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Could Military Commanders' Good Leadership Influence Subordinates' Smartphone Over-dependence? A Serial Mediation Analysis

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ABSTRACT

Owing to the ubiquitous use of smartphones by soldiers, military researchers have an increasing interest in potentially problematic side effects such as smartphone overdependence. This raises a question regarding the psychological mechanisms underlying the potentially self-damaging use of smartphones. Here, we address this question by analyzing how heterogeneity in commander's good leadership explains subordinate soldiers' differences in self-control and smartphone use. Specifically, we found that subordinate soldiers who thought their commander's leadership was good were self-regulated, less dependent on smartphones, less stressed, and finally had good mental health. This result indicates that commander's good leadership can be used to estimate whether subordinate soldiers exert control over their impulses and use their smartphones properly. Thus, the current findings help to identify external factors that lead to a better understanding of problematic smartphone use and can potentially help to design appropriate preventive mechanisms or interventions that target commander's good leadership.

KEYWORDS

Military commander; leadership; smartphone overdependence; soldier; mental health

Introduction

Smartphones have become indispensable to our lives [1]. The ubiquitous use of smartphones has allowed people to perform a plethora of tasks much faster and easier, leading to unprecedented levels of social connectivity [2]. However, the growing trend of using smartphones has invasive and destructive negative effects such as smartphone overdependence [3]. The increase in the potential risk of smartphone overdependence among adolescents increases perceived stress, which causes stress-related symptoms, such as depression, anxiety, somatization, and reduced life satisfaction [4]. In particular, 36% of adolescent smartphone users showed withdrawal, 30% showed tolerance, 27% showed use that was longer than intended, 18% experienced unsuccessful attempts at use reduction, and 10% showed functional impairment of close relationships [5]. In other

words, excessive use of smartphones might interfere with important aspects of daily life, as it may lead to disproportion between smartphone use and motivated behaviors in work or social interactions [3].

Reflecting the widespread and everyday use of smartphones, the Korean Ministry of National Defense (KMND) established a policy in 2018 allowing soldiers to use smartphones [6]. As a result, soldiers have been using smartphones after daily regular work since July 2020. Currently, a policy that allows the use of smartphones not only during breaks but also during regular daily work hours is being promoted. As the military force cannot communicate freely with society, obtaining opportunities for self-development is difficult and interpersonal relations are limited because of the strict hierarchical order [7]. Therefore, the use of smartphones by soldiers has a net function of increasing the quality of communication

between the soldiers and officers, quality of self-development, satisfaction with military life, and psychological stability [8]. However, considering that more than half of active duty enlisted personnel are 25 years or younger [9], the negative effects of smartphones on general adolescents can equally apply to soldiers. Even the mere presence of a smartphone can reduce working memory and fluid intelligence, possibly due to greater strain on attentional resources [10], and increase blood pressure, unpleasantness, and anxiety during regular work when smartphones should be avoided [11]. Military forces must maintain continuous combat readiness and ensure that they can conduct combat operations when necessary [12]; therefore, understanding the psychological antecedents of soldiers' smartphone overdependence is important.

Self-control and smartphone overdependence

Many empirical studies suggest that self-control should be included in the psychological mechanism underlying this potentially self-damaging use [13]. Self-control refers to the ability to override the impulses to act, as well as the ability to initiate or persist in boring, difficult, or disliked activities [14]. People with high self-control are more likely to resist impulses in their everyday lives and reduce temptations that obstruct the continued repetition of goal-relevant behaviors [15]. In addition, individuals with high self-control can regulate their emotions better and are unlikely to experience high levels of negative emotional arousal [16]. This makes them less likely to use smartphones impulsively [17]. Conversely, people with low self-control are more likely to respond immediately to mobile notifications [2], and they are vulnerable to immediate rewards in form of social networking, news, communication, or games in smartphones [18]. Based on this logic, previous research has confirmed that self-control influences smartphone overdependence [19]. Adolescents are particularly vulnerable to overdependence because they are more likely to demonstrate risk-taking and novelty- and sensation-seeking social interactions [20], in which self-control is essential in reducing smartphone overdependence [21].

