

ORIGINAL RESEARCH REPORT

Only so Many Hours: Correlations between Personality and Daily Time Use in a Representative German Panel

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Time is a finite resource, strictly limited to 24 hours a day. How people spend these resources is in many ways determined by necessities and external constraints, yet research on personality-situation transactions shows that people also choose their environments to resonate with their personality. This finding implies that daily time use and individual traits should be correlated. However, few studies have linked modern methods for assessing time use to individual differences in personality traits. In this study, we investigate correlations between the Big Five traits and time spent on various daily activities in the German Socio-Economic Panel (SOEP), including 5,456 days in the lives of 1,364 individuals. Results converged towards previously reported personality-situation transactions. For example, extraversion predicted whether or not respondents reported meeting their friends, whereas openness was correlated negatively with watching TV. Effects were modest in size, ranging from $r \approx .10$ to $.25$. Taking together, our findings corroborate the notion that our personality is robustly associated with the way we spend our lives.

Keywords: Big Five; time use; personality-situation transactions; Day Reconstruction Method

Time has frequently been considered the most valuable resource, asset, or commodity, and thus, for an individual, it will likely matter how she spends it from day to day. This renders daily time use a highly relevant outcome variable that allows for powerful descriptions of real-world phenomena, descriptions which are often lacking in social and personality psychology (Rozin, 2001). However—and despite the increasing popularity of modern assessment methods that capture daily time use (Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004)—time use per se has been an underutilized concept in psychology.

In 2015, an employed person from the US spent on average more than nine hours on sleep and personal care activities; six hours on income-generating work plus one and a half hour on household chores (Bureau of Labor Statistics, U.S. Department of Labor, 2016). From the remaining time budget, one more hour was devoted to eating and drinking, and another hour spent on caring for other household members. This left between three and four hours for leisure activities including sports,

socializing and relaxation. How these numbers vary across individuals is arguably determined by a multitude of influences, ranging from individual characteristics such as gender (Fisher, Egerton, Gershuny, & Robinson, 2007) and age (Harvey & Singleton, 1989) to larger societal factors such as public policy regimes (Gershuny & Sullivan, 2003) and the predominant pacing of society (Robinson, Tracy, & Lee, 2015). A whole interdisciplinary field of studies—time-use research—is dedicated to investigate how people spend their time (see e.g. Harvey & Pentland, 2002; Michelson, 2015).

Largely unaffected by these endeavors, personality psychologists have studied how individuals choose their situations and environments in accordance with their personality. Such incidents of situational selection have been called cooperative person-situation interactions (Buss, 1987; Funder, 2008) or personality-situation transactions (Wrzus, Wagner, & Riediger, 2016). These personality-situation transactions directly map onto predictions regarding time use. If, for example, extraverts actively choose situations that align with their disposition, they should spend more minutes per day socializing. However, individuals often cannot freely choose their situations but have to face external pressures, normative expectations, and the imperatives of the human condition when deciding how to allocate their time. Under such restricting conditions, probing for links between time use and personality constitutes a severe test for whether personality measures capture meaningful variance of daily life.

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Findings on Personality-Situation Transactions

It has been notoriously difficult for researchers to arrive at consensus about what constitutes a situation. Instead, multiple approaches for a taxonomy have emerged (e.g. Kelley et al., 2003; Rauthmann, 2015). Which taxonomy is useful, of course, depends on the question a specific researcher tries to answer. In the context of time use—trying to answer the question: “How do people spend their time?”—distinct categories of activities—eating, getting ready, commuting, working and so forth—offer an intuitive categorization that mirrors how one would answer this question in everyday language. Thus, for the purpose of this study, we will focus on findings regarding situations in terms of activities.

Previous studies investigating links between personality and activities have relied on various methods to measure the activities in which respondents engage. One approach involves frequency-based measures. For example, in a study by Chapman and Goldberg (2017), 765 respondents from a community sample reported how frequently they participated in 400 different activities on a categorical scale (from *never in my life* to *15 or more times in the past year*). Stephan, Boiché, Canada, and Terracciano (2014) used data from a large-scale panel study ($N = 3,396$) and from multiple French samples with a broad age range ($N = 2,917$), in which respondents again reported how frequently they engaged in a number of activities, using a categorical scale (from *never* to *several times a week*). Furnham (1981) relied on a slightly different approach: 130 students filled out a potpourri of activity scales that asked either for the number of hours spent on a certain activity in the last week, or to what extent respondents choose or avoid certain situation types (arguably only an indirect measure of activity engagements).

In contrast to such generalized retrospective reports, and somewhat closer to “real-time” assessment, diary studies request respondents to only recall a single day, but do so multiple times in a row. For example, in a study by Emmons, Diener, and Larsen (1986), a small sample of 22 students filled out daily diaries, recording how much time they spent in certain specific situations.

Ans finally, new technology allows for momentary assessment of respondents’ activities. For example, Wrzus et al. (2016) used experience sampling: 378 participants covering a broad range of age groups carried phones over the course of multiple days and reported the activity they were *momentarily* engaged in six times per day. And in a particularly innovative study by Mehl, Gosling, and Pennebaker (2006), 96 psychology students wore recorders that automatically sampled snippets of ambient sounds, which were later coded for specific activities.

Across this multitude of studies using diverse methods, a number of associations has emerged rather consistently: positive correlations between extraversion and socializing; positive correlations between conscientiousness and working, with “complementary” negative correlations between conscientiousness and leisure activities; and positive correlations between openness to experience and engagement in cultural activities, accompanied by negative correlations

between openness to experience and watching TV. These findings match “folk theories” about daily manifestations of personality (Mehl et al., 2006) and have high face validity, given that activities are often tightly linked to the definitions of traits. For example, the factor conscientiousness has also appeared under the label “work”, while openness has been labelled “culture” in previous research (John & Srivastava, 1999).

