

The Whole is the Sum of Its Parts

Holistic Processing Impaired not Absent in Developmental Prosopagnosia



- **Holistic processing** is thought to be causally related to face recognition ability and perceptual expertise more broadly.
- However, studies also suggested that the face recognition deficit in **Developmental Prosopagnosics (DP)** is caused by impaired holistic processing, although there have been mixed findings in the literature.
- More recently, it has been suggested that these mixed findings could be the result of the **independent use of different measures** of holistic processing, that showed *poor to no association* between each other.
- The study reported here aimed to gain further insight into the **role of holistic processing and differences in face recognition ability**.

METHODS

10 DPs vs. 17 demographic-matched NTs

Evaluation stage (Day 1):

- Cambridge Face Memory Test (CFMT)
- Cambridge Face Perception Test (CFPT)
- Cambridge Car Memory Test (CCMT)

Holistic stage (Day 2):

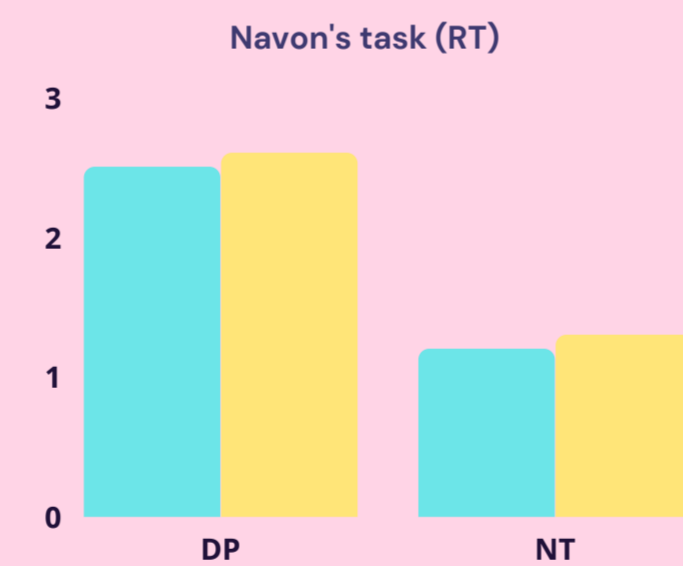
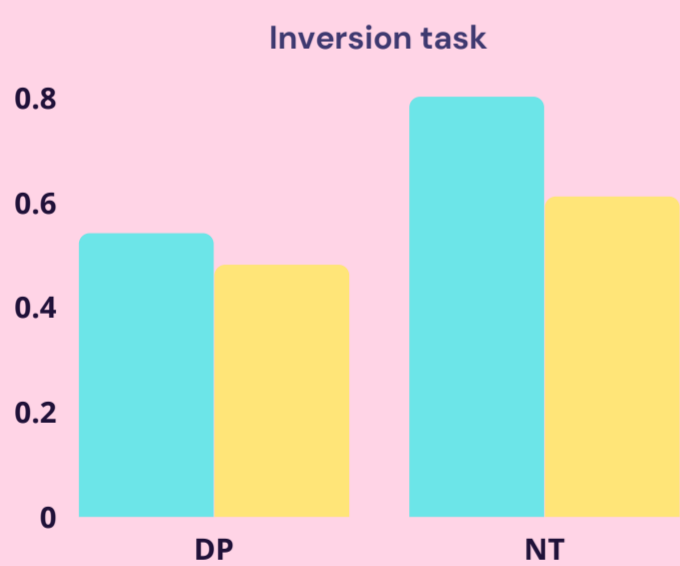
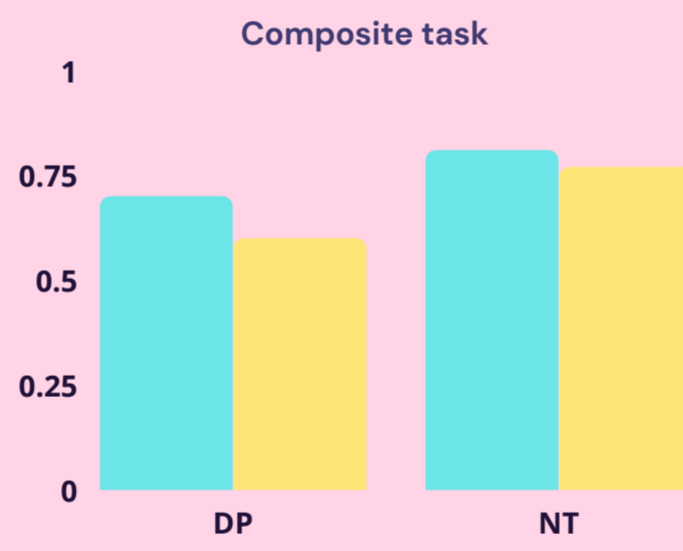
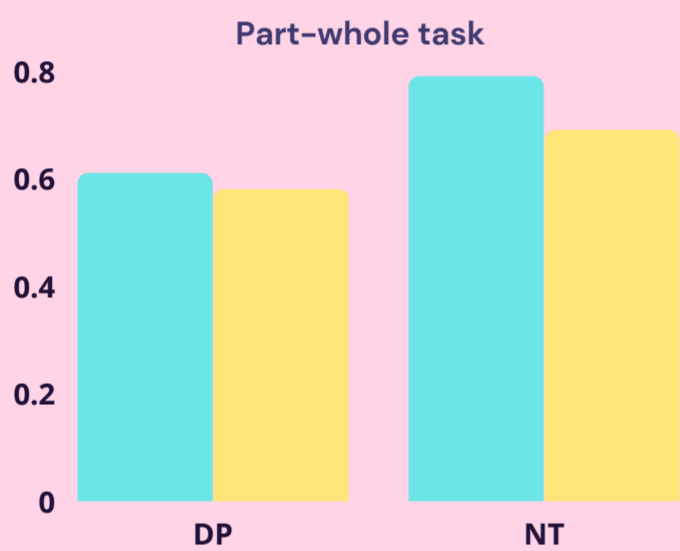
- **Inversion task** - Upright > Inverted faces
- **Part-whole task** - Whole faces > Face parts
- **Composite task** - Misaligned > Aligned
- **Navon's task** - Global < Local (Reaction time)

