The Ups and Downs of Daily Diary Research

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Contributor Biographies

Shevaun D. Neupert, PhD is an associate professor of Psychology at North Carolina State University. She earned her PhD in Family Studies and Human Development with a minor in Statistics from the University of Arizona in 2003 and completed her postdoctoral training at Brandeis University in 2005. Her research interests include contextual and individual differences surrounding stressors and well-being outcomes (e.g., physical health, cognition, affect). In particular, she is interested in the psychosocial and sociodemographic characteristics of individuals along with changing contextual factors which may be related to emotional, physical, and cognitive reactivity (or responses) to stressors. She conducts daily diary designs to examine short-term variability and individual differences in within-person processes. She is a fellow of the Gerontological Society of America and currently serves as an associate editor for the *Journal of Gerontology: Psychological Sciences*.

Jennifer A. Bellingtier, PhD, completed her PhD in Lifespan Development at North Carolina State University in 2017. Her research interests focus on individual's attitudes, beliefs, and feelings about their own aging, as well as how those beliefs develop and impact well-being. She is currently a postdoctoral research associate at Friedrich Schiller University Jena, Germany.

Published Articles

Bellingtier, J.A., & Neupert, S.D. (2016). Negative aging attitudes predict greater reactivity to daily stressors in older adults. *Journal of Gerontology*. Advance online publication. doi:10.1093/geronb/gbw086

Bellingtier, J.A., Neupert, S.D., & Kotter-Grühn, D. (2017). The combined effects of daily stressors and major life events on daily subjective ages. *Journal of Gerontology: Psychological Sciences, 72,* 613-621. doi:10.1093/geronb/gbv101

Neupert, S.D., & Bellingtier, J.A. (2017). Aging attitudes and daily awareness of age-related change interact to predict negative affect. *The Gerontologist, 57,* S187-S192. doi:10.1093/geront/gnx055

Neupert, S.D. Ennis, G.E., Ramsey, J.L., & Gall, A.A. (2016). Solving tomorrow's problems today? Daily anticipatory coping and reactivity to daily stressors. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 71,* 650–660. doi:10.1093/geronb/gbv003

Abstract

We detail the ups and downs of our experiences in collecting daily diary data using a paper and pencil protocol as well as an online protocol in two separate projects. We are engaged in studies focused on the dynamic interplay of individual differences and contextual changes associated with health and well-being on a daily basis. By obtaining information about individuals' actual events and behaviors over short-term intervals, daily diaries offer a window into life as it naturally unfolds in individuals' everyday lives. The first project we will describe used a paper and pencil methodology and in-person recruitment. The second project used Amazon's Mechanical Turk (mTurk) to recruit participants and then collect data online via Qualtrics.

Learning Outcomes

By the end of this case, students should be able to

- Discuss the advantages of using daily diary methods to study individuals' experiences, behaviors, and emotional states
- Compare the advantages of conducting a daily diary study via paper and pencil methods versus online methods
- Anticipate some of the potential problems and concerns that may arise when conducting daily diary studies in both methods

Case Study

Project Overviews and Contexts

We are engaged in studies focused on the dynamic interplay of individual differences and contextual changes associated with health and well-being on a daily basis. Daily diary methods are used to obtain repeated measurements from individuals during their daily lives (Almeida, 2005) to capture the ups and downs of daily health and well-being. Typically, participants self-report on events, experiences, behaviors, and emotional states for a set number of consecutive days; although the questions do not change from day to day, the expectation is that the participants' responses can change, capturing within-person (intraindividual) variability (Neupert & Bellingtier, Submitted). By obtaining information about individuals' actual events and behaviors over short-term intervals, daily diaries reduce concerns about ecological validity (applicability to real life) that constrain findings from laboratory research (Almeida, 2005). As Allport noted in 1942,

> Acquaintance with particulars is the beginning of all knowledge—scientific or otherwise. In psychology the font and origin of our curiosity in, and knowledge

> of, human nature lies in our acquaintance with concrete individuals. To know them in their natural complexity is an essential first step . . . psychology needs to concern itself with life as it is lived, with significant total-processes of the sort revealed in consecutive and complete life documents. (p. 56)

In this entry, we will detail the ups and downs of our experiences in collecting daily diary data using a paper and pencil protocol as well as an online protocol.

