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Effectiveness of online self-leadership training on leaders' self-leadership skills and recovery experiences

Julia Krampitz
Institute of Psychology, University of Innsbruck, Innsbruck, Austria

Julia Tenschert and Marco Furtner
Institute for Entrepreneurship, University of Liechtenstein, Vaduz, Liechtenstein

Joachim Simon
European Mentoring and Coaching Council, Brussels, Belgium, and

Jürgen Glaser
Institute of Psychology, University of Innsbruck, Innsbruck, Austria

Abstract

Purpose – The purpose of this study is to investigate the effectiveness of online self-leadership training (OSLT) in promoting leaders' self-leadership skills and recovery experiences.

Design/methodology/approach – A non-randomized controlled trial was conducted under two conditions: a standardized seven-week OSLT (N = 43) and a control without any intervention (N = 42). All participants (N = 85) completed standardized questionnaires measuring self-reported self-leadership skills and recovery experiences. Additionally, participants in the intervention group were assigned to invite one team member each (N = 26) to assess their leaders' pre-post self-leadership skills and pre-post leader–member exchange.

Findings – Significant interaction effects of time and group and increases in the OSLT group (t1 vs t2) in self-leadership skills (cognitive and natural reward strategies) and recovery experiences (detachment and relaxation) indicated the effectiveness of OSLT training. Significant improvements in self-leadership skills and leader–member exchange were reported by team members of leaders in the OSLT group.

Originality/value – To the best of the authors' knowledge, this study was the first to examine the effectiveness of OSLT for leaders in business contexts in a controlled before-after intervention design. The findings of this study revealed improvements in self-leadership skills and recovery experience because of OSLT.

Keywords Self-leadership skills, Online training, Controlled intervention, Effectiveness, Recovery experiences, Leader–member exchange

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1. Introduction

While a plethora of definitions for self-leadership exist, Knotts *et al.* (2022, p. 1) stated that "[. . .] whereas the predominance of leadership research has focused upon top-down influence processes, we examine the process of leading from the inside out", thus enabling internal-based self-influencing activities. Pioneers in the development of the basic concepts revolving around self-leadership undoubtedly include the sterling research performed by Neck, Manz and Sims and are described in detail below (Neck and Houghton, 2006; Neck and Manz, 1996; Neck and Manz, 2013; Manz and Sims, 1991). Adopting a more practical perspective, Stewart *et al.* (2011) described self-leadership to trigger cognitive processes and habits that are focused on objectives and actions. Concomitantly, individuals continuously scrutinize these particular cognitive processes and skills and re-evaluate their own influence on such objectives and actions (Stewart *et al.*, 2011). Through positive influence of thoughts and behavior, self-leadership directly aims at discovering the meaning of a specific task and, consequently, sparks a high level of interest, enthusiasm, fun and joy (Furtner and Baldegger, 2016). In this study, self-leadership training was based on genuine and substantial issues confirmed by participating leaders – such as being disconnected from team members or managing the rapid pace of current work. The self-leadership theoretical framework is based on the more common conceptualizations of social cognitive theory (Bandura, 1991) and control theory (Carver and Scheier, 1982). It is rooted in the literature on self-regulation (Carver and Scheier, 2012) and self-determination (Deci and Ryan, 1985). Self-leadership contains three main strategy dimensions:

(1) behaviour-focused strategies (self-goal setting, self-observation, self-reward, self-punishment and self-cueing);

(2) natural reward strategies (fostering intrinsic motivation); and

(3) constructive cognitive pattern strategies (visualizing successful performance, self-talk and evaluating beliefs and assumptions; Furtner *et al.*, 2018).

Potential learning outcomes of self-leadership trainings can be observed in three categories:

(1) performance improvements (through self-efficacy);

(2) stress/emotional regulation (or the reduction of subjective stress); and

(3) physical health improvements (Knotts *et al.*, 2022).

When Lucke and Furtner (2015) examined the effects of self-leadership training in a military context, they observed a reduction in subjective stress levels of self-leadership trained soldiers when compared to non-trained soldiers. Their intervention study demonstrated the ability to successfully train self-leadership and highlighted the reduction of subjective stress as a potential learning outcome of self-leadership training. Unsworth and Mason (2012) performed an experimental-based investigation which increased self-efficacy and reduced mental strain when compared to the control group. Physical health improvements following self-leadership training have also been reported by Bum's (2018) cross-sectional study involving 280 athletes, linking self-leadership, commitment to physical exercise and exercise adherence intention. The author concluded that all three domains of self-leadership (behaviour-focused strategies, natural reward strategies and constructive thought pattern strategies) markedly enhanced sport participants' commitment to exercise, following a self-leadership training. Self-leadership strategies can be a useful tool for individuals to enjoy their daily work activities more, demonstrate higher individual task performance and exhibit proactive leadership traits (Manz and Sims, 1991) while also acting as role models (Barbuto, 2005; Furtner and Hiller, 2013). Social learning theory states that individuals learn

their behavior in part by observing the behavior of competent role models and taking note of the social and instrumental consequences of that behavior (Bandura, 1977). This process allows individuals to learn constructively without being exposed to the potentially harmful consequences of direct learning and trial-and-error (Mans and Sims, 1991). In the workplace, leaders are most likely to possess characteristics of status, power and perceived competence that are typically associated with role models (Bandura, 1977). Leaders are influential role models because they occupy a central role in the organization, making their behaviors highly visible to employees (Ogunfowora, 2014).

Marques-Quinteiro *et al.* (2019) found in their intervention study that self-leadership training can be used as a valuable tool to help organizations improve employees' adaptive performance and job satisfaction, especially during organizational crisis. These direct measures and results concerning job satisfaction and performance have not yet been considered in the research field of self-leadership.

However, evidence of potential benefits of self-leadership training on individual recovery processes remain scarce. There is a dire need for empirical evidence with respect to beneficial effects of an online self-leadership training (OSLT) upon team leaders in terms of improved self-leadership skills and recovery from work and enhanced LMX with team members. The development of a novel body of proof regarding such relevant benefits for endowing the employment and corporate productivity environment will certainly be essential in promoting any form of intervention that further establishes self-leadership training as a core principle during daily corporate activities.

