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Original article

A field test of the quiet hour as a time management technique

Un essai in situ de l'instant de tranquillité en tant que technique de gestion du temps

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ABSTRACT

Introduction. – This field study tested the effectiveness of quiet hours (an hour free of any phone calls, visitors or incoming emails).

Objective. – Based on interruptions research and on a behavioral decision-making approach to time management, we argue that establishing quiet hours is a precommitment strategy against predominantly harmful interruptions. Furthermore, conscientiousness and the use of other time management techniques should moderate the effects of the quiet hour.

Method. – We tested this by using a two-week experimental diary study with managers as participants.

Results. – Multi-level analyses showed that a quiet hour improved the performance on a task worked on during the quiet hour in comparison to a similar task on a day without a quiet hour. Furthermore, overall performance was higher on days with a quiet hour than on days without one. Conscientiousness acted as a moderator, unlike the use of other time management techniques.

Conclusion. – These results imply that more people should consider implementing a quiet hour, especially if they are non-conscientious.

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R É S U M É

Introduction. – Cet essai in situ a mesuré l'efficacité des instants de tranquillité (une heure sans appels, ni visites, ni messages électroniques).

Objectif. – Basé sur des connaissances de la recherche sur les interruptions et sur l'approche de la décision comportementale sur la gestion du temps, nous avançons la thèse que l'établissement d'instant de tranquillité constitue une stratégie prophylactique permettant de réduire considérablement les interruptions nuisibles. De plus, la conscience et d'autres techniques de gestion du temps devraient baisser les effets de l'instant de tranquillité.

Méthode. – Nous avons tenté d'appuyer notre thèse en établissant une étude de journal quotidien avec des managers comme participants.

Résultats. – Des analyses à plusieurs niveaux ont démontré que l'application de cet instant de tranquillité permit aux managers d'obtenir de meilleures performances. Le sens des responsabilités agit comme un modérateur, contrairement à l'utilisation d'autres techniques de gestion du temps.

Conclusion. – Ces résultats montrent qu'il convient de considérer l'implantation de l'instant de tranquillité, surtout quand on constate un manque du sens des responsabilités.

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Time management is a problem for many people. For example, Hawkins and Klas (1997) surveyed teachers, nurses, and social workers and found that many complain about their insufficient time management. What is more, the importance attributed to time management has risen over time (Gentry, Harris, Baker, & Leslie,

2008). It is therefore not surprising that many practitioners (e.g., Lakein, 1973; Mackenzie, 1997; Seiwert, 2001) have written books aiming to help people to manage their time, and have offered time management training.

Although some researchers have shown that time management training may work (e.g., Häfner & Stock, 2010; Orpen, 1994; van Erde, 2003b; but see Macan, 1996), other time management interventions have not been tested. In particular, authors of self-help books (e.g., Seiwert, 2001; Mackenzie, 1997) have advised their

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readers to establish a quiet hour, which is an hour during a person's workday that is free of any phone calls, visitors or automatic notifications of incoming emails. However, no field study has evaluated whether this time management intervention actually works.

Therefore, the goal of this study is to experimentally test in the field whether or not the quiet hour is an effective time management technique. Furthermore, we will put forward arguments as to why the quiet hour should work that are deduced from research on interruptions (e.g., Cellier & Eyrolle, 1992) and from behavioral decision-making research (e.g., Koch & Kleinmann, 2002; König & Kleinmann, 2007). Moreover, we will argue that there are two important moderators of the effectiveness of quiet hours: people who are less conscientious or who use fewer other time management techniques should particularly benefit from establishing a quiet hour.

1. Theory

Practitioners in the field of time management often give the advice to lock oneself in the office for an hour or so and ask that nobody interrupts (e.g., Mackenzie, 1997). For example, people should keep the office door closed throughout and equip it with a "Do Not Disturb" sign; they should redirect all phone calls to a secretary or mailbox and switch off the option on their email software that automatically checks for new mail on a regular basis. This constitutes a quiet hour, and people have been advised to use this time of concentrated work particularly for working on important non-urgent tasks (e.g., Mackenzie, 1997).

1.1. Why a quiet hour should work?

The behavioral decision-making perspective on time management (Koch & Kleinmann, 2002; König & Kleinmann, 2007) offers an explanation of why it is difficult for people to work on non-urgent but important tasks: people's time discounting. Time discounting means that delayed events have psychologically less value than immediate events (e.g., Frederick, Loewenstein, & O'Donoghue, 2002), and not only does it therefore matter how valuable the consequence of a task is, but it is also important when this consequence is experienced. Consequently, non-urgent tasks can be of high value, but their value is often experienced in a more distant future and is thus discounted (Koch & Kleinmann, 2002). For example, an employee knows that she has to prepare a presentation for a meeting with the top management in two weeks, and if the meeting goes well, her project idea will be funded. Thus, she knows that this meeting has important consequences, but she also knows that she still has two weeks time. Due to time discounting, it is highly likely that she will consider the preparation of the presentation as non-urgent and will therefore postpone the preparation because of this temporal distance.

