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The effects of smartphone use during play on performance and enjoyment among recreational golfers

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Abstract

Smartphone use during play has become a common feature of recreational golf, with 44% of golfers indicating that they use their smartphone every few holes during a round. It is not known, however, whether this form of behaviour has any impact on golfers' performance or their enjoyment of the round. The present study is the first to address this question. Based on theories of cognitive switching and psychological detachment, we propose that frequent digital distraction resulting from smartphone use during play would negatively impact both performance and round enjoyment. Data were collected from 186 recreational golfers at five different courses directly after participation in mid-week club competitions. Our results indicate that smartphone use for work-related purposes negatively impacts performance, but that smartphone use for personal purposes has no impact. Additionally, we find no direct relationship between smartphone use and round enjoyment, but propose that it may indirectly impact enjoyment through its impact on performance.

Keywords

golf, smartphone, digital distraction, performance, enjoyment, cognitive switching

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Introduction

Over the past decade, high levels of smartphone use have become a defining characteristic of human behaviour across all spheres of life. The rapid advancement of mobile computing technologies and the pervasiveness of internet access have cultivated an *always-on* way of life characterised by permanent online connectedness (Vorderer et al., 2017). The affordances offered by these technological advancements enable individuals to engage, through a range of online communication platforms, with multiple life domains independent of their physical location or context. For example, work-related emails can be read during a family dinner, sports scores can be followed during a business meeting, and money can be invested during a morning commute. Le Roux & Parry (2020), accordingly, argue that the constant use of mobile computing devices allow individuals continuously augment their material realities with information from their online spheres, creating a sense of "being in multiple places at once" (p. 191).

This behavioural trend is also observable in sport settings. In 2015, Golf Digest conducted a Twitter survey of 233 000 golfers to test their attitudes towards smartphone use on the course (Pittman, 2015). A majority of respondents (44%) indicated that they check or use their smartphone every few holes during a round, with 21% indicating that they are "inextricably linked to their phone" and would not be able to play a round without checking it. While 19% of respondents indicated that they carried their smartphones in their pockets, 66% indicated that they tried to forget about them during play.

Despite the high prevalence of smartphone use during play among recreational golfers, their remains uncertainty about its effects on their performance and enjoyment of the round. Arguably, interaction with a smartphone during play has the potential disrupt a player's concentration and, consequently, harm their performance. This, in turn, may decrease their enjoyment of the round. In the present study we address this proposition by analysing survey data about performance, enjoyment and smartphone use patterns during play collected from 186 recreational golfers directly after completion of a mid-week round.

The Role of Attention in Golf

It is broadly recognised that attention plays an important role in golf performance, with research on the topic spanning more than 30 years (Christianson et al., 2021). A majority of the research in this domain concerns the attentional focus of golfers in the period before or during shot execution, with particular emphasis on pre-shot routines (e.g., Bell & Hardy, 2009; Chen et al., 2021; Christianson et al., 2021; Roberts et al., 2021).

By contrast, very few studies have examined golfers' attentional orientation between shots or over the full duration of their rounds, and how this may impact their performance and enjoyment of the round (Davies, 2017). From the perspective of sustained attentional focus, golf presents a particular challenge due to the length of time that a player is not actively engaged in play (i.e., hitting shots). A typical mid-week round of 18 holes is generally completed in around four and a half hours (Last, 2014), with golfers hitting an average of 81 shots per round and each shot taking around 14 to 20 seconds to complete (Zienius et al., 2015). Consequently, golfers generally spend less than 30 minutes of their round actively engaged in shots, leaving a significant amount of time for other cognitive activities (Christianson et al., 2021). Singer (2002) uses the term "self-paced" to describe sporting situations in which an individual has adequate preparation time to perform an action, and argues that this creates the possibility of cognitive challenges like "overthinking, distraction, perceptions of inadequacy, overly elevated emotions such as anxiety or fear of failure" (p. 360).