As mentioned above, many studies have verified the causal relationship between self-control, smartphone overdependence, perceived stress, and mental health (i.e., psychological distress and subjective well-being). These achievements have allowed researchers to consider self-control as a practical starting point for helping people at risk of smartphone overdependence when designing interventions. However, smartphone overdependence is a newly emerging problem in soldier behavior [22], and few studies have examined factors that can mitigate it in military settings. Considering that the ability to properly take care of subordinates represents a vital element in successful military leadership [23], we propose the verification of whether commander's good leadership precedes self-control in predicting smartphone overdependence, stress, and psychological adjustment. By analyzing the chain-mediating effect, we created a sequence that could lead to a better understanding of smartphone overdependence and explored the complex mechanisms between variables in depth [24].

Commander's good leadership and followers' self-control

According to the resource-based theory of self-control [25], humans use a finite set of valued resources to obtain, retain, and protect what they want. The process through which humans exercise self-control is not resource-neutral; it draws from a finite pool of resources. In other words, humans draw from their resources whenever they exert self-control to override an impulse, make complex decisions, or change a felt emotion. When these mental resources are depleted, humans tend to show diminished self-control over ensuing activities until they have had opportunities for recovery activities [26]. Consequently, to exercise self-control over a particular behavior, sufficient provision of mental resources must precede it [25].

Interestingly, prior investigations found that commanding officers' good leadership replenishes the resources required for their subordinates' self-control. First, charismatic leadership augments the inner value of subordinates' efforts and goal achievement, thereby increasing their self-esteem and collective efficacy [27]. Second, all four factors of transformational leadership promote subordinates' psychological capital and help prevent their resources from depletion [28]. Idealized influence allows subordinates to identify with and want to emulate everything that their leaders do, thereby promoting their optimism and belief in problem-solving skills [29]. Inspirational motivation presents followers with a clear vision of their future and the belief that they will acquire the necessary abilities to realize their vision. These works enable members to strive, persevere, and create a knowledge-sharing climate within their group to avoid unnecessary resource exploration activities [30]. Intellectual stimulation allows members to interpret problems in new ways, viewing obstacles as challenging and being stress resilient [29]. Individualized consideration provides meaning to subordinates' roles and enhances their confidence [31]. Third, transactional leadership establishes the expectation that subordinates can achieve corresponding results if they strive and creates a belief that they can complete their tasks with their leaders [29]. Conversely, the lack of guidance and information, reflective of passive leadership, heightens members' role ambiguity, which exhausts their psychological resources [32].

Notably, Korean Defence Agency for Spiritual and Mental Force Enhancement (DASMFE) has developed the positive leadership that Korean military commanders should exert based on crucial factors that determine the organization effectiveness in modern leadership [33]. It consists of five factors: expertise, praise and encouragement to subordinates, reward and punishment fairness, communication, and voluntary obedience, which we conceptualize as good leadership.

Objectives of the current study

Several studies have confirmed that unit leaders' outstanding leadership influences their subordinates' self-control by increasing their intrinsic motivation and self-efficacy [34]. Moreover, the authenticity, empathy, empowerment of others, humility, and tenacity from leaders toward their subordinates are necessary factors during recovery from

overdependence [35]. Nevertheless, little is known about the soldier-level mechanisms by which a unit leader's good leadership yields psychological gains relevant to smartphone overdependence. Attempts to identify whether leaders' competencies have a noticeable utility as individual predictors of subordinates' self-control and smartphone overdependence can contribute to military decision making. This could help military headquarters to appoint excellent leaders as commanders to deal with soldiers' problematic smartphone usage. Based on a review of the available literature, we sought to test the mediation model that links all these variables together and to see whether all these mediators cause outstanding commanders to have a better psychological state for their soldiers. In particular, we tested whether mediators function in a causal chain, referred to as serial mediation. For example, the impact of commander's good leadership on subordinate soldiers' self-control in turn might affect their smartphone overdependence, ensuing their perceived stress and associated mental health problems. Within this sequence, subordinates' self-control, smartphone overdependence, and perceived stress may act as mediators in the association between commander's good leadership and the consequences. Investigating serial mediation is important, as commander's good leadership might exert its influence through complex causal chains that remain unexplored in simple mediation. Specifically, we examined the possibility that commander's good leadership (Hypothesis 1) positively predicted the subordinates' self-control and/or (Hypothesis 2) negatively predicted their smartphone overdependence, improving their mental health. We also explored the possibility that (Hypothesis 3) the relationship between commander's good leadership and the subordinates' mental health is mediated by the subordinates' self-control, smartphone overdependence, and perceived stress.