Time discounting also specifies which alternatives are particularly attractive and tempting, especially if people are working on important non-urgent tasks: alternatives that offer immediate rewards – and these might be offered by interruptions (or at least people presume that they might). For example, an email might bring important news (or just some gossip) and at least some welcomed distraction even if reading the email disturbs the work flow, and the (presumed) immediate reward might be the reason why emails are typically read immediately (Jackson, Dawson, & Wilson, 2003). Thus, interruptions can be understood as temptations that are particularly powerful if people are working on important non-urgent tasks.

The behavioral decision-making perspective on time management (Koch & Kleinmann, 2002) also explains why it is not enough just to plan to resist such temptations: time discounting research

(e.g., Kirby & Herrnstein, 1995; Rachlin & Green, 1972) has shown preference reversals to be common. In the time management context (Koch & Kleinmann, 2002), a preference reversal means that people plan to resist tempting interruptions and to concentrate on working on a non-urgent but important task, but do not stick to their plan when an interruption occurs.¹ In other words, people will resist interruptions in the future, but when the future arrives (i.e., when time has passed), they find interruptions too tempting to avoid reacting to them. Thus, people might be aware that interruptions can harm their performance, especially if they are working on complex tasks (e.g., Cellier & Eyrolle, 1992; Gillie & Broadbent, 1989) and that interruptions can produce stress (e.g., Johansson & Aronsson, 1984). Therefore, they prefer not to be interrupted, but still find it difficult to ignore, for instance, the arrival of a new email.

However, the behavioral decision-making perspective on time management (Koch & Kleinmann, 2002) also suggests how preference reversals can be prevented: by precommitment (Ariely & Wertenbroch, 2002; Kivetz & Simonson, 2002; Read, 2001). Precommitment means that people make early decisions that are binding. In the time management context (Koch & Kleinmann, 2002), precommitment leads people to arrange their work environment in such a way that they are hindered from switching their attention to interruptions, and they do this before they start working on an important but non-urgent task (and before interruptions can occur). This is precisely what is achieved by implementing a quiet hour: it allows the individual to concentrate on non-urgent important tasks by shielding interruptions. For example, if the email program is switched off, there cannot be any signal that a new email has arrived.

In summary, the arguments put forward so far are as follows: establishing a quiet hour is a precommitment strategy against interruptions, and working on a non-urgent important task should therefore be more efficient if people work on it during a quiet hour than during normal office time. Similarly, a day on which people take a quiet hour should be more productive than days without a quiet hour. More formally, we can state:

H1a: People report better performance on a task if they have implemented a quiet hour than if they have not implemented a quiet hour.

H1b: People report better day performance if they have implemented a quiet hour than if they have not implemented a quiet hour.

1.2. Who benefits more from a quiet hour?

Some people might benefit from a quiet hour more than others. In particular, we will argue that the effectiveness of a quiet hour is moderated by individual differences in the general use of other time management techniques and in conscientiousness.

1.2.1. Use of other time management techniques

Typical time management techniques include making lists, scheduling tasks, setting goals, and monitoring progress (e.g., Macan, Shahani, Dipboye, & Phillips, 1990). These techniques can be found both in the academic and the practitioner literature on time management (e.g., Macan et al., 1990; Mackenzie, 1997; Seiwert, 2001), and using these techniques have been found to be positively related to performance (e.g., Nonis & Sager, 2003). If people already use a large number of time management techniques, they might not benefit a great deal from a quiet hour because they already

¹ It has been mathematically shown that preference reversals are the consequence of the way in which people discount future outcomes (e.g., Kirby & Maraković, 1995; see also König & Kleinmann, 2005).

manage their time well. In other words, they may not need another time management technique, and consequently, establishing quiet hours does not change much for them. At the same time, quiet hours should matter more for those who do not already use many time management techniques. Thus, we hypothesize:

H2: The quiet hour is more effective the fewer other time management techniques people use.

1.2.2. *Conscientiousness*

From the perspective of the Big Five personality taxonomy (cf. Digman, 1990), conscientiousness is also a likely candidate as a moderator. Conscientious people can be characterized as being punctual, dependable, reliable, and organized (Digman, 1990). In particular, conscientious people have been found not to procrastinate (see the two meta-analyses by Steel, 2007; van Eerde, 2003a). Thus, if a quiet hour prevents procrastination because it renders indulging in little distractions unlikely, the difference in performance between a day with a quiet hour and a day without one should be greater for the non-conscientious people. We therefore hypothesize:

H3: The quiet hour is more effective the less conscientious people are.