One line of inquiry into this domain has focussed on the notion of flow states as proposed by Mihaly Csikszentmihalyi and colleagues (Csikszentmihalyi et al., 2014). A flow state is characterised by "focused attention, clear performance goals and feedback, mind and body in unison, effortless concentration, complete control, a loss of self-consciousness, the distortion of time, and intrinsic enjoyment" (Catley & Duda, 1997, p. 309). Research among elite golfers suggest that cognitive techniques can be adopted to achieve and maintain experiences of flow states during the course of a round, and that this has the potential to enhance performance (Nicholls et al., 2005; Singer, 2002). Among professional players, Tiger Woods is broadly recognised as the greatest exponent of this focussed state during play. Writing for The New York Times Magazine in 1995, Peter de Jonge stated that "Woods exudes the pure focus and purposefulness of a sleepwalker making his way through the dark to the refrigerator. It's as if he has already made the shot or sunk the key putt, and all that remains is the minor technicality of the present catching up with the reality" (De Jonge, 1995).

While the performance impacts of flow states have been studied among elite golfers, there is a dearth of studies that address this theme among recreational players.

Digital Distraction

Digital distraction, refers to instances when an individual switches their attention away from an ongoing, primary activity (e.g., a conversation, work, driving, a round of golf etc.), towards a secondary activity that involves the use of a computing device like a smartphone or a tablet. While digital distraction often follows upon notifications received through devices like smartphones, there is growing evidence that individuals develop technology habits that involve frequent, often automatic, self-initiated engagements with digital devices that are not preceded by external stimuli (Aagaard, 2021).

Le Roux & Parry (2022) conceptualise digital distraction by outlining three key properties that characterise it. They argue, firstly, that digital distraction occurs in the context of an ongoing primary task which requires the individual's attention for optimal performance. This primary task may encompass multiple, smaller *on-task* activities that are combined to fulfil the overall task goals. For example, the primary task of playing a round of golf involves numerous related on-task activities like hitting shots, reading greens, investigating course layout etc. Secondly, an instance of digital distraction involves a secondary task in the form of an interaction with a digital device (e.g., smartphone, laptop or tablet) that is qualitatively unrelated to the primary task (i.e., it is *off-task* and involves task-irrelevant activities). For example, during a round of golf, the use of a smartphone for distance measurement would be considered an on-task activity and, by extension, not an instance of digital distraction. However, reading a work-related email between shots would constitute digital distraction since it is qualitatively unrelated to the task of playing golf. Thirdly, because of the qualitative difference between the domains of the primary and secondary tasks, digital distractions imply cognitive switches during which the individual shifts their attention from the one domain to the other.

Digital distraction has been shown to impact performance in tasks across multiple task domains, including learning (Parry & Le Roux, 2018), working (Koay & Soh, 2019), driving (Ortiz et al., 2018; Prat et al., 2018), and walking (Raoniar & Maurya, 2023). These impacts can be understood as resulting, in various ways, from the cognitive effects of task switching. Based on an extensive body of research involving computer-based task-switching experiments, Monsell (2003) concludes that switching from one task to another involves processes of "task-set reconfiguration" (p. 135). A task set includes the "stimulus attributes, conceptual criteria and goals states (what to do) and condition action rules (how to dot it)" that are held in the individual's procedural working memory during task execution. When switching to a new task, the individual needs to reconfigure the task-set in accordance with attributes, goals, and action rules of the new task. These switches are associated with a reduction in the performance of the new task, both in terms of speed and accuracy.

Monsell (2003) provides two primary reasons for the observed performance reductions. The first is that the process of task-set reconfiguration itself takes time, implying that individuals take longer to prepare for and ultimately execute a new task. The second is termed "residual cost" (p. 135) and refers the degree to which elements of previous task-sets remain in working memory during execution of a new task. Monsell (2003) argues, accordingly, that task-switching involves both the activation of the new task-set as well as the inhibition of the previous task-set. For example, when a golfer switches directly from reading a work-related email to hitting a shot, a certain proportion of their cognitive capacity may remain engaged with the processing of what they've read even though they have already switched to the new task.

Digital Distraction during Golf

The nature of the relationship between smartphone use patterns (either in general or during play) and performance among golfers has received almost no research attention. In a rare study on the topic, Lee et al. (2021) investigated the relationship between time spent on smartphone apps (when not playing) and performance among professional golfers in Korea over a 4-week period. Their results indicate that changes in the use of entertainment apps (e.g., YouTube and Netflix) were positively correlated with changes in handicap, while changes in the use of serious apps (e.g., books, diary, golf form analysis) were negatively correlated with changes in handicap. The authors argue that self-monitoring of general smartphone use patterns may be an important aspect of performance enhancement. Similar trends have been observed in other sports. For example, Greco et al. (2017) found that extended periods of smartphone use before play decreases performance among young footballers.

