**ESM Power computations**

Table 1.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Beeps | Days | Subjects | Effect Size | Percentage missing days/beeps | Number Of Tests (Bonferroni) | Random Effects | Power |
| 10 | 14 | 25 | 0.25 | 0 | 4 | Intercept over days/subjects | 1.00 |
|  |  | 20 | 0.25 | .30/ .40 |  | Intercept over subjects | 0.99 |
|  |  | 25 | 0.25 | .30/ .40 |  | Intercept over subjects | 1.00 |
|  |  | 40 | 0.25 | .30/ .40 |  | Intercept over subjects | 1.00 |
|  |  |  |  |  |  |  |  |
|  |  | 30 | 0.15 | .30/ .40 |  | Intercept over subjects | 0.96 |
|  |  | 25 | 0.15 | .40/ .50 |  | Intercept over subjects | 0.86 |
|  |  |  |  |  |  |  |  |
|  |  | 25 | 0.10 | 0 |  | Intercept over days/subjects | 1.00 |
|  |  | 25 | 0.10 | 0 |  | Intercept over subjects | 0.95 |
|  |  | 25 | 0.10 | .20/ .20 |  | Intercept over subjects | 0.81 |
|  |  | 25 | 0.10 | .30/ .40 |  | Intercept over subjects | 0.55 |
|  |  | 40 | 0.10 | .30/ .40 |  | Intercept over subjects | 0.84 |
|  |  |  |  |  |  |  |  |

An ESM design will be used with 14 days, and each day containing 10 beeps. To estimate the required sample size for a power of at least 80% we have focused on the dynamic relation between loneliness and discomfort. To estimate this relationship multilevel regression analysis will be used. We assume that the intercept in this regression model fluctuates across subjects, which implies that we assume a random intercept in the statistical model. Furthermore, we assume that 30% of the days will be missing and also that 40% of the beeps will be missing. Since the effect size is unknown a conservative effects size of 0.10 is taken, which corresponds to a small effect. The Type I error is set to 5%, but since more hypotheses will be tested a Bonferroni correction is applied: for this analysis we divided the alpha level by 4. With these parameters a simulation (using 5,000 replications) was conducted in R. This simulation showed that 40 participants will be necessary to obtain a power of 84%.

A slightly larger assumed effect size of 0.15, which is between small and moderate, needs 25 participants, even when there are 40% missing days and 50% missing beeps.