The first project we will describe used a paper and pencil methodology and in-person recruitment. Participants from the Anticipatory Coping Every Day (ACED) study (Neupert, Ennis, Ramsey, & Gall, 2016) were recruited through presentations at community activity groups targeted for older adults in central North Carolina. Potential participants were informed about the purpose of the study and were screened for cognitive impairment with the Short Blessed Test (Katzman et al., 1983). Individuals who scored ≤ 8 were included in the study (indicating normal cognitive functioning). Participants read and signed informed consent forms and provided contact information for mailing of compensation. They were then given the packets of daily diary questionnaires, along with pre-paid envelopes to return to the primary investigator. Participants completed diaries over nine consecutive days at home. The first packet collected baseline and demographic information (e.g., personality and socioeconomic status [SES]). The following packets—to be opened on each of the 8 days—contained items assessing daily stressors, anticipatory coping (i.e., coping done in advance of a potentially stressful event), memory failures, affect, and physical health symptoms. Participants mailed back completed packets and were subsequently debriefed over the phone.

The second project that we will describe is the Mindfulness and Anticipatory Coping Everyday (MACE; Neupert & Bellingtier, 2017) study. In this daily diary project, we used Amazon's Mechanical Turk (mTurk) to recruit participants and then collect data online via Qualtrics. MTurk is online marketplace where "requesters" can post Human Intelligence Tasks (HITs), that is, jobs, for "workers" to complete. It has become popular inside academia as a method for collecting survey data, especially for cross-sectional studies. To our knowledge, our study is the first to use mTurk to recruit older adult participants to participate in an online daily diary study, providing researchers with another way to recruit a nationally (or internationally) representative sample. The content of the daily surveys was identical to those in the ACED study, but we added questions regarding daily mindfulness and awareness of age-related change and had participants take some timed cognitive tasks.

Research Practicalities

The number of days and duration of a daily diary should be closely linked to the research questions and balanced with participant burden (Neupert & Bellingtier, Submitted). It is important that the study be long enough to capture within-person variability in the constructs of interest, yet not so long that the participants become highly selected because they do not agree to participate in the first place or drop out midway through the protocol. Both projects we describe here used an 8-day paradigm and allowed us to find significant within-person variation in all of our constructs of interest (e.g., anticipatory coping, awareness of age-related change, mindfulness).

We encountered some strict regulations when implementing the MACE project at our university. For a brief period of time, the university did not allow the use of mTurk to recruit

participants. Some of the concerns the university had were the requirement of prepayment (money needs to be in the requestor's Amazon account to pay mTurkers), the necessity to exclude university employees because any payments to employees must go through payroll and be taxed, questions regarding whether unused funds in the requestor's account could be refunded, and whether payments could be tracked. After a series of regulations were put in place and approved by the university controller's office, we were allowed to use mTurk for our project. To be in compliance with the regulations, we had to add an exclusion criterion for university employees (we added a binary question regarding employment at the university in the Day 1 survey) and submit comprehensive documentation for each daily payment and fee to be reimbursed.

Research Design

Daily diary designs allow researchers to examine processes that change together on a daily basis, often in a naturalistic setting (Almeida, Wethington, & Kessler, 2002; Shiffman & Stone, 1998; Tennen, Suls, & Affleck, 1991). Perhaps the most valuable feature of diary methods is the ability to assess within-person processes (Almeida, 2005). This represents a shift from assessing mean levels of events and well-being between individuals to charting the day-to-day fluctuations in events and well-being within an individual as well as to identify their antecedents, correlates, and consequences (Reis & Gable, 2000). For example, instead of asking whether individuals with high levels of work stress experience more distress than individuals with less stressful jobs, a researcher can ask whether a worker experiences more distress on days when he or she has too many deadlines compared to days when work has been stress free. This within-person approach

allows the researcher to rule out stable personality and environmental variables as third variable explanations for the relationship between events and well-being (Almeida, 2005).

By studying within-person covariation between daily processes, one can more precisely establish the short-term effects and temporal ordering of concrete daily experiences (Almeida & Kessler, 1998). Additionally, the daily diary design reduces retrospective recall bias because participants are asked to recall events that occurred over the previous 24-hr period as opposed to a week or even a year (Kessler, Mroczek, & Belli, 1999). Therefore, a more accurate picture of individuals' daily lives can be captured with this design. When conclusions are drawn between people about the relationship between the predictors and outcomes, the covariation that occurs within people through time is lost. In a within-person design, conclusions can be made about the simultaneous effects of within-person covariation as well as between-person differences. This is especially important when many interindividual differences (e.g., traits) may exist in within-person relationships (e.g., states) (Neupert & Bellingtier, Submitted). A focus on the individual as the unit of analysis across time, conditions, and situations can be used in important ways to examine behavior and development (Diehl, Hooker, & Sliwinski, 2015).