However, no studies have explicitly addressed the performance impacts of smartphone use during play among recreational golfers. Considering the prevalence of this phenomenon (Pittman, 2015), and the evidence of performance deficits resulting from smartphone-based digital distraction in other task domains (Ortiz et al., 2018; Prat et al., 2018), we propose that digital distractions resulting from smartphone use during play can impact performance among recreational golfers. To explicate this proposition we adopt the performance routine categories proposed by Thomas (2010) and argue that digital distraction can disrupt mental processes during each of the three routine types: between-shot, pre-shot, and post-shot.

- Between-shot: While the mental processes involved in pre-shot routines have been studied extensively among golfers, Davies (2017) points out that few studies have investigated the question of how golfers spend their time between shots (i.e., before commencing pre-shot routines and after completing post-shot routines). They argue that golfers should use these periods to process important information "(e.g. course set-up, ball lie, pin position, wind speed/direction, technical changes made since last facing a similar shot or situation)" (p. 4) prior to commencing pre-shot routines. However, these are also the time periods during which smartphone use is most likely to occur. Accordingly, between-shot off-task smartphone use may harm performance by distracting the player's attention from the processing of relevant information about their environment that may be important for the achievement of desired shot outcomes and this this, in turn, may harm overall performance. Additionally, given extant evidence of the performance benefits associated with flow states (Catley & Duda, 1997), between-shot digital distraction has the potential to harm performance by impacting a golfer's ability to develop and maintain focussed attention as they move between shots.
- Pre-shot: Smartphone use between shots can also harm a golfer's pre-shot routines and shot execution due to the residual effects of cognitive switching (Monsell, 2003). Specifically, while not actively using their phone during pre-shot routines or shot execution, a golfer may not be able to completely remove the task-set representation associated with preceding instances of smartphone engagement from procedural working memory and, as a result, fail to inhibit task-irrelevant mind wandering during pre-shot routines and shot execution. Mind wandering during these routines has been shown to harm performance (Christianson et al., 2021). Arguably, such residual effects may particularly strong in cases where between-shot smartphone interaction involves work-related communication and the configuration of complex task-sets in working memory. For example, a work-related call from a colleague concerning an intricate business problem may be more distracting (and harmful for performance) than a casual instant message from friend. Conradie et al. (2023), accordingly, propose that distinction should be made between online communication domains as distractions from different domains may have different cognitive impacts.
- Post-shot: Post-shot routines involve the cognitive and behavioural processes that follow a shot, including the manner in which the golfer "puts away" a shot and shifts attention to the next shot (Davies, 2017, p.14). An important element of these routines is that they involve reflection about the executed shot with the aim of correcting errors made or swing problems experienced. Digital distraction may reduce the performance benefits associated with such post-shot routines when players switch to off-task smartphone use and fail to thoroughly reflect about the completed shot and adapt as required.

Based on these arguments and acknowledging potential difference in the cognitive impacts off digital distractions from work and personal online domains, we propose that:

H1: Work-related smartphone use during play will negatively affect performance among recreational golfers.

H2: Personal smartphone use during play will negatively affect performance among recreational golfers.

In addition to impacting performance, digital distraction may impact recreational golfers' enjoyment of their rounds. We propose that there are at least two ways in which this impact may occur. First, digital distraction may impact enjoyment directly by limiting golfers' ability to avoid cognitive involvement in life domains that evoke negative emotions like stress, anxiety or frustration. This is perhaps most relevant in the case of work-related smartphone use during play. Feuerhahn et al. (2014) use the term psychological detachment to describe the "state of being mentally away from work" and argues that it involves "not thinking about or bothering with work-related problems, tasks, or contents" (p. 64). The ever-presence of smartphones and their mediation of work-related communication make it increasingly difficult for individuals to effectively manage the boundaries between their work and personal lives (Conradie et al., 2023). Accordingly, we propose that instances of work-related smartphone use during play may limit the degree of psychological detachment players experience and, as a consequence, reduce round enjoyment. Secondly, extant evidence indicates a positive effect of performance on enjoyment in sport (McCarthy, 2011). Accordingly, we propose that smartphone use may impact round enjoyment indirectly through its potential negative impact on performance (H1 and H2). To test these propositions relationship between performance and round enjoyment, we will test the following two hypotheses:

H3: Performance will positively affect round enjoyment among recreational golfers.