While previous studies allowed valuable insights into personality-situation transactions, they, like all research, have suffered from various limitations. Participants frequently were students (Emmons et al., 1986; Furnham, 1981; Mehl et al., 2006), and personality-situation transactions found in these populations might not hold in samples with more diverse demographics (Henrich, Heine, & Norenzayan, 2010). In line with this possibility, Wrzus et al. (2016) found that some personality-situation transactions were only observable in particular age groups.

Furthermore, measurement strategies might not have been optimal to establish links between personality and time use. Studies that use coarser frequency-based measures (Chapman & Goldberg, 2017; Stephan et al., 2014) lack crucial information regarding the time allocated to certain activities, because they only ask respondents how often they participated in an activity. Likewise, experience sampling (e.g. Wrzus, 2016) offers momentary snapshots of mental processes and well-being (Csikszentmihalyi & Larson, 2014), but does not offer complete coverage of the day per design, and provides no or only little information regarding the time allocated to specific activities. In contrast, the Day Reconstruction Method (Kahneman et al., 2004) aims to assess *all* activities that an individual engaged in on a particular day, and additionally assesses the time allocated to these activities. It might thus be the preferable method for a more nuanced picture on links between personality and time use.

The Present Study

In this study, we explore links between personality and how people make use of their time in everyday life, analyzing time use records of 5,456 days in the lives of 1,364 individuals from German Socio-Economic Panel Study (SOEP). More specifically, we investigate the correlations between the Big Five personality traits and time spent on 9 different activities: working/studying, chores, socializing, talking on the phone, watching TV, using the computer/internet, reading, and sports.

Unlike many other studies on the topic, this study investigates personality-situation transactions in a representative, heterogenous samples. Additionally, this is to our knowledge the first study that makes use of multiple waves of measurements of time use, which allowed us to model latent factors to accommodate for the fact that measures of time use are likely subject to substantial fluctuations given that time use is determined by a multitude of external factors. This study is exploratory in nature: We have no explicit expectations whether previously reported personality-situation transactions can be replicated using the SOEP time-use data.

Methods

Data came from the Innovation Sample of the German Socioeconomic Panel Study (*SOEP-IS*; Richter & Schupp, 2015, Wagner, Frick, and Schupp (2007)). The *SOEP-IS* is an ongoing longitudinal panel survey launched in 2011 which includes individuals who have been part of the core study of the German Socioeconomic Panel previously and aims to be a representative sample of the German population. It includes more than 5,000 individuals from over 3,000 households to date and is dedicated to assess new and innovative survey instruments. Data are collected in computer-assisted personal interviews (CAPI). *SOEP-IS* participants reported personality in 2013 and 2015; a random subsample of the *SOEP-IS* participants furthermore completed time use measures in each of the annual waves from 2012 to 2015.

We included all who reported (a) their time use in each of the four waves and (b) personality in both years in our analyses, which resulted in 5,456 time diaries of 1,364 respondents (53.23% women) who were on average 52.60 years old in 2012 ($SD = 16.80$ years). Notice that the alternative approach of including all respondents who reported at least one time diary ($N = 2,231$) and treating missing values with full-information maximum likelihood lead to very similar conclusions. Furthermore, we analyzed whether personality was systematically associated with completion of the time diaries over the years. Results of these additional analyses can be found on the OSF page (<https://osf.io/wcka9/>).

Assessment of Time Use

Following the diary-based approach of the Day Reconstruction Method (DRM; Kahneman et al., 2004), respondents were asked to reconstruct their previous day. First, they were asked to break up the previous day into episodes. For each episode, respondents then selected one activity from a predetermined list of activities and reported both start and end time of that activity. Respondents further reported whether they had simultaneously participated in any other activity from the list, i.e. whether they had any secondary activity. The DRM measure included in the *SOEP-IS* has been validated elsewhere and showed patterns largely consistent with previous research (Anusic, Lucas, & Donnellan, 2017).

We calculated time usage variables that indicated the number of minutes spent on the respective activity in the prior day, including episodes in which the activity was reportedly secondary (e.g. episodes of simultaneous eating and watching TV counted towards both activities). Notice that exclusion of secondary activities can lead to serious underestimation of the time committed to certain activities such as e.g. child care (Australian Bureau of Statistics, 1998). Additionally, we aggregated a number of activities ("household tasks", "shopping", "preparing food", "gardening") to form a single indicator reflecting the time spent on chores.¹ All in all, we analyzed 9 different activities: working/studying (assessed as only one combined category in the survey), chores, socializing ("meeting friends"), talking on the phone, watching TV, using the computer/internet, reading, and actively doing sports.

Notice that the DRM included a range of other activities, including some that were only reported by a small number of respondents (e.g. visiting the doctor, intimate relationships). For some of the more frequently reported activities, results of analysis can be found on the OSF (<https://osf.io/wcka9/>) but are not discussed here for the sake of brevity.

Personality Assessment

Personality was assessed in 2013 and 2015 with the German 15-item version of the Big Five Inventory, the BFI-S (Lang, John, Lüdtke, Schupp, & Wagner, 2011). Respondents answered on a 7-point response scale ranging from *does not apply at all* to *completely applies*. Cronbach's alphas were $\alpha_{Extraversion} = .66$, $\alpha_{Emotionalstability} = .61$, $\alpha_{Agreeableness} = .45$, $\alpha_{Conscientiousness} = .58$, $\alpha_{Openness} = .60$. These Cronbach's alphas are lower than for many longer standard personality inventories, which is due to the very short scales used: The brief measure was designed to cover complementary aspects of the very broad Big Five traits, leading to little redundant content. Thus, internal consistency may underestimate the true reliability. Furthermore, reducing the number of items necessarily reduces Cronbach's Alpha; thus, it is anything but surprising to find lower values for such brief scales. However, the inter-item correlations of this short measure are quite similar to those from longer inventories (Lucas & Donnellan, 2011). Furthermore, we address potentially reduced reliability by using the latent-variable modeling strategy described below.

Statistical Models

We used structural equation modeling (SEM) to estimate pairwise correlations² between the Big Five personality variables and the time use variables across all waves, treating each single wave as an indicator for an underlying latent variable.

