Title: A Controlled Pilot Study of the Wish Outcome Obstacle Plan Strategy for Spouses of Persons with Early-Stage Dementia

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Statistical Analysis Plan is from the grant proposal and corresponds to the IRB proposal approved 11/4/2020

All analyses will be conducted using mixed effects dyadic and longitudinal data analysis techniques within the Mplus software package (Mplus 8.1, 1998-2018). With interdependent data such as those found within couple and longitudinal data, it is essential to account for the interdependence in outcomes in all analyses. Mixed effects (or multilevel) modeling handles interdependence of outcome residuals for each member of a couple (dyad), as well as accounting for the correlation of repeated measures within individuals. Missing data will be handled using Full Information Maximum Likelihood Estimation (FIML), an appropriate modeling-based correction for missingness that is considered equivalent to multiple imputation and much less problematic than listwise deletion (Allison, 2001). As long as at least one dyad member has a measure at one timepoint, their data will be retained in all analyses. Thus, each couple with baseline data will be retained in all analyses.

A multivariate dyadic linear growth curve model will be used to predict the trajectories of psychological well-being (Raudenbush, Brennan, & Barnett, 1995). This model estimates a latent trajectory of change for each type of partner (care partners [CP] vs. persons with dementia [PWD]), and accounts for interdependency of partners' residuals as well as correlation among repeated assessments at Level 1, with dyadic clustering accounted for at Level 2. Models will be conducted separately for each outcome (perceived stress, depressive symptoms, quality of life, positive and negative affect), and *p* values were corrected for familywise error using Holm's Sequential Bonferroni Procedure (Holm, 1979). Equations for the model are provided below:

Level 1 (within couples):
$Outcome_{ij}$ =
β_{1j} *CP + β_{2j} *CP_Time + $r_{cp\,ij}$
β_{3j} *PWD+ β_{4j}*PWD_Time + $r_{pwd\,ij}$

Level 2 (between couples):
$\beta_{1j} = \gamma_{10} + \gamma_{11}$*WOOP + u_{1j}
$\beta_{2j} = \gamma_{20} + \boldsymbol{\gamma_{21}}$*WOOP+ u_{2j}
$\beta_{3j} = \gamma_{30} + \gamma_{31}$*WOOP + u_{3j}
$\beta_{4j} = \gamma_{40} + \boldsymbol{\gamma_{41}}$*WOOP + u_{4j}

Within each dyad a CP and PWD intercept and linear trajectory of growth are estimated at Level 1, with Time centered at baseline. These are summarized as averages via the fixed effects (γ_{10}, γ_{20}, γ_{30}, γ_{40}) and variability via the random effects (u_{1j}, u_{2j}, u_{3j}, u_{4j}) for each partner type at Level 2. The WOOP intervention is a couple-level indicator (couples in the WOOP intervention had a value of 1, those in the CON condition had a value of 0) entered as a predictor at Level 2. The main effect of WOOP tests differences between WOOP and CON in their baseline values of the outcome ($\boldsymbol{\gamma_{11}}$ and $\boldsymbol{\gamma_{31}}$ for CP and PWD, respectively). The key tests for the study hypotheses are represented as the effect of the WOOP intervention as a predictor of change in outcomes over the study period ("intervention x time" effects), in bold font ($\boldsymbol{\gamma_{21}}$ and $\boldsymbol{\gamma_{41}}$ for CP and PWD respectively). Thus, the model simultaneously estimates distinct intervention effects for each partner role (CP versus PWD), while appropriately accounting for the interdependence in partners' outcomes by allowing both residual variances at Level 1 and all random effects variances at Level 2 to covary (Kenny, Kashy, & Cook, 2006). Standardized effect size δ will be calculated for each significant effect. This statistic is calculated by dividing the unstandardized difference between the treatment groups on the rate of change (ie the γ_{21} or γ_{41} coefficient) by the standard deviation of the change slope (Spybrook et al, 2011). Interpretation of this effect size is akin to that of Cohen's *d* interpretation, with small (0.2), medium (0.5) and large (0.8 and above) rules of thumb for effect magnitudes.) Simple slopes will be estimated for the WOOP condition in order to understand whether the outcome change for the WOOP group was significantly different from zero (Aiken & West, 1991).