Nonverbal Dynamics Predict Deceptive Traits in High Risk Youth

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Introduction

- Head motion is an important aspect of non-verbal communication, assisting in conveying affective states during speech (Busso et al., 2007).
- For example, analyses of nonverbal communication have been previously related to the detection of depression (Dibeklioğlu et al., 2015; Girard & Cohn, 2015).
- Automatic extraction of nonverbal communication signals offer an unbiased method for measuring interpersonal behavior.
- Such methods may be specifically useful in studying individuals with elevated psychopathic traits, who typically score high on items including manipulation, deception, and impression management.
- **Study Aim**: *To examine the relationship between psychopathic traits and head dynamics measured during a PCL:YV interview in incarcerated male youth offenders through a novel automated extraction technique.*
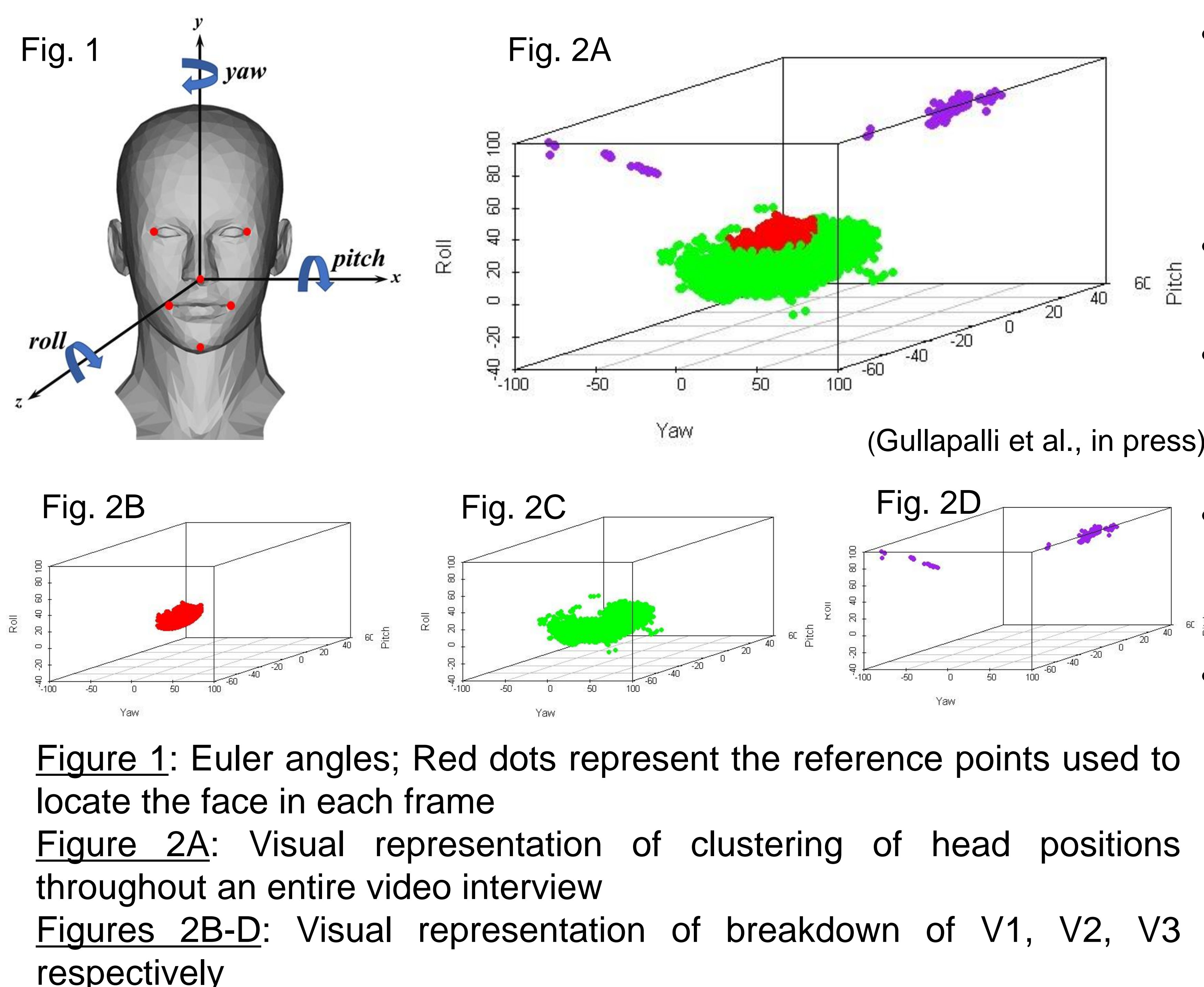
Head Dynamics

Fig. 1
Fig. 2A
(Gullapalli et al., in press)
Fig. 2B
Fig. 2C
Fig. 2D

<u>Figure 1</u>: Euler angles; Red dots represent the reference points used to locate the face in each frame
<u>Figure 2A</u>: Visual representation of clustering of head positions throughout an entire video interview
<u>Figures 2B-D</u>: Visual representation of breakdown of V1, V2, V3 respectively

- A machine learning algorithm was created to automatically localize and extract head position per frame as Euler angles (*pitch, yaw, and roll*) that allow for the estimation of a 3D head position in a 2D frame of the PCL:YV interview video.
- Only video frames containing all 6 reference points (Fig. 1) of the face were included in analyses.
- An average head position was calculated for each participant as the point of reference for comparison of head position in every frame.
- A machine learning approach was used to quantify the movement of the subject's head per frame from the average head position into three different motion dwell times.
- ***Dwell times*** represent the proportion of time participants spent in one of three partitions of movement during the PCL:YV interview:
  - **V1**: minimal movement from average head position.
  - **V2**: moderate movement from average head position.
  - **V3**: extreme movement from average head position.

Methods

- Participants included *n* = 215 incarcerated male youth offenders, ranging from 14-21 years of age (*M* = 17.50, *SD* = 1.02).
- Psychopathic traits were assessed using the Psychopathy Checklist: Youth Version (PCL:YV; Forth et al., 2003) and were compared to patterns of head dynamics measured during video recordings of the PCL:YV interview.
- PCL:YV facet scores were investigated in order to identify which specific psychopathic traits related to head dynamic patterns.

PCL:YV Facet Scores

	M	*SD*
Facet 1	2.18	1.82
Facet 2	4.46	1.77
Facet 3	6.43	1.96
Facet 4	8.27	1.56

Results

Multiple Regression Analyses with PCL:YV Facet Scores Predicting Proportion of Time Spent in V2

	β	Sig.
PCL:YV Facet 1	.221	.003*
PCL:YV Facet 2	.081	.318
PCL:YV Facet 3	.103	.194
PCL:YV Facet 4	-.030	.710

*survives Bonferroni multiple comparison correction.

PCL:YV Facet 1 scores were significantly associated with a higher proportion of time spent in V2, indicating moderate movement from average head position.

Discussion

- The relationship between head dynamics measured during a PCL:YV interview and psychopathic traits was quantified through a novel automated extraction technique.
- Specifically, deceptive/interpersonal traits may be particularly associated with communication styles during the PCL:YV interview.

References

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