leadership	0.50	0.11	4.61	<.001	0.47
Destructive leadership					
Emotion regulation	-0.09	0.03	-2.79	.005	-0.15
Leader education	-0.15	0.07	-2.36	.02	-0.12
Self-leadership	-0.15	0.08	-1.98	.048	-0.14
Laissez-faire leadership					
Self-leadership	-0.29	0.10	-2.93	.003	-0.22
Leader education	-0.29	0.08	-3.90	<.001	-0.20
Instrumental leadership					
Self-leadership	0.16	0.08	2.07	.04	0.14
Emotion regulation	0.08	0.03	2.28	.02	0.13

Note. N = 313 leader–follower dyads.

[a] 0 = no university degree, 1 = university degree. [b] 1 = male, 2 = female.

Table 45

Indirect and Total Effects of Leader Emotion Regulation and Self-Leadership on Follower Job Satisfaction

Path	*B*	*SE*	*z*	*p*	β
Emotion regulation → destructive leadership → job satisfaction	0.02	0.01	1.31	.19	0.03
Self-leadership → laissez-faire leadership → job satisfaction	0.02	0.03	0.79	.43	0.02
Self-leadership → instrumental leadership → job satisfaction	0.08	0.04	1.89	.06	0.06
Emotion regulation → instrumental leadership → job satisfaction	0.04	0.02	2.11	.04	0.06
Self-leadership → destructive leadership → job satisfaction	0.03	0.02	1.27	.20	0.02
Total effect of emotion regulation on job satisfaction	0.09	0.04	2.32	.02	0.14
Total effect of self-leadership on job satisfaction	0.10	0.07	1.38	.17	0.08

Note. Model 4. *N* = 313 leader–follower dyads.

8.3 Discussion

The results of this study confirm that significant mixed-source associations of leader emotion regulation and self-leadership with different leadership styles exist. After controlling for leader education level, both emotion regulation and self-leadership showed significant negative correlations with active destructive leadership and significant positive correlations with instrumental leadership. Additionally, self-leadership, but not emotion regulation, showed a significant negative correlation with laissez-faire leadership.

More specifically, the hypothesized relationships between leader self-leadership and constructive as well as destructive leadership could be supported for the leadership styles explicitly mentioned in the hypotheses (i.e., instrumental and laissez-faire leadership) as well as for active destructive leadership, extending the previous same-source results of Furtner et al. (2013) and Furtner et al. (2015) for transformational, transactional, and laissez-faire leadership to instrumental leadership and mixed-source associations.

Likewise, the hypothesized negative relationship between emotion regulation and destructive leadership was supported, in line with the theoretical prediction by Krasikova et al. (2013) that self-regulation impairment can lead to active destructive leadership and extending previous findings of similar relationships between (very broadly defined) emotional intelligence (Zhang & Bednall, 2016) or self-control (Yam et al., 2016) and abusive supervision. Additionally, Hypothesis 13 from Study 1, which was not part of the original research model for this study, but which predicted a positive association between emotion regulation and instrumental leadership, received additional support in this study.

In this study, the bivariate mixed-source correlations of emotion regulation with instrumental and active destructive leadership, respectively, were only low to moderate in size compared to the moderate effects in Study 1. Similarly, the bivariate mixed-source correlation of self-leadership with instrumental leadership was small in this sample, but moderate in Study 2. However, the effect size of the bivariate correlation of self-leadership and active destructive leadership was virtually identical in Study 2 and in this study. Despite the smaller effect sizes, the overall effects are consistent across samples, lending further support to the operationalization of emotion regulation and self-leadership through indicators of self-regulation success.

As expected, leader emotion regulation was positively associated with follower job satisfaction. However, this effect was not mediated by destructive leadership (as was hypothesized), but rather by instrumental leadership. By contrast, neither the hypothesized positive association between self-leadership and follower job satisfaction nor the indirect effect of self-leadership on job satisfaction via laissez-faire leadership were supported. Only the hypothesized indirect effect of self-

leadership on job satisfaction via instrumental leadership was partially supported as this effect approached statistical significance (p = .06). Therefore, the corresponding paths within affective events theory could only partially be supported in this study.

8.3.1 Strengths, Limitations, and Future Research

The data collection for this study took place during different phases of the Covid-19 pandemic, which may have influenced follower job satisfaction in various ways. For example, having to work from home due to government orders is enjoyable to persons with the right conditions and dispositions to comfortably work from home and highly unpleasant to others who lack either or both. The amount of work also notably increased for some employees (e.g., in the health sector or in some branches of the IT sector) while others experienced involuntarily reduced work hours or the prospect of future, potentially severe reductions in work hours (in some cases to zero hours per week, e.g., in the entertainment sector). At the same time, employees with children had to juggle childcare and homeschooling with their work duties during school closures.

Therefore, the impact of the pandemic on job satisfaction is likely to be highly individual and interacting with the phase of the pandemic during which the person participated[27]. For example, Möhring et al. (2021) used a representative German sample to compare pre-pandemic (September 2019) job satisfaction to job satisfaction in April 2020, when heavy restrictions were in place. They found an overall drop in job satisfaction, that was particularly strong in mothers, while job satisfaction slightly increased in fathers. Persons without children also reported lower job satisfaction in April 2020. Working from home did not influence job satisfaction for any group (mothers, fathers, persons without children) while forced reductions in work hours did have a significant negative impact on work satisfaction, especially for mothers and persons without children (the effect for fathers was not significant).

Although leaders' self-leadership and emotion regulation should enable the leaders to cope constructively with the pandemic, many aspects of the working conditions in a pandemic, such as school closures or work-from-home mandates, are outside the leaders' control. Therefore, it would be desirable to either control for the different pandemic-related factors that are likely to influence job satisfaction (parenthood, forced reductions in work hours, conditions for working from home, perceived adequacy of the safety measures at work) or to repeat the study once the pandemic has passed.

Whereas the mixed-source data is a strength of this study, the follower perceptions of their leader's emotion regulation and self-leadership skills might be more relevant to follower job

[27] No obvious overall time or phase (lockdown vs. no lockdown) effects could be identified in this sample. As documented in the results section, job satisfaction was slightly higher in women compared to men in this sample.

satisfaction than the leaders' self-perceptions, as the followers' reactions to affective work events are based on their own perceptions of these events. To prevent potentially inflated correlations between the measures, the data could be collected in two waves, or other sources could be used for gathering information on the leadership styles in future studies that examine similar models. Furthermore, the same limitations that were mentioned in Study 1 regarding the use of student-recruited samples apply to this study and future studies should resort to more reliable data sources.

It would also be advisable to include follower self-leadership as a moderator variable given that no significant overall effect of leader self-leadership on follower job satisfaction could be found in this study and due to the moderator effect found in Study 2, that follower job satisfaction only increases with leader self-leadership in followers with moderate to high levels self-leadership.

Another aspect to consider is that both the means and the standard deviations for (active) destructive and laissez-faire leadership were lower in this sample compared to the values presented in the test manual of the original version of the questionnaire (Rowold & Poethke, 2017). Whereas not directly comparable for destructive leadership, as this subscale was extended by one item for the preliminary version of the second edition of the questionnaire, the laissez-faire subscale remained unchanged. Therefore, the incidence rate of both active and passive destructive leadership in this sample may have been rather low, limiting the variance in these variables and thereby reducing potential effect sizes due to a floor effect. Consequently, it might be fruitful to re-examine the three mediator effects proposed in the research model for this study in samples where higher incidence rates of destructive leadership can be expected, for example, where vulnerable social groups such as migrant workers from poorer countries are involved (Fischer et al., 2021).

Follower positive and negative affectivity were purposefully not included as control variables in this study, despite previous results that showed correlations between follower negative affectivity and follower ratings of destructive leadership (Mackey et al., 2021) and positive associations between positive affectivity and overall job satisfaction (Ashkanasy & Humphrey, 2011). Positive and negative affectivity were omitted, because it is impossible to distinguish dispositional affectivity from affective reactions to work events within affective events theory (Weiss & Cropanzano, 1996) in a cross-sectional survey.