In addition, even though self-leadership can be trained (Furtner *et al.*, 2012; Lucke and Furtner, 2015; Neck and Manz, 2013), this has not yet been established for self-leadership training specifically for leaders.

Thus, this study sought to evaluate the effects of online-based self-leadership training on leaders in a controlled intervention. Expected outcomes include leaders' improved self-leadership skills (i.e. behaviour-focused strategies, natural reward strategies and constructive cognitive pattern strategies) and recovery. Further, we expect self-leadership training to improve relationships between leaders and team members in terms of leader–member exchange (LMX). To our knowledge, this is the first study to evaluate the effectiveness of leaders' self-leadership training in operational business settings through a controlled before-and-after study with multi-sourced data.

2. Review and hypotheses

Godwin and Hershelman (2021) defined cognitive self-leadership as the practice of positive assertions, self-talk and mental imagery to enhance personal performance, possibly enforcing this through combination with individualized gratitude mindset projections (for interpreting specific events or as a consistent daily train of thought).

Thompson (1992) focused on the effect of cognitive-based self-leadership training on a cohort of executives, particularly regarding self-awareness and individual thought patterns. Results showed that such a training allowed leaders to create novel thoughts altering core beliefs and facilitating the purpose of their daily duties as executives within an organization.

Natural-reward self-leadership concerns positive perceptions and experiences associated with the tasks to be accomplished. The leader identifies specific rewards embedded within the work-related situation to generate a level of competency and fulfilment like when one finds a reward in engaging with tasks and activities that are highly enjoyable (Boonyarit, 2021).

Social self-leadership refers to the practice of using empathy, positive influence, accountability and health-oriented social skills by the leader within the work team (Pihl-Thingvad, 2014).

Leaders who practice self-leadership have enhanced cognitive processes and can successfully use psychological resources to accomplish their objectives (Harunavamwe *et al.*, 2020). Highly engaged leaders are more energized, have a greater connection to their work-related activities, believe they can fulfil complicated job demands and have more commitment to their organizations. Self-awareness also increases through the process of learning or enhancing self-leadership skills. OSLT can augment such powerful skillsets within leaders once the tools are formally recognized through lectures or other learning materials, leading to the following hypotheses:

H1a. Online self-leadership training increases the self-reported self-leadership skills of leaders.

H1b. Online self-leadership training increases the leadership skills of leaders reported by team members.

2.1 Recovery experiences (relaxation, detachment and control of leisure time)

According to Hobfoll's (1998) Conservation of Resources Theory, personal stress can deplete mental and emotional resources to the extent of jeopardizing physical health, unless daily stress recovery procedures allow a person to discharge and recover consistently. Personally perceived stress level, well-being and work performance are strongly related to someone's ability to relax through psychosocial activities (Sonnentag, 2001). While individual preferred diversions vary, the effect of appropriate leisure seeking is consistent in that they all achieve psychological detachment, relaxation and self-control (Sonnentag and Fritz, 2007). This recovery process entails that physical and psychological systems exposed to stress revert to their unburdened state and become capable of additional exposure (Meijman and Mulder, 1998).

Self-leadership positively correlates with stress management competencies and resilience (Lovelace *et al.*, 2007; Schraub, 2011; Houghton *et al.*, 2012; Altenhöner *et al.*, 2014; Pietilä, 2019). If resilience is regarded as a capacity and as an individual's positive psychological state of development (Luthans *et al.*, 2007), then it can be assumed that high or more highly developed self-leadership competencies (e.g. self-control as a subcomponent of psychological capital; Luthans *et al.*, 2007) go hand in hand with increased resilience (Britt *et al.*, 2016; Vanhove *et al.*, 2015).

Unsworth and Mason (2012) focused on evaluating the utility of online self-leadership intervention training on the negative repercussions of strain in a sample of 71 volunteer employees working in government health departments. The online intervention course was 10-week long and consisted of multiple modules revolving around self-leadership concepts and exercises, such as natural rewards and cognitive self-leadership, together with experiences of self-efficacy and positive affect for mitigating individual strain levels. Following course completion and a post-training survey, all employees who successfully completed the OSLT intervention demonstrated significant changes in handling personal strain at work when compared to the control group.

In addition, two cross-sectional investigations by Dolbier *et al.* (2001) focused on the possible links between the practice of self-leadership and increased psychological, health and work-related outcomes in two populations of 270 university undergraduates and 160 corporate employees. For undergraduate students, self-leadership skills implementation was linked to increased psychological functions, such as coping skills, optimism and recovery, and reduced distrusting behavior, together with an overall increase in well-being and health. For corporate employees, the implementation of self-leadership skills was linked to enhanced

feelings of job gratification, promotion of communication channels with team members, increased management skills, stronger bonding with colleagues, reduced stress levels and improved well-being.

Sonnentag and Fritz (2007) evaluated recovery experiences using a four-factor model. The first factor, psychological detachment, refers to the psychological and mental separation from work required for rehabilitation (Etzion *et al.*, 1998) and relates to temporary disengagement from job obligations for recovery purposes. Relaxation, the second factor, is a mental state that is often connected to leisure (active or contemplative) and is defined by a low level of mental and psychological activity combined with pleasant feelings (Stone *et al.*, 1995). Mastery experience, as the third factor, refers to challenging or educational activities conducted outside the workplace that motivate the individual and distract them from their everyday routines (Fritz and Sonnentag, 2006). The final factor, control over leisure time (leisure control), refers to individuals' experiences of self-determined leisure activities, promoting pleasant feelings and compensating for lack of personal power at work (Burger, 1989; Griffin *et al.*, 2002).

Recovery experiences have been effectively taught in various contexts (Scott *et al.*, 2017). Hahn *et al.* (2011) found that three consecutive recovery training sessions resulted in enhanced recovery competence, increased self-efficacy and sleep quality and decreased stress levels. Additional findings pointed to the possibility that collective training enhances an individual's rehabilitation experience (Cronise, 2016). Beshlide *et al.* (2015) and Taghipour *et al.* (2017) found that ten 2-h recovery training sessions with employees improved relaxation and enabled participants to feel mastery, mental detachment and control throughout the pre- to post-test period.