Methods

Participants

The required sample size in this present study was determined based on the results of a priori statistical power analysis [36]. A priori power analysis was performed using G*Power 3.1.9.7 software. The F-test family for linear multiple regression was selected as the closest analysis to mediation within G*Power. Power was calculated based on the medium effect size ($f^2 = 0.15$) recommended for multiple regression analyses [37], four predictor variables, a target power of 0.95, and an alpha of 0.05. This process required a minimum sample size of 129 participants. With reference to the results of the power analysis, we recruited 1,651 active-duty soldiers (mean age = 20.80 years; SD = 1.56 years) from the Republic of Korea Army (ROKA). All participants were males who fulfilled the mandatory military service in the division of the ROKA. These comprised 108 privates, 759 privates first class, 603 corporals, and 181 sergeants. Additionally, approximately 65% (n = 1,078) were serving in the operational branch and 35% (n = 573) were serving in the technical and administrative branches. All procedures in this study complied with the principles of the Declaration of Helsinki,

and all participants provided voluntary informed written consent prior to the study.

Measures

A questionnaire was administered in the Korean language, containing questions about socio-demographic characteristics (age, rank, and military branch) and the following scales:

Commander's good leadership. We used six items from the Korean Military General Social Survey developed by the DASMFE [33]. The items measure the degree of commander's expertise (e.g., "My commander has expertise in his/her work."), praise and encouragement to subordinates (e.g., "My commander is good at praising and encouraging his/her subordinates."), reward and punishment fairness (e.g., "My commander rewards me fairly."), communication (e.g., "My commander communicates well."), and voluntary obedience (e.g., "I can trust and follow my commander."). Participants were asked to rate the extent to which they judged their commander on a scale from 1 (*completely disagree*) to 5 (*completely agree*). The total sum of all item scores was used; higher scores implied that subordinates perceived the commander's competencies as high. The six items had good reliability (α = 0.97).

Self-control. Brief Self-Control Scale (BSCS; [38]) was used to assess the level of self-control. Eleven items were rated on a 5-point scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). These items included, "I know it's wrong, but I can't stop it myself.". The total sum of each item score was used, with high scores indicating high control over impulses. The scale's internal consistency was above acceptable (α = 0.87).

Smartphone overdependence. Soldiers' smartphone overdependence was assessed using the smartphone overdependence scale [39], which includes ten items rated on a 4-point Likert scale, ranging from 1 = *not at all* to 4 = *very much* (e.g., "It's hard to concentrate on other things if my smartphone is next to me."). Three items were revised based on military characteristics (e.g., from "academic or task" to "training or task"). The total sum of each item score was used, with higher scores reflecting riskier dependence on smartphones (α = 0.95).

Perceived stress. Stress was measured using the 10-item Perceived Stress Scale [40]. Respondents were asked to rate the frequency of the stress they had felt in the past month on a 5-point scale ranging from 1 (*never*) to 5 (*very often*) (e.g., "How many times have you been embarrassed by something unexpected?"). The total sum of each item score was used; higher scores were indicative of more severe stress. Cronbach's alpha was 0.79.

Psychological distress. We assessed psychological distress using the Brief Symptom Inventory-18 (BSI-18; [41]). The BSI-18 is an 18-item standardized self-report measure that uses a 5-point scale (0 = *not at all*, 4 = *extremely*) to explore the degree to which problems have distressed or bothered the respondents in the last 7 days. This measure is divided into three subscales related to depression, anxiety, and somatization. For this study, we used all 18 items to generate a Global Severity Index (GSI) that reflects the level of distress associated with the experience of general

psychiatric symptoms. Example items include "feeling hopeless about the future" (depression), "feeling tense or keyed up" (anxiety), and "nausea or upset stomach" (somatization). Cronbach's alphas were 0.90, 0.93, 0.92, and 0.97 for depression, anxiety, somatic, and GSI, respectively.