Additionally, experience sampling studies would be desirable to distinguish the relative magnitudes of the effects of leader characteristics (such as self-leadership and emotion regulation skills) on follower job satisfaction via the direct, cognitive route versus the affective route that includes work events and the affective reactions of followers to these work events as serial mediators (Weiss & Cropanzano, 1996).

8.3.2 Practical Implications

Leader emotion regulation was found to have a positive association with follower job satisfaction that was mediated by instrumental leadership. Additionally, leader self-leadership also seems to influence follower job satisfaction through instrumental leadership. If these results can be replicated, organizations might benefit from targeting deficits in leader emotion regulation or self-leadership with suitable training measures (see Sections 6.3.2 and 7.3.2).

Furthermore, even though the other indirect effects could not be verified in this study, emotion regulation and self-leadership were positively associated with constructive and negatively associated with destructive leadership styles. Therefore, selecting leaders who are skilled in self-regulation and offering suitable trainings to leaders who have deficits in these areas, might foster more constructive and reduce destructive leadership behaviors. With this, follower job satisfaction and leadership effectiveness could be increased (Antonakis & House, 2014; Judge & Piccolo, 2004; Rowold, 2014).

8.3.3 Conclusion

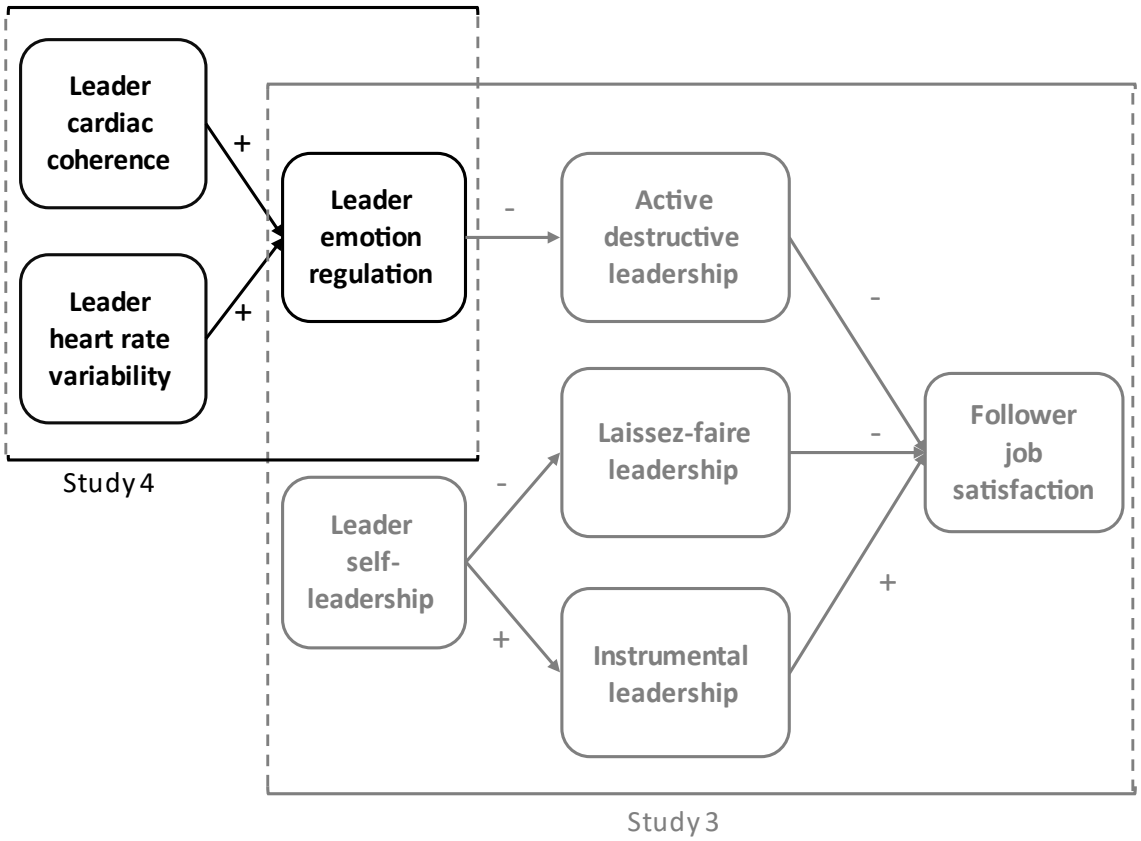
This study provides initial evidence that leader self-regulation in the shapes of successful emotion regulation and successful self-leadership are associated with constructive and destructive leadership styles and that leader emotion regulation is further associated with follower job satisfaction. Therefore, the study provides fruitful avenues for future research as self-regulation skills can be acquired by those who have deficits even before a person has a formal or informal leadership role that would enable them to put skills learned in leadership trainings into practice (e.g., Moltrecht et al., 2021; Pandey et al., 2018).

9 Study 4: Neurophysiological Correlates of Emotion Regulation

In addition to the survey study conducted in Study 3, I also assessed whether self-rated emotion regulation in university students could be predicted by their high frequency heart rate variability and the related measure of cardiac coherence (see Figure 9).

Figure 9

Research Model for Study 4



9.1 Method

9.1.1 General Procedure

The data used for this study was gathered within a larger, still ongoing, research project regarding the neurophysiological correlates of leadership behavior at professor Rowold's lab at TU Dortmund University. The research project was approved by an institutional review board.

Students recruited other students from several different universities to participate in the research project in exchange for partial course credit or extra credit. The students who were enrolled in a course taught by a person involved in the research project were not permitted to participate due to ethical reasons. Furthermore, students who suffered from mental illnesses or who

took prescription drugs other than contraceptives on a permanent basis were not eligible for participation.

The participants received written information that the research project included tasks that are commonly used in assessment centers and that ECG, electromyography (EMG), and electroencephalography (EEG) data would be collected during the lab session. They were also informed that they would be required to participate in online surveys at their own convenience prior to the lab session. The online questionnaires included self-reported emotion regulation, several control variables, and measures unrelated to this study such as a personality and an IQ test. The participants did not receive any monetary compensation for their participation, but they were provided with the results of the personality test and the IQ test. Additionally, the lab session provided them with the chance to experience and thereby practice exercises used in personnel selection assessment centers for their search of employment after graduation.

This study uses data from lab sessions that took place between October 28, 2019, and December 4, 2019, before the Covid-19 pandemic interrupted the research project. Within this period, 35 lab sessions with two participants each had been scheduled, of which 8 were cancelled either by the participants due to illness or a loss of interest, or by us, because the participants arrived very late or because of problems with the central heating in the lab building. In four additional cases, physiological data of only one of the two participants was available, due to technical problems, or because the second participant did not arrive on time.

At the beginning of the lab session, the participants confirmed that they had read and understood the information about the research project or were provided with this information if they had not read it. All participants had the opportunity to ask any remaining questions and they were informed that they could leave at any time if they so desired. Afterwards, written consent was obtained from the participants.

The two participants per lab sessions were randomly split into two groups (“leaders” and “followers”) for reasons unrelated to the results reported in this dissertation. Due to logistical reasons, the leaders were asked to arrive half an hour earlier than the followers for the lab session. After providing their written consent, the leaders received detailed instructions on how and where to place the ECG and EMG electrodes on their torso and how to put on the cap for the EEG[28]. This was followed by a five-minute baseline measure during which the leaders breathed naturally while sitting in a comfortable chair. The participants were instructed to remain silent, to keep their eyes open, not to move, and to think of something neutral such as their current grocery shopping list. The leaders then went on to do several assessment center exercises, which are not part of this study.

[28] Details regarding the EEG and EMG procedures are omitted here.

After giving their informed consent, the followers first conducted one assessment center exercise in a different room, before entering the lab itself and receiving the same instructions regarding the placement of the electrodes as the leaders. This was followed by a baseline measure identical to that of the leaders except that both the leader and the follower were present in the lab besides the experimenter. The leader and the follower both sat at a table, facing each other. To avoid distractions, the followers were asked to look at a neutral picture of a nature scene on the opposite wall and the leaders were asked to look outside the window rather than at each other during the baseline measure. From their position at the table, the leaders could see part of the sky and a few branches of a tree. The two participants then engaged in an assessment center exercise together, followed by another measurement and additional questionnaires unrelated to this study. The total duration of each lab session was approximately 3 hours for the leaders and approximately 2.5 hours for the followers, including verbal feedback for the participants regarding their performance during the assessment center exercises and a full debriefing.