Time use data has certain features that impose challenges to statistical modeling: The data is always nonnegative, often right-skewed and often contains a large share of observations reporting zero time for an activity (Hammer, 2012). We thus decided to use a two-step approach to model time use: In a first step, time use was coded as a simple binary variable indicating whether a respondent did or did not perform a certain activity; this variable was treated as a dichotomous indicator. In a second step, time was treated as a continuous variable reflecting the time spent on an activity in minutes, with time diaries not containing the activity being treated as missing values using full information maximum likelihood. Notice that the alternative approach of using only one class of models in which the zero-inflated nature of the time use variable was simply ignored resulted in similar conclusions, results can be found on the OSF page (<https://osf.io/wcka9/>). However, correlations based on such models could mirror different data patterns: It could, for example, be possible that (1) personality correlates with participation in that activity regardless of the time spent on it, or that (2) personality correlates with the time spent on that activity while respondents participate in it regardless of their personality. We thus decided to report results from the two-step approach instead.

We defined a latent variable measuring the respective personality trait and a latent variable measuring either (a) performance of or (b) time spent on the respective activity. This model specification assumes a stable underlying trait both on side of the personality variables and on side of the activity variables. For example, we assume an underlying latent variable of time spent with chores (i.e. a tendency to spend time on chores), treating each of the four time diaries as an indicator of this tendency. Each wave of personality scores was treated as one indicator of personality, constraining all loadings to equality; each wave of time use assessment was treated as one indicator of time use, again constraining all loadings to equality. In this way, we attempted to reduce measurement error resulting from e.g. random daily fluctuations in time use.

Notice that the assumption of stability was empirically supported by the observation that correlations between the time use variables did not systematically decrease with increasing time gaps between observations for almost all activities. For example, time spent working in 2012 correlated with time spent working in 2013 ($r = .485$) just as much as it did with time spent working in 2015 ($r = .490$). Only one activity, watching TV, showed a systematic slight decline in stability with increasing time gaps: Consecutive years correlated in the range of $r \approx .40$, whereas observations spaced by two years correlated only $r \approx .37$, and across three years, i.e. from 2012 to 2015, the variables correlated $r = .324$. Thus, we decided for the parsimonious models which assume one underlying factor behind the activity variables.

Additionally, we ran models controlling for the normative effects of gender and age that might confound associations between personality and time use. More specifically, we regressed both the latent personality and the latent time use variable onto gender, age, age², and also included the interactions, age \times gender and age² \times gender. Comparison of these controlled models with the uncontrolled, i.e. “zero-order” models, can clarify whether the observed associations can be attributed to normative gender differences or age trends in time use and personality.

Notice that some of the time diaries (11.3 %) captured time use on the weekend. Naturally, time use will likely vary between days of the week and the weekend. However, per survey design, one would not expect that personality systematically covaries with the day of the week that respondents were surveyed, and indeed we found no such associations (all $ps > .275$). Thus, day of the week cannot introduce any spurious associations between time use and personality, which is why there was no need to control for this variable.

Analyses were run in *lavaan* (version 0.5-20; Rosseel, 2012).

Subgroup Analysis: Full-Time Employed Respondents

The number of minutes that respondents reportedly worked or studied was highly correlated with their employment status: The average day of a full-time employed respondents included 372 minutes of working/studying as opposed to only 90 minutes among all other

respondents. Differences in employment status could thus potentially account for any correlation between personality traits and time spent working. However, conceptually, this does not necessarily imply that analyses should be controlled for employment status. In fact, employment status might be a mediator of the effects of personality. For example, a more conscientious individual might be more likely to take up and keep a full-time job. However, at the same time, employment status is also a plausible confounder, since employment status might causally affect both conscientiousness and time spent working. To describe the links between personality and time use as thoroughly as possible—without necessarily imposing any view regarding the causal web underlying the variables—we additionally report all analyses concerning time spent working restricted to the subsample of $N = 353$ respondents who reported full-time employment in all assessment waves included.³

Results

Across all models, fit measures indicated overall decent fit. CFI ranged from 0.88 to 1, $Mdn = 1.0$, $M = 0.99$. RMSEA ranged from 0 to 0.05, $Mdn = 0.01$, $M = 0.01$. SRMR ranged from 0.01 to 0.09, $Mdn = 0.03$, $M = 0.04$. Applying conventional cutoff values (e.g. Hu & Bentler, 1999), only six models had a CFI below 0.95, only three models had an RMSEA exceeding 0.05, and only three models had an SRMR exceeding 0.08. Only the model analyzing the relationship between time spent working and agreeableness with statistical control for age and gender among the employed subsample missed more than one cutoff value; $CFI = .088$, $RMSEA = 0.051$, $SRMR = 0.052$.

Figures 1–3 show the results of our SEM models. Please refer to the OSF page for tables containing all results in numerical form.

Working/Studying

In the full sample (**Figure 1**, Panel A–E), we found a large number of links between personality and both reporting to have worked as well as time spent working. However, discrepancies arose in analyses including only respondents who reported full-time employment in all four DRM waves ($N = 353$; **Figure 1**, Panel F–J), and these differences go beyond the obvious explanation that the sample of full-time employed respondents ($N = 353$) was considerably smaller and thus had lower statistical power.