Method in Action

Recruitment

For ACED, we visited community activity groups, gave talks, and met individually with participants to screen them for cognitive impairment. The process took several weeks to get 43 participants, with 54 initially expressing interest and 51 passing the Short Blessed cognitive screener.

For MACE, we posted a HIT on mTurk, restricting age to 60+ and United States as location. A total of 178 accepted the HIT, but 139 were qualified to continue to the daily portion of the study. The reasons for disqualification included being younger than 60 (n = 24), being a University employee (therefore ineligible to earn money from a study on mTurk, n = 11), self-reporting mild cognitive impairment or dementia diagnosis (exclusion criteria, n = 4), and not residing in the United States (n = 2). The recruitment process took only a few hours, but each Day 1 HIT had to be evaluated to determine if the participant was eligible to continue with the daily (Day 2-9) portion of the study. However, there were some selection effects because there are age differences in technology use and representation on mTurk, with older adults using technology less frequently than younger adults and fewer older adults represented on mTurk than younger adults.

We were interested in the potential sample differences between the two studies, given the difference in recruitment and response modes. Relative to ACED, participants in the MACE study were younger (average age for MACE was 65 but 75 for ACED), more likely to be working (56% retired in MACE compared with 94% retired in ACED), and less diverse (90% White for MACE vs 47% White for ACED), but more gender balanced (61% women in MACE vs 90% women in ACED). The two studies were similar in terms of SES (about 50% of both samples had a 4-year degree and 30% in ACED and 40% in MACE reported incomes above US$50,000).

Retention

In the ACED project, of the 51 participants who passed the Short Blessed and consented to participate, 43 returned their daily diary packets. We kept records of who started the study on a

given date, and called them approximately 1 week after the date when we expected to receive their completed packet to follow up and encourage them to complete the study. Some participants indicated that they changed their mind and no longer wished to participate. The total number of days completed was 380, representing 98% of the total possible days.

In the MACE project, of the 139 who met the criteria to continue to the daily diary portion of the study, 116 (83%) continued to Day 2, 88 (63%) continued to Day 3, and 71 (51%) continued to Day 9. The total number of days completed was 743, representing 71% of the total possible days.

Given the differences in submission modes (mail versus online), it is not surprising that the ACED participants completed more of the possible days because they mailed their completed packets back to the lab at one time. We also believe that our study was the first one to use mTurk to collect daily diary data from older adults. The protocol of responding to a password-protected survey each day for 9 consecutive days was likely very different from the other HITs that the participants were used to doing.

Compensation

In the ACED project, participants were offered US$10 gift cards for 4 or fewer days (although no one in the study fell into this category) and US$20 gift cards for completing 5 or more days. This type of graduated payment schedule has been used in other studies (e.g., VA Normative Aging Study; Neupert, Almeida, Mroczek, & Spiro, 2006) and can incentivize compliance. We opted to offer gift cards because our university would not do checks without getting social security numbers from participants. Due to an abundance of caution with handling such highly

sensitive information, we avoided requesting social security numbers and offered gift cards to local stores that participants selected. We were unable to offer cash because we did not see them at the end of the study.

In the MACE project, participants earned US$1 per day (for a total possible payment of US$9), but we were also charged mTurk fees (US$297). mTurk charges fees as a percentage of what you pay your participants. If you request 10 or more participants the fee is 40%. If you request 9 or fewer participants the fee is 20%. To avoid paying the higher 40% fee you could post your survey in "batches" with each batch requesting 9 or less participants.

Data Collection

The ACED project used paper and pencil booklets that we gave to participants after they qualified for the study. This mode does not require familiarity or comfort with technology, and does not require an internet connection. We gave them a pre-paid flat-rate postage envelope to return the booklets when they were done with the study, but postage rates changed midway through data collection. We had to go to the post office and add postage to the remaining self-addressed envelopes so we would not lose data.