Additionally, online training aimed at equivalent recovery experience competencies proved effective in real-life scenarios (Feicht *et al.*, 2013).

The research described above demonstrates that training in self-leadership increases participants' mental and psychological well-being and reduces stress (Cronise, 2016; Taghipour *et al.*, 2017). Hence, we hypothesize:

H2. Online self-leadership training increases the self-reported recovery experience (detachment, leisure control and relaxation) of leaders.

2.2 Leader–member exchange

According to LMX theory, leadership is an interaction between at least two individuals (leaders and team members), which typically results in the formation of connections between the parties involved, which may be of high or poor quality. The stronger the connection, the higher its quality, which leads to greater work satisfaction, performance and overall well-being. Trust, loyalty and commitment are the defining characteristics of high-quality partnerships (Gerstner and Day, 1997).

According to research on super-leadership, the level of bonding between leaders and team members is significantly strengthened following super-leadership implementation (Hassan *et al.*, 2013). This super-leadership model stresses the need for leaders to lead themselves before successfully leading others (Pearce and Manz, 2005). Individuals should build personalized self-leadership qualities. Leaders employ their super-leadership conduct in the capacity of a coach and trainer; they establish objectives while also encouraging their team members to create their own. OSLT can possibly augment LMX by indirectly increasing rapport between the leader with increased self-leadership skills and their team members, because of the latter's perception of enhanced social and empathy skills demonstrated by the leader. To the best of our knowledge, no studies have examined the influence of self-leadership training on LMX dynamics.

Leaders who are enthusiastic and enjoy their work duties can have enhanced intrinsic motivational qualities facilitated by natural reward self-leadership. Consequently, such

leaders might emit additional benefits on LMX by motivating their team members, including the deployment of empathetic direction-giving and transmitting purpose to their team members. Such motivation-based LMX interactions might lead to a positive feedback cycle (Mayfield and Mayfield, 2009). Venus *et al.* (2013) supported such a bonding phenomenon when team members interact with enthusiastic and motivation-transmitting leaders.

Self-leadership skills, such as natural reward strategies, assist leaders by integrating pleasant and satisfying aspects into work tasks (Neck and Houghton, 2006). Regarding this motivational source, the actual task becomes naturally rewarding, as such leaders enjoy what they are doing. The behavioral traits of intrinsically motivated leaders are personally expressive, consequently serving as role models, inspiring team members to pursue their own self-leadership strategies (Barbuto, 2005). Thus, we hypothesize:

H3. Online self-leadership training increases leader–member exchange as reported by team members.

3. Method

3.1 Study design

A non-randomized controlled trial was conducted under two conditions: standardized self-guided OSLT and a control group without any intervention. Participants allocated to the control group were allowed access to the training following the post-treatment measures. All participants in the intervention group were assigned to invite one employee each for a team member rating as third-party feedback. All three groups (intervention group, control group and team members) were surveyed at two time points: t1 (pre-intervention) and t2 (seven weeks post-intervention termination). Only completed data sets were used for data analysis.

3.2 Participants and procedure

This study used different methods to recruit participants. The participants were recruited through in-person contact, target mailings and social media. Overall, 200 individuals responded to our invitation and were sent a link to an online screening to determine eligibility in line with the study's inclusion and exclusion criteria. This study included individuals who claimed to be currently working in leadership responsibility, who showed commitment to investing time in the online course, additional commitment to investing in coaching calls, accepting external feedback from team members, having preparedness to change, agreed to share their three greatest professional challenges and were motivated to improve their stress management and self-leadership skills. All information concerning the participant inclusion criteria was collected through online questionnaires. A total of 190 participants passed the screening procedure and provided written informed consent. Consequently, 163 participants returned the consent form and were allocated by controlled assignment to one of two treatment conditions: the OSLT group or the control group. Pretreatment questionnaires (t1) were completed by 82 participants in the intervention group and 81 in the control group. After seven weeks, 43 participants in the OSLT group and 42 in the control completed the post-treatment questionnaires (t2). Completed questionnaires were also available from 26 team members of leaders within the OSLT group at t1 and t2. Participants in the control group who did not engage in the training received identical questionnaires. A total of 85 leaders participated in the intervention study until their completion. As shown in Table 1, the intervention group consisted of 43 participants (26 female; age $M = 39.81$ and $SD = 8.10$ years; contractual working time $M = 37.92$ and $SD = 9.00$

hours/week; and effective working time including overtime $M = 46.42$ and $SD = 9.34$ hours/week) and the control group of 42 participants (17 female; age $M = 40.50$ and $SD = 9.58$ years; contractual working time $M = 38.67$ and $SD = 5.40$ h/week; and effective working time including over time $M = 45.41$ and $SD = 10.80$ h/week). A total of 26 team members (13 female; age $M = 34.85$ and $SD = 11.84$ years) participated in the intervention study.

3.3 Online-self-leadership training

Two primary strategies were used in this study: The first approach was asynchronous self-guided cognitive-behavioral training, often referred to as an "online course". The second approach was video-enabled live-online group sessions. The training focused on cognitive processes that contributed to the accurate reappraisal of challenging circumstances and behavioral practices for more effective resource management. The training modules aim to strengthen leaders' capacity for self-leadership and recovery experience.

Online training was accessible through personal computers, tablets or smartphones. The program lasted for seven weeks and consisted of six modules; each module included three lectures and one live online group discussion; and each lecture consisted of a lesson, a transfer exercise that allowed executives to apply their learning to real-world situations and a written reflection.

Each weekly module was structured around a theme and focused on self-leadership strategies, such as self-observation, self-efficacy, self-reflection, self-management, persistence, visualization methods, positive thinking, natural rewards, sense-rendering and self-goal setting. The six modules had a distinct developmental focus using behaviour-focused, constructive thought patterns and natural reward strategies. A detailed description of all modules and learning objectives can be found in the supplementary material.

3.4 Outcome measures

The leaders' questionnaire was developed to examine self-leadership as a primary outcome and recovery experiences (detachment, control and relaxation) as secondary outcomes. A questionnaire for team members was developed to assess leaders' self-leadership and LMX.