1.3. *The present study*

The present study uses a unique experimental diary study design. Although diary studies have been suggested for experimental work (Bolger, Davis, & Rafaeli, 2003), researchers have not yet fully realized the opportunities that lie in using them for within-subject manipulations: The effectiveness of an intervention (e.g., a quiet hour) can be tested in a two-week diary study by comparing a week with and a week without an intervention. The order of the weeks should be counterbalanced in order to control for order effects in such a design. Advantages of this type of design include the greater power of within- versus between-subject designs (cf. Reise & Duan, 2003) and the greater willingness of companies and participants to take part in a study in which they can try out an intervention.

2. *Methods*

2.1. *Participants*

Forty-six German managers from several regionally operating companies in the financial sector were asked whether they would be interested in participating in a study on daily time management practices. Of these, 33 agreed and 29 sent diaries back (reasons for not responding were, for example, illness). As one person only participated for one week and another had too much missing data for inclusion, the final data set consisted of 27 participants (three women, 24 men). The dataset contained 227 days in total (i.e., 43 missing days). The mean age of participants was 42 years ($SD = 5.8$), and they had an average of 13 subordinates reporting to them ($SD = 21.6$).

2.2. *Procedure*

Participants filled out diaries for two weeks. In one week, participants were told to be flexible in how they coped with the daily work demands, and in the other week, they were told to implement a daily quiet hour. Both approaches were explicitly framed as reasonable ways of working that have both their benefits (see below), and participants were not told about the hypotheses of the study (i.e., the research was described just as a study about how people manage their time in general).

Participants were randomly assigned to one of two conditions to examine carry-over effects. For the first group ($n = 16$), the no intervention condition was implemented in the first week and the intervention condition in the second week. For the second group ($n = 11$), this order was reversed.

First, participants filled out the part of the questionnaire with measures at the person level (see below). On the Monday of the first week, they read the following instructions:

In this study, the focus is on how you work on important tasks that are part of your daily business. These tasks are often long ranging. This means you could work on them today but you could also delay working on them for a few days. Two alternative ways of working on important tasks have been found in practice:

- A. Some managers consider it important not to plan their day in fine detail because unpredictable events render definite planning impossible. Working this way creates a great deal of flexibility and allows you to react to changing conditions. These managers think it is advisable to allow oneself enough freedom to work on tasks without having to determine in advance when to work;
- B. Other managers set down clear times for working on important tasks. In order not to be interrupted, they go into their office, close the door, switch on the answering machine or redirect their phone calls to the secretary. Additionally, they inform their staff and colleagues that they want to concentrate on working on a task for a certain amount of time.

Participants of the first group were asked to follow advice A in the first week. Each morning, they were asked to define an important (but non-urgent) task they planned to work on that required between approximately 45 and 60 minutes (we focused on an important but non-urgent task because such tasks are often neglected, see Claessens, van Eerde, Rutte, & Roe, 2010). They were advised not to use any method to shield themselves from interruptions. At the end of the working day, participants filled out the part of the questionnaire with measures at the day level (see below).

On the Monday morning of the second week, participants in the first group read the same instructions but were asked to follow advice B during this week. Each morning, participants were again asked to describe an important (but non-urgent) task they planned to work on that required between approximately 45 and 60 minutes. However, during this week they were advised to work on this task during a quiet hour lasting approximately 45 to 60 minutes. They were therefore asked to shield themselves from interruptions during the quiet hour. In particular, they were asked to redirect phone calls to reception or to an answering machine, to inform the secretary, colleagues and staff members that they wanted to work without any interruptions, and to use a door hanger specifically constructed for this study showing visitors that a person does not want to be disturbed until a certain time. It was left to the participants to decide when this quiet hour should be. As in the first week, participants filled out the part of the questionnaire with measures at the day level at the end of each day.

Participants in the second group received the same instructions but were asked to follow advice B in the first week and advice A in the second week.

2.3. *Measures at the day level*

2.3.1. *Task performance*

Task performance was measured with three items: "Working on the task that I defined this morning was effective", "I made progress with the task that I have defined this morning", and "I made some

steps forward with the task that I defined this morning". Respondents used a five-point scale (1 = strongly disagree to 5 = strongly agree). Cronbach alphas were computed separately for the ten working days. They ranged between 0.91 and 0.98 ($M = 0.95$).

2.3.2. Daily performance

Daily performance was measured with six items based on Luong and Rogelberg (2005) and on König, van Eerde, and Burch (2010). The items were "I was productive today", "I achieved a lot today", "I have the impression that I wasted a great part of the day" (reverse coded), "The time I worked today was spent in a useful way", "The time I worked today was spent in a helpful way", and "I have the impression that I made considerable progress on my work today". Respondents used the same five-point scale as for task performance. Cronbach alphas were computed separately for the ten days and ranged between 0.85 and 0.94 ($M = 0.87$).