9.1.2 Sample

The final sample consisted of 37 students who had completed the relevant online questionnaire and for whom the respective baseline measurement (depending on their group) was usable (see below). Twenty of these participants belonged to the leader group and 21 of the participants were female (10 leaders and 11 followers) and 16 were male (10 leaders and 6 followers). The participants were between 19 and 28 years old (M = 22.35, SD = 2.19).

Seven participants did not know their blood pressure. Of the other participants, 21 reported having a normal blood pressure, 5 reported a slightly elevated, and 4 a low blood pressure (hypotension). No participants reported high blood pressure (hypertension). During the online survey at home, the participants received instructions on how to measure their heart rate. The reported self-measured heart rates ranged from 44 to 110 beats per minute (M = 68.89, SD = 13.95).

Two-thirds (n = 25) of the participants were non-smokers, 9 persons smoked occasionally, and 3 indicated that they smoked on a regular basis. More than half of the participants (n = 21) indicated that they drank alcohol, 11 participants indicated that they only consumed alcohol on rare occasions, and 5 indicated that they never drank alcohol.

9.1.3 Heart Rate Variability Measures

Two g.USBamp biosignal amplifiers (in combination with g.GAMMAbox interface boxes) were used to record cardiac activity and other physiological data, which are not reported here. The raw data was gathered via the interface provided by g.tec for MATLAB with a sampling rate of 4800 Hz. Two gel-filled electrodes were placed on the anterior torso near the heart, approximately in the position of the Wilson standard leads V1 and V2. However, not a unipolar, but a bipolar

recording was used for reasons unrelated to this study. A ground electrode was placed on the inside of the wrist of the non-dominant hand of the participants.

MATLAB (version 2020b) was used to process the data. Before extracting the inter-beat intervals for the calculation of the heart rate variability measures, the first five seconds and the last second of the continuous 5-minute recordings were removed to eliminate technical artifacts. The initial sampling rate was downsampled to 600 Hz, which is sufficient for accurate calculations of heart rate variability measures (Berntson et al., 1997; Task Force of The European Society of Cardiology and The North American Society of Pacing and Electrophysiology, 1996). Next, linear trends were removed from the data, a process which should not affect high frequency measures of heart rate variability (Task Force of The European Society of Cardiology and The North American Society of Pacing and Electrophysiology, 1996).

Two algorithms were used to derive the inter-beat intervals used for the subsequent analyses: First, the Pan Tompkins algorithm (original source: J. Pan & Tompkins, 1985; MATLAB implementation: Sedghamiz, 2014) was used to identify the QRS complexes in the signals. Then, an algorithm provided by the Heart Rate Variability Analysis Software (HRVAS; Ramshur, 2010) was used to detect inter-beat intervals that were artificially large or small due to ectopic heartbeats, which are additional, skipped, or otherwise irregular heartbeats (Choi & Shin, 2018).

However, visual inspection of the (detrended) ECG waves revealed that the algorithms failed to correctly identify the inter-beat intervals due to irregular heartbeats and/or movement artifacts as some of the participants were unable to refrain from fidgeting during the five-minute measure. As I was not skilled enough to manually edit the data (as suggested by the Task Force of The European Society of Cardiology and The North American Society of Pacing and Electrophysiology, 1996), I discarded the data of 7 (out of initially 44) participants that were affected.

The RMSSD (in ms) and HF power (in ms^2) were also calculated with HRVAS. For the latter, a discrete fast Fourier transform (Welch's method with an overlap of 50%, see Welch, 1967) was used to calculate the power spectrum. Cardiac coherence (McCraty & Shaffer, 2015) was calculated in MATLAB using the formula reported in Section 4.4.3. For all three measures, the entire remaining time-interval of 4 minutes and 54 seconds were used for the calculations.

All three values were transformed using the natural logarithmic (ln) to approximate normal distributions for linear analyses, because the raw values were strongly skewed, as is frequently the case with heart rate variability measures (Koenig & Thayer, 2016). As in previous studies (e.g., D. P. Williams et al., 2015), ln(RMSSD) and ln(HF) were strongly correlated ($r = .95$, $p < .001$).

Table 46

Means, Standard Deviations, and Ranges of the Heart Rate Variability Measures

	Study 4				Values reported in Nunan et al. (2010)			
Measure	*Min*	*Max*	*M*	*SD*	*Min*	*Max*	*M*	*SD*
HF (ms^2)	70	3,455	846	776	82	3,630	657	777
RMSSD (ms)	13	84	41	18	19	75	42	15

As can be seen in Table 46, the means and standard deviations of the raw values of HF and RMSSD were roughly comparable to those in the studies summarized by Nunan et al. (2010).

9.1.4 Self-Report Measures

As in Study 1, self-ratings of reappraisal (α = .77) and suppression (α = .74) use were collected with the German version of the ERQ (Abler & Kessler, 2009). Successful emotion regulation was assessed with a slightly modified version of the German CoERS (α = .61; see Section 5.3.1). As the sample consisted of students, the participants were instructed to think about a setting in which they worked together with other persons, for example for group assignments for their studies or at their part-time job, if they had one and to interpret the word “work” in the items as referring to this setting.

9.2 Results

All statistical analyses were conducted with IBM SPSS Statistics (version 27). No significant differences between the two groups (leaders vs. followers) emerged for any of the emotion regulation or heart rate variability measures (including cardiac coherence), so the two groups were collapsed into one sample. Likewise, alcohol consumption and smoking (both measured in the broad categories described above) were unrelated the three heart rate variability measures (alcohol: $|r_S| < .18$, $ps > .28$, smoking: $|r_S| < .22$, $ps > .19$) and to the three emotion regulation measures (alcohol: $|r_S| < .13$, $ps > .45$, smoking: $|r_S| < .27$, $ps > .13$). However, smoking showed a trend toward statistical significance, given the small sample size of $N = 37$, for suppression ($r_S = -.26$, $p = .13$) so that a dummy-coded variable was created to differentiate between those persons who never smoked and those who smoked at least sometimes for further analyses.

The self-reported blood pressure category was unrelated to the three emotion regulation measures ($|r_S| < .14$, $ps > .46$) and not significantly correlated with either HF power ($r_S = -.16$, $p = .41$) or the RMSSD ($r_S = -.15$, $p = .43$), but significantly correlated with cardiac coherence ($r_S = .39$, $p = .03$, $n = 30$).

Table 47

Intercorrelations of Demographic, Heart Rate Variability, and Emotion Regulation

Measure	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12
1. Gender [a]	–	–	–											
2. Age	22.35	2.19	.31†	–										
3. Group [b]	–	–	.15	.35*	–									
4. Smoking status [c]	–	–	.21	.32†	.18	–								
5. Resting pulse at home [d]	68.89	13.95	.02	.01	-.23	.24	–							
6. Heart rate [e]	77.34	12.29	-.19	-.33*	-.38*	-.33*	.44***	–						
7. ln(HF)	6.33	0.98	.09	-.22	-.09	.18	.05	-.31†	–					
8. ln(RMSSD)	3.60	0.49	.05	-.20	-.02	.15	-.04	-.36*	.95***	–				
9. ln(cardiac coherence)	-2.18	0.63	.10	.05	.18	.00	-.07	.00	.09	-.03	–			
10. Reappraisal	4.58	1.03	-.15	-.17	-.06	.00	.13	.30†	.03	.04	-.09	(.77)		
11. Suppression	4.17	1.27	-.04	.04	-.03	-.23	-.22	.09	-.08	-.02	.00	.04	(.74)	
12. Successful emotion regulation	4.86	0.87	-.04	-.22	-.07	-.25	-.09	.26	-.11	-.13	-.06	.00	.34*	(.61)

Note. N = 37. Values in parentheses denote Cronbach's α.