Specifically, a small positive association between extraversion and reporting working/studying in daily life (**Figure 1**, Panel A); the negative relationship between agreeableness and time spent working/studying (**Figure 1**, Panel C), and the positive association between openness and reporting working/studying (**Figure 1**, Panel E) all got considerably smaller or even vanished to zero when only looking at the full-time employed (**Figure 1**, Panel F, H and J). This likely reflects systematic personality differences between respondents who are full-time employed and other respondents who are part-time employed or unemployed. Considering the correlation that is of particular interest—conscientiousness and time spent working/

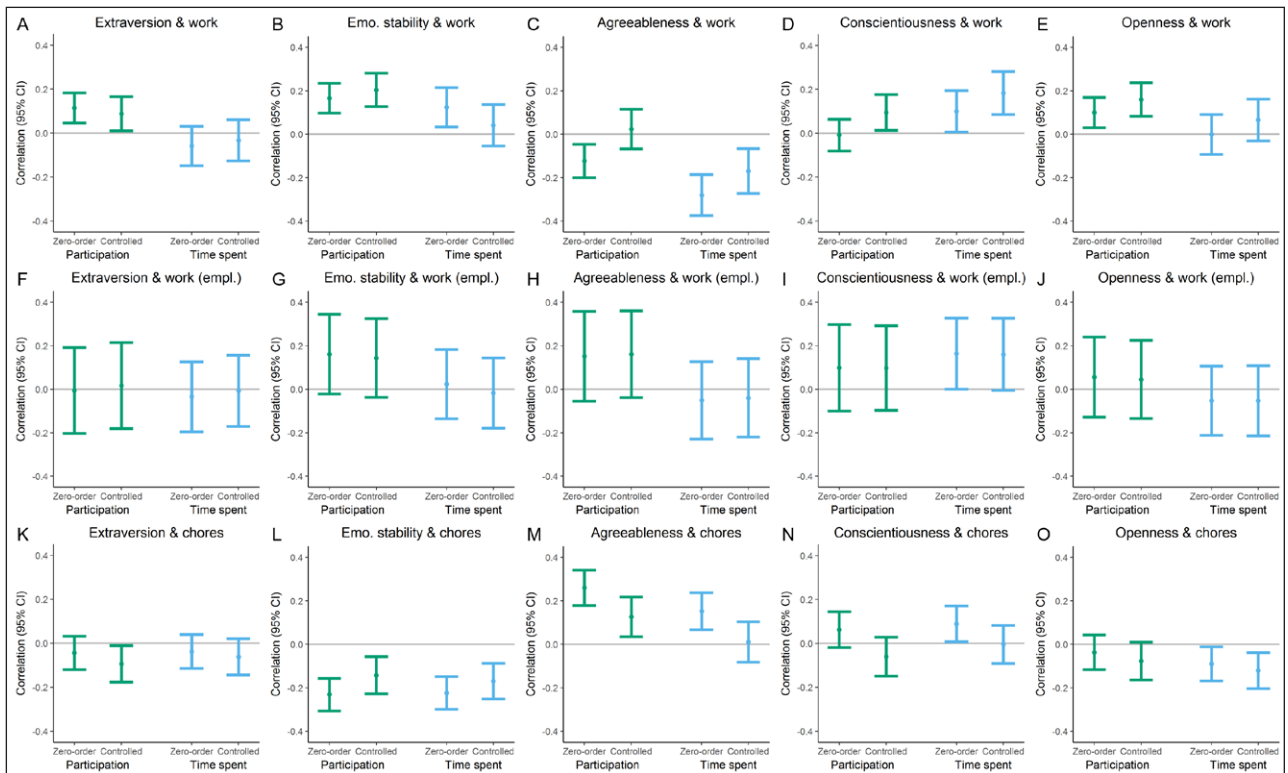


Figure 1: Correlations between Big Five personality traits and time spent on work and chores in the SOEP. Participation refers to analysis of whether or not a respondent reported the activity; time spent refers to analysis of minutes spent on activity. Notice that the width of the confidence intervals can vary between the two outcomes as non-participation in an activity leads to missing values for the time spent on the activity. Zero-order refers to models that only include personality and time use; controlled models additionally take into account the effects of gender and age. Upper row shows results for working/studying ($N = 1,364$); middle row shows results for working/studying in the subsample of participants that reported being fully employed ($N = 353$); lower row shows results for chores ($N = 1,364$).

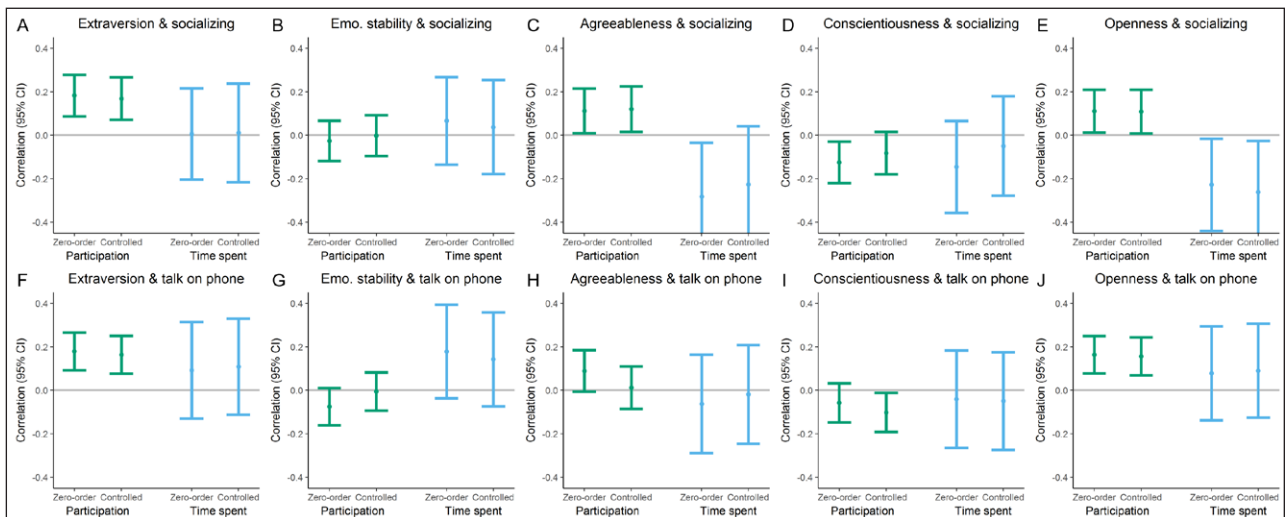


Figure 2: Correlations between Big Five personality traits and time spent on primarily social activities in the SOEP. Participation refers to analysis of whether or not a respondent reported the activity; time spent refers to analysis of minutes spent on activity. Notice that the width of the confidence intervals can vary between the two outcomes as non-participation in an activity leads to missing values for the time spent on the activity. Zero-order refers to models that only include personality and time use; controlled models additionally take into account the effects of gender and age. Upper row shows results for socializing; lower row shows results for talking on the phone (both $N = 1,364$).

