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Long-term impact of the diagnosis on quality of life, social skills, and person recognition strategies in congenital prosopagnosics: A cross-sectional study

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Abstract

Persons with congenital prosopagnosia (cPA) find it hard to recognize familiar persons by their faces, learn new faces, and decide whether a face looks familiar. The deficit is common (prevalence of 2.5%), hereditary, and has no known cure. An increasing number of studies have tried to assess the scope of the deficit and the underlying functional brain alterations. Being diagnosed with a hereditary, lifelong condition can have negative effects that researchers should be aware of. Our study assessed the long-term impact of the diagnosis in 49 persons with cPA. We found that positive effects clearly predominate. Many participants developed new strategies for person recognition and improved their interpersonal skills. Their face recognition skills remain poor, as do their intuitive person recognition skills. Most importantly, a majority reported an improvement in the quality of their relationships and increased social support. The results are discussed, and recommendations for the diagnosis and recruitment process are presented.

Keywords

face recognition, prosopagnosia, congenital prosopagnosia, quality of life, person recognition, diagnosis, developmental

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Introduction

Humans and other hominids recognize each other primarily—but not exclusively—by their faces. But there is more: faces also convey information about the sex, age, health, and emotion (Bruce & Young, 1986). Social interaction is more difficult with face masks, as many people found out during the COVID-19 pandemic (Carbon, 2020). However, some people find it difficult to recognize people by their faces, decide whether faces are familiar, and learn new faces, even without a mask. This cognitive deficit is known as prosopagnosia. The acquired type has been known to be caused by brain damage, such as injury or stroke (Bouvier & Engel, 2006). Far more common is the congenital type (congenital prosopagnosia [cPA]), also called developmental type (dPA or DP), with no history of brain damage or malformation (Corrow et al., 2016; Grüter et al., 2008). The cPA prevalence in Germany was shown to be about 2.5% (Kennerknecht et al., 2006). A similar prevalence was demonstrated for Hong Kong (Kennerknecht et al., 2008). Many cases run in families. All published pedigrees are compatible with an autosomal dominant pattern of inheritance (De Haan, 1999; Duchaine et al., 2007; Grueter et al., 2007; Schmalzl et al., 2008; Sun et al., 2024). The terms cPA and dPA are currently used as synonyms. The majority uses dPA (for a comprehensive overview see Nørkær et al., 2024). We still prefer cPA, because there is no known cognitive development disorder causing prosopagnosia, while a hereditary component has been shown and a gene mutation has been found (Sun et al., 2024).

While the basic definition of prosopagnosia is short and unambiguous, the individual diagnosis may be challenging. In the human brain a core face processing network comprising areas in the occipital lobe (occipital face area), on the fusiform gyrus (fusiform face area) and the posterior part of the superior temporal sulcus feeds information to an extended face network with areas in the anterior temporal cortex, inferior frontal gyrus, insula, orbitofrontal cortex, and amygdala (Avidan & Behrmann, 2021; Duchaine & Yovel, 2015; Haxby et al., 2000; Zhen et al., 2013). Currently, there is no consensus as to the anatomical or functional alterations responsible for cPA. Several fMRI studies have tried to shed light on the brain processes, but as of yet, no consistent or concise picture has emerged (A. L. Cohen et al., 2019; Jiahui et al., 2018; Lohse et al., 2016; Ramot et al., 2019; Rosenthal et al., 2017; Tian et al., 2020; Zhang et al., 2015; Zhao et al., 2016, 2022).