2.3.3. Manipulation check

If people implement a quiet hour, their work should be interrupted less often than if they do not implement a quiet hour. Therefore, we asked participants how often they were interrupted by others when working on the task they had defined at the beginning of the working day.

2.3.4. Work hours

Participants also had to state how many hours they worked each day. Implementing a quiet hour might be seen as an additional burden, resulting in longer working days, which would be an unwanted side effect.

2.3.5. Stressor index

Participants also reported daily stressors to rule out the possibility of positive effects of the interventions being confounded by a lack of daily stressors. The six items for this index variable (for more details on index variables see Streiner, 2003) were "Problems with subordinates occurred during the day", "Problems with colleagues occurred today", "Problems with customers occurred today", "Worsening general conditions (e.g., in the financial market) had a negative effect on the company", "Problems with external organizations occurred today", and "Current internal statistics showed negative tendencies". Respondents used the same five-point scale as for task and day performance.

Participants also reported whether they informed their staff and colleagues about their quiet hour and whether they switched on the answering machine or redirected their phone calls on days with a quiet hour.

2.4. Measures at the person level

All measures at the person level used a five-point Likert response scale (1 = strongly disagree to 5 = strongly agree). Participants filled out the questionnaires one week before the start of the diary study.

2.4.1. Conscientiousness

Conscientiousness was measured with the 12-item subscale of the German version of the NEO Five-Factor Inventory (Borkenau & Ostendorf, 1991; Ostendorf & Angleitner, 2004). The manual reports a Cronbach alpha of 0.85 and a retest reliability over two years of 0.81 (Ostendorf and Angleitner, 2004). In this study, Cronbach alpha was 0.86.

2.4.2. Time management

Time management was measured with 15 items from the Time Management Behavior Scale (Macan, 1994; Macan et al., 1990) in its German version (König & Kleinmann, 2006). Items captured time

management techniques such as setting goals, carrying an appointment book, specifying priorities, and setting oneself deadlines. Sample items are "I schedule activities at least a week in advance", "I finish top priority tasks before moving on to less important ones", and "I set deadlines for myself when I set out to accomplish a task". Cronbach alpha was 0.76.

2.5. Analyses

Data were analyzed using hierarchical linear modeling (Raudenbush & Bryk, 2001) because diary data have a nested (multilevel) structure: variables at the day level and at the person level. Hierarchical linear modeling could be described as follows. Separate regression equations are computed on the day level (level 1), one for each person. For example, we regressed task performance on whether it was a day with or without a quiet hour. At level 2, the parameters estimated at level 1 (intercepts and slopes) are regressed on level 2 variables – in our case on conscientiousness and the use of other time management techniques. Thus, higher-level variables (i.e., at the person level) can influence lower-level variables (i.e., at the day level).

Hierarchical linear modeling allows the variables at the person level to be treated as fixed or random effects (Raudenbush & Bryk, 2001). If a variable is treated as random, its effect can be generalized to a population of such effects because it is assumed that the levels of the variable that are used in the study are a subset of levels selected from a population of levels. For example, participants should be treated as random to enable a generalization beyond the specific participants. If a variable is treated as fixed, its effect cannot be generalized. An example for a fixed variable from our study is the variable GROUP. There are only two possible sequences here: starting with no intervention and ending with the intervention, or vice versa. Thus, there is no need to generalize beyond the two levels of the variable GROUP, and GROUP can be treated as a fixed variable. Mathematically, this means that there is no error term in the equation with the variable GROUP. All other variables are allowed to vary as random effects.

In line with the recommendation by Raudenbush and Bryk (2001), all measures at the day level were so-called "group-mean centered". This expression stems from the fact that many multilevel analyses focus on people nested in groups – unlike diary studies in which days are nested in people. Thus, "group-mean centering" means centering around the mean of the person in diary studies. All measures at the person level were grand-mean centered (i.e., centering around the mean of all participants in this application). The only exceptions are the variables QUIET HOUR and GROUP, which are entered uncentered. Centering is not needed if the raw values can be directly interpreted. In the case of the variable QUIET HOUR, this means that the estimate for the day-level regression weight can be interpreted as the difference in the dependent variable between days with a quiet hour and days without one. In the case of the variable GROUP (0 = group with first week no quiet hour, second week quiet hour; 1 = group with first week quiet hour, second week no quiet hour), this means that the person-level regression weight can be interpreted as the difference between the two groups. We used the computer program Hierarchical Linear Modeling (HLM; Bryk, Raudenbush, & Congdon, 2005) for these analyses.