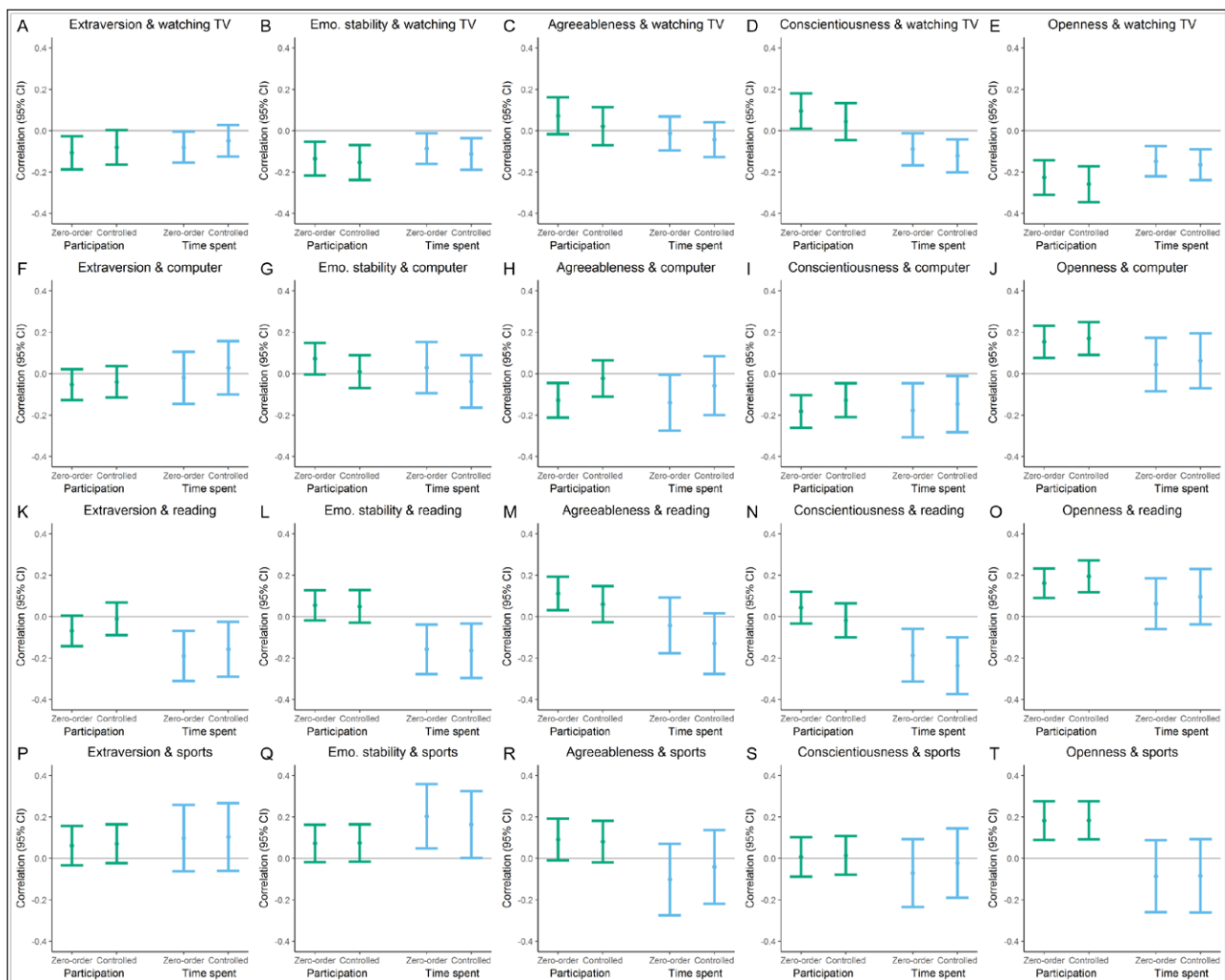


Figure 3: Correlations between Big Five personality traits and time spent on leisure activities in the SOEP. Participation refers to analysis of whether or not a respondent reported the activity; time spent refers to analysis of minutes spent on activity. Notice that the width of the confidence intervals can vary between the two outcomes as non-participation in an activity leads to missing values for the time spent on the activity. Zero-order refers to models that only include personality and time use; controlled models additionally take into account the effects of gender and age. Rows display results for watching TV, using computer/internet, reading, and actively doing sports respectively (all $N = 1,364$).

studying—results indicated a positive association in the complete sample ($r = .100, p = .039$ without control for age and gender and $r = .183, p < .001$ with control for age and gender; **Figure 1**, Panel D). Analysis of full-time respondents resulted in a similar association ($r = .164, p = .050$ without control for age and gender and $r = .161, p = .057$ with control for age and gender; **Figure 1**, Panel I), although the evidence was weaker, probably due to the smaller sample size.

Chores

Most remarkably, respondents with higher levels of emotional stability were less likely to report doing chores ($r = -.279, p < .001$ without control for age and gender and $r = -.173, p < .001$ with control for age and gender) and if they reported doing chores, they spent less time on them ($r = -.209, p < .001$ without control for age and gender and $r = -.126, p = .015$ with control for age and

gender; **Figure 1**, Panel L). In addition, there were some other trends such as a positive correlation between agreeableness and reporting chores (**Figure 1**, Panel M); and a tendency that more open respondents spent less time on chores (**Figure 1**, Panel O).

