Singing in the Brain: The Impact of Participation in a Dementia Choir on Caregivers' Affect and Distress

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VOICES IN MOTION
A multi-generational community choir for adults with memory loss and their caregivers.

Rationale

- Worldwide, over 50 million people are living with dementia and there are nearly 10 million new cases every year.
- Family caregivers provide the majority of care, and this can have significant health consequences (e.g., high levels of negative affect).
- Choirs are a novel intervention that may offer significant psycho-social benefits for persons with dementia and their care partners, but little research has been conducted on their impact.

Research Objectives

Investigate the psycho-social impact of participation in an intergenerational community-based choir for persons with dementia, caregivers, and high school students on caregivers' affect and distress

1. **Explore the trajectories of change across months of the intervention for positive affect, negative affect, and caregiver distress.**
2. **Examine the time-varying relationship between affect and caregiver distress.**

Design

- Longitudinal intensive repeated measures design
- Three to four assessments were completed for participants for each of the three 12-week choir seasons held from 2018-2019.

Measures

Affect

- Positive and Negative Affect Scale (PANAS): a self-report questionnaire of two 10-item scales to measure positive and negative affect.
- Each item is rated on a 5-point scale of 1 (not at all) to 5 (very much), with a range from 0-50 for each subscale.

Caregiver Distress

- Zarit Burden Interview (ZBI): a self-report measure of 12 items to measure caregiver burden.
- Response options are rated from 0 (never) to 4 (nearly always), with a total range from 0-48.

Sample (n=32)

- **Caregivers:** participants were caregivers (81% female) of persons with dementia
- **Age:** Mean age was 68.4 years (SD=9.9), range of 48-89 years
- **Relationship:** 62.5% spouses, 25% adult children

Analysis

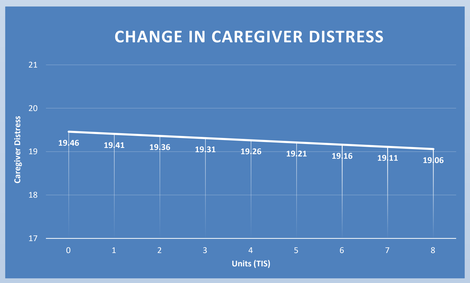
- **Linear mixed models** characterized changes in caregiver affect and distress both within-person (Level 1) and between-person (Level 2) as a function of length of time participating in the ViM choir.
- **Coupling analyses** were used to assess within-person time-varying associations between variables. Maximum likelihood estimation was employed to facilitate inclusion of all participants' data.
- Time was indexed as time in study (TIS) in months from baseline assessment.

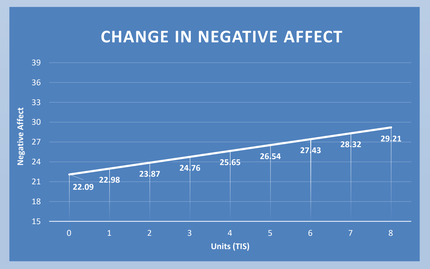
Results

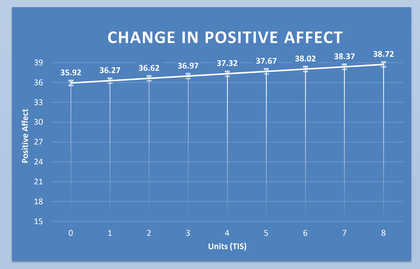
Research Objective 1: Trajectories of Change in Affect and Distress

$$Affect_{ij}/\ CGD_{ij} = \beta_{0i} + \beta_{1i}(Time\_Month) + e_{ij} \quad \text{Level 1}$$
$$\beta_{0i} = \gamma_{00} + \gamma_{01}(Age\_Centered\ at\ 75) + \mu_{0i} \quad \text{Level 2}$$
$$\beta_{1i} = \gamma_{10}$$

ICC for unconditional model:
Positive affect: 43% (0.43) of the variance is between person (BP) and 57% (0.57) is within person (WP)
Negative affect: 34% (0.34) of the variance is BP and 76% (0.76) is WP.
Caregiver distress: 75% (0.75) of the variance is BP and 25% (.0.25) is WP.
Note: Time in study was centered at 0 (baseline), with age was centered at 75 years old.