2.6. Final evaluation and follow-up

2.6.1. Final evaluation

At the end of the second week, participants were asked to evaluate the effectiveness of the intervention. The following five general items were developed for this purpose: "My job performance increased on days on which I implemented a quiet hour", "My job satisfaction increased on days on which I implemented

a quiet hour”, “I will include a quiet hour in the future”, “I consider implementing a quiet hour to be worthwhile”, and “I consider implementing a quiet hour to be a useful technique”. Participants answered a five-point Likert response scale (1 = strongly disagree to 5 = strongly agree). Cronbach alpha was 0.82.

2.6.2. Follow-up evaluation

Three months after the end of the study, participants were approached again and asked to evaluate the quiet hour from a more distant point of view. Twenty-five participants replied to the same items used in the final evaluation, plus the items “I have implemented a quiet hour after the end of the study”, “I planned to implement a quiet hour but did not realize this plan” (reverse coded), “I consider implementing a quiet hour to be worthwhile for groups or departments”, and “I consider implementing a quiet hour to make sense for individual people”. Cronbach alpha was 0.84. Unfortunately, it was not possible to link the follow-up data with other data because participants filled out the follow-up evaluation anonymously.

3. Results

Table 1 shows means, standard deviations, and correlations for both conditions, aggregated to the person level. As tasks that are important (but non-urgent), participants mentioned tasks like reviewing a loan application, preparing for or carrying out follow-up work from meetings, writing a proposal for a decision to be made by top management, and developing a strategy for a particular target market. There was great variety regarding the time at which quiet hours were implemented, ranging from 8:00 am to 5:30 pm (average beginning time 11:51 am).

3.1. Control analyses and manipulation check

3.1.1. Order effect

Multilevel analyses were used to evaluate whether it was of any importance if the quiet week was the first or the second week. The dependent variable was either task or daily performance. The set of equations used for the analyses is:

$$Y_{ij} = \beta_{0j} + \beta_{1j} \text{QUIET HOUR}_{ij} + \Gamma_{ij}, \tag{1a}$$

$$\beta_{0j} = \gamma_{00} + u_{0j}, \tag{1b}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11} \text{GROUP}_j, \tag{1c}$$

where the dependent variable Y_{ij} is TASK PERFORMANCE_{ij} or DAY PERFORMANCE_{ij} on the i th day for the j th participant, β_{0j} the individual’s mean performance across all days, QUIET HOUR_{ij} the dummy-coded intervention (0 = no quiet hour; 1 = quiet hour), β_{1j} the regression weight that indicates the degree of change in performance produced by a change from no intervention to the intervention, γ_{00} the sample-wide mean performance score, γ_{10}

the regression intercept on the upper level predicting the regression weight for QUIET HOUR_{ij} at the lower level, GROUP_j the dummy-coded order effect (0 = group with first week no quiet hour, second week quiet hour; 1 = group with first week quiet hour, second week no quiet hour), γ_{11} the regression weight of the variable GROUP_j, and Γ_{ij} and u_{0j} are error terms.

To analyze the effect of order, it is only important whether the regression weight γ_{11} for the variable that codes whether the quiet week was followed or preceded by a week without a quiet hour becomes significant. The regression weight γ_{11} did not become significant for either dependent variable (task performance: $\gamma_{11} = -0.03$, $SE = 0.17$, $t\text{-ratio} = -0.15$, $P = 0.88$; daily performance: $\gamma_{11} = 0.06$, $SE = 0.12$, $t\text{-ratio} = 0.49$, $P = 0.62$). Thus, the two data sets can be collapsed, reducing the danger of overparameterization.

3.1.2. Manipulation check

To test whether implementing a quiet hour indeed reduced the number of interruptions, the following set of equations were used:

$$\text{INTERRUPTIONS}_{ij} = \beta_{0j} + \beta_{1j} \text{QUIET HOUR}_{ij} + \Gamma_{ij}, \tag{2a}$$

$$\beta_{0j} = \gamma_{00} + u_{0j}, \tag{2b}$$

$$\beta_{1j} = \gamma_{10} + u_{1j}. \tag{2c}$$

Here, it is important whether the regression intercept γ_{10} on the higher level predicting the regression weight for the quiet hour at the lower level becomes significant. As predicted, γ_{10} became significant: $\gamma_{00} = 4.64$, $SE = 0.67$, $t\text{-ratio} = 6.89$, $P < 0.001$; $\gamma_{10} = -2.72$, $SE = 0.43$, $t\text{-ratio} = -6.20$, $P < 0.001$. This means that the intervention decreased the average number of interruptions from 4.64 (γ_{00}) by 2.72 (γ_{10}) to 1.92. (In addition, participants reported that they informed their staff and colleagues about the quiet hour on 87.3% of the days with a quiet hour and that they switched on the answering machine or redirected their phone calls on 80.0% of the days with a quiet hour).

