

Research Plan - Exploring the emotional facial recognition from dynamic and static faces by people with Parkinson's



Moudhi Al Twajri, Ellen Poliakoff & Karen Lander

Division of Neuroscience and Experimental Psychology, University of Manchester

Introduction

- People with Parkinson's (PwP) have an impairment in emotional facial recognition (EFR) (Jacobs et al., 1995); and production (hypomimia) (Simons et al., 2003).
- The loss of facial movement in PwP may contribute to difficulties in EFR (Tickle-Degnen & Lyons, 2004).
- Some claim PwP have better EFR from dynamic expressions (Kan et al., 2002), while others believe static to be superior (Péron et al., 2011), although few studies compared the two (Bek et al., 2020; Kan et al., 2002).
- Bek et al. (2020) found increased EFR from dynamic compared to static expressions for controls only. Thus, further work is needed with bigger population and range of emotions.
- Researchers claim EFR impairment in PwP is specific to certain emotions (Assogna et al., 2010; Clark et al., 2010), while others believe it is not (Alonso et al., 2013; Baggio et al., 2012).
- It is unclear whether PwP can better recognise emotions from dynamic or static stimuli and whether specific emotions or all (or none) emotions are affected.

❖ **Aim: To investigate EFR from dynamic and static expressions by PwP compared to healthy controls.**

❖ To investigate how EFR may be influenced by type of emotion, mood (depression, anxiety, and apathy; see Arguard et al., 2018) and motor symptoms Parkinson's

Experimental Design

Participants

[An a-priori power analysis was conducted using G*Power3 (Faul et al., 2007)].

- 42 participants with mild to moderate Parkinson's disease.
- 42 age matched healthy control participants.
- All participants will have normal or corrected-to-normal vision.
- Addenbrooke's Cognitive Examination-Revised (ACE-R; Mathuranath et al., 2000) will be administered to exclude participants with any cognitive impairments.

Materials and Methods

- Geriatric Depression Scale (GDS) for depression (Sheikh & Yesavage, 1986).
- Geriatric Anxiety Scale (GAS; Gould et al., 2014).
- Apathy Scale (AS; Starkstein, et al., 1992).
- Unified Parkinson's disease rating scale (MDS-UPDRS; Goetz, 2010).

Experimental Design

Procedure

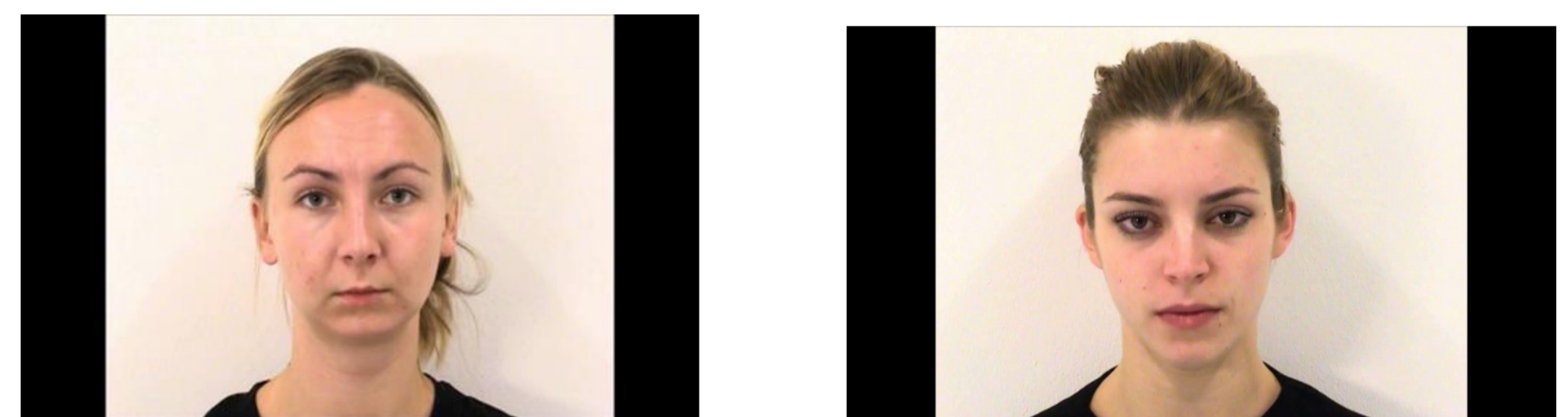
1. A video call via Zoom will take place, and participants will be asked for demographic information.
2. ACE-R and UPDRS will be administered.
3. Participants will complete the EFR task and questionnaires (GDS, GAS, AS).

EFR Task

All participants will be asked to observe the displayed facial stimuli, and choose the correct emotion (from the list).

Stimuli

- 6 identities (3 males, 3 females) will be used from the Amsterdam Dynamic Facial Expression Set (ADFES; <https://aice.uva.nl/research-tools/adfes-stimulus-set/adfes-stimulus-set.html>).
- 9 emotions (anger, contempt, disgust, embarrassment, fear, joy, neutral, sad, surprise).
- 2 emotion intensities (low, high).
- 216 total trials (108 static and 108 dynamic).
- Dynamic and static images (in colour) will show apex of expression for one second, then a grey slide will appear.



Statistical Analysis Plan

- ❖ Two-way mixed ANOVA will be administered [group (Parkinson's vs controls) and stimuli (dynamic vs static)] to test for the effects of dynamic versus static in the two groups.
- ❖ A linear mixed model will be used to investigate other factors that could affect EFR accuracy for dynamic and static expressions. The measures are anxiety, depression, apathy, severity of Parkinson's motor symptoms, and dominant motor symptoms (left or right), as well as emotion type.

Predictions

- Controls may have better EFR for dynamic images in comparison to static images (as found in Bek et al. 2020). The PwP may have reduced EFR overall and a reduced benefit of dynamic faces.
- High anxiety, depression and apathy will reduce EFR accuracy for both dynamic and static expressions of negative emotions.
- Increased motor symptoms of Parkinson's will be associated with lower accuracy in EFR for dynamic when compared with static expression. Symptom asymmetry (left, right) may interact with emotion type.

References

- Ariatti et al. (2008). *Neurol Sci*, 29(4):219-27.
- Arguard et al. (2018). *Movement Disorders*, 33(4), 554-567.
- Bek et al. (2020). *Journal of Neuroscience Methods*, 331, 108524.
- Faul et al. (2007). *Behavior Research Methods*, 39, 175-191.
- Goetz, C. (2010). *Encyclopedia of Movement Disorders*, 307-309.
- Gould et al. (2014). *Journal of Anxiety Disorders*, 28, 804-811.
- Jenkinson et al. (1997). *Age and Ageing*, 26(5), 353-357.
- Mathuranath et al. (2000). *Neurology*, 55(11), 1613-1620.
- Péron et al. (2011). *Movement Disorders*, 27(2), 186-199.
- Sheikh & Yesavage (1986). *Clinical Gerontologist*, 5, 165-173.
- Starkstein et al. (1992). *The Journal of Neuropsychiatry and Clinical Neurosciences*, 4(2), 134-139.
- Trautmann et al. (2009). *Brain Research*, 1284, 100-115.
- Wingenbach et al. (2016). *PLOS ONE* 11(12).