Summary of Results for Trajectories of Change Models

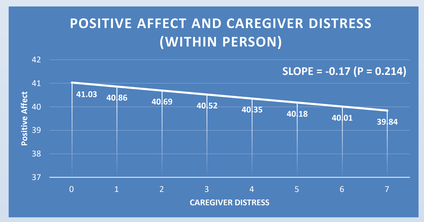
Variable	Fixed Effect Parameters	
	Intercept (γ_{00})	Slope (γ_{10})
Caregiver Distress	19.46***	-0.05
Positive Affect	35.92***	0.35***
Negative Affect	22.09***	0.89***

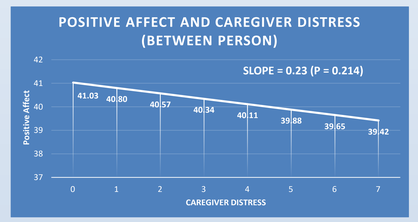
*** indicates at 1% level of significance (p<0.01)
Random effect parameters: significant random effects for intercept were observed for positive affect (p<0.05) and caregiver distress (p<0.01), but not for negative affect; no significant random effects for slope were observed

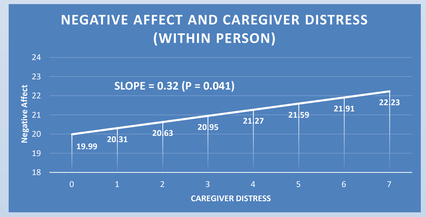
Research Objective 2 : Relationship between Affect and Distress

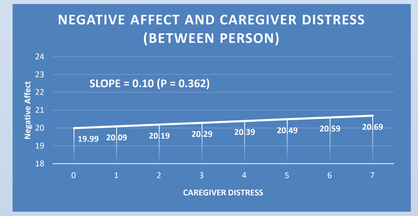
$$Affects_{ij} = \beta_{0i} + \beta_{1i}(Time\_Month) + B_{2j}(CGD\_WP) + e_{ij} \quad \text{Level 1}$$
$$\beta_{0i} = \gamma_{00} + \gamma_{01}(Age\_Centered\ at\ 75) + \gamma_{02}(CD\_BP) + \mu_{0i} \quad \text{Level 2}$$
$$\beta_{1i} = \gamma_{10}$$
$$\beta_{2i} = \gamma_{20}$$

Note: CGD_WP = Monthly caregiver distress – person mean of caregiver distress
Random Effect Parameter: significant random effects for intercept were observed for positive affect (p<0.05) but not for negative affect









Discussion

- **Trajectories of Change Models:** Increases in both positive and negative affect highlight the challenging and complex nature of dementia interventions, particularly for progressive neuropathologies. An increase in caregiver stressors over time can reflect the impact of dementia progression and contribute to an increase in negative affect.
- **Negative Affect Coupling Model**: On occasions when caregiver distress was higher relative to a given individual's usual level, negative affect significantly increased. The corresponding between-person effect was not significant.
- **Positive Affect Coupling Model**: Higher between-person levels of caregiver distress were associated with decreased levels of positive affect. The within-person coupling effect was not significant.
- Overall, findings from this study highlight the potential of an intergenerational community-based dementia choir for mitigation of caregiver distress and negative affect, and bolstering positive affect.

Conclusions and Recommendations

- **Limitations**: convenience sample, small sample size (but up to 10 longitudinal assessments), lack of conventional control group (but examined change relative to personal baseline).
- **Future research:** employ dyadic analyses to elucidate the impact of the choir on both caregiver and care recipient affect.

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