Social Activities: Socializing and Talking on the Phone

Multiple traits correlated positively with whether or not respondents reported socializing (meeting friends): First and foremost extraversion ($r = .182, p < .001$ without control for age and gender and $r = .169, p = .001$ with control for age and gender; **Figure 2**, Panel A), and to a lesser extent also agreeableness ($r = .112, p = .034$ without control for age and gender and $r = .120, p = .025$ with control for age and gender; **Figure 2**, Panel C) and openness ($r = .111, p = .028$ without control for age and gender and $r = .109, p = .034$ with control for age and

gender; **Figure 2**, Panel E). Interestingly, for respondents who did report socializing, how long they spent on this activity seemed unrelated to their extraversion (**Figure 2**, Panel A) and, if anything, there were negative associations between time spent socializing and agreeableness (**Figure 2**, Panel C) and openness (**Figure 2**, Panel E).

A second activity that reflects an activity with social focus, talking on the phone, showed very similar trends for extraversion (**Figure 2**, Panel F) and Openness (**Figure 2**, Panel J).

Leisure Time Activities

Weaker negative associations were found between extraversion and (a) whether or not respondents reported watching TV, as well as (b) how long they watched if they participated in this activity (**Figure 3**, Panel A); and a similar pattern emerged for emotional stability (**Figure 3**, Panel B).

In contrast, conscientiousness only showed a negative relationship with how long respondents watched TV, but not with whether or not they did it at all (**Figure 3**, Panel D). The most pronounced correlation was found for openness: Respondents who scored high on openness to experience were less likely to watch TV ($r = -.226, p < .001$ without control for age and gender and $r = -.258, p < .001$ with control for age and gender) and watched for shorter periods of time if they watched ($r = -.147, p < .001$ without control for age and gender and $r = -.164, p < .001$ with control for age and gender; **Figure 3**, Panel E).

Conscientiousness was negatively associated with whether or not respondents reported using a computer/the internet ($r = -.182, p < .001$ without control for age and gender and $r = -.128, p = .002$ with control for age and gender) and also showed a negative association with how long they used it ($r = -.177, p = .008$ without control for age and gender and $r = -.147, p = .035$ with control for age and gender; **Figure 3**, Panel I). In contrast, openness was positively associated with using a computer/the internet ($r = .154, p < .001$ without control for age and gender and $r = .170, p < .001$ with control for age and gender; **Figure 3**, Panel J).

Results indicated negative correlations or trends towards negative correlations between the time respondents spent reading and extraversion (**Figure 3**, Panel K), emotional stability (**Figure 3**, Panel L), agreeableness (**Figure 3**, Panel M), and conscientiousness (**Figure 3**, Panel N). Interestingly, those trends did not mirror the associations between these traits and the latent factor indicating participation in this activity. In contrast, openness was positively associated with whether or not respondents read ($r = .161, p < .001$ without control for age and gender and $r = .195, p < .001$ with control for age and gender; **Figure 3**, Panel O), and, if anything, showed a positive trend for the time spent reading.

Participating in sports showed certain trends indicating positive relationships with extraversion, emotional stability, and agreeableness—though the latter only showed a trend for participation in the activity and not for the time spent on it. Again, openness showed the strongest association; openness was positively correlated with whether or

not respondents reported doing sports ($r = .183, p < .001$ without control for age and gender and $r = .184, p < .001$ with control for age and gender; **Figure 3**, Panel T).

Discussion

In the present study, we identified associations between personality traits and time use in everyday life in a heterogeneous, representative sample. This expands our understanding of how personality is related to meaningful real-world behaviors, as time is frequently considered an inherently valuable resource. Overall, our findings match results from previous studies on personality-situation transaction, strengthening the evidence for links between extraversion and both social activities (meeting friends, talking on the phone) and conscientiousness and work. Cultural activities were not assessed in the DRM implemented in the SOEP-IS and so we were not able to test whether these activities show positive correlations with openness. However, we did replicate a negative association between openness to experience and watching TV, and results furthermore suggested that leisure time activities such as using a computer/the internet, reading and doing sports were positively correlated with openness.

The results regarding chores stand out to some extent, as they do not fully match “folk theories” or what we would expect based on the definitions of the Big Five (e.g., John & Srivastava, 1999). First of all, we did *not* find an association between chores and conscientiousness, which is surprising given that orderliness is considered an aspect of conscientiousness (DeYoung, Quilty, & Peterson, 2007). One could speculate that individuals high on conscientiousness desire more orderliness, but are also more effective when it comes to keeping things neat and tidy, resulting in zero-association despite the close conceptual link. Instead, we found preliminary evidence that time spent on chores correlated negatively with emotional stability; and importantly, this could not be fully explained by gender differences. Again, after having seen the data, one could come up with a plausible explanation—more neurotic individuals might be bothered by clutter without necessarily being more effective in keeping things neat—though this is only speculation. Additionally, results also hinted towards a positive association between doing chores and agreeableness, which is in line with previous findings from a study using an act-frequency approach: Chapman and Goldberg (2017) found that individuals high in agreeableness reported that they ironed clothes or washed dishes more frequently over the course of the last year (Chapman & Goldberg, 2017). Chapman and Goldberg suggested that this might be because agreeable individuals tend towards behaviors that benefit others.

Overall, effects were rather modest in size, with correlations typically between $|r| = .10$ and $.20$, including some larger values such as the negative correlation between openness and watching TV ($r = -.258$). Effects of $|r| = .20$ have been described as “typical” for personality research (Gignac & Szodorai, 2016). More importantly, daily time use is an outcome that is determined by a large number of factors, which inherently bounds the correlations we can expect to lower values (Ahadi & Diener, 1989).

Our study adds to the existing literature by differentiating between participation in activities and time allocated to those activities. In many cases, effects were clearer in the models that used binary indicators of participation in an activity as indicators. While this might in part be explained by differences in statistical power (analyses of participation had no missing values because all indicators were available for all 1,364 respondents), there were some genuine discrepancies such as a positive association between openness and participation in socializing with a concurrent *negative* association between openness and time spent socializing. How much time is spent on an activity might be strongly constrained by the embedding of the activity in daily life and thus, it might be more characteristic for an open person to make the effort to meet friends in their daily life, while the length of such a meeting is constrained by the wealth of other activities in daily life. Such nuanced differences might be obscured in studies that rely on experience sampling and thus lack information regarding the duration of certain activities.