To measure self-leadership, we applied the Self-leadership Skills Inventory (Furtner, 2017) with 27 items. The Self-leadership Skills Inventory includes three central core dimensions:

(1) cognition-based strategies (e.g. "I spend time carefully analyzing myself") that encompass behaviour-focused and constructive thought pattern strategies (Houghton and Neck, 2002);

Table 1. Intervention effects (ANOVA) on self-leadership skills (reported by leaders)

	Pre-test		Post-test		*ANOVA* F		
Variables	IG *M (SD)*	CG *M (SD)*	IG *M (SD)*	CG *M (SD)*	*IG/CG*	*t1/t2*	*group * time*
Self-leadership							
Cognitive	3.83 (0.74)	4.01 (0.64)	4.65 (0.69)	4.02 (0.81)	2.45	34.34**	32.72**
Natural reward	3.63 (0.96)	3.99 (0.77)	4.16 (0.70)	4.53 (0.81)	0.00	50.14**	23.55**
Social	4.65 (0.62)	4.78 (0.70)	4.88 (0.65)	4.75 (0.70)	0.16	0.62	7.24**

Notes: $n = 85$; IG = intervention group, $n = 43$; CG = control group, $n = 42$; *M = mean; and (SD) = standard deviation.* $*p < 0.05$ *and* $**p < 0.01$*; F = F-value*

(2) natural reward strategies (e.g. "I try to incorporate some rewarding aspects into my tasks") with a positive focus, intrusion and success envision that are tied to emotion regulation mechanisms aimed at generating and maintaining intrinsic motivation; and

(3) social self-leadership strategies (e.g. "I encourage other group members to achieve the group's optimal objective") with group optimization and performance reference.

At t1 (α = 0.89) and t2 (α = 0.93), the total self-leadership scale revealed a high level of internal consistency. The participants rated the items on a six-point Likert scale ranging from 0 ("not at all") to 5 ("very often").

Recovery experiences were measured using items of scales by Sonnentag and Fritz (2007), which reflect psychological detachment (three items, e.g. "I forget about work"; α = 0.88), relaxation (four items, e.g. "I kick back and relax"; α = 0.83) and leisure control (three items, e.g. "I determine for myself how I will spend my time"; α = 0.90). Response options ranged from 1 ("strongly disagree") to 5 ("strongly agree"). In this study, subscales demonstrated high internal consistency at t1 (relaxation: α = 0.85; detachment: α = 0.90; and leisure control: α = 0.87) and t2 (relaxation: α = 0.89; detachment: α = 0.91; and leisure control: α = 0.89).

Participants reported their age (in years), sex (0 = male and 1 = female), effective working time (hours per week) and whether they were in a leadership position at work (0 = no and 1 = yes).

For the measurement of *team member ratings*, the Self-Leadership Other Rating Scale with nine items (one item per self-leadership dimension) was based on Houghton and Neck's (2002) as well as Andreßen and Konradt's (2007) original items. All items were rated on a six-point Likert scale ranging from 0 ("not at all") to 5 ("very often"; for example, "The leader consistently pursues the goals he or she has set for him or herself" and "The leader can motivate himself/herself very well"). The Self-Leadership Other Rating Scale *(team member rating)* demonstrated medium internal consistency at t1 (α = 0.68) and high internal consistency at t2 (α = 0.81).

The seven-item *Leader–Member Exchange scale* by Graen and Uhl-Bien (1995), translated by Schyns and Paul (2014), was used to measure LMX at t1 (α = 0.68) and t2 (α = 0.90) (e.g. "I have enough confidence in my supervisor to defend those decisions"). All items were rated on a five-point Likert scale. In this study, the LMX scale demonstrated sufficient to good internal consistencies at t1 (α = 0.78) and t2 (α = 0.90).

3.5 Data analyses

Before conducting the analysis over time, we tested whether the two groups differed at baseline (t1). We used only complete cases for analysis. To assess differences between groups over time, a mixed ANOVA for each dependent variable of interest was computed, with time as a within-subject factor (t1 and t2) and condition (intervention/control group) as a between-subject factor. In the case of a significant interaction effect, we further investigated this effect using post hoc tests (*t*-tests using a Bonferroni-Holm correction). We applied *t*-tests for repeated measures of the t1 and t2 scores for each group separately. To compare the intervention and control groups after treatment, a between-group *t*-test at t2 was used. The reported effect sizes are partial eta squared η_P 2(0.01 = small; 0.06 = medium; and 0.14 = large) in the case of analyses of variance and Cohen's d (0.30 = small; 0.50 = medium; and 0.80 = large; Cohen, 1988) in the case of *t*-tests. To assess changes over time in leaders' self-leadership and LMX, both reported by team members, we applied *t*-tests for repeated measures on t1 and t2. The level of significance was set at $p < 0.05$. All analyses were performed using SPSS (version 26.0; IBM Corp, 2019).

4. Results

The demographics and baseline variables for the intervention group (= IG) and control group (= CG) are shown in Table 2. Except for relaxation (IG: $M = 3.05$ and $SD = 0.77$; CG: $M = 3.84$ and $SD = 0.82$; t(83) = 2.50 and $p = 0.01$) and detachment (IG: $M = 2.44$ and $SD = 0.87$; CG: $M = 2.98$ and $SD = 0.89$, t(83) = 2.85 and $p = 0.01$), there were no significant differences between the two groups at baseline (Table 1).

4.1 Intervention effects on self-leadership

In *H1*, we proposed that OSLT positively affects leaders' self-leadership. ANOVA for *cognitive self-leadership* yielded differences between baseline and post-intervention, $F(1, 83) = 34.34$, $p < 0.001$, $\eta 2p = 0.38$, 95% CI [0.25, 1], but not between groups, $F(1, 83) = 0.00$, $p = 0.96$, $\eta 2p = 0.000$ 95% CI [0.00, 1]. In addition, the interaction effect between group and time was significant ($F(1, 83) = 32.72$, $p < 0.001$, $\eta 2p = 0.22$, 95% CI [0.10, 1]) . Post hoc tests indicated a difference between the intervention and control groups post-intervention, t(80.14) = −3.82, $p < 0.001$, $d = -0.85$ and 95% CI [−1.31, −0.39]. Cognitive self-leadership in the intervention group increased over time, t(42) = −8.01, $p < 0.001$, d = −1.24 and 95% CI [−1.63, −0.83], but not in the control group, t(41) = −0.10, $p = 0.92$, d = −0.02 and 95% CI [−0.32, 0.29]. These results support *H1a*.