[a] 1 = female, 2 = male. [b] 0 = follower, 1 = leader. [c] 0 = non-smoker, 1 = smoker. [d] Measured by the participants. [e] Measured during the lab session.

$^{\dagger}p < .10$. $^{*}p < .05$. $^{***}p < .001$.

Table 47 shows the intercorrelations of the dichotomous and continuous variables used in this study. Self-measured resting heart rate at home and the heart rate measured in the lab were moderately correlated (r = .44, p = .008). Additionally, the mean heart rate measured at the lab was significantly higher than the heart rate measured by the participants themselves at home (t(34) = 3.49, p = .001, d = 0.59). The mean heart rate measured in the lab was moderately negatively associated with HF power (r = -.31, p = .06) and the RMSSD (r = -.36, p = .03), but unrelated to cardiac coherence (r = -.004, p = .98). The self-measured heart rate at home was unrelated to any of the three measures. Among the three emotion regulation measures, only suppression and successful emotion regulation were significantly correlated (r = .34, p = .04).

As can be further seen in Table 47, none of the three heart rate variability measures showed a significant bivariate association with any of the three emotion regulation measures ($|r| \leq .13$, ps ≥ .43). Controlling for the heart rate during the HRV-measurement slightly increased the correlations between reappraisal use and HF ($r_{partial}$ = .14 vs. r = .03) and RMSSD ($r_{partial}$ = .16 vs. r = .04) and decreased the (non-significant) negative correlations between successful emotion regulation and HF ($r_{partial}$ = -.03 vs. r = -.11) and RMSSD ($r_{partial}$ = -.04 vs. r = -.13), but none of the resulting partial correlations was statistically significant (see also Table 48). Therefore, Hypothesis 8, which predicted a positive association between resting vmHRV (assessed by HF and RMSSD) and successful emotion regulation, was not supported. Furthermore, no significant associations could be found between vmHRV and reappraisal or suppression use.

Table 48

Partial Correlations of ln(HF) and ln(RMSSD) with Emotion Regulation after Controlling for Heart Rate

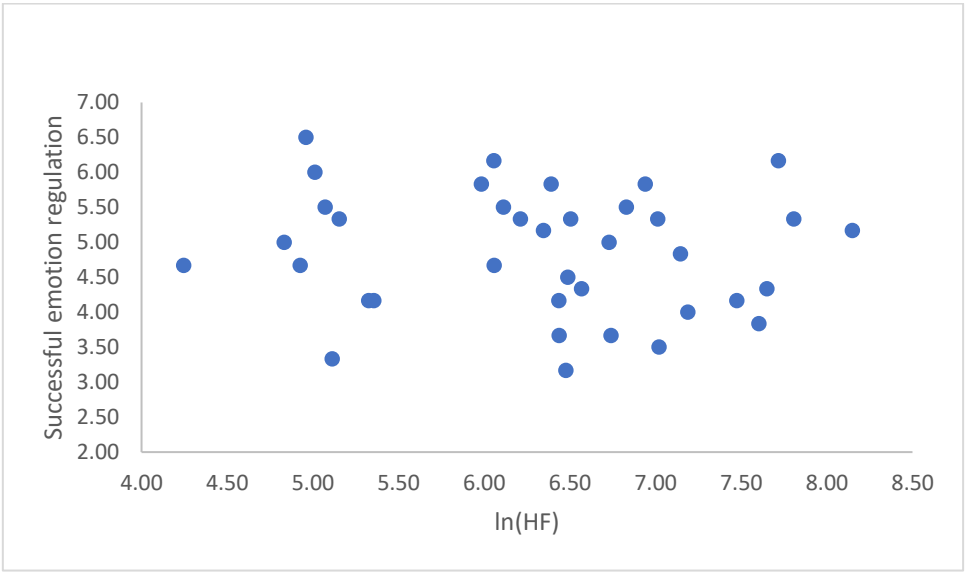
	Reappraisal	Suppression	Successful emotion regulation
ln(HF)	.14	-.06	-.03
ln(RMSSD)	.16	.02	-.04

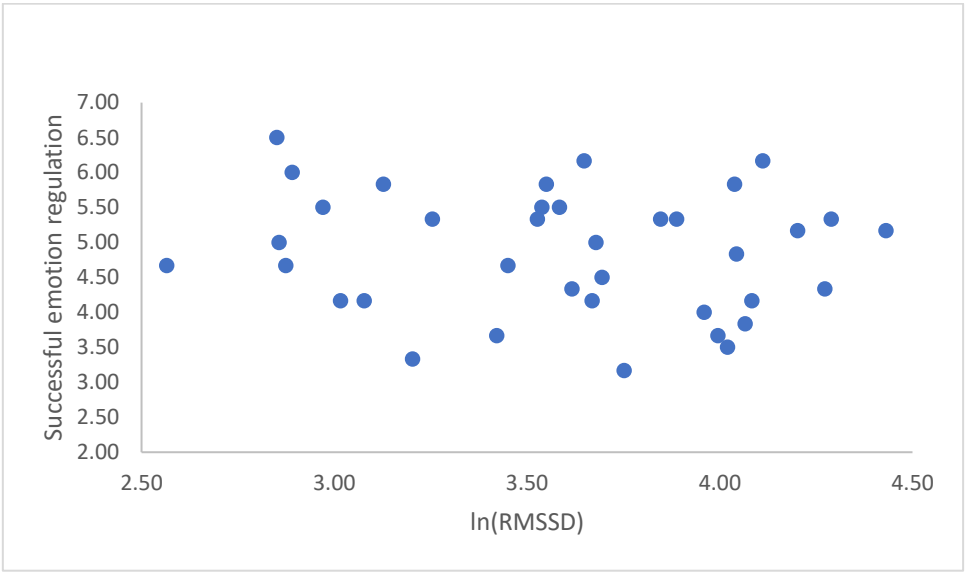
Note. None of the *p*-values are smaller than .10.

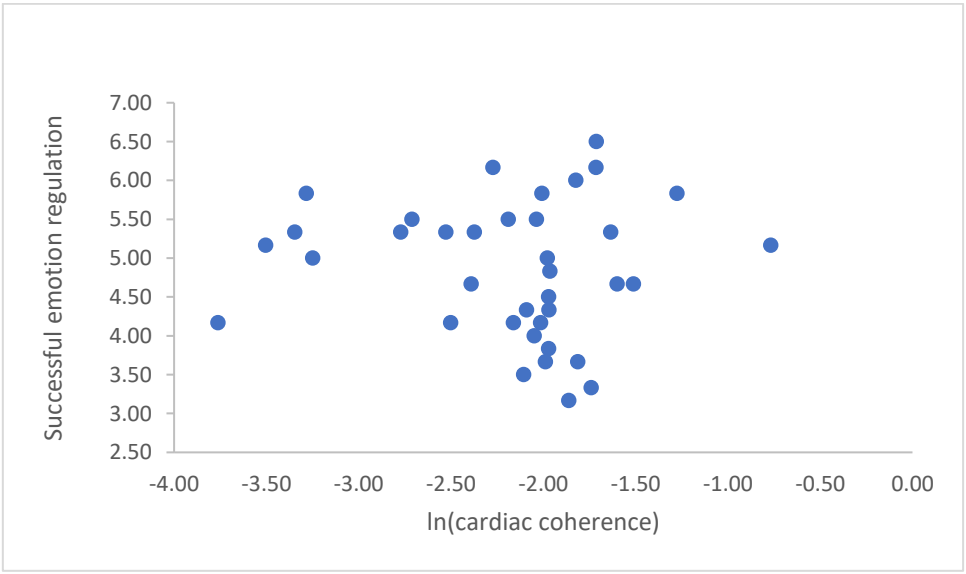
After controlling for blood pressure, cardiac coherence did not predict any of the emotion regulation measures (reappraisal: β = -0.04, p = .86; suppression: β = -0.01, p = .98; successful emotion regulation: β = -0.12, p = .55). Therefore, Hypothesis 9, which predicted that cardiac coherence would be positively related to successful emotion regulation, was also not supported.