Limitations

Our data also come with a number of limitations. For example, only 10% of the time diaries referred to weekend days—thus, the data might have been insufficient to fully capture associations between personality traits and activities that might be typically performed on the weekend (e.g., sports, socializing). Furthermore, as is true of all studies that rely on self-reports, self-report biases such as socially desirable responding might have affected some of the associations. For example, it might be socially desirable to report high levels of openness but socially undesirable to spend a lot of time watching TV.

In addition, the DRM has quite high demands on memory as participants need to reconstruct the complete previous day, and the method leaves it open to participants how to parse their day into distinct episodes. How respondents fill out the DRM might be in itself affected by personality, potentially biasing the associations between activities and personality. For example, a preliminary analysis we ran suggested that more agreeable respondents reported more episodes with more distinct activities—but using DRM data alone, it is impossible to figure out whether this reflects an actual difference in daily structure or a different response style.

Because of these weaknesses, it is crucial that diverse assessment methods are employed by researchers. For example, experience sampling and frequency-based measures might neglect information regarding the duration of a certain activity; but experience sampling does not require respondents to recall a whole day from memory, and frequency based measures can cover longer periods of time (i.e., the last month or year) and thus get closer to “typical” activities in respondents’ lives. On top of that, objective measures such as short audio recordings from respondents’ everyday life (Mehl, Gosling, & Pennebaker, 2006) can rule out certain self-report biases. If a certain finding

is replicated across such a variety of diverse methods, confidence in a specific personality-situation transaction is greatly increased, and certain alternative explanations can be ruled out.

Conclusion

Taken together, we demonstrate that links between personality and everyday life can reliably be detected in a heterogenous sample representative of the broader (German) population. Student samples could potentially misrepresent these links, as one could argue that young respondents are less constrained in their time use because of fewer obligations. However, our study suggests that even under the constraints of everyday life, personality shows modest but meaningful associations with daily patterns. Personality therefore qualifies as a real-world phenomenon (cf. Rozin, 2001), exerting its influence beyond the context of the research laboratory and allowing for strong descriptions of human life.

Data accessibility Statement

Analysis scripts can be found on the Open Science Framework, <https://osf.io/wcka9/>. The SOEP-IS is made available to the scientific community by the German Institute for Economic Research. Please refer to http://www.diw.de/sixcms/detail.php?id=diw_01.c.558445.en for further information how to access the data.

Notes

- ¹ We decided to aggregate these four activities as they all might be considered chores according to our judgment. However, two of the activities might sometimes be considered leisure activities: gardening (German label: *Gartenarbeit*, literally garden work) and shopping (German label: *Einkaufen*, which is often used in the context of groceries shopping, whereas the German *Shopping* is more often used to refer to leisurely shopping). Importantly, applying a narrower definition of chores (only “household tasks”) led to the same pattern of results.
- ² We decided to investigate bivariate association rather than including all Big Five traits in one model because (1) previous predictions, as well as previous studies, did not specifically address *unique* effects of traits and because (2) including all personality traits might result in estimates that have no straightforward interpretation, as the meaning of constructs changes when other, potentially overlapping constructs are controlled for (see Lynam, Hoyle, & Newman, 2006).
- ³ The number of continuously full-time employed respondents might seem surprisingly low; however, a substantial part of the sample is already beyond the average retirement age in Germany and many respondents report part-time employment. We decided to restrict the sample in such a rigorous manner to make sure that only respondents with regular, continuous employment trajectories are included, excluding respondents who e.g. lose their job over the course of the study.

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Competing Interests

The authors have no competing interests to declare.

Authors Contributions

- Substantial contributions to conception and design: JMR, REL
- Analysis and interpretation of data: JMR
- Drafting the article or revising it critically for important intellectual content: JRM, REL
- Final approval of the version to be published: JMR, REL