H4: Work-related smartphone use during play will negatively affect round enjoyment among recreational golfers, over and above the effect of performance.

Materials and Methods

To test our hypotheses, we developed a survey to collect data from sample of recreational golfers at five different golf clubs after completion of their rounds. Before commencing data collection activities, we obtained ethical clearance from the Institutional Ethics Committee at the institution of the first author (Project number: REC: SBE-2023-28118).

Participants and procedure

We targeted a sample of recreational golfers of any age older than 18 years, any gender, and any skill level. Three key research design decisions influenced out data collection strategy. First, to increase the accuracy of self-reported smartphone use frequency and volume during play, we aimed to conduct data collection activities as shortly as possible after a player completed a round. Second, to increase the possibility of work-related smartphone use occurring among players, we only collected data after mid-week rounds. Third, to ensure accurate performance measures we only collected data when players participated in club competitions for which they had to submit signed score cards after rounds, increasing the likelihood of rule adherence and accurate scoring.

We requested permission to perform data collection activities from 24 golf clubs, of which five responded positively. We subsequently interacted with management staff at each of these five clubs to determine appropriates dates and times for data collection activities. Upon arrival at each club for data collection, we engaged with management staff to determine appropriate positioning of researchers, and to ensure that data collection activities did not disrupt their standard operating procedures.

During data collection, golfers were approached by researchers directly after completion of their rounds and finalisation of their score cards. In each instance researchers followed a detailed verbal consent script, describing the nature of the study, what participation involved, and the incentive offered for participation (a chance to win a gift voucher for a golf retail store). All instances of participation were voluntary and anonymous.

Across the five participating clubs, data was collected on eight different dates between August 2023 and October 2023 (twice at three of the clubs, and once at two of the clubs). An individual golfer was only allowed to participate in the study once.

Our final sample included 186 golfers of which 94% are male, with a mean age of 55.84 years (*SD*=15.8) and a mean handicap index of 14.2 (*SD*=7.24). Only 4.8% of the respondents are under the age of 25, 7.5% are between 25 and 35 years, 12.9% are between 36 and 45 years, 18.3% are between 46 and 55 years, and 56.5% in the over the age of 55.

Measures

For each participant we collected their age, gender (male, female, or other), handicap index, course handicap, and gross score for the round. Gross score is the total number of shots the player hit during the round with higher scores indicating worse performance. A player's handicap index represents their "demonstrated ability", typically calculated as the average of the lowest eight of their most recent 20 score differentials (the difference between their gross score and par score for the course) (*Handicap Index Calculation*, n.d.). Course handicap is calculated based on the player's handicap index and two variables representing the difficulty level of the course on which the round is played (course Rating and slope rating), allowing for the portability of a player's handicap index to different courses. For each participant we calculated "net score" as gross score minus course handicap. Thus, while gross score represents the player's performance in absolute terms, net score represents their performance relative to their demonstrated ability.

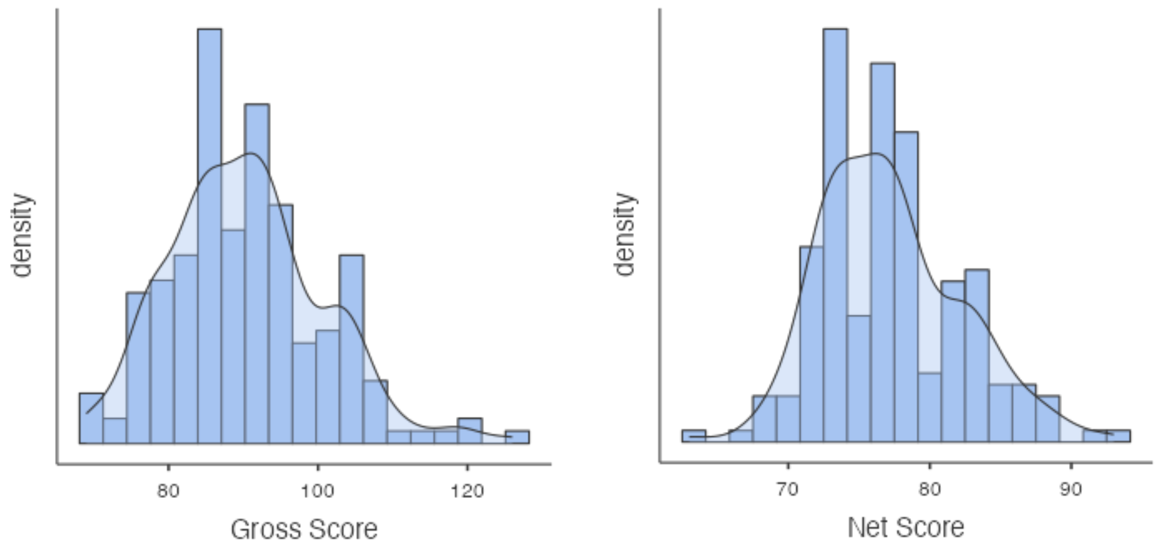
To measure the player's enjoyment of the round, we used a 5-point Likert scale with indicators ranging from "Not at all" to "A great deal", and we recoded these to numeric values ranging from one to five.