Subjective well-being. We measured subjective well-being (SWB) using the 9-item Concise Measure of Subjective Well-Being (COMOSWB; [42]). COMOSWB comprises three items that measure satisfaction (e.g., "I am satisfied with the personal aspects of my life."), as well as six items that measure positive emotion (e.g., "joyful") and negative emotion (e.g., "irritated"). We rated it on a 7-point scale (1 = *strongly disagree/never*, 7 = *Strongly agree/always*). The SWB score was calculated using the following formula: satisfaction sum score + positive emotion sum score − negative emotion sum score. Higher scores indicate greater happiness. Cronbach's alphas were 0.91 for satisfaction, 0.96 for positive emotion, and 0.91 for negative emotion.

Data analysis
The PROCESS macro for SPSS (Model 6, [43]) was used to analyze the model used to test the sequential mediation of self-control, smartphone overdependence, and perceived stress in the relationship between good leadership and two outcome variables (GSI and SWB). A bootstrap of 10,000 samples was used, and 95% confidence interval estimates were calculated for total, direct, and indirect effects. Confidence intervals that do not comprise zero may be considered statistically significant.

Results

Correlation analysis
Descriptive statistics and bivariate correlations are presented in Table 1. As expected, several significant correlations were observed. Commander's good leadership was positively correlated with soldiers' self-control and SWB (all *p* < 0.001). In contrast, commander's good leadership was negatively correlated with soldiers' smartphone overdependence, perceived stress, and GSI (all *p* < 0.001). Similarly, self-control was negatively associated with smartphone overdependence, perceived stress, GSI (all *p* < 0.001), while it was positively associated with SWB (*p* < 0.001). Smartphone overdependence, perceived stress, and

GSI were positively correlated with each other (all *p* < 0.001). SWB was negatively related to smartphone overdependence, perceived stress, and GSI (all *p* < 0.001).

Covariates
Among the socio-demographic characteristics, age was found to be statistically associated with GSI in both the total effects model (*B* = 0.450, *p* = 0.006) and the direct model (*B* = 0.444, *p* = 0.002). Furthermore, rank was found to be statistically associated with SWB in both the total effects model (*B* = 0.848, *p* = 0.013) and direct model (*B* = 0.674, *p* = 0.011). Therefore, age was included as a covariate in the mediation model when the outcome variable was GSI and rank was included as a covariate when the outcome variable was SWB.

Mediation analysis
Fig. 1 shows the results of the serial mediation model analyzed by using GSI as the outcome variable. As expected in Hypothesis 1, commander's good leadership had a direct effect on predicting self-control, with higher commander's good leadership influencing more perceived self-control among soldiers (*B* = 0.363, *SE* = 0.034, CI = 0.297, 0.429). Further, as in Hypothesis 2, commander's good leadership was associated with reduced smartphone overdependence in soldiers (*B* = −0.086, *SE* = 0.022, CI = −0.129, −0.043). Higher self-control was associated with less reliance on smartphones, which is consistent with previous findings (*B* = −0.281, *SE* = 0.015, CI = −0.311, 0.251). Both the total effect (*B* = −0.416, *SE* = 0.045, CI = −0.504, −0.329) and direct effect (*B* = −0.126, *SE* = 0.042, CI = −0.209, −0.044) of commander's good leadership on GSI were significant.

As shown in Table 2, commander's good leadership indirectly affected soldiers' GSI through all significant mediation pathways: (1) self-control (*B* = −0.050, CI = −0.083, −0.018); (2) smartphone overdependence (*B* = −0.393, CI = −0.068, −0.017); (3) perceived stress (*B* = −0.082, CI = −0.110, −0.056); (4) self-control and smartphone overdependence (*B* = −0.047, CI = −0.069, −0.027); (5) self-control and perceived stress (*B* = −0.061, CI = −0.080, −0.044); (6) smartphone overdependence and perceived stress (*B* = −0.005, CI = −0.009, −0.002); and (7) self-control, smartphone overdependence, and perceived stress (*B* = −0.003, CI = −0.005, −0.002). The total indirect effect in the relationship between commander's good

TABLE 1

Descriptive statistics and correlations among research variables

	M (SD)	Range	1	2	3	4	5	6
1	25.51 (5.47)	6–30	–					
2	41.02 (7.72)	11–55	0.257***	–				
3	14.56 (5.21)	10–40	−0.197***	−0.439***	–			
4	14.40 (6.06)	0–40	−0.316***	−0.580***	0.363***	–		
5	5.00 (10.23)	0–72	−0.224***	−0.376***	0.388***	0.427***		
6	23.86 (11.30)	−15–39	0.418***	0.499***	−0.277***	−0.663***	−0.431***	–

