How to Convert a Traditional Survey to an Experience Sampling Study

How to Translate a Traditional Survey for an ESM Study

When designing a study using the experience sampling method (ESM), you are unlikely to find many surveys that have been standardized and validated for ESM. However, it's relatively easy to convert a traditional survey to one for ESM. Here's how to do it:

1.   Find a survey

Find a validated, traditional survey that measures the construct(s) you are studying.

2.   Select top-loading questions

Review the paper or article in which the measure was validated and identify the top-loading items for the measure. You can do this by looking at the factor loadings that are typically reported in a table in the results section. There is no clear guideline about how many items to include in an ESM assessment, so it usually comes down to using enough items to sufficiently cover of the construct without overburdening participants with too many in-the-moment questions. For multidimensional constructs, you should consider whether to represent all of the dimensions of the construct. If you decide try to assess multiple dimensions of a construct, then it will ned to include more items.

3.   Change the wording

Because most traditional instruments are worded retrospectively, you will have to modify the wording to reflect the in-the-moment nature of ESM. However, be aware of the time frame from which you want to sample participants' experiences. For constructs that fluctuate substantially over time (like mood), you might want to ask about it "right now." For variables that more stable over time, or happen less frequently, you might want to frame the question, "in the past hour" or "since the last signal."

4.   Pilot

Once you have selected your initial set of items for experience sampling, you can pilot them. Traditional wisdom suggests that you should have 20 people per question you're testing, but you can probably get by with considerably less, depending on the number of items you're using and the number of times you're assessing respondents.

5.   Measure internal reliability with Cronbach's alpha

Cronbach's alpha is used to measure the internal reliability of an instrument– or how consistent respondents' answers are with each other, at the moment of the assessment. While constructs being measured in an ESM study will inherently change from signal to signal (like mood), Cronbach's alpha focuses on the reliability or consistency of responses at each assessment point. If your Cronbach's alpha is low (below .80), rerun your analysis, systematically dropping one item at a time to see if any items might detract from the measure's reliability. If your reliability goes up when you don't include an item in your analysis, that suggests that the item is not being consistently answered in relation to the other items in the measure and might need to be deleted.

If you want to run Cronbach's alpha in R, here is some code to help you evaluate your ESM items:

```
#install psych package so you can run Cronbach's alpha
install.packages(c("psych"))

#load psych package
library(psych)

#Cronbach's alpha- name the subset of items (e.g., testdat) you want to
analyze (1,2,..n)
```

```
testdat <- subset(dat, select=c("item 1", "item 2", "item 3", "item n"))
alpha(testdat)

#scatterplot matrix
pairs(testdat, pch=19, cex=.5)
```

6. Consider a principal components analysis or other factor analytic technique to examine the factor structure of your measure.

Once you have settled on a preliminary set of items and found them to be sufficiently reliable, you can evaluate the construct validity of your ESM measure using factor principal components factor analysis. Below, we have provided the R code necessary to run a principal components factor analysis and generate a scree plot. After running the analysis, review the scree plot to determine how many factors to retain. You can then rerun the analysis (using the code profvided) specifying how many factors to extract. Finally, rotating your factors will allow you to better fit your model to your data.

```
#install GPArotation package (only have to do this once)
install.packages(c( "GPArotation"))

#Generate scree plot and run principal components analysis (PCA)
scree(testdat, factors=FALSE)
principal(testdat)

#Run PCA with two or more factors (nFactors=[number to extract]; 2 in
this example)

#Number of components (factors) to extract depend on the scree plot.

#Once you specify the number of components to extract, rotate factors
```

is selected, rotate components using oblimin rotation
principal(testdat, nfactors=2, rotate="oblimin")

7. Further Steps?

As a further step, you can compare your composite ESM scores to traditional survey scores. However, keep in mind that retrospective and in-the-moment measures are inherently different and, therefore, can yield substantially different results (Bolger & Laurenceau, 2013).

Depending on the nature of what you're studying, you can creatively gather convergent validity evidence for your ESM measure by comparing your questions with other variables that, theoretically, should be related to your measure. For example, you could check:
- Heart rate with reported current activity (like watching TV or going up stairs)
- Mood after activity (like running vs. waking from a nap)
- External factors (like being in a grocery store) and mood
- (Hektner et al., 2007)

Once you've analyzed the relationship between your items and other relevant measures, you can determine the strength of validity evidence for your ESM survey and whether to add or remove additional questions.

That's how you can modify an existing, traditional survey for an ESM study, and validate it.

References and Further Reading

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