References

- Ahadi, S., & Diener, E.** (1989). Multiple determinants and effect size. *Journal of Personality and Social Psychology, 56*(3), 398. DOI: <https://doi.org/10.1037/0022-3514.56.3.398>
- Anusic, I., Lucas, R. E., & Donnellan, M. B.** (2017). The validity of the day reconstruction method in the German Socio-Economic Panel Study. *Social Indicators Research, 130*(1), 213–232. DOI: <https://doi.org/10.1007/s11205-015-1172-6>
- Australian Bureau of Statistics.** (1998). How Australians use their time. ABS Canberra.
- Bureau of Labor Statistics, U.S. Department of Labor.** (2016, June). American time use survey – 2015 results. *Press Release*.
- Buss, D. M.** (1987). Selection, evocation, and manipulation. *Journal of Personality and Social Psychology, 53*(6), 1214. DOI: <https://doi.org/10.1037/0022-3514.53.6.1214>
- Chapman, B. P., & Goldberg, L. R.** (2017). Act-frequency signatures of the Big Five. *Personality and Individual Differences, 116*, 201–205. DOI: <https://doi.org/10.1016/j.paid.2017.04.049>
- Csikszentmihalyi, M., & Larson, R.** (2014). Validity and reliability of the experience-sampling method. In *Flow and the foundations of Positive Psychology*. Springer, pp. 35–54. DOI: https://doi.org/10.1007/978-94-017-9088-8_3
- DeYoung, C. G., Quilty, L. C., & Peterson, J. B.** (2007). Between facets and domains: 10 aspects of the Big Five. *Journal of Personality and Social Psychology, 93*(5), 880. DOI: <https://doi.org/10.1037/0022-3514.93.5.880>
- Emmons, R. A., Diener, E., & Larsen, R. J.** (1986). Choice and avoidance of everyday situations and affect congruence: Two models of reciprocal interactionism. *Journal of Personality and Social Psychology, 51*(4), 815. DOI: <https://doi.org/10.1037/0022-3514.51.4.815>
- Fisher, K., Egerton, M., Gershuny, J. I., & Robinson, J. P.** (2007). Gender convergence in the American Heritage Time Use Study. *Social Indicators Research, 82*(1), 1–33. DOI: <https://doi.org/10.1007/s11205-006-9017-y>
- Funder, D. C.** (2008). Persons, situations, and person-situation interactions. In Oliver, J., Robins, R., & Pervin, L. (Eds.), *Handbook of personality: Theory and research*. New York: The Guilford Press, pp. 568–580.
- Furnham, A.** (1981). Personality and activity preference. *British Journal of Social Psychology, 20*(1), 57–68. DOI: <https://doi.org/10.1111/j.2044-8309.1981.tb00474.x>
- Gershuny, J., & Sullivan, O.** (2003). Time use, gender, and public policy regimes. *Social Politics: International Studies in Gender, State & Society, 10*(2), 205–228. DOI: <https://doi.org/10.1093/sp/jxg012>
- Gignac, G. E., & Szodorai, E. T.** (2016). Effect size guidelines for individual differences researchers. *Personality and Individual Differences, 102*, 74–78. DOI: <https://doi.org/10.1016/j.paid.2016.06.069>
- Hammer, B.** (2012). Statistical models for time use data: An application to housework and childcare activities using the Austrian Time Use Surveys from 2008 and 1992. Retrieved from <http://www.ntaccounts.org/doc/repository/Statistical%20Models%20for%20Time%20Use%20Data%20-%20An%20Application....pdf>.
- Harvey, A. S., & Pentland, W. E.** (2002). Time use research. In *Time use research in the social sciences*. Springer, pp. 3–18. DOI: https://doi.org/10.1007/0-306-47155-8_1
- Harvey, A. S., & Singleton, J. F.** (1989). Canadian activity patterns across the life span: A time budget perspective. *Canadian Journal on Aging/La Revue Canadienne Du Vieillessement, 8*(03), 268–285. DOI: <https://doi.org/10.1017/S0714980800008898>
- Henrich, J., Heine, S. J., & Norenzayan, A.** (2010). The weirdest people in the world? *Behavioral and Brain Sciences, 33*(2–3), 61–83. DOI: <https://doi.org/10.1017/S0140525X0999152X>
- Hu, L., & Bentler, P. M.** (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1–55. DOI: <https://doi.org/10.1080/10705519909540118>
- John, O. P., & Srivastava, S.** (1999). The Big Five trait taxonomy: History, measurement, and theoretical perspectives. *Handbook of Personality: Theory and Research, 2*(1999), 102–138.
- Kahneman, D., Krueger, A. B., Schkade, D. A., Schwarz, N., & Stone, A. A.** (2004). A survey method for characterizing daily life experience: The Day Reconstruction Method. *Science, 306*(5702), 1776–1780. DOI: <https://doi.org/10.1126/science.1103572>
- Kelley, H., Holmes, J., Kerr, N., Reis, H., Rusbult, C., & Van Lange, P.** (2003). *An atlas of interpersonal situations*. Cambridge University Press. DOI: <https://doi.org/10.1017/CBO9780511499845>
- Lang, F. R., John, D., Lüdtke, O., Schupp, J., & Wagner, G. G.** (2011). Short assessment of the Big Five: Robust across survey methods except telephone interviewing. *Behavior Research Methods, 43*(2), 548–567. DOI: <https://doi.org/10.3758/s13428-011-0066-z>
- Lucas, R. E., & Donnellan, M.** (2011). Personality development across the life span: Longitudinal analyses with a national sample from Germany. *Journal of Personality and Social Psychology, 101*(4), 847–861. DOI: <https://doi.org/10.1037/a0024298>

- Lynam, D. R., Hoyle, R. H., & Newman, J. P.** (2006). The perils of partialling: Cautionary tales from aggression and psychopathy. *Assessment*, *13*(3), 328–341. DOI: <https://doi.org/10.1177/1073191106290562>
- Mehl, M. R., Gosling, S. D., & Pennebaker, J. W.** (2006). Personality in its natural habitat: Manifestations and implicit folk theories of personality in daily life. *Journal of Personality and Social Psychology*, *90*(5), 862. DOI: <https://doi.org/10.1037/0022-3514.90.5.862>
- Michelson, W. H.** (2015). *Time use: Expanding explanation in the social sciences*. Routledge.
- Rauthmann, J. F.** (2015). Structuring situational information: A road map of the multiple pathways to different situational taxonomies. *European Psychologist*, *20*(3), 176. DOI: <https://doi.org/10.1027/1016-9040/a000225>
- Richter, D., & Schupp, J.** (2015). The SOEP Innovation Sample (SOEP IS). *Journal of Applied Social Science Studies*, *135*(3), 389–399. DOI: <https://doi.org/10.3790/schm.135.3.389>
- Robinson, J. P., Tracy, E., & Lee, Y.** (2015). Cruising through the millennium—2003–13 changes in American daily life. *Electronic International Journal of Time Use Research*, *133*. DOI: <https://doi.org/10.13085/eIJTUR.12.1.133-152>
- Rosseel, Y.** (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, *48*(2), 1–36. DOI: <https://doi.org/10.18637/jss.v048.i02>
- Rozin, P.** (2001). Social psychology and science: Some lessons from Solomon Asch. *Personality and Social Psychology Review*, *5*(1), 2–14. DOI: https://doi.org/10.1207/S15327957PSPR0501_1
- Stephan, Y., Boiché, J., Canada, B., & Terracciano, A.** (2014). Association of personality with physical, social, and mental activities across the lifespan: Findings from US and French samples. *British Journal of Psychology*, *105*(4), 564–580. DOI: <https://doi.org/10.1111/bjop.12056>
- Wagner, G. G., Frick, J. R., & Schupp, J.** (2007). The German Socio-Economic Panel Study (SOEP)—scope, evolution and enhancements. *Journal of Applied Social Science Studies*, *127*(1), 139–169. DOI: <https://doi.org/10.2139/ssrn.1028709>
- Wrzus, C., Wagner, G. G., & Riediger, M.** (2016). Personality-situation transactions from adolescence to old age. *Journal of Personality and Social Psychology*, *110*(5), 782. DOI: <https://doi.org/10.1037/pspp0000054>

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