Figure 10

Scatterplots of vmHRV and Cardiac Coherence with Successful Emotion Regulation







A visual inspection of the scatterplots presented in Figure 10 did not reveal any obvious outliers or nonlinear trends so that no further exploratory analyses in these directions were conducted.

9.3 Discussion

In the present study, no associations between either (resting) vmHRV or cardiac coherence and successful emotion regulation could be found, even though a previous study found a moderate negative association between resting vmHRV and difficulties in emotion regulation (D. P. Williams et al., 2015). While the scatterplots did not reveal any obvious correlation patterns, a post-hoc power analysis with G*Power (version 3.1.9.7; Faul et al., 2009) revealed that the sample size of $N = 37$ in this study yielded a power of only .57 to detect a moderate correlation of $r = .30$. Additionally, changes in only a few data points are able to significantly change the magnitude and direction of correlations in small data sets such as the one used here. Therefore, further studies with more robust sample sizes are clearly needed to test the proposed positive associations. Given that previous meta-analyses found only small associations between heart rate variability and emotion regulation strategy use (Holzman & Bridgett, 2017), behavioral self-regulation (Holzman & Bridgett, 2017), and self-control (Zahn et al., 2016), even larger sample sizes may be needed to reliably detect any associations.

9.3.1 Strengths, Limitations, and Future Research

As recommended (Massaro & Pecchia, 2019), several measures of vmHRV were used in this study and all ECG waveforms were visually inspected before calculating these measures to avoid statistical artifacts. The necessity of manual data editing has been clearly stated by the Task Force of The European Society of Cardiology and The North American Society of Pacing and Electrophysiology (1996) and could be confirmed in this study, as the algorithms calculated improbable to clearly wrong values for either vmHRV, the mean heart rate, or both, for most of the seven discarded cases.

For example, in one case, a heart rate of 177 was calculated by the algorithms, instead of a true heart rate of approximately 80 beats per minute. For a different case, a raw HF (in ms^2) of 114,334 was calculated, which is 31 times the maximum value reported in Nunan et al. (2010). Organizational researchers interested in heart rate variability analyses would thus be well advised to collaborate with an expert on ECG waveforms to enable them to edit rather than simply discard data with irregularities.

Even though no gender effects could be found in this study, others have found that the association between vmHRV and emotion regulation was stronger in women compared to men (D. P. Williams et al., 2019), so future studies should investigate potential gender effects. One limitation of this study is the restriction in the age range due to the student sample, because—despite the effects

found by D. P. Williams et al. (2015)—Holzman and Bridgett (2017) generally found that the associations between heart rate variability and self-regulation tended to be stronger in older samples.

A second limitation is that the CoERS for assessing successful emotion regulation was only slightly modified for the use in this student sample and not validated for student samples beforehand. Even though the context of the assessment center lab session has some characteristics of a work environment (e.g., being told what to do and working together with strangers), the CoERS may not be ideally suited for assessing successful emotion regulation in this context. For example, even though 68% of the students in Germany had a part-time or full-time job before the Covid-19 pandemic (Bundesministerium für Bildung und Forschung et al., 2017) and group assignments for students are quite common in many subjects, not all students may have been able to relate to the items used to assess successful emotion regulation within the work context.

A third potential limitation of this study is that emotion regulation and vmHRV were assessed at different time points, which should be avoided, because vmHRV can be influenced by a variety of factors outside the experimenter's control, such as meals or sleeping routines. However, this limitation mostly refers to assessments of state self-regulation with self-regulation tasks in the lab, which are likewise influenced by situational factors (Laborde & Mosley, 2016). It remains to be seen whether this also applies to more global questionnaire measures, as D. P. Williams et al. (2015) did present their self-report measures in the same lab session that was also used to measure vmHRV. Additionally, there is some evidence that heart rate variability reactivity (i.e., in reaction to an emotion-eliciting event) rather than resting heart rate variability may be more strongly associated with self-regulation (Laborde & Mosley, 2016), a possibility that is currently being investigated in a second study within the research project in which this study was conducted.

This preliminary study offers two further methodological hints for future studies. First, as the mean heart rate measured at the lab was significantly higher than the heart rate measured by the participants themselves at home, it might be useful to include a resting period before the baseline measure, as has also been suggested by Zahn et al. (2016), because higher heart rates permit less time for variability between heartbeats and thus reduce heart rate variability (McCraty & Shaffer, 2015).

Second, while it may be more comfortable for many participants to place the electrodes on their torso themselves and to avoid having to undress in front of and be touched (even if indirectly) by a stranger, it was evident from the ECG waveforms that the actual placement of the electrodes differed widely between the participants. Therefore, in studies in which the participants are merely seated at a table and do not move much, Einthoven's leads, which are placed on the limbs, may be

preferable, despite the recommendation of Massaro and Pecchia (2019) to place the electrodes on the torso so as not to unduly restrict movement. If the electrodes are placed on the limbs, the correct placement of these leads can be checked by the experimenter without causing much embarrassment in most participants.

Finally, regarding the relationships between emotion regulation and cardiac coherence, an experimental training study design using existing methods for increasing cardiac coherence such as paced-breathing supported by biofeedback (see McCraty & Shaffer, 2015, for a review), or the intentional generation of low arousal positive emotions (McCraty et al., 2009) in the experimental group, may be more appropriate. These interventions could be followed by a lab measure of cardiac coherence and an experimental emotion regulation task (see Christou-Champi et al., 2015, for a similar study design using reappraisal training and the RMSSD as a measure of vmHRV). This would reflect that cardiac coherence is a state rather than a trait and thus likely to be more strongly correlated with state measures of emotion regulation rather than with a global measure such as the CoERS used in this study.

9.3.2 Conclusion

Whereas this study lacked to power to find effects between vmHRV and cardiac coherence and emotion regulation, several important methodological insights could be gleaned for future studies, which are needed to further investigate these relationships.

10 General Discussion

This dissertation focuses on leader self-regulation, or more specifically: leader emotion regulation and self-leadership. First, I used existing theories (mainly control theory, Carver & Scheier, 1998, and the levels of self-regulation described by Lord et al., 2010) to disentangle four central theoretical concepts related to self-regulation: self-regulation itself, which encompasses the three other concepts; emotion regulation, which refers to influencing one's emotions; self-control, which refers to inhibiting unwanted impulses; and self-leadership, which refers to self-regulation toward the completion of tasks. These theoretical deliberations were necessary to develop two new questionnaire measures for assessing emotion regulation and self-leadership not as emotion regulation and self-leadership strategy use, but through indicators of self-regulation success with regard to emotions and tasks, respectively.

Second, I follow the recent developments in emotion regulation research which stress the necessity of a flexible use of different, contextually appropriate emotion regulation strategies for successful emotion regulation (e.g., Aldao et al., 2015; Bonanno & Burton, 2013). I extend this concept of regulatory flexibility (Bonanno & Burton, 2013) to the study of self-leadership, which has been previously focused on the use of different groups of self-leadership strategies (Goldsby et al., 2021; Harari et al., 2021). A consequence of regulatory flexibility is that self-regulation success can be context-dependent, as one may be able to use strategies that are adaptive in one context, but not in another. Therefore, the two self-regulation measures developed for this dissertation focus on indicators of successful emotion regulation and successful self-leadership particularly with respect to the work context. Additionally, I specifically focused on indicators that could be observed or judged by others, to enable future research on the follower perspective on leader self-regulation and to make self-ratings easier.

Third, I began to validate the two new measures in Studies 1 and 2. Whereas both scales generally showed some promise, the new self-leadership may need some further scale development in the future.

Fourth, I conducted a mixed-source correlational study with leader–follower dyads regarding the consequences of the leaders' skills or deficits in emotion regulation and self-leadership which was based on affective events theory (Weiss & Cropanzano, 1996). In this study, emotion regulation and self-leadership were significantly positively associated with the constructive leadership style instrumental leadership and significantly negatively associated with active destructive leadership. Self-leadership was furthermore significantly negatively associated with passive destructive leadership (i.e., laissez-faire leadership). These results were consistent with previous findings in

Studies 1 and 2. The results regarding the outcome of follower job satisfaction were somewhat mixed, as is discussed in the next sections.