cPA may be based on a general visual processing deficit affecting face recognition more severely than object recognition. A large number of studies have yielded different and sometimes contradictory answers to the question of whether and to what extent cPA is accompanied by object agnosia (Gerlach & Starrfelt, 2021; Geskin & Behrmann, 2018; Svart & Starrfelt, 2022). There are indications that cPA may not even be a unitary disorder (Tian et al., 2020) or the lower end of a continuum (DeGutis et al., 2023), but see Bate et al. (2025). Still, most people with cPA share some symptoms apart from their face recognition impairment. They tend to forget faces more rapidly than other people (Pertzov et al., 2020). Also, a missing or impaired mental imagery of faces, objects or scenes, a condition also named aphantasia (Zeman et al., 2015), has been reported to be more common in people with cPA (Grüter et al., 2009; Maw et al., 2025; Svart & Starrfelt, 2022). People with cPA tend to be less impaired in the perception of other facial information. In a group of 12 persons with cPA, Palermo et al. (2011) found normal expression recognition. In another study, the judgment of facial attractiveness in persons with cPA did not differ from controls, although the same group was significantly impaired in the rating of facial distinctiveness (Carbon et al., 2010).

To date, there is no standard therapy for cPA. Professional training and experimental remedial therapies yielded positive but limited results (Bate et al., 2014; Byrne & Porter, 2025; Corrow et al., 2019; DeGutis et al., 2014; Kirsch et al., 2023), with any long-term effects being unclear.

Making a diagnosis of cPA comes with a particular responsibility on the part of the diagnosticians. Persons with cPA experience their condition to varying degrees (Fine, 2012; Grüter, 2007; Nigrou et al., 2024; Rivolta, 2014). They may benefit from the diagnosis (as anecdotally mentioned by some authors and patients), or they may be devastated by learning that their

condition is incurable and may be passed on to their children. Good clinical/scientific practice requires that the physicians or psychologists who make the diagnosis offer advice and help with possible implications. In a study about the consequences of cPA for psychosocial functioning and occupational disability, Yardley et al. (2008) found anecdotal evidence that some participants in their study had developed chronic anxiety about offending people they did not recognize.

Currently, though, not much is known about any short- or long-term effects of the diagnosis. While some studies have assessed how people with cPA cope in daily life (Adams et al., 2020; Dalrymple et al., 2014; Lowes et al., 2025; Yardley et al., 2008), the immediate or long-term impact of the diagnosis on the patients has never been determined.

The current study aims to assess the long-term effects of diagnosis on people with cPA and their social and professional environment.

Materials and Method

Participants

From our database, consisting of long-standing personal contacts that are continuously maintained, we contacted 132 people with cPA who had received their diagnosis at least eight years before. We considered the time span to be sufficiently long to develop and fine-tune new person recognition techniques, adjust social strategies and judge the respective success. Eighty-one persons answered, 65 of whom agreed to participate. Finally, 54 participants returned the questionnaires together with the signed informed consent form.

At the time of their first diagnosis, standard diagnostic procedures had not been widely established. Therefore, we decided to have the participants tested with the CMFT+ test (Russell et al., 2009) and have them fill out a German translation of the Twenty-Item Prosopagnosia Index (PI20; Shah et al., 2015). The CMFT+ test is a measure of objective face recognition ability, while the PI20 questionnaire assesses the subjective symptoms. In order to be included, participants had to score at least 2 *SD* below the normative mean in the CMFT+ long form and at least 64 points on the PI20. We chose CFMT+ over the CMFT because people with prosopagnosia repeatedly told us that, with a major conscious effort, they could distinguish a smaller number of faces. With a large number of faces, this would not work anymore. We applied the means and *SDs* provided with the test. The study was conducted in a predominantly White population; therefore, we adjusted the values to a Caucasian population.

A table of the participants' CMFT+ and PI20 scores is provided in the Supplemental Table S1.

Five participants were excluded. One claimed that his face recognition was back to normal and his PI20 scored under 64 points; two women did not meet CFMT+ criteria, one woman could not take the CFMT+ test due to health problems, and one man was excluded because he had been taking strong painkillers at the time of his CMFT+ test.

At the time of the study, the 49 remaining participants were between 16 and 72 years old ($M = 47.6$ years, $SD = 13.85$, $MD = 51$). They received the diagnosis between 8 and 25 years before ($M = 16.2$ years, $SD = 3.3$, $MD = 17$).