Note: 1 = commander's good leadership, 2 = self-control, 3 = smartphone overdependence, 4 = perceived stress, 5 = GSI, 6 = SWB. ***p < 0.001.
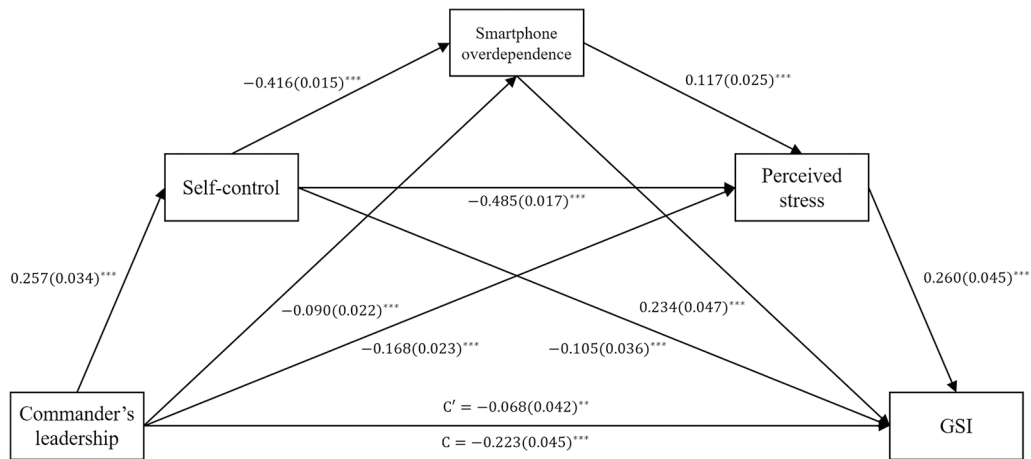
FIGURE 1. Serial mediation linking commander's leadership and GSI.
Note: Standardized effects are presented outside parentheses, with bootstrapped SEs in parentheses. C' = direct effect of commander's leadership on GSI; C = total effect of commander's leadership on GSI. $^{**}p < 0.01$, $^{***}p < 0.001$.

leadership and GSI was especially significant ($B = -0.290$, CI = -0.348, -0.235). Thus, commander's good leadership is associated with increased subordinates' self-control, which is related to decreased smartphone overdependence. In turn, their less dependence on smartphones is related to their feeling of less stress, which is associated with lower psychiatric symptoms. In addition, significant sequential mediation paths from commander's good leadership to the subscales of the BSI via the mediators described above (depression: $\beta = -0.004$, CI = -0.005, -0.002; anxiety: $\beta = -0.003$, CI = -0.005, -0.002; somatization: $\beta = -0.003$, CI = -0.004, -0.001).

Fig. 2 shows the results of the serial mediation model analyzed by using SWB as the outcome variable. Similar to the pattern shown in Fig. 1, a significant direct effect was detected between commander's good leadership and SWB ($B = 0.473$, $SE = 0.039$, CI = $0.397–0.549$). Furthermore, the total effect was positive and significant ($B = 0.884$, $SE = 0.047$, CI = 0.977, 0.428). Interestingly, smartphone overdependence did not directly predict SWB, the prediction was only through an indirect path of perceived stress.

TABLE 2

Indirect effect between leadership and GSI in serial mediation

Path	β	boot SE	95% CI
CL→SC→GSI	−0.027	0.009	−0.044, −0.009
CL→SO→GSI	−0.021	0.007	−0.036, −0.009
CL→PS→GSI	−0.044	0.007	−0.058, −0.030
CL→SC→SO→GSI	−0.025	0.005	−0.036, −0.015
CL→SC→PS→GSI	−0.033	0.005	−0.042, −0.024
CL→SO→PS→GSI	−0.003	0.001	−0.005, −0.001
CL→SC→SO→PS→GSI	−0.003	0.001	−0.005, −0.002
Total indirect effect	−0.155	0.012	−0.179, −0.132