To elicit data about smartphone use during play, participants were presented with items concerning work-related and personal forms of use. For work-related smartphone use, participants were asked to indicate how frequently they used their phones for work-related calls, emails, and WhatsApp messages during the round. For personal use, participants were asked to indicate how frequently they used their phones for personal calls, emails, WhatsApp messages, social media and other reasons. Each question was answered through a 5-point Likert scale with indicators for "Not at all", "Once or twice", "About five times", "More than five times” and “All the time”. Responses were coded to values ranging from one to five. Two aggregate scores were computed based on the responses. Overall work-related use (WU) was computed as the sum of all the scores on each of the questions pertaining to work-related smartphone use – creating a scale ranging from 3 to 15. Overall personal use (PU) was calculated as the sum of all questions relating to personal use to create a scale ranging from 5 to 25.

Finally, to control for the potential role of smartwatches as meditators of notifications received on smartphones, we asked participants whether they used a smartwatch during the round, and, of so, whether they received smartphone notifications on their smartwatch during the round.

Results

Across the full sample, the mean gross score recorded was 90.3 shots (*SD*=10.3), and the mean net score was 77.3 shots (*SD*=4.98). The distributions of gross and net scores for the full sample are shown in Figure 1 Panels A and B.



A **B**

Figure 1: Distribution of gross (A) and net (B) scores

Table 1 provides descriptive statistics of net scores across the eight dates of data collection at the five different courses, with the highest mean net score (80.9) recorded at Course 3 on 6 September 2023 and lowest mean net score (75.3) recorded at Course 2 on 30 August 2023.

Table 1: Descriptive statistics for net scores at the different courses.

Course	Date	N	Mean	Median	SD	Minimum	Maximum
Course 1	16/08/2023	31	79.0	79.0	5.44	67.0	89.0
	26/08/2023	26	76.7	76.5	4.09	70.0	87.0
Course 2	30/08/2023	24	75.3	75.0	3.52	68.0	83.0
Course 3	06/09/2023	17	80.9	83.0	5.74	71.0	89.0
Course 4	14/09/2023	43	76.5	76.0	4.79	63.0	85.0

	16/09/2023	6	78.8	77.5	6.71	73.0	91.0
Course 5	02/08/2023	19	75.8	76.0	3.86	70.0	85.0
	05/10/2023	19	76.2	76.0	5.17	69.0	93.0

A One-Way ANOVA indicated that the course at which a round was played significantly affects net scores ($p<0.01$). However, Independent Samples T-tests indicated that, for courses where data were collected on two different days, the differences in mean net scores across the dates are not statistically significant.

Table 2 provides descriptive statistics for net scores across the different age groups. The under 25 age category ($n=9$) has the lowest mean net score of 74.0 ($SD=2.92$). The 25-35 age category ($n=14$) has a mean of 76.2 ($SD=5.65$), while the 36-45 age category ($n=24$) has a mean net score of 76.3 ($SD=4.60$). The 46-55 age group ($n=34$) has a mean net score of 76.5 ($SD=4.96$) and, lastly, the older than 55 age group ($n=104$) has the highest mean net score of 78.0 ($SD=5.01$). A One-Way ANOVA indicated that these differences are statistically significant ($p<0.05$).

Table 2: Net score distribution by age categories.