The final research question of this dissertation referred to potential physiological correlates of emotion regulation. Whereas the model of neurovisceral integration (Thayer & Lane, 2000, 2009) predicted that heart rate variability measures would be associated with the capacity for emotion regulation, I could not detect any associations between emotion regulation and three heart rate variability measures, which included the measure of cardiac coherence. However, this study allowed me to draw several methodological conclusions for future studies on this research question.

10.1 Theoretical and Methodological Contributions

Conceptual clarity is necessary for the development and communication of theories, as well as for adequate operationalizations of the concept, and for the study of its antecedents, correlates, and consequences (Podsakoff et al., 2016). Therefore, one major contribution of this dissertation is the development of a clear definition of self-leadership, which heavily draws on the early definition by Manz (1986) and rejects both the more recent attempts to stretch the concept almost beyond recognition (see Section 3.5.4) and the inconsistent efforts to subsume related concepts under the term self-leadership (see Section 3.5.5). These previous efforts extended the concept into an umbrella term even though, with self-regulation, such a concept already existed. The theoretical framework of self-regulation developed in Chapter 3 further provides clarity regarding some of the attributes that self-regulation, self-leadership, self-control, and emotion regulation share and in which attributes they differ from each other (see Section 3.5.6).

The second major contribution of this dissertation is the rationale behind the construction of the two new scales for successful emotion regulation and self-leadership, because adequate operationalizations are just as important as conceptual clarity (Dasborough et al., 2021) and the frequent lack thereof may be at the core of the harsh recent criticisms regarding the unreflected use of questionnaires in organizational research (e.g., Fischer et al., 2020).

The three main points of this rationale, which specifically refer to the assessment of successful self-regulation, are a) that it is not sufficient to measure strategy use, if one wishes to assess self-regulation success, because from the mere use of a strategy does not follow that the strategy is successful or even that the strategy is used correctly (Bertrams & Dickhäuser, 2009; Gross, 2015; Troy et al., 2017); b) that the context in which self-regulation occurs needs to be taken into account (see Section 3.4.6); and, drawing on the realistic accuracy model (Funder, 1995, 2012) c) that the accuracy of both self- and other-ratings can be improved if the indicators for self-regulation success can be easily observed by others. This latter point is especially important if

automatic regulation is also of interest, such as with emotion regulation. All three principles can be easily applied to other populations and contexts.

The rationale further includes five more general points: a) where feasible, scales should be kept as short as possible to increase the overall data quality of surveys (Galesic & Bosnjak, 2009), for example by refraining from the use of several very similar items; b) item wordings should be clear and easy to understand (Clark & Watson, 1995); c) when assessing socially undesirable behaviors, such as instances of emotion regulation failures, items can be phrased in a manner so that it is easier to admit to such behaviors; d) absolute statements should be avoided, because their endorsement depends on a number of factors that are typically unrelated to the construct one whishes to assess (Al-Mosaiwi & Johnstone, 2018; Batchelor & Miao, 2016; Zettler et al., 2016); and e) only the most promising items that fulfill all other criteria should be used when presenting the first version of the new scale to a large sample. The reasons for this last point are courtesy toward the participants and the avoidance of scales that are too well-fitted to one sample as a result of empirical item selection.

Needless to say, most of these points are not new, but even though it should be self-evident that using unclear item wordings defeats the purpose of any scale, many scales exist that use double-barreled items (most popular with scales that assess the Big Five) or that have item wordings that are either unclear or difficult to understand. An example of the latter would be the item “I am conscious of the cultural knowledge I use when interacting with people with different cultural backgrounds” from the Cultural Intelligence Scale (Ang et al., 2007) that is widely used to assess intercultural competence. This item is easy to understand for populations with a scientific background in intercultural psychology and related fields, but almost unintelligible even for otherwise highly educated persons.

The third major contribution of this thesis are the empirical results of Studies 1 to 3 which demonstrate that leader self-regulation is associated with different constructive and destructive leadership styles and that this is not only the case for same-source follower assessments, which were also examined in Studies 1 and 2, but also for mixed-source data. This latter finding is especially noteworthy with regard to the associations between self-leadership and leadership, because the results of previous mixed-source studies—which mostly used the traditional operationalization of self-leadership as strategy use—were very inconsistent (Brown & Fields, 2011; Crossen, 2015; Furtner et al., 2013). Additionally, the previous findings regarding the associations between leader self-regulation and destructive leadership (Yam et al., 2016; Zhang & Bednall, 2016) could be extended to successful emotion regulation. Finally, I also found significant associations between leader emotion regulation and instrumental leadership—a relationship that has not been examined previously. Importantly, as the multidimensional (Mayer et al., 2000) concept of

emotional intelligence is rather controversial (Ashkanasy & Humphrey, 2011; Cherniss, 2010; Dasborough et al., 2021; Locke, 2005), the concept of emotion regulation can serve as a more neutral and more clearly defined alternative for organizational research, as has been demonstrated theoretically and empirically in this dissertation.

The fourth major contribution of this thesis is that I simultaneously assessed both constructive and destructive leadership styles in Study 3, which only few studies have done before (Glasø et al., 2018). In the past, some such studies supported the "bad is stronger than good"-hypothesis of Baumeister et al. (2001), such as Skogstad et al. (2014) for follower job satisfaction, while in a different study only constructive, but not destructive leadership was significantly related to follower job satisfaction (Fors Brandebo et al., 2019). In Study 3, instrumental leadership turned out to be central to follower job satisfaction: Whereas leader emotion regulation was positively associated with follower job satisfaction, only an indirect effect of leader self-leadership on follower job satisfaction via instrumental leadership (but not laissez-faire leadership) that approached statistical significance at $p = .06$ could be found in the structural equation model.

Likewise, the effect of emotion regulation on job satisfaction was not mediated by active destructive leadership, as I had hypothesized, but—unexpectedly—by instrumental leadership. Therefore, the constructive leadership style instrumental leadership proved to be most relevant for mediating the effects of leader self-regulation on follower job satisfaction and the dominance of bad over good (Baumeister et al., 2001) was not supported in this dissertation. Furthermore, it appears that not only potential deficits in leader self-regulation are important antecedents of destructive leadership behaviors (Collins & Jackson, 2015; Krasikova et al., 2013; Tepper et al., 2017), but that there is also a positive association between leader self-regulation and constructive leadership, which can be explained by affective events theory (Weiss & Cropanzano, 1996), as is briefly reiterated in the next section together with avenues for future research.

10.2 Limitations and Future Research

Past research has shown that the behavior of leaders is a source of both positive and negative affective events for followers (Dasborough, 2006; Gibson & Callister, 2010). As I argued in Section 4.3.2, leader self-leadership and leader emotion regulation can be viewed as part of the work environment within affective events theory (Weiss & Cropanzano, 1996), as both increase the likelihood of affective work events for the followers. According to affective events theory, the affective reactions of the followers to those affective work events influence the followers' job satisfaction. Furthermore, I argued that the direct path from work environment to job satisfaction in the model might also be relevant, as followers might cognitively evaluate their leaders more favorably if the leaders self-regulate successfully. As neither leader emotion regulation nor leader

self-leadership had a direct effect on follower job satisfaction after controlling for leader education level, follower gender, and constructive and destructive leadership, this presumed cognitive route was not supported in Study 3.

However, while affective events theory is generally well supported empirically (Ashkanasy & Humphrey, 2011), I did not examine follower affective reactions to either leader affect or leader behaviors (including, but not limited to constructive and destructive leadership) in Study 3. In Section 4.3.2, I proposed three paths through which leaders' emotions can influence followers' emotions. The first two paths via emotional contagion and via leadership behaviors have received some previous empirical support: Clarkson et al. (2020) found that emotional contagion among leaders and follower does occur and that it is likely to be stronger in followers who are susceptible to emotional contagion. Furthermore, Dasborough (2006) found that leaders who showed constructive leadership behaviors evoked positive emotions in followers, while inappropriate and destructive leader behaviors caused negative emotions. The third theoretical path, in which followers judge their leader's mood as conducive or detrimental to their personal goals (such as asking for a raise or leaving early), has, to my knowledge, not been studied to date.