Note: SEs: standardized indirect effects with bootstrapped; CL: commander's leadership; SC: self-control; SO: smartphone overdependence; ST: perceived stress; GSI: global severity index.
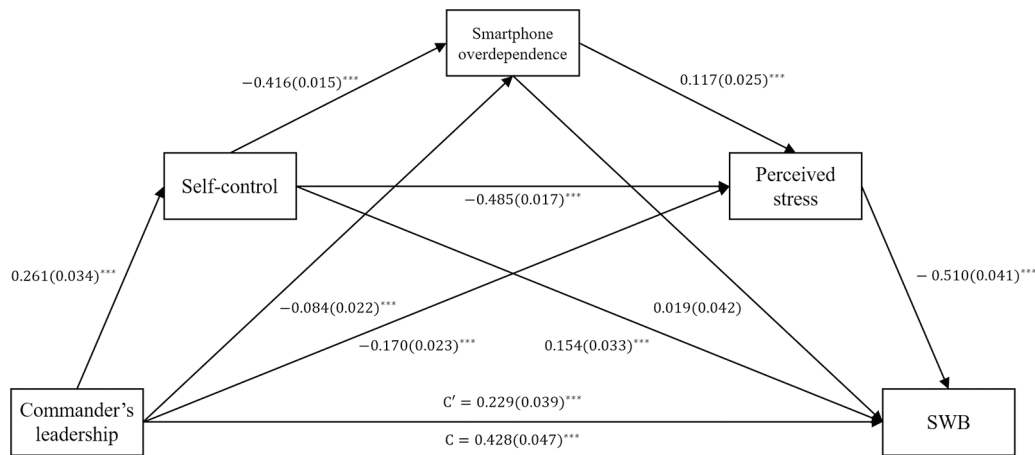
As shown in Table 3, commander's good leadership indirectly influenced soldiers' SWB through all significant mediation pathways: (1) self-control ($B = 0.083$, CI = 0.053, 0.116); (2) perceived stress ($B = 0.179$, CI = 0.134, 0.228); (3) self-control and perceived stress ($B = 0.133$, CI = 0.105, 0.166); (4) smartphone overdependence and perceived stress ($B = 0.010$, CI = 0.004 and 0.019); and (5) self-control, smartphone overdependence, and perceived stress ($B = 0.013$, CI = 0.008, 0.020). Finally, we observed a significant total indirect effect given that zero was not included in the confidence interval ($B = 0.412$, CI = 0.351, 0.476). These results, including the results in Table 2, support Hypothesis 3. This study found that the better commander's good leadership was, the more it contributed to the subordinates' self-control, a lower level of smartphone overdependence, and reduced perceived stress, which in turn led to their increased SWB.

Discussion

This study examined the relationship between commander's good leadership and subordinate soldiers' mental health, including the soldiers' self-control, smartphone overdependence, and perceived stress, through serial mediation. The results demonstrate that the soldiers' self-control was positively associated with their SWB and negatively associated with their smartphone overdependence, perceived stress, and GSI. Our results coincide with self-control theory [38], which suggests that self-control can adjust human behaviors, causing them to fit well in an environment. In addition to the theoretical framework, our data are consistent with the conclusions drawn from previous empirical studies on young adults [44].

Furthermore, commander's good leadership was positively correlated with soldiers' self-control and negatively linked to their smartphone overdependence. These findings are consistent with our inference from the tenets of resource allocation theory of self-control [25]. In addition to the correlational analysis results, this study revealed that commander's good leadership could

FIGURE 2. Serial mediation linking commander's leadership and SWB.
Note: Standardized effects are presented outside parentheses, with bootstrapped SEs in parentheses. C' = direct effect of commander's leadership on SWB; C = total effect of commander's leadership on SWB. ***$p < 0.001$.

significantly predict the subordinates' self-control and smartphone overdependence. These links suggest that, if commanding leaders exhibit poor leadership skills, their subordinates might be at risk of a decline in self-control and smartphone overdependence. However, military decision-making in symptom management is traditionally driven by soldiers' personal characteristics rather than the environmental impact on them. A few military studies have emphasized the management of external factors such as superiors, comrades, and workplace culture, rather than individual management within a distressing situation where a symptom cluster manifests [45]. Our study's observed association extends these earlier works by showing that the unit leader's competencies can not only cause subordinates' increased self-control but also mitigate their smartphone overdependence.