Age Category	N	Mean	Median	SD	Minimum	Maximum
Under 25	9	74.0	73.0	2.92	70.0	78.0
25-35	14	76.2	74.0	5.65	69.0	91.0
36-45	24	76.3	76.0	4.60	68.0	87.0
46-55	34	76.5	76.0	4.96	69.0	93.0
Older than 55	104	78.0	77.5	5.01	63.0	89.0

The mean net score for male players ($n=174$) is 77.0 ($SD=4.95$), and for female players ($n=11$) it is 79.7 ($SD=5.08$). This difference is not statistically significant in our sample ($p=0.08$).

Table 4 provides the descriptive statistics for the measures of smartphone use during play. The most frequent use case reported is personal WhatsApp messages with a mean of 1.59 ($SD=1.00$), followed by work-related WhatsApp messages with a mean of 1.54 ($SD=1.06$). Work-related calls ($M=1.39$, $SD=0.83$) and personal calls ($M=1.32$, $SD=0.73$) are the third and fourth most frequently reported use cases. Social media ($M=1.14$, $SD=0.50$) personal emails ($M=1.12$, $SD=0.52$) were the least frequently reported use cases.

The work-related use scale (WU) ranging from 3 to 15 had a mean of 4.28 ($SD=2.47$), while the overall personal use scale (PU) ranging from 5 to 25 had a mean of 6.40 ($SD=2.55$).

Table 4: Work and personal phone use.

	N	Mean	Median	SD	Min	Max
Work calls	186	1.39	1	0.83	1	5
Work emails	186	1.34	1	0.91	1	5
Work WhatsApp	186	1.55	1	1.07	1	5

WU	**186**	**4.28**	**3**	**2.47**	**3**	**15**
Personal call	186	1.32	1	0.73	1	5
Personal emails	186	1.12	1	0.52	1	5
Personal WhatsApp	186	1.59	1	1.00	1	5
Social Media	186	1.14	1	0.50	1	4
Other phone use	186	1.24	1	0.78	1	5
PU	**186**	**6.40**	**5**	**2.55**	**5**	**22**

Note: WU = Work-related phone use; PU=Personal phone use

Table 5 provides a breakdown of the WU and PU scales across different age categories. For respondents under 25, the mean for work-related use is 5.44 (*SD*=4.22) whereas the mean for personal use is higher at 7.33 (*SD*=2.78). In the 25-35 age category, mean work-related use is 5.14 (*SD*=2.93) and their personal use mean is 7.79 (*SD*=2.19). The 36-45 age group has the highest work-related use mean of 5.57 (*SD*=2.56), and their personal smartphone use similarly represented the highest mean of 8.38 (*SD*=4.60). For the 46-55 age category, work related use has a mean of 4.76 (*SD*=3.37), while personal use has a mean of6.62 (*SD*=2.37). The over 55 age category displayed the lowest smartphone use levels during play, with a mean of mean of 3.56 (*SD*=1.30) for work-related use and 6.62 (*SD*=2.37) for personal use. One-Way ANOVA analyses indicated that age group had a significant effect on both WU (p<0.01) and PU (p<0.01).

Table 5: Work phone use compared to personal phone use.

	Age	N	Mean	Median	SD
WU	Under 25	9	5.44	3.00	4.22
	25-35	14	5.14	3.00	2.93
	36-45	23	5.57	5.00	2.56
	46-55	34	4.76	3.00	3.37
	Older than 55	105	3.56	3.00	1.30
PU	Under 25	9	7.33	6.00	2.78
	25-35	14	7.79	8.00	2.19
	36-45	24	8.38	7.50	4.60
	46-55	34	6.62	5.00	2.37
	Older than 55	105	5.62	5.00	1.41

Note: WU = Work-related phone use; PU=Personal phone use

Table 6 provides the bivariate correlations (Spearman's rho) between the key study variables. There is a positive correlation between age and course handicap (ρ=0.33, p<.001), as well as age and net score (ρ=0.28, p<.001). However, there is a negative correlation between age and work-related phone use (ρ=-0.33, p<.001), as well as personal phone use (ρ=-0.43, p<.001). Our data further indicate a positive correlation between course handicap and net score (ρ=0.45, p<.001), but a negative correlation between course handicap and personal phone use (ρ=-0.170, p<0.02), and between course handicap and enjoyment (ρ=-0.205, p<0.005). Finally, there is a negative correlation between net score and enjoyment (ρ=-0.369, p<.001) and a positive correlation between work-related and personal phone use (ρ=0.523, p<.001).