Therefore, future research might include these three paths to determine their comparative relevance. Of course, a different research design would be needed to untangle the different paths: Event-based experience sampling, triggered by any affective reactions to a follower's leader that are noticed by the follower, would be ideally suited to study these different mechanisms. Experience sampling is generally a very promising method because substantial amounts of variance in both emotion regulation (Brans et al., 2013; Catterson et al., 2017; English et al., 2017; Haines et al., 2016; Scott et al., 2012) and destructive leadership (e.g., Barnes et al., 2015) occur within person.

Such a follower-focused study would also be better suited to further investigate the differential effects of constructive vs. destructive leadership, as leader–follower dyads with interpersonal conflicts resulting from or leading to destructive leadership behaviors may be less likely to participate in a study together than the follower on their own. Therefore, destructive leadership behaviors may be underrepresented in studies based on leader–follower dyads such as Study 3.

Other than emotional contagion as a potential moderator within the emotional-contagion path proposed above, it might be useful to include follower perceptions regarding the intentions behind a leader's destructive behaviors as a moderator, because (seemingly) intentional destructive behaviors may evoke stronger negative affective reactions than unintentional destructive behaviors such as thoughtlessness (Einarsen et al., 2007; Schyns & Schilling, 2013).

The significant interaction effect of (perceived) leader and follower self-leadership on follower job satisfaction in Study 2, with matching high levels of self-leadership being associated with higher job satisfaction, also warrants further studies and the introduction of follower self-leadership as a moderator in the model outlined above. If this effect can be confirmed or possibly extended to work teams, the results have significant practical consequences for leader and personnel selection as well as for human resource development through self-leadership trainings.

Two obvious limitations that concern all four studies in this dissertation are that only convenience samples were used, which limit the generalizability of the findings to other populations, and that only correlational research designs were used, so that no causal relationships can be inferred from the results. However, whereas some proposed mechanisms within the theoretical research model of this thesis such as emotional contagion can be and have been (e.g., Barsade, 2002) studied experimentally, the complex reality of work life and leader–follower interactions over time cannot adequately be captured in experiments. Additionally, strictly speaking, experiments only allow causal inferences regarding whatever experimental manipulation was used. Even if the experimental manipulation appears to be effective in a manipulation check, one cannot be certain if the manipulation truly had the intended effect or not. For example, an experimental manipulation of destructive leadership may be perceived as such and thereby cause a negative mood in a participant, or it may be viewed as a ridiculous attempt by the experimenters to mimic destructive leadership and a resulting perception by the participant that the experimenters must think them stupid enough to believe the farce, which may be the real cause of the resulting negative mood.

Therefore, even though experiments are currently being encouraged within organizational science (Antonakis, 2017; Podsakoff & Podsakoff, 2019), and as valuable as experiments are for basic psychological and behavioral research to establish narrow causal links, they offer only a description of reality, just as survey studies do. How useful these descriptions are, depends more on the research model and operationalizations used, than on the exact research method. Nevertheless, training studies with experimental designs might be useful to ascertain whether changes in leader self-regulation lead to changes in follower job satisfaction over time, as would be predicted by the mechanisms explained above, or if the trainings result in greater vmHRV, as would be predicted by the model of neurovisceral integration (Thayer & Lane, 2000, 2009).

Another potential limitation of the results of Studies 1 to 3 is the possibility of a common method bias (Podsakoff et al., 2003), as all measures in those studies were questionnaire measures. However, while the same-source relationships between leader self-regulation and constructive and destructive leadership were significantly stronger than the mixed-source relationships in both Studies 1 and 2, Study 1 first of all demonstrated the point made by Spector (2006) that using same-

source data does not automatically produce significant correlations. Second, apart from potential common method effects that may have caused some inflation in the size of the same-source relationships, the same-source follower-ratings refer to different situations and events than the leader self-ratings, because the follower is not always present or informed about the leader's behavior. Consequently, the mixed-source relationships may underestimate the true relationships.

For example, if a leader is annoyed by a particular follower and thus loses their temper with this follower more easily than with other followers, this particular follower will likely be more strongly affected by their perception that their leader has a volatile temper than by the leader's ability to self-regulate when dealing with other followers. This also illustrates that it may be the follower perceptions of a leader's self-regulation that matter more to the followers' job satisfaction rather than the leader's overall self-regulation. Therefore, the size of the true effects is likely to be somewhere in between the same-source and mixed-source estimates (excluding other biases such as the reliabilities of the scales).

The addition of physiological measures such as vmHRV in lab studies or, using portable devices, within natural organizational settings, would deter common method effects by introducing a second method. However, physiological measures and self-reports can be differently affected by unconscious processes (Kraus & Mendes, 2014), which might introduce a new bias that leads to an underestimation of the effects in question.

One final limitation is that only three of the four dimensions of instrumental leadership were used in this dissertation. Therefore, it remains to be seen if the results can be replicated and extended to all four dimensions.

10.3 Implications for Practice

The adverse consequences of destructive leadership, such as on follower job satisfaction, turnover intentions, and performance, are well-documented (Mackey et al., 2017; Mackey et al., 2021; Schyns & Schilling, 2013; Zhang & Liao, 2015). Although the antecedents of destructive leadership are complex (Krasikova et al., 2013; Tepper et al., 2017), even measures that result in only small reductions in destructive leadership very likely financially pay off for an organization (Tepper et al., 2006). In this dissertation, leader emotion regulation and self-leadership were consistently negatively associated with active destructive leadership and self-leadership was further negatively associated with passive destructive leadership. Additionally, emotion regulation and self-leadership were related to instrumental leadership, which in turn influenced follower job satisfaction.

Therefore, organizations may want to identify (e.g., through staff surveys) current leaders who have deficits in these areas to offer them targeted training measures (e.g., Berking, 2010;

Berking & Whitley, 2014, for emotion regulation and van Dorssen-Boog et al., 2021, for self-leadership) and to keep these two skills in mind when selecting future leaders. In this way, destructive leadership can be reduced, and leadership effectiveness increased through fostering constructive leadership (Antonakis & House, 2014; Judge & Piccolo, 2004; Rowold, 2014). In doing so, practitioners should note that it is unlikely that leaders show only destructive leadership behaviors, but rather that they are likely to use both constructive and destructive leadership (Tepper et al., 2017) and are thus already capable of both.

The two new scales developed for this dissertation that assess successful emotion regulation and self-leadership are not suitable for personnel selection, because their psychometric properties do not permit their use for diagnostic purposes. However, they may be of use as screening instruments in staff surveys where the ratings of multiple followers per leader can be aggregated. These ratings can also be supplemented with opportunities for comments in a text box within the survey or with additional information from a leader's own supervisor.

Another way to identify leaders who might need self-regulation training would be the introduction of a strictly confidential online or offline suggestion box for all employees and clear organization-wide communication that the use of this suggestion box is encouraged if the employees have any grievances to report that they would not feel comfortable to discuss in person. This communication would obviously need to be supported by observable actions taken in response to messages that are received via the system to convey the willingness to make organizational changes. Online suggestion boxes may be preferable to offline suggestion boxes because employees may fear that they will be observed while using an offline box and an online version may offer the opportunity for the human resources department to directly respond to an employee while their anonymity is preserved.

The results in Study 2 further indicate that followers with difficulties in self-leadership of their own may be less affected by leaders who struggle with self-leadership, at least with regard to their job satisfaction. Therefore, it might be beneficial to organizations to seek to match leaders and followers (and thus also co-workers within the leader's team) with regard to their self-leadership skills through personnel selection, self-leadership training for followers, and reorganizing work teams in cases where conflicts in this area cannot be solved otherwise, if these results can be confirmed.