ANOVA for *natural reward self-leadership* yielded differences between baseline and post-intervention, $F(1, 83) = 50.14$, $p < 0.001$, $\eta 2p = 0.29$ and 95% CI [0.16, 1], but not between groups, $F(1, 83) = 2.45$, $p = 0.12$, $\eta 2p = 0.003$ and 95% CI [0.00, 1]. In addition, the interaction effect between group and time was significant ($F(1, 83) = 23.55$, $p < 0.001$, $\eta 2p = 0.28$ and 95% CI [0.16, 1]). Post hoc tests indicated a difference between the intervention and control groups post-intervention, t(81.85) = −2.29, $p < 0.05$, $d = -0.51$ and 95% CI [−0.94, −0.06]. Natural reward self-leadership of the intervention group increased over time, t(42) = −7.11, $p < 0.001$, $d = -1.10$ and 95% CI [−1.47, −0.71] and, in the control group, t(41) = −2.09, $p = 0.05$, $d = -0.33$ and 95% CI [−0.64, −0.01]. The increase in natural reward self-leadership from t1 to t2 in the intervention group supports *H1a*.

ANOVA for *social self-leadership* yielded no significant differences between baseline and post-intervention, $F(1, 83) = 0.62$, $p = 0.43$, $\eta 2p = 0.00$ and 95% CI [0.00, 1] and not between groups, $F(1, 83) = 0.16$, $p = 0.69$, $\eta 2p = 0.00$ and 95% CI [0.00, 1]. The interaction effect between group and time was significant ($F(1, 83) = 7.24$, $p = 0.01$, $\eta 2p = 0.08$ and 95% CI [0.01, 1]). Post hoc tests indicated no significant difference between the intervention and control groups after intervention, t(79.37) = −1.49, $p = 0.28$, $d = -0.33$ and 95% CI [−0.66, −0.03]. Social self-leadership in the intervention and control groups did not increase over time, t(42) = −2.25, $p = 0.09$, d = −1.27 and 95% CI [−1.67, −0.86]; control group, t(41) = 1.51, $p = 0.28$, d = 0.24 and 95% CI [−0.08, 0.54]. The significant interaction effect was not sufficient to support *H1a*.

Table 2. Intervention effects (ANOVA) on recovery experiences of leaders

	Pre-test		Post-test		*ANOVA*		
	IG	CG	IG	CG	F		
Variables	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*IG/CG*	*t1/t2*	*group * Time*
Recovery							
Relaxation	3.05 (0.77)	3.84 (0.82)	3.66 (0.84)	3.58 (0.75)	1.20	25.43**	13.56**
Detachment	2.44 (0.87)	2.98 (0.89)	3.22 (0.74)	3.01 (1.05)	0.92	24.59**	21.13**
Leisure control	3.82 (0.77)	3.93 (0.65)	4.18 (0.71)	4.04 (0.71)	0.79	10.70**	3.14

Notes: *n* = 85; *IG = intervention group; CG = control group; M = mean; and (SD) = standard deviation.* *$p < 0.05$ and **$p < 0.01$; F = F-value*

For a visualization of the interaction effects, see Figure 1.

4.2 Intervention effects on self-leadership reported by team members

H1b proposed that the self-leadership of leaders reported by team members will increase after the OSLT. The results of *t*-tests revealed significant increases, t(26) = −2.18, $p < 0.04$, $d = -0.44$ and 95% CI [−0.84, −0.02]; t1: $M = 4.25$, $SD = 0.62$ and t2: $M = 4.49$ and $SD = 0.60$.

4.3 Intervention effects on recovery experiences

In *H2*, we proposed that the OSLT would positively affect leaders' recovery experiences (detachment, leisure control and relaxation). First, a *t*-test for independent samples for the three recovery experiences subscales at t1/Baseline showed no significant differences between the groups for *leisure control* ($p = 0.46$) but for *relaxation* ($p = 0.01$) and detachment ($p = 0.01$) (Table 2).

ANOVA for *relaxation* yielded differences between baseline and after intervention, $F(1, 83) = 25.43$, $p < 0.001$, $\eta 2p = 0.23$ and 95% CI [0.11, 1], but not between groups, $F(1, 83) = 1.20$, $p = 0.276$, $\eta 2p = 0.01$ and 95% CI [0.00, 1]. Additionally, the interaction effect between group and time was significant, $F(1, 83) = 13.56$, $p < 0.001$, $\eta 2p = 0.14$ and 95% CI [0.04, 1]. Post hoc tests indicated no significant difference between the intervention and control groups post-intervention, t(82.30) = −0.50, $p = 0.63$, d = −0.11 and 95% CI [−0.54, 0.32]. The intervention group increased over time, t(42) = −5.87, $p < 0.001$, $d = -0.91$ and 95% CI [−1.27, −0.54] but not in the control group, t(41) = −1.02, $p = 0.63$, d = −0.16 and 95% CI [−0.47, 0.15]. Both the group × time interaction effect and the increase in *relaxation* from t1 to t2 in the intervention group support *H2*. For a visualization of the interaction effects, see Figure 2.