In the MACE project, participants were directed to Qualtrics to complete the surveys online. The benefit to this method is that you can have participants complete timed cognitive tasks because the timing of screens with stimuli (e.g., words for a word list recall task) and responses can be tightly controlled. This is an important benefit for those interested in daily cognitive performance. In a previous project that we do not detail in this entry, we attempted to assess daily cognitive performance by providing participants with digital timers to time their own

cognitive tasks within the context of a paper and pencil diary protocol. Besides the clear limitations of less researcher control of timing and following instructions, these timers created a potential security concern at our university. The psychology office received a phone call one day from the building's mailroom with a concern that a package that was addressed to Neupert was beeping. The mailroom staff needed to be reassured that the package contents were benign, were from a research participant and contained a digital timer, and did not require police action!

The ability to incorporate skip patterns is another benefit to an online protocol; if a participant indicates, for example, that no argument has occurred within the questions regarding daily stressors, there is no need to present the follow-up questions regarding who the argument was with, what the argument was about, and so on.

Additional data collection considerations with an online protocol are quite obvious: an Internet connection and some minimal comfort with technology are required. Although these are key ingredients for participation in an online diary study, they are important when considering sample selectiveness. Internet access and use varies across countries and also across age groups. To the extent that a researcher is interested in older adults in a developing country, an online mode may not be as feasible as the same study targeting younger adults in a country with ubiquitous Internet access and use.

Practical Lessons Learned

For the ACED project, we met each potential participant individually and had the opportunity to describe the study in detail and answer any questions. Given the personal connection, it is likely

that once participants decided to enroll in the study, they had some level of buy-in that lead to high rates of compliance.

Because you will not be meeting participants in person if using the mTurk platform, you may have more questions than usual. Over the course of our data collection, we exchanged over 100 emails containing questions, complaints, and compliments from participants. For this reason, we suggest launching recruitment for daily diary studies in batches so that you can reasonably try to manage communication with a small number of participants at a time. For example, if the goal is to collect daily diary data from 100 participants, one could launch 5 batches of 20 participants in a staggered manner so that when one batch completes the protocol, the next one begins.

One benefit of mTurk is that it has the possibility to globalize research with access to potential participants around the world. Our Institutional Review Board (IRB) informed us that they have been made aware of potential concerns in some countries where mTurk workers are being forced to work in sweatshop-like conditions. For this reason, we limited our data collection to the United States. If we had wanted to collect data from a global population, we would have needed to submit our protocol for a cultural review at our IRB, with cultural experts evaluating the protocol for each country. An additional consideration with possible global data collection is that mTurkers will be in different time zones and will have questions or need to contact you at all hours. We suggest coming up with a plan so that emails can be quickly addressed at all times, otherwise there is a risk of losing participants.

Be aware of Turkopticon, which is similar to ratemyprofessor.com where mTurkers go to rate studies and requesters/researchers. Paying too little or being unresponsive can lead to poor ratings and mTurkers avoiding your study. One suggestion is to sign up for an account so that

you can see what is being said about you and your study on Turkopticon. Similar to course evaluations, we suggest thoughtfully evaluating the comments and examining whether changes could and should be made to your study protocol or management.

We had several people sign up for the study, despite reporting being younger than the minimum age requested. We suggest using a qualifying HIT to screen for age (or other characteristics you care about), or pay a premium for mTurk's age qualification (currently 55+ for $.50).

Conclusion

In sum, we encourage those interested in studying "life as it is lived" (Allport, 1942, p. 56) to dive into the ups and downs of daily diary research. Matching research questions to the appropriate design is important, and daily diary designs are a powerful way to learn about individuals in their natural complexities of daily life. Daily diaries can also be a way for participants to learn about themselves. One older adult participant from the MACE project emailed us after the study was completed and shared

> Thank you for allowing my participation in this survey. A side affect [sic] of the survey for me was that I did become more attentive and aware of how much less stress I have in my life since I retired . . . I realized that I have become more accepting of the foibles of my fellow family, neighbors, and friends . . . Thank you for allowing me to learn this.

Exercises and Discussion Questions

1. What are some topics that could be studied in younger or middle-aged adults with daily diary designs?
2. How could researchers increase the diversity of samples used in daily diary research?
3. What are some additional advantages of daily diary research that were not discussed in this entry?
4. What are some additional drawbacks of daily diary research that were not discussed in this entry?

Further Readings

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Web Resources

https://www.mturk.com/mturk/welcome

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