The model proposed in this study, which is based on three mediators, offers an interesting insight into the relationship between commander's good leadership and soldiers' mental health. Our results showed that soldiers who serve a commanding officer with outstanding leadership tend to be more resistant to impulse and

temptation and, consequently, are less prone to smartphone overdependence. Therefore, they are less prone to perceiving stress, and are likely to, eventually, experience less psychological distress and more SWB. Using three serial mediators together forms a highly complex model, particularly for interpretation purposes, as the model can create up to eight distinct effects of commander's good leadership on subordinates' mental health [43]. Discovering the chains of causality is important for confirming theories and providing a basic understanding of the processes in question; however, it also represents a first step toward increasing subordinates' psychological adjustment, as it provides possible targets for intervention. Although previous studies have emphasized implementing self-control training to reduce individuals' excessive use of smartphones [46], it is also important that commanders grow their capabilities through leadership training. Fortunately, the military emphasizes the need for leadership development, and the branches maintain leadership-development training centers and provide effective development programs suitable for unit leaders [47]. Commanders should meticulously implement these programs to prevent and intervene in case of soldiers' smartphone overdependence. One advantage of such interventions may be that they are highly domain independent. Thus, self-control is not only useful in the context of problematic smartphone usage, but also in all other areas requiring a certain level of self-control. At work, for example, employees exert self-control to align their own thoughts, feelings, and behaviors with company values and norms, supervisor expectations, task performance goals, and evaluation criteria for performance appraisals and compensation systems [48].

Meanwhile, soldiers' smartphone overdependence was not a direct mediator of the association between commanders' good leadership and their SWB; rather, it appeared to function as part of a chain, increasing perceived stress, which in turn influenced SWB. These findings are similar to those of other SWB studies, whereby college students' smartphone overdependence did not correlate with SWB [49]. However, similar to previous research in this area, we found that a soldier's smartphone overdependence

TABLE 3

Indirect effect between leadership and SWB in serial mediation

Path	β	boot SE	95% CI
CL→SC→SWB	0.040	0.008	0.026, 0.056
CL→SO→SWB	−0.002	0.002	−0.005, 0.022
CL→PS→SWB	0.087	0.012	0.065, 0.110
CL→SC→SO→SWB	−0.002	0.002	−0.007, 0.003
CL→SC→PS→SWB	0.065	0.007	0.051, 0.079
CL→SO→PS→SWB	0.005	0.002	0.002, 0.009
CL→SC→SO→PS→SWB	0.007	0.001	0.004, 0.009
Total indirect effect	0.199	0.014	0.172, 0.228

Note: SEs: standardized indirect effects with bootstrapped; CL: commander's leadership; SC: self-control; SO: smartphone overdependence; ST: perceived stress; SWB: subjective well-being.

was related to an increase in their perceived stress [50]. Differences in soldiers' perceived stress were associated with their SWB, suggesting that smartphone overdependence may influence psychological adjustment through complex cognitive pathways.

To the best of our knowledge, this is the first study that articulates the interpersonal mechanism between commanding officers' good leadership and subordinates' smartphone overdependence, using military data. However, this study has several limitations. First, the study did not manipulate any variables; thus, causality could not be determined from the data, and conclusions must be qualified accordingly. Second, because this study is based on a self-reported questionnaire, numerous respondents might have been unwilling to answer sensitive questions honestly. To increase validity, future studies should obtain data without the participants' direct awareness. Third, the participants were all active-duty soldiers from Eastern cultures, and the results may not be generalizable to military personnel from a wider socioeconomic range or to groups from other parts of the country. Finally, because the data were cross-sectional, longitudinal data are needed to better understand the relationships between determinants, mediators, and outcomes across a soldier's service period.

Author Contributions: Seungju Hyun served as lead for study design, formal analysis, and writing. Xyle Ku served in a supporting role for formal analysis and writing. Sungrok Kang, Yoonyoung Choi and Jaewon Ko served in a supporting role for recruitment of participants and formal analysis. Hyunyup Lee served as lead for study conceptualization, study design, funding acquisition, resources, supervision, and writing-review and editing. All authors reviewed the results and approved the final version of the manuscript.

Availability of Data and Materials: The data that support the findings of this study are available from the corresponding author, Hyunyup Lee, upon reasonable request.

Ethics Approval: All procedures in this study complied with the principles of the Declaration of Helsinki, and all participants provided voluntary informed written consent prior to the study.

Conflicts of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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