ANOVA for *detachment* yielded differences between baseline and after intervention, $F(1, 83) = 24.59$, $p < 0.001$, $\eta 2p = 0.23$ and 95% CI [0.11, 1], but not between groups, $F(1, 83) = 0.918$, $p = 0.34$, $\eta 2p = 0.01$ and 95% CI [0.00, 1]. Additionally, the interaction effect between group and time was significant, $F(1, 83) = 21.13$, $p < 0.001$, $\eta 2p = 0.20$ and 95% CI [0.09, 1]. Post hoc tests indicated no significant difference between the intervention and control groups after intervention, t(73.37) = −1.06, $p = 0.59$, $d = -0.25$ and 95% CI [−0.71, 0.21]. Detachment in the intervention group increased over time, t(42) = −6.27, $p < 0.001$,

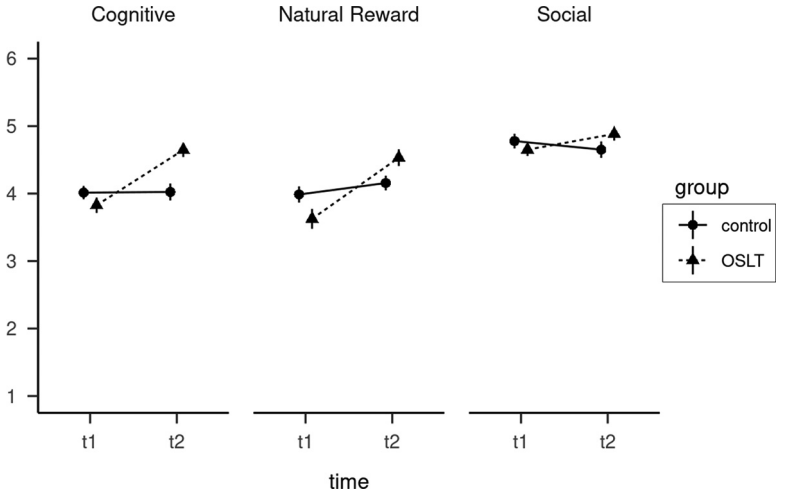

Figure 1.
Interaction effects of online-self-leadership training on self-leadership (reported by leaders)

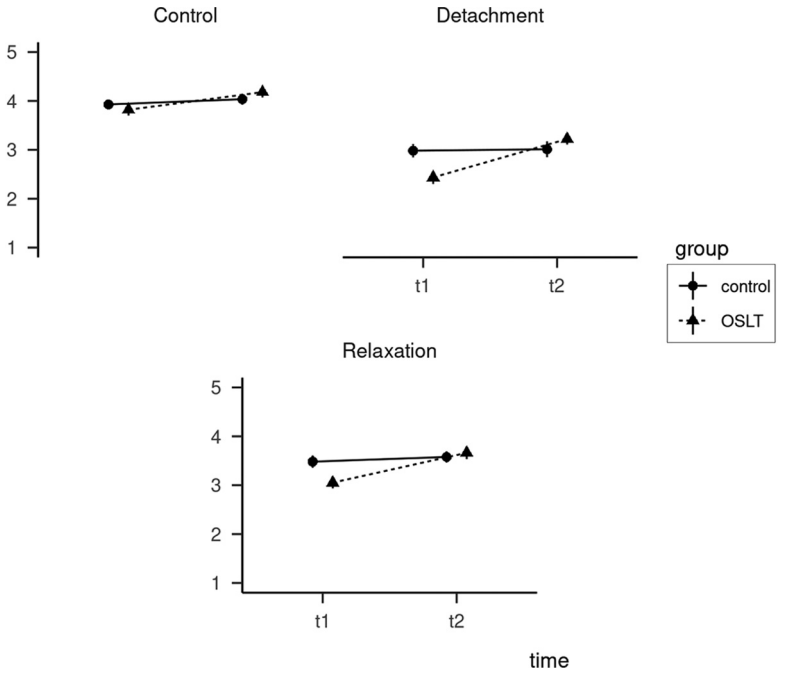

Figure 2.
Interaction effects of online-self-leadership training on recovery experiences (reported by leaders)

$d = -0.97$ and 95% CI [−1.33, −0.60], but not in the control group, t(41) = −0.28, $p = 0.78$, d = −0.04 and 95% CI [−0.35, 0.26]. The group × time interaction effect and increase in detachment from t1 to t2 in the intervention group support *H2*.

ANOVA for *leisure control* yielded differences between baseline and post-intervention, $F(1, 83) = 10.70$, $p = 0.002$, $\eta 2p = 0.11$ and 95% CI [0.02, 1] but not between groups, $F(1, 83) = 0.79$, $p = 0.90$, $\eta 2p = 0.00$ and 95% CI [0.00, 1]. The interaction effect between group and time was not significant ($F(1, 83) = 3.14$, $p = 0.08$, $\eta 2p = 0.04$ and 95% CI [0.00, 1]). Post hoc tests indicated no significant difference between the intervention and control groups post-intervention, t(82.95) = −0.94, $p = 0.60$, d = −0.21 and 95% CI [−0.64, 0.22]. Leisure control in the intervention group increased over time, t(42) = −3.61, $p = 0.002$, $d = -0.56$ and 95% CI [−0.88, −0.23] but not in the control group, t(41) = −0.11, $p = 0.60$, $d = -0.16$ and 95% CI[−0.47, 0.15]. Only the effect of an increase in *leisure control* from t1 to t2 in the intervention group partially supports *H2*.

4.4 Intervention effects on LMX reported by team members

H3 proposed that the OSLT improves LMX, as reported by team members. The results of the *t*-test for the dependent sample revealed a significant difference, t(26) = −2.55, $p = 0.02$ and $d = -0.51$; t1: $M = 80.37$ and $SD = 10.09$; and t2: $M = 84.23$ and $SD = 12.58$. Findings indicated that LMX reported by team members increased from t1 to t2. This supports *H3*.

5. Discussion

Our findings corroborate prior investigations, indicating that the OSLT has several beneficial effects on leadership abilities. *H1a*, concerning the positive effect of OSLT on leaders' self-leadership skills across multiple facets, was confirmed for cognitive and natural reward self-leadership, though not for social self-leadership, which failed to show significant

improvement over time. Previous studies have also identified natural reward self-leadership (Boonyarit, 2021) to be classified as an enhanced self-leadership skill. A selection of similar investigations has identified the promotion of social self-leadership skills with enhancements in empathy, positive influence, accountability and empowerment (Pihl-Thingvad, 2014). However, our study failed to improve social self-leadership using OSLT. This might be because of the predominant focus of our OSLT modules and exercises on individual, cognitive and natural reward strategies and a certain neglect of more social aspects of self-leadership in terms of positively influencing others in teams.

H1b, regarding the potential positive effect of OSLT upon improvements in leaders' self-leadership skills, as reported by team members, was confirmed by significant skills increase as perceived by team members. Despite the preliminary character of this finding (as discussed in the limitations), we attempted to address criteria for training evaluations on different levels (i.e. observable behavior) according to Kirkpatrick's (1998) evaluation approach. Future studies might strive to strengthen this approach by including more ratings by several team members, even in a control group, and might include objective indicators at the outcome level (e.g. the health and performance of leaders and team members).