Condition of interest:

Inversion = Upright,
Part-whole = Whole
Composite = Misaligned
Global precedence = Global

Control condition:

Inversion = Inverted,
Part-whole = Part
Composite = Aligned
Global precedence = Local



RESULTS

Between Group - DP & NT

- CFMT & CFPT: DP < NT ; $p < .001^{***}$
- CCMT: DP = NT ; $p = .441$
- Inversion task: DP < NT ; $p < .001^{***}$
- Part-whole task: DP < NT ; $p < .001^{***}$
- Composite task: DP = NT ; $p = .053$
- Navon's task: DP > NT ; $p < .001^{***}$

Within Group - Condition of interest & Control condition

- Inversion task: Upright > Inversion ; $p < .001^{***}$
- Part-whole task: Whole > Part ; $p = .004^{**}$
- Composite task: Misaligned = Aligned ; $p = .065$
- Navon's task: Global < Local ; $p = .045^*$

Holistic Advantage (Holistic effect)

- Condition of interest subtract Control condition



Interaction - Holistic advantage "differences"

- Inversion effect: DP < NT ; $p = .010^*$
- Part-whole effect: DP = NT ; $p = .115$
- Composite effect: DP = NT ; $p = .456$
- Global Precedence effect: DP = NT ; $p = .554$

DISCUSSION

- DPs have a **specific deficit** in recognising faces
- DPs showed **reduced susceptibility towards the inversion effect (impaired not absent)**, but not for the part-whole, composite, or global precedence effect.
- **Single-Case Analysis:** The majority of individual DPs were not impaired in holistic processing compared to NTs.
- These three holistic face indexes are **measuring different underlying cognitive mechanism(s)**.