10.4 Conclusion

Although partially theoretical and technical in nature, the ultimate goal of this dissertation was to back casual personal observations that destructive leadership appeared to be related to deficits in self-regulation with empirical results. As it turned out, leader emotion regulation and

leader self-leadership were indeed related to constructive and destructive leadership styles. Both types of leader self-regulation further indirectly affected follower job satisfaction via instrumental leadership, providing further illustrations of the relevance of leader self-regulation for leader selection and training. Two new measures for assessing successful emotion regulation and self-leadership were developed and introduced in this dissertation, which provide new opportunities for future research, and which may also be of practical use within organizations for identifying leaders who may benefit from self-regulation trainings. Finally, future research may benefit from the theoretical distinctions between the four concepts of self-regulation, self-control, self-leadership, and emotion regulation that were developed in this dissertation.

11 References

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Appendix A: CoERS-German

Table 49

German Version of the Contextual Emotion Regulation Scale (CoERS)

Item	Coding	Self-Rating	Other-Rating
1	-	Wenn jemand einen groben Fehler gemacht hat, kann ich schon mal laut werden.	… wird schon mal laut, wenn jemand einen groben Fehler gemacht hat.
2	-	Manchmal sage ich in Konfliktsituationen etwas, das ich später bereue.	… sagt in Konfliktsituationen manchmal Dinge, die unangebracht sind.
3	+	Wenn ich schlechte Laune habe, lasse ich mir das nicht anmerken.	… lässt es sich nicht anmerken, wenn sie schlechte Laune hat.
4	+	Auf der Arbeit habe ich meine Gefühle (fast) immer im Griff.	… hat ihre Gefühle auf der Arbeit (fast) immer im Griff.
5	-	Ich habe starke Stimmungsschwankungen, gegen die ich nicht viel ausrichten kann.	… hat starke Stimmungsschwankungen, die man ihr deutlich anmerkt.
6	-	Wenn ich bei meiner Arbeit von jemandem gestört werde, reagiere ich manchmal gereizt.	… reagiert manchmal gereizt, wenn sie bei der Arbeit von jemandem gestört wird.

Note. Scale instruction: “Bitte denken Sie bei den folgenden Fragen an Situationen *auf der Arbeit* (nicht in der Freizeit).” Scale anchors: 1 = *trifft gar nicht zu* to 7 = *trifft voll und ganz zu*. Item stem for the other-ratings: “Die Führungskraft, die ich einschätze…”.

Appendix B: SSLQ-German

Table 50

Original 12-Item German Version of the Successful Self-Leadership Questionnaire (SSLQ)

Item	Coding	Self-Rating	Other-Rating
1	**+**	**Ich weiß genau, welche Aufgaben (die mich betreffen), in der nächsten Zeit anstehen.**	**… weiß genau, welche Aufgaben (die uns beide betreffen), in der nächsten Zeit anstehen.**
2	-	Ich habe das Gefühl, auf der Arbeit [im Studium] ständig nur auf Aufgaben zu reagieren, die von außen auf mich „hereinprasseln“.	… wirkt manchmal überfordert von den ganzen Aufgaben, die von außen an sie herangetragen werden.
3	-	Ich kann schlecht „nein“ sagen, wenn andere mich um etwas bitten, was ich eigentlich nicht tun möchte.	… kann schlecht „nein“ sagen, wenn sie um etwas gebeten wird.
4	**+**	**Ich schaffe es (fast) immer, vereinbarte Fristen einzuhalten.**	**… hält vereinbarte Fristen (fast) immer ein.**
5	**+**	**Ich bin (fast) immer pünktlich.**	**… ist (fast) immer pünktlich.**
6	-	Ab und zu vergesse ich Termine, wenn mich niemand anderes daran erinnert.	… vergisst manchmal Termine, wenn sie niemand anderes daran erinnert.
7	-	Ich fange oft zu viele Aufgaben gleichzeitig an.	… fängt oft zu viele Projekte gleichzeitig an.
8	**+**	**Ich bin sehr gut organisiert.**	**… ist sehr gut organisiert.**
9	-	Manchmal verzettele ich mich mit meinen Aufgaben.	… verzettelt sich manchmal mit ihren Aufgaben.
10	**+**	**Wichtige Aufgaben erledige ich möglichst direkt.**	**… erledigt wichtige Aufgaben möglichst zeitnah.**
11	-	Unangenehme Aufgaben schiebe ich öfter so lange vor mir her, bis die Zeit knapp wird.	… schiebt unangenehme Aufgaben öfter so lange vor sich her, bis die Zeit knapp wird.
12	-	Notwendige Veränderungen zögere ich oft hinaus (z. B. neue Technik, Veränderungen in den Arbeitsabläufen).	… zögert notwendige Veränderungen (z. B. neue Technik, Veränderungen in den Arbeitsabläufen) oft hinaus.

Note. Scale instruction for self-ratings: “Wenn Sie an Ihre **Arbeit** [an Ihr **Studium**] denken, wie sehr stimmen Sie den nachfolgenden Aussagen zu?“. Instruction for other-ratings: „Wie sehr stimmen Sie den nachfolgenden Aussagen zu?“. Item stem for other-ratings: „Meine Führungskraft… / Die Person, die ich einschätze…“. Scale anchors: 1 = *stimme überhaupt nicht zu* to 7 = *stimme voll und ganz zu*, only for other-ratings: -99 = *kann ich nicht beantworten*. Items in bold face were included in the final 5-item version of the SSLQ.

Appendix C: Short Version of the RSLQ-D (Andreßen & Konradt, 2007)

Table 51

Correlations of the 21-Item- and 7-Item-Versions of the RSLQ with the Included Subscales

(Sub-)Scale	α	Global self-leadership (21 items)	Global self-leadership (7 items)	z_{diff}	p_{diff}
Global self-leadership (21 items)	.89				
Global self-leadership (7 items)	.71	.95			
Visualizing successful performance	.72	.76	.70	2.17	.02
Self-talk	.80	.81	.78	1.23	.11
Self-goal setting	.81	.62	.58	1.22	.11
Self-reward	.89	.63	.61	0.62	.27
Self-punishment	.80	.61	.59	0.61	.27
Self-observation	.73	.55	.52	0.87	.19
Self-cueing	.76	.66	.66	0.00	.50

Note. N = 62 leaders. RSLQ = Revised Self-Leadership Questionnaire. The difference tests refer to the magnitude of the correlation coefficients of the 21-item vs. the 7-item version of the RSLQ.

Appendix D: Inter-Item Correlations of the 12-item SSLQ

Table 52

Inter-Item Correlations of the 12-Item SSLQ Self-Ratings

Item	**1**	2 [a]	3 [a]	**4**	**5**	6 [a]	7 [a]	**8**	9 [a]	**10**	11 [a]	12 [a]
1	-	.26	-.01	**.51**	**.32**	.30	.11	**.64**	.06	**.37**	.03	.12
2 [a]	.26	-	.31	.26	.16	.20	.24	.15	.25	.19	.21	.20
3 [a]	-.01	.31	-	.08	.12	.17	.17	.03	.17	.10	.44	.34
4	**.51**	.26	.08	-	**.57**	.24	.18	**.60**	.11	**.59**	.20	.19
5	**.32**	.16	.12	**.57**	-	.29	.11	**.38**	.09	**.42**	.32	.20
6 [a]	.30	.20	.17	.24	.29	-	.29	.38	.35	.17	.17	.09
7 [a]	.11	.24	.17	.18	.11	.29	-	.19	.49	.03	.32	.28
8	**.64**	.15	.03	**.60**	**.38**	.38	.19	-	.12	**.62**	.29	.22
9 [a]	.06	.25	.17	.11	.09	.35	.49	.12	-	.08	.24	.28
10	**.37**	.19	.10	**.59**	**.42**	.17	.03	**.62**	.08	-	.39	.25
11 [a]	.03	.21	.44	.20	.32	.17	.32	.29	.24	.39	-	.51
12 [a]	.12	.20	.34	.19	.20	.09	.28	.22	.28	.25	.51	-

Note. Leader self-ratings in Sample 1 with *N* = 81. Items in bold were selected for the 5-item SSLQ. Bold correlation coefficients show intercorrelations between the selected items.

[a] Reverse-coded item.

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[29] i.e., funny phrasings in student papers