Table 6: Bivariate correlations (Spearman's rho) between key study variables

	Age		Course handicap		Gross score		WU		PU
Course handicap	0.33	***	—						
Gross score	0.34	***	0.88	***	—				
WU	-0.33	***	-0.09		-0.04		—		
PU	-0.43	***	-0.17	*	-0.14		0.52	***	—
Enjoyment	-0.05		-0.21	**	-0.31	***	-0.04		-0.02

*Note: * p < .05, ** p < .01, *** p < .001; WU = Work-related phone use; PU=Personal phone use*

To investigate the effects of work-related and personal smartphone use on performance (H1 and H2 respectively), we conducted a multiple linear regression predicting a golfer's gross score with WU and PU, while controlling for course handicap, gender, age, and course, and the receiving of notifications through a smartwatch. Table 7 presents the results of the regression, indicating that the combination of predictors are significantly related to the gross score of a golfer, F (10,174) =86.8, p<0.001, adjusted $R2$ = 0.83. In the model course handicap significantly predicts gross score, β = 0.84, t (171) =24.29, SE=0.05, p<.001, together with work-related phone use, β = 0.11, t (171) =2.99, SE= 0.16, p<0.01, and age, β = 0.08, t (97) =2.34, SE= 0.02, p<0.05. Personal phone use, β = -0.04, t (97) =-1.01, SE= 0.15, p=0.31, does not predict gross score in our model. Accordingly, given that higher gross scores indicate worse performance, our data supports H1 but not H2.

Table 7: Results of multiple linear regression model predicting gross score.

						95% CI	
Predictor	Estimate	SE	t	p	Stand. Est	Lower	Upper
Intercept [a]	72.48	2.46	29.43	< .001			
Course handicap	1.25	0.05	23.84	< .001	0.87	0.79	0.94
Age	0.05	0.03	1.97	0.051	0.08	0.00	0.15
WU	0.42	0.16	2.67	0.008	0.10	-0.29	0.24
PU	-0.16	0.15	-1.02	0.309	-0.04	0.03	0.18

Note: WU = Work-related phone use; PU=Personal phone use

Finally, to determine whether smartphone use has an effect on a player's enjoyment of the round, we conducted a multiple ordinal logistic regression. In the first model we predicted round enjoyment with gross score while controlling for course, age, course handicap and gender. The model explained only 7% of the variance in round enjoyment (McFadden's R^2=0.071) with gross score and course handicap as significant predictors (see Table 8). displayed in Table 8. The negative effect of gross score on enjoyment provides support for H3, suggesting that lower scores are associated with greater enjoyment while controlling for handicap differences.

Table 8: Results of ordinal logistic regression model predicting round enjoyment.

Predictor	Estimate	SE	Z	p
Age	0.015	0.009	1.576	0.115
Course handicap	0.124	0.047	2.668	0.008
Gross score	-0.142	0.034	-4.164	< .001

To test H4, we added both work-related and personal smartphone use as predictors in a second model. There was no difference in the predictive capacity of the model after adding these predictors, and neither predicted round enjoyment. Accordingly, our data does not support H4 and suggests that smartphone use during play has no direct impact on enjoyment over and above its indirect impact through performance.

Discussion

Smartphone use during play has become a common feature of recreational golf, but its impact on performance and round enjoyment has not been investigated. In present study we aimed address this gap in the literature by adopting a survey-based method to collect data from 186 recreational golfers directly after completion of mid-week rounds at five different courses. Our results indicate that work-related smartphone use during play negatively predicts performance, but that personal smartphone use has no effect on performance. Additionally, neither work-related nor personal smartphone use impacts round enjoyment directly. However, we find a positive effect of performance on round enjoyment and propose that the negative effect of work-related smartphone use on performance may indirectly impact enjoyment negatively.

Theoretical Implications

Considering our findings with regards to performance, the difference in the effects observed between the two forms of use (work-related vs personal) suggests that digital distractions involving the cognitive processing of work-related information and communication are more disruptive to performance than those involving personal matters. Given Monsell (2003)'s theorisation of switch costs and their impacts on performance, a number of potential mechanisms may explain our observations.