All participants were informed that they should feel free to contact us anytime for questions or for professional help, if necessary. Two participants made use of this offer.

The study was approved by the local Ethics Committee (Ethikrat) of the University of Bamberg on October 31st, 2019 (Application No. 2019–10/31).

Materials

We designed two German-language questionnaires. The Prosopagnosia Impact Questionnaire (PAIQ) covers the prediagnostic situation, the direct impact of the diagnosis, and the long-term

social and cognitive changes. The Personal Data questionnaire covers personal information and medical history. We have added the original German as well as an authorized English version to the Supplemental Material (S3: original German version, S4: authorized English version; S5: Personal Data questionnaire in English). All materials are made available under the Creative Commons Attribution 4.0 International License (CC BY 4.0).

The PAIQ is divided into three sections:

Prediagnostic Situation and Diagnosis. Awareness of face recognition problems, awareness of the term prosopagnosia. Diagnosis: when, how, by whom? As people with an acquired PA may react differently to the diagnosis, we asked people whether they remembered any special event that may have caused their prosopagnosia.

Consequences of the Diagnosis. Whom did they tell, if any?

Changes After Diagnosis in Hindsight. Did the diagnosis change their lives? Are they more or less confident with person recognition, face recognition, social interaction? Did they develop new strategies? Has the quality of the relations to other people changed in any way? Have people (partner, relatives, colleagues, others) reacted positively or negatively? Did they get support from partners, friends, colleagues?

Interspersed were questions about person identity recognition strategies (other than by face), and the degree of social contacts.

We left ample space for comments and encouraged the participants to write down their thoughts, comments or criticism.

Procedure

The questionnaires were sent by e-mail as PDF forms or on paper by mail. The participants were instructed to fill them out on their computers and return them by e-mail, or upload them via https to a secure server. If this did not work for them, we also offered the option to print the forms, fill them out, and return them by mail. There was no time limit for the answers. We did not demand that all parts of the questions be answered as long as the questionnaire was meaningfully filled out. The length of comments was not limited. In case the questionnaires were not returned after 50 days, we e-mailed a reminder.

Results

Prediagnostic Situation

Twenty-six (53.1%) participants noticed their face recognition problems no earlier than 5 years before the diagnosis or were not consciously aware of their condition until they received their diagnosis in the course of a cPA pedigree research study (Grueter et al., 2007). Seventeen (34.7%) had known about their deficit for 6 or more years prior to diagnosis. Four (8.2%) participants did not answer this question. Twenty persons (40.8%) had turned to us because reports in various media had made them think that they suffered from prosopagnosia. Twelve (24.5%) contacted us because their children showed noticeable signs of face recognition problems.

No participant remembered any special event to blame for the onset of their deficit. Forty-seven (95.9%) answered “no” when asked if they remembered a disease or an accident as a trigger for the prosopagnosia. Two (4.1%) answered, “I do not know” (PAIQ Q6).