3.1.3. Working time

The following set of equations tests whether implementing a quiet hour merely extends the average working day:

$$\text{WORKING TIME}_{ij} = \beta_{0j} + \beta_{1j} \text{QUIET HOUR}_{ij} + \Gamma_{ij}, \tag{3a}$$

$$\beta_{0j} = \gamma_{00} + u_{0j}, \tag{3b}$$

$$\beta_{1j} = \gamma_{10} + u_{1j} \tag{3c}$$

The manipulation (quiet hour versus no quiet hour) had no influence on the length of the working day ($\gamma_{10} = -0.03$, $SE = 0.12$, $t\text{-ratio} = -0.29$, $P = 0.77$). This means that participants were able to integrate the quiet hour into their working day without working for a longer amount of time.

Table 1

Means, standard deviations, and Pearson correlations for both conditions (aggregated to the person level).

Variable		1	2	3	4	5	6	7	
	<i>M</i>	<i>M</i>	4.53	4.08	1.88	8.64	1.61	4.08	3.39
		<i>SD</i>	0.34	0.35	3.52	0.95	0.38	0.43	0.49
Task performance	3.65	0.62	–	0.39*	–0.25	–0.23	–0.35	–0.25	0.12
Daily performance	3.77	0.41	0.53**	–	–0.09	–0.12	–0.19	–0.11	0.20
Number of interruptions	5.05	3.56	–0.10	0.11	–	0.32	0.28	0.29	0.12
Length of working time per day	8.65	1.09	–0.05	–0.23	0.29	–	0.27	0.08	0.31
Daily stressors	1.87	1.23	–0.14	0.17	0.05	0.02	–	0.33	0.19
Conscientiousness	4.08	0.43	0.34	0.36	–0.04	0.18	0.21	–	0.17
Use of other time management techniques	3.39	0.49	0.14	0.21	0.23	–0.01	–0.38	0.17	–

No quiet hour condition below the diagonal, with quiet hour condition above the diagonal. $N_{participants} = 27$. * $P < 0.05$; ** $P < 0.01$.

Table 2
Effects of a quiet hour on day and task performance.

Dependent variable	Predictor	Parameter	Estimate	SE	t-ratio	P
Task performance	Intercept	γ_{00}	3.72	0.11	33.39	<0.001
	Quiet hour	γ_{10}	0.82	0.12	6.66	<0.001
Day performance	Intercept	γ_{00}	3.79	0.08	47.15	<0.001
	Quiet hour	γ_{10}	0.30	0.07	4.30	<0.001

$N_{participants} = 27$; $N_{days} = 227$.

3.1.4. Daily stressors

The following set of equations tests whether days with a quiet hour differed from days without a quiet hour in terms of the amount of daily stressors (which would be a confound):

$$DAILY\ STRESSORS_{ij} = \beta_{0j} + \beta_{1j}QUIET\ HOUR_{ij} + r_{ij}, \quad (4a)$$

$$\beta_{0j} = \gamma_{00} + u_{0j}, \quad (4b)$$

$$\beta_{1j} = \gamma_{10} + u_{1j}. \quad (4c)$$

The results showed that days did not differ ($\gamma_{10} = -0.05$, $SE = 0.05$, t -ratio = -0.09 , $P = 0.39$). This means that the effects of the quiet hour are not confounded by daily stressors.

3.2. Tests of the hypotheses

3.2.1. The effect of the intervention (hypotheses 1a and 1b)

The following set of equations was used to test whether the intervention influenced task and day performance:

$$Y_{ij} = \beta_{0j} + \beta_{1j}QUIET\ HOUR_{ij} + r_{ij}, \quad (5a)$$

$$\beta_{0j} = \gamma_{00} + u_{0j}, \quad (5b)$$

$$\beta_{1j} = \gamma_{10} + u_{1j}, \quad (5c)$$

where Y_{ij} is TASK PERFORMANCE_{ij} or DAY PERFORMANCE_{ij}. The coefficient γ_{10} is important here because it is the regression intercept on the upper level, predicting the regression weight for QUIET HOUR at the lower level. As Table 2 shows, γ_{10} became significant with both dependent variables, indicating that the intervention was effective. With a quiet hour, task performance intervention increased by 0.82 (γ_{10}) from 3.72 (γ_{00}) to 4.54, and day performance by 0.30 from 3.79 to 4.09.