Firstly, it may the case that golfers take longer to reconfigure cognitive task sets after digital distractions during which they need to attend to work matters. This argument, however, is at odds with the self-paced nature of the sport which generally allows players adequate time to prepare for a shot (Singer, 2002). It is unlikely, accordingly, that golfers have too little time to cognitively switch from work-related phone engagements to pre-shot routines. A second and perhaps more likely explanation is that work-related digital distractions, in general, produce higher degrees of attention residue than personal digital distractions. For example, when a work-related phone call draws a golfer's attention to a problem that requires their input, the associated cognitive task set may involve extensive cognitive processing and, by extension, become difficult to inhibit during performance routines. By contrast, a casual conversation with a family member may require little cognitive processing and produce negligible attention residue. This would imply that golfers find it more difficult to refocus their attention on performance routines after engagement with work-related matters because the associated task set configurations are more persistent. Thirdly, it may be the case that work-related digital distractions generally produce more negative affect (e.g., frustration, anxiety or stress) than those involving personal matters, and that these negative emotions harm performance. These mechanisms are not mutually exclusive and may work together to produce the observed effect. We call for future studies to build upon our results by investigating the manner in which different forms of digital distraction produce different degrees of impact on performance. While these differences may be observable in sports contexts, we propose that they may also be observable in performance in other life domains (e.g., learning).

Our results did not support the hypothesis that work-related smartphone use during play reduces round enjoyment directly. We based the hypothesis on extant evidence of the manner in which work-related smartphone use can disrupt efforts to psychologically detach from the stressors associated with work (Conradie et al., 2023), with recreational golf arguably presenting an ideal opportunity for such detachment. Various factors may explain the lack of support for the hypothesis in our results. Firstly, round enjoyment likely depends on a broad set of factors with the effect of work-related smartphone use playing a very small role, too small to be detected with the limited statistical power in our study. Secondly, for the sake of survey brevity, we only used a single question to measure round enjoyment. It may be the case that the adoption of a more extensive enjoyment measure would produce different results. Based on our model, two factors considered in our study contribute towards greater round enjoyment – better performance and lower handicaps. However, the full model only explains 7% of the variance in round enjoyment, suggesting the impacts of these factors are very themselves very small. We call for future studies to identify other predictors may explain the remaining variance, and the interaction between these factors and smartphone use during play.

Practical Implications

Given the small effect of work-related smartphone use on performance observed in our study, we are hesitant to propose that recreational golfers can enhance their performance by abstaining from phone use during play. Nonetheless, players aiming to improve their concentration during rounds should be mindful of the manner in which digital distractions can disrupt performance routines due to attention residue. Coaches, accordingly, can benefit from the basic understanding of the performance effects of cognitive switching described in this paper. An understanding of these effects may be particularly beneficial to players seeking to improve attentional focus during play.

Limitations

A key limitation of our study is the age and gender distribution of our sample which included only nine golfers under the age of 25, and only 11 females. A majority of the sample were men over the age of 55 displaying relatively low levels of smartphone use during play compared to the other age categories. This skewed distribution can be partly ascribed to the decision to only collect data after mid-week rounds. While this decision increased the likelihood of work-related disruptions occurring during play, it also implied that our sample would be dominated by golfers that are able to play during the week.

The use of self-reported data raises possibility that golfers may have failed to accurately recall the frequency of their smartphone use during play when completing our survey. We aimed to minimise such inaccuracy by collecting data directly after round completion, but are mindful of the possibility that there may exist discrepancies between actual and self-reported smartphone use frequency.

Finally, we aimed to keep our survey as short as possible to limit our intrusion at the various courses. Accordingly, we only collected data about particular forms of smartphone use which may not have been inclusive of all instances of smartphone use during play. Additionally, as explained earlier, we only used a single item to measure round enjoyment which may have impacted the validity of this variable.

Conclusion

This study represents the first attempt to investigate the impact of smartphone use during play on performance and round enjoyment among recreational golfers. Based on our findings we conclude that work-related smartphone use during play negatively impacts recreational golfers' performance and we propose that this effect can be ascribed to the costs associated with cognitive switching between shot routines and work-related concerns. Specifically, we argue that the attention residue generated by cognitive involvement with work-related concerns disrupts between-shot, pre-shot and post-shot performance routines, resulting in decreased performance outcomes. While our findings indicate that decreased performance reduce golfers' enjoyment of their rounds, we found no evidence that smartphone use during play directly impacts round enjoyment in addition to the impact of performance.

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Declaration of interest statement

We have no conflicts of interest to declare.

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