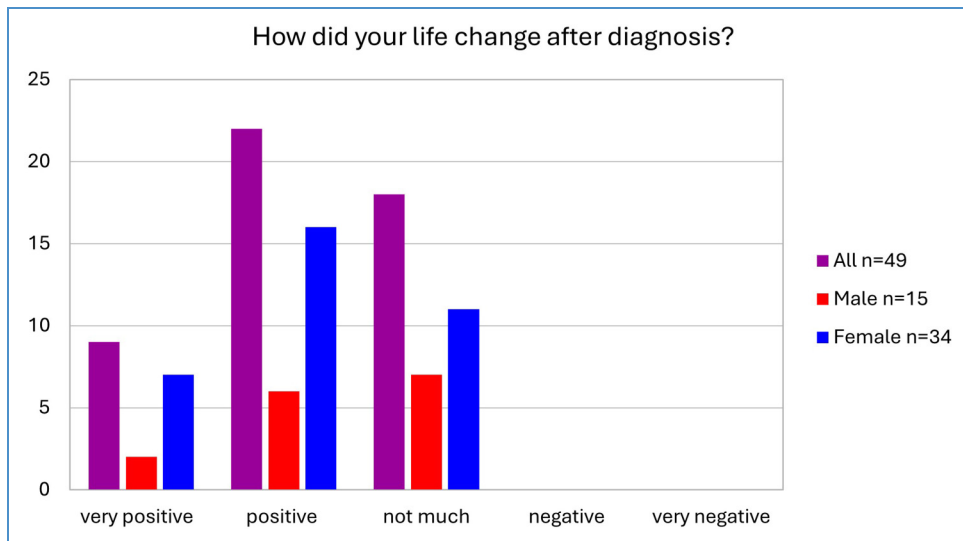


Figure 1. Long-term effect of the diagnosis. It should be noted that no participants expressed a negative effect of the diagnosis on their lives, and more than half expressed a positive or very positive effect.

Table 1. Development of confidence in face recognition, person recognition, and interpersonal skills after diagnosis.

Confidence in Is Now:	Face Recognition	Person Recognition	Interpersonal Skills
Much higher	0	2	4
Higher	3	7	28
Unchanged	43	39	16
Lower	3	1	1
Much lower	0	0	0
Total	49	49	49

Impact of Diagnosis

Did the diagnosis change the participants' lives (PAIQ Q19, 5-point Likert scale: 1 = *very positive*, 2 = *positive*, 3 = *not much*, 4 = *negative*, 5 = *very negative*)? Eighteen (36.7%) found that the diagnosis had not brought much of a change, 22 (44.9%) answered that the diagnosis had a positive effect, and 9 (18.4%) saw a very positive effect (Figure 1). While 67.7% of the women reported a positive effect, only 53.3% of the men did ($\chi^2 = 0.9176$, $df = 1$, $p = 0.338$, *n.s.*). No negative effects were reported.

We also asked the participants about changes in their face recognition skills, person recognition skills, and interpersonal skills. While 43 of 49 saw no change in their *face* recognition skills (three better, three worse), nine grew more confident with their *person* recognition skills (39 no change, one less confident). A majority (65.3%) reported that they had improved their interpersonal skills (Table 1). All in all, most participants reported positive long-term effects.

Effects of the Diagnosis on the Interaction With the Social Environment

Upon the question of whether the diagnosis caused a change in the quality of their relations with other people, 26 participants (53.1%) reported an improvement, two of these even a great improvement. Twenty-two saw no changes, and none experienced a deterioration.

Table 2. To whom did the participants talk about their condition?

	Told About Condition		Outcome					No Answer	No Rating
	Yes	No	++	+	0	-	-		
Partner	44	3	7	14	21	0	0	2	0
Family	47	2	6	13	26	0	0	2	0
Friends	42	6	6	19	17	0	0	1	0
Acquaintances	8	37	0	5	3	0	0	4	0
Colleagues	29	19	2	13	11	0	0	3	0
Further	13	34	1	8	2	0	0	2	0

Notes. ++ = very positive, + = positive, 0 = indifferent, - = negative, -- = very negative.

Thirty-two of 49 reported (65.3%) that their social environment is supporting them. They specifically named family members ($n = 10$), partner ($n = 9$), close friends ($n = 7$), people who accompany them ($n = 5$), colleagues ($n = 5$), and their own children ($n = 2$).

We also asked whom they informed about the condition (partner, family, friends, acquaintances, colleagues, clients/customers/students) after having been diagnosed. More than 90% (47/49) reported that friends, partners, and family members were aware of their condition, but only 16.3% (8/49) also informed acquaintances. The colleagues of 29/49 knew about their trouble with faces. However, only a minority notified customers, clients, and students (13/49, 26.5%). For all, the feedback from their social environment was positive or at least neutral. No one reported negative experiences (Table 2).