H2, regarding the potential positive effect of OSLT on self-reported recovery experiences (detachment, leisure control and relaxation) of leaders, was confirmed for detachment and relaxation, although leisure control revealed no significant improvement after completion of the OSLT course. The success of self-leadership training also reduced workplace stress (Neck and Manz, 1996). We assessed recovery experiences (detachment, relaxation and leisure control) as potential secondary outcomes. According to previous studies and our results, self-leadership training seems to be a beneficial intervention for recovery from work as an important process for restoring necessary individual resources during leisure time (Meijman and Mulder, 1998; Sonnentag, 2001). Recovery experiences in our control group were either reduced or remained unchanged, whereas the OSLT intervention group exhibited marked improvements across all three domains. The most substantial improvement was observed in detachment from work. Consequently, OSLT-driven self-leadership skills can endow leaders with additional "healing experiences" and necessary psychological resources to avoid chronic tiredness or burnout in fast-paced and stressful careers (Sonnentag *et al.*, 2010; Unsworth and Mason, 2012). It is possible that we could not find significant improvements for leisure control, as this facet of recovery experiences might largely be influenced by other persons in the private setting of leaders (e.g. spouses or children), and additional effort might be necessary to reorganize responsibilities and interactions with other persons at home – a possible explanation in line with our interpretation of the non-significant effect of OSLT on social self-leadership in the workplace.

H3, regarding a beneficial effect of OSLT on LMX, was confirmed by the pre- and post-ratings of team members of OSLT participants. According to LMX theory, leadership involves continued interaction between at least two individuals (leaders and team members), forming a relationship of either high or poor quality. Respect, trust and commitment are characteristics of a high-quality partnership that are related to job satisfaction, performance and overall well-being for all parties involved (Gerstner and Day, 1997). Our findings align with previous evidence that LMX exhibits distinct improvements following self-leadership interventions (Kariuki, 2020). These findings suggest that a leader who demonstrates self-leadership skills can also promote LMX as a role model.

Our study adopted high-standard inclusion criteria for specific leadership responsibilities, with leaders engaging in ongoing methods of improving their self-leadership skills. Additionally, this study explored the feasibility of using a structured online training approach with limited personal contact. To do justice to strengthening validity (Yin, 2013), we suggest replications of our work in other organizational contexts or even within an organization. It would be promising

to establish a mixed methods approach to strengthen the quantitative survey with a qualitative assessment. Future studies should examine how the design and the expansion of possible meaningful predictors and outcomes (e.g. training motivation, health outcomes, coping with everyday hindrances, workload issues, personal, organizational, familial and community factors) can be extended (Britt *et al.*, 2016) to make further success criteria for self-leadership training tangible.

Overall, based on the ratings of leaders and their team members, our study indicated substantial improvements in self-leadership skills, leaders' recovery experiences and LMX. The OSLT course was effectively deployed as a primary intervention to promote self-leadership abilities in a virtual context. In our study, we cannot specify whether the exchange between the leader and the team members took place more online, offline or in combination. Because of the pandemic situation and depending on the branch, it can be assumed that the exchange in our sample was very heterogeneous. In future studies, this aspect should be included, as, among others, the study by Toscano, Zappalà and Galanti (2022) shows that good relationships with the supervisor in a new and challenging situation reduce well-being if they are coupled with weak coping skills. In this regard, it would also be interesting to explore whether specific self-leadership strategies are required to lead remotely in a particularly healthy way.

Further, the precise number of team members per leader should be surveyed. We have ensured via an item that personnel responsibility is present but have not asked for the precise number of subordinate employees.

Our findings are encouraging and merit further exploration using extended evaluation measures and follow-up periods to examine the sustainability of the beneficial effects.

5.1 Limitations and future research

This study does have limitations. First, our study lacked a randomized group assignment of participants to the intervention versus control group, which impeded our ability to attribute our findings to online self-training. Randomization is a decisive instrument to prevent selection bias and to ensure the internal validity of experimental manipulations (Higgins *et al.*, 2019). Despite striving for randomization, we had to resort to the next lower level of evidence by conducting a controlled before-after trial for organizational reasons (including company internals, day-to-day business, personnel planning and organizational environment). However, we are confident that the beneficial effects are attributable to the OSLT intervention. Thus, the scope of the current study was not to maximize internal validity but to maximize external validity and generalize previous results in a real-life situation. Nonetheless, future research may strive for random assignment to increase internal and external validity.

This study attempted to apply equitable justice to all self-leadership strategies in the program. Nevertheless, it should be critically examined in the future whether individual preferences or company-specific orientations can be integrated into the program and which self-leadership strategies are most relevant for actual leaders. For example, it could be reasonable to design bespoke programs for participants by applying a modular system, according to the baseline measurement, to focus on self-leadership weaknesses or on those facets that are necessary for organizational culture. Such a bespoke program design might be particularly suitable for the online-based variant and might boost individual learning effects because of targeted transfer tasks and linking-up with company-specific challenges while considering day-to-day business. The development of a good relationship characterized by trust, openness and respect should be emphasized, especially in a video-call scenario. Consequently, training colleagues will be better equipped to challenge and support each other and contribute to constructive feedback. Other colleagues' perspectives are important in providing a basis for changing mindsets and behaviors.

Second, a general limitation resulted from the fact that the organizational context, including working conditions, was not incorporated. Organizational change is an important part of influencing individuals' behavior and learning results as well as the motivation and commitment for participation in an intervention program. No direct measures of organizational context were applied in this study, and the focus was entirely on the individual. Future studies might explore the impact of self-leadership training, both at the individual and organizational levels, by considering specific conditions of work settings, as well as the private circumstances of leaders.