3.2.2. The use of other time management techniques and conscientiousness as moderators (hypotheses 2 and 3)

The set of equations testing whether the effects of the intervention were moderated by conscientiousness and the use of other time management techniques is as follows:

$$Y_{ij} = \beta_{0j} + \beta_{1j}QUIET\ HOUR_{ij} + r_{ij}, \quad (6a)$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01}CONSCIENTIOUSNESS_j + \gamma_{02}TIME\ MANAGEMENT_j + u_{0j}, \quad (6b)$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}CONSCIENTIOUSNESS_j + \gamma_{12}TIME\ MANAGEMENT_j + u_{1j}, \quad (6c)$$

where the dependent variable Y_{ij} is either TASK PERFORMANCE_{ij} or DAILY PERFORMANCE_{ij}. Conscientiousness and time management were also entered as predictors for β_{0j} due to the well-established findings that conscientiousness (e.g., Barrick & Mount, 1991; Salgado, 1997) and time management correlate with performance (e.g., Claessens, van Eerde, Rutte, & Roe, 2004; Nonis & Sager, 2003). Using these variables as predictors for β_{0j} therefore controls for these effects.

As expected, conscientiousness was a negative moderator of the effect of the quiet hour on task performance and daily performance (as indicated by the significance of both regression weights γ_{11}). This means that people who were less conscientious benefited more from a quiet hour. However, time management was not a significant moderator of the effect of the intervention on task performance and daily performance. In addition, neither moderator was an independent predictor of task performance and daily performance (Table 3).

Table 3
Effects of a quiet hour on task and daily performance with conscientiousness and time management as moderators.

Dependent variable	Predictor	Parameter	Estimate	SE	t-ratio	P
Task performance	Intercept	γ_{00}	3.72	0.10	35.48	<0.001
	Conscientiousness	γ_{01}	0.43	0.26	1.68	0.11
	Time management	γ_{02}	0.16	0.22	0.73	0.47
	Quiet hour	γ_{10}	0.83	0.12	7.15	<0.001
	Conscientiousness	γ_{11}	-0.66	0.28	-2.32	0.03
	Time management	γ_{12}	-0.03	0.25	-0.15	0.88
Daily performance	Intercept	γ_{00}	3.78	0.08	49.26	<0.001
	Conscientiousness	γ_{01}	0.31	0.19	1.65	0.11
	Time management	γ_{02}	0.13	0.16	0.77	0.45
	Quiet hour	γ_{10}	0.31	0.07	4.52	<0.001
	Conscientiousness	γ_{11}	-0.44	0.17	-2.62	0.02
	Time management	γ_{12}	0.05	0.15	-0.36	0.72

$N_{participants} = 27$; $N_{days} = 227$.

3.3. Final evaluation and follow-up

3.3.1. Final evaluation

The evaluation at the end of the second week was positive ($M = 4.12$, $SD = 0.54$, on a scale from 1 to 5, $n = 24$ due to missing values). This shows that participants had formed a positive impression of the quiet hour during the study.

3.3.2. Follow-up evaluation

When participants were approached after three months, their evaluation was again positive ($M = 3.96$, $SD = 0.55$, $n = 25$). This was also the case for the item “I have implemented a quiet hour after the end of the study” ($M = 3.42$, $SD = 0.97$), which indicates that the participants continued to implement the quiet hour at least in part.

4. Discussion

This experimental field study was designed to test the effectiveness of implementing a quiet hour. The results show that people report a higher performance on days when they have implemented a quiet hour than on days without a quiet hour. They also report more progress on tasks worked on during the quiet hour than on comparable tasks during a day without a quiet hour. These effects were not due to an increase in hours worked during the day, and they could not be attributed to differences in daily stressors. Furthermore, participants evaluated the quiet hour positively, both directly at the end of the study and three months later.

This study supports the idea that a behavioral decision-making research framework could be used for understanding time management issues (e.g., Koch & Kleinmann, 2002). In particular, we used this framework to argue that establishing a quiet hour can be considered as a precommitment strategy (e.g., Ariely & Wertenbroch, 2002): if people establish a quiet hour, they are committing themselves to working on an important but non-urgent task and to not allowing themselves to be interrupted. Such a precommitment is advisable because interruptions are often powerful temptations (e.g., because they might offer exciting new information), and it is much easier to generally reduce the number of interruptions than to say no to an interrupting colleague.

Our study also supports the idea that shielding oneself from interruptions is important (but difficult, König & Kleinmann, 2007) because a great deal of research has established the negative effects of being interrupted on performance (primarily in lab studies, e.g., Cellier & Eyrolle, 1992; Gillie & Broadbent, 1989). At the same time, our manipulation check showed that quiet hours do not completely obliterate interruptions – they merely decrease the number of interruptions. This might indicate that adopting an interruption-free work environment is unrealistic because organizations might sometimes require a fairly continuous flow of information.