Person Recognition Strategies

Upon the question of how much contact they have with other people, 33/49 (67.3%) of the participants checked 5–7 on a 7-point Likert scale (1 = *very little* to 7 = *very much*; Figure 2). This does not support the hypothesis that persons with cPA tend to avoid social interaction.

Instead, the study participants tended to compensate for their face recognition deficit by using other identifiers. Therefore, we asked how well, in school grades (1 = *very good*, 2 = *good*, 3 = *satisfactory*, 4 = *sufficient*, 5 = *poor*, 6 = *deficient*—following the German school grade system which could intuitively be used by the participants), they recognized persons holistically (“as a whole”), intuitively (“without thinking”), from face, voice, gait and bearing, invariable marks like scars and tattoos, hair and clothing style, or accessories (Figure 3).

Most participants relied on bearing and gait (1.90), invariable marks (2.04, voice (2.08), and style (2.46). Participants judged accessories as not very reliable (2.58). Not surprisingly, most participants are poor at recognizing faces (4.73). Thirty-three participants rated themselves as poor or deficient. The participants assessed their intuitive person recognition skills mostly as *sufficient* or *worse*, $M = 4.22$. The holistic recognition score was higher, though ($M = 2.65$). Participants obviously differentiate between “holistic” and “intuitive.” In the comments, eight participants noted that they also use the environment to identify other people.

Twenty-seven of 49 reported that the diagnosis prompted them to develop new strategies (PAIQ, Question 23). Specifically, 28 participants paid more attention to general clues for person identification (Q23a), 29 consciously looked for helpful attributes (Q23b) and 29 for permanent attributes such as scars or tattoos (Q23c). Fifteen did not develop new strategies, and the remaining three were not sure.

Figure 4 provides a statistical evaluation of the results on basis of repeated-measurement ANOVA with the within-participants variable of recognition category (eight levels) with a

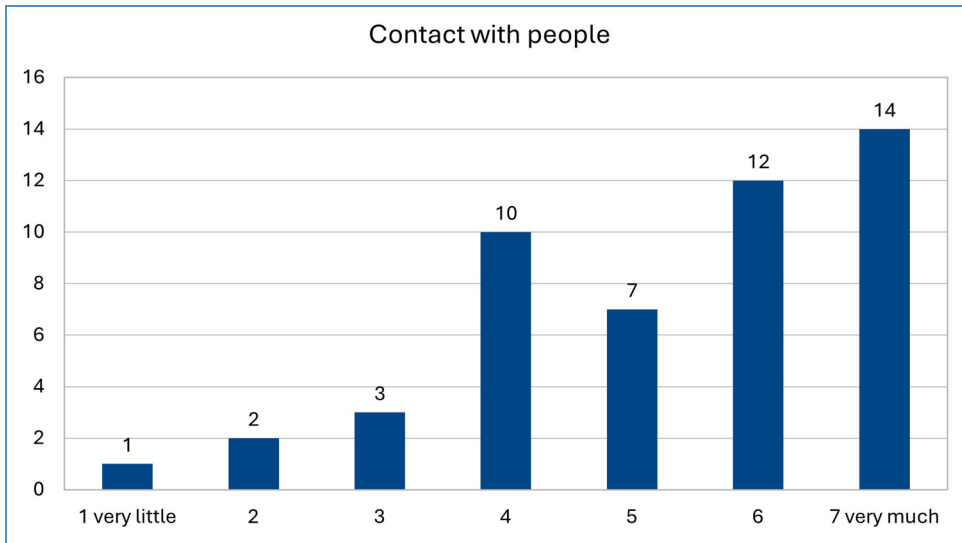


Figure 2. Self-reported amount of contact with other people. More than half of the participants (26/49) stated that they have much or very much (6 or 7 on a seven-point scale) contact with other people. These data do not support the idea that people with cPA tend to avoid contact with other people. cPA = congenital prosopagnosia.