Third, the seven-week intervention period can be criticized. Regarding the duration of the intervention, advantages might be seen in a long-term program that allows leaders to integrate the learned behaviors into their behavioral concepts (Britt *et al.*, 2016; Marques-Quinteiro *et al.*, 2018). Participants should have the opportunity to practice what they have learned in training programs at their workplace between training sessions, to learn their own way to practice the tools and to gain own experiences. The learning and transfer effect of lectures and discussions can be strongly improved, for example, by individual feedback. In contrast to the benefits of long-term interventions, Grant *et al.* (2009) showed that interventions in as little as four coaching sessions can be effective. In the study of Marques-Quinteiro *et al.* (2018), there were four modules on self-leadership training, which were composed by two 4.5-h sessions each. Modules 1–3 were used at intervals of 2 weeks each. The follow-up Module 4 took place 6 months after Module 3.

In our decision for a duration of seven weeks, practical reasons were considered. For example, the challenge of integrating the intervention into the "increasingly agile" work routines in addition to the everyday tasks. The fact that the dropout rate is lower with a shorter intervention also speaks in favor of a "shorter" intervention. We also refer to the publication by Dormann and Griffin (2015), who discussed optimal time lags and call for more "shortitudinal" studies in the future. Research should compare short- and longer-term interventions. The same applies to the consideration of follow-up modules/sessions to take more account of the sustainability and duration of effects and likewise to the economic perspective of resource use.

Finally, an important limitation was that leaders selected the team member for external assessment, possibly introducing selection bias. Nevertheless, these additional participants provided valuable insights into the external assessment of self-leadership skills and LMX dynamics from the perspective of team members. Following this, we map out the probing of super-leadership theory for scientific evidence of its effectiveness. This is a further important step in answering the question of whether leader behavior becomes visible through self-leadership training and is reflected in the quality of relationships between leaders and their team members.

5.2 Practical implications

Much of the existing development and training literature considers executive training a relatively novel and promising discipline related to growth and development; however, empirical evidence supporting these observations remains limited (Bell *et al.*, 2017). When considering a real, measurable improvement of leaders that can be directly attributable to their participation in a training intervention, results are much more sporadic (Haan and Nieb, 2011). Regarding such claims, the participants' subordinates (and possibly their superiors) should be involved in the self-leadership training process. It was also recommended that the participants have the opportunity to practice what they learned during training at their workplace between each training seminar to practice such tools and obtain their own experiences. The OSLT contributed to continuous learning, which is paramount in such a process. The following aspects should be strengthened in future studies: To ensure continuous and ongoing participation in the training program, these issues should be included in the intervention planning. A clear intervention goal should be formulated, which might be based on a needs assessment. In

particular, the analysis of self-leadership competencies might be used to target self-leadership strategies in specific areas (e.g. behavior focused, natural reward or constructive thought patterns) (Marques-Quinteiro *et al.*, 2018). The selected strategies should be in line with the needs of the leaders and at the same time be compatible with the leadership culture and the corporate strategy. It would be useful for the design of the training program to fit the company structure in terms of duration, scope and content and to consider the transfer into day-to-day business (consideration of 360° feedback, employee interviews for intervention transfer, process and outcome evaluation). Awareness and personal responsibility of the leaders should be ensured as a basic requirement for participation in a self-leadership training (Whitmore, 1997) to start a development program in a target-oriented way, as well as the experience/quality of the coach/trainer. In addition, it might still be valuable to ask about leaders' motivation to learn (Chung *et al.*, 2022).

It could be exciting to pay more attention to the aspect of learning-oriented leadership. Leaders' perceptions of learning and development are an important prerequisite for learning-oriented leadership. Therefore, leaders need to be trained on how to promote employee learning in the workplace (Wallo *et al.*, 2021).

Although wide coverage of the three self-leadership strategies could provide (the greatest) benefit, this might not be possible when considering time, money and other resources of organizations. Leaders influence the organizational culture and the learning behavior of employees. Characteristics of the digital world of work show that remote leadership could be an essential theme for development. Blended learning could be an effective way to train managers regarding their leadership skills (Ibrahim and Nat, 2019; Namyssova *et al.*, 2019). Another idea from a more organizational point of view would be to include a kind of self-leadership assessment as early as during the personnel recruitment process. People are increasingly assessed for stress resistance as they enter the education system and eventually in the labor market or military service. Similar to this procedure in the context of resilience (Britt *et al.*, 2021), it would be advisable to examine self-leadership competencies in relation to the requirements of job description profiles.

The use of a controlled design allowed the probing of causal relationships in a complex field setting with the ability to eliminate alternative justifications for reported effects (e.g. other developments in organizations). In addition – unlike multiple previous studies which were founded solely upon self-report assessments of self-leadership effectiveness – the present study drew upon multiple respondents in its data collection protocols, namely, leaders as participants, selected team members and untreated leaders in a control group.

Our OSLT and its evaluation results provide evidence for the effectiveness of training leaders' self-leadership skills and recovery experiences. Ultimately, our findings suggest that leaders as role models with strong self-leadership behavior might also increase the quality of LMX in their teams.

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Further reading

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Supplementary material

The supplementary material for this article can be found online

About the authors

Julia Krampitz works as a Freelance Lecturer for the German University for Prevention and Health Care Management DHfPG. She finished her PhD at the University of Bielefeld and is currently registered in the PhD in Psychology at the University of Innsbruck. Her current research focuses on leadership, human-oriented work design and recovery experiences. Julia Krampitz is the corresponding author and can be contacted at: Julia.Krampitz@student.uibk.ac.at

Julia Tenschert completed a master's degree in entrepreneurship at the University of Liechtenstein and is currently enrolled in the PhD in Management at the University of Innsbruck. Her research focuses on self-leadership, leadership and mindfulness and its effects on work performance and stress management.

Marco Furtner holds the Chair for Entrepreneurship and Leadership at the University of Liechtenstein. He is Head of the Institute of Entrepreneurship and Dean of Studies for the MSc Entrepreneurship and Management at the University of Liechtenstein. His current research focuses on leadership, entrepreneurship and innovation.

Joachim Simon is a self-employed leadership development consultant from Germany. He holds a master's degree in HR and Organizational development and is the originator of the online- hybrid-course used in this study. Simon is also the Co-founder of the self-coaching app mindshine.

Jürgen Glaser is a Full Professor of Applied Psychology at the Department of Psychology at the University of Innsbruck. He has held academic leadership roles at several universities, developing and directing a program of applied interdisciplinary research to improve the quality of working life.