As predicted, conscientiousness moderated the effects of implementing a quiet hour on performance. The more conscientious people were, the smaller the effect of the quiet hour. This means that nonconscientious people, who are likely to procrastinate (Steel, 2007; van Eerde, 2003a), might especially benefit from implementing a quiet hour. The use of other time management techniques, however, did not moderate the effects of implementing a quiet hour on performance. If the effects of the quiet hour are independent of the extent to which people use other time management techniques, this means that people who already use other time management techniques can equally benefit from implementing a quiet hour as people who do not use them.

This study contributes to the empirical literature on time management by testing the effectiveness of one particular time management technique for the first time. Time management is often studied from an individual differences perspective (see

Claessens, van Eerde, & Rutte, 2007). However, intervention studies are much rarer (Claessens et al., 2007), and we agree with Claessens et al. that there is “still a lot of work to be done on the subject of time management” (p. 270), particularly work that evaluates time management interventions.

As in all studies, there are some limitations to our research. First, our research design made it necessary to assess momentary performance – a type of performance that cannot be obtained by asking supervisors (Fisher, 2003; Totterdell, 2000), as for supervisors to rate task or day performance, they would need to have information about slow or fast progress available to them, which would be unrealistic. Thus, the only way of testing the hypotheses was to obtain self-report performance data, although it remains to be shown how strongly self-reports of momentary performance correlate with momentary performance measured objectively or by others' reports. Even though, at least some of our participants might have been somewhat lenient when rating their own performance, this is not an issue for this study as the effects of implementing a quiet hour were tested as within-person effects. Thus, differences in mean performance between participants are not of importance here.

Second, we used a rather short timeframe. The only long-term results we have are general, albeit positive statements that our participants made in our follow-up survey after three months. It would therefore be interesting to examine the effects of a quiet hour implemented over a longer period of time.

Third, participants might have been wondered whether we believed in the effectiveness of the quiet hour and tried to behave accordingly. However, we carefully designed our questionnaire in a way that both conditions (i.e., also the one with no quiet hour) were framed as reasonable work styles that have both their benefits (and disadvantages), and the study was described as a study about how people manage their time in general (and not as a test of the quiet hour). This design features make it at least less likely that participants just reported to be more effective on days with a quiet hour in order to do us researchers a favor.

Fourth, the quiet hour can be understood as a technique that shields a person from interruptions by others, but it does not shield him/her from self-initiated interruptions. In particular, the internet offers many options for killing time (e.g., an employee might think “why not just check whether there is any interesting news?” and interrupt his/her current work task to visit an online news site, see, e.g., Vitak, Crouse, & LaRose, 2011; Weatherbee, 2010). Thus, future research should develop and evaluate interventions that help employees to resist these temptations.

Future research could also look at other individual variables as moderators of the relationship between the quiet hour and performance. For example, people who are good at multitasking (e.g., Bühner, König, Pick, & Krumm, 2006; Hambrick, Oswald, Darowski, Rench, & Brou, 2010) or who like to multitask (cf. König & Waller, 2010) might cope better with interrupting events and thus profit less from the quiet hour. In addition, people who have less developed “cooling strategies” (Metcalfe & Mischel, 1999, p. 14), which are strategies to focus on the informational aspects of an interruption instead of the rewarding and pleasurable aspects, might benefit more from implementing quiet hours. Researchers could also explore in which jobs quiet hours are particularly beneficial and in which jobs quiet hours do not work or are even harmful. For example, if jobs require a great deal of communication between different people, implementing quiet hours may disrupt this flow of communication, leading to a decrease in job performance (see also Jett & George, 2003; Käser, Fischbacher, & König, in press).

Given that this study indicates the general effectiveness of quiet hours, an interesting follow-up question concerns which time slots are appropriate for implementing quiet hours. Our study shows a variety of starting times, but it remains open whether participants

chose appropriate starting times. It is likely that appropriateness depends both on organizational procedures (e.g., sometimes it might be necessary to be able to interrupt certain people to get urgent information) and on individual preferences, which might be linked to circadian and ultradian rhythms (i.e., biological rhythms with periods of 24 hours or less than 24 hours, see e.g., Hobbs, Williamson, & Van Dongen, 2010; Iskra-Golec, 2006).

The study has important practical implications: employees should consider implementing a quiet hour, as it should help to improve their performance. In addition, people with a low degree of conscientiousness will benefit to an even greater extent. A quiet hour is likely to work especially well if it is implemented by a whole department or even a whole company (cf. Perlow, 1999). In this case, nobody would phone or try to visit their colleagues during this time because it would also be their own personal quiet time. Quiet hours could be included in time management training to bolster its often inadequate effectiveness (Slaven & Totterdell, 1993).

Mackenzie (1997, p.88), the author of a very successful time management self-help book, claimed that the “quiet hour is one of the most successful and profitable time management techniques ever devised”. Although we do not know whether it is indeed the most successful technique, we do now know that it is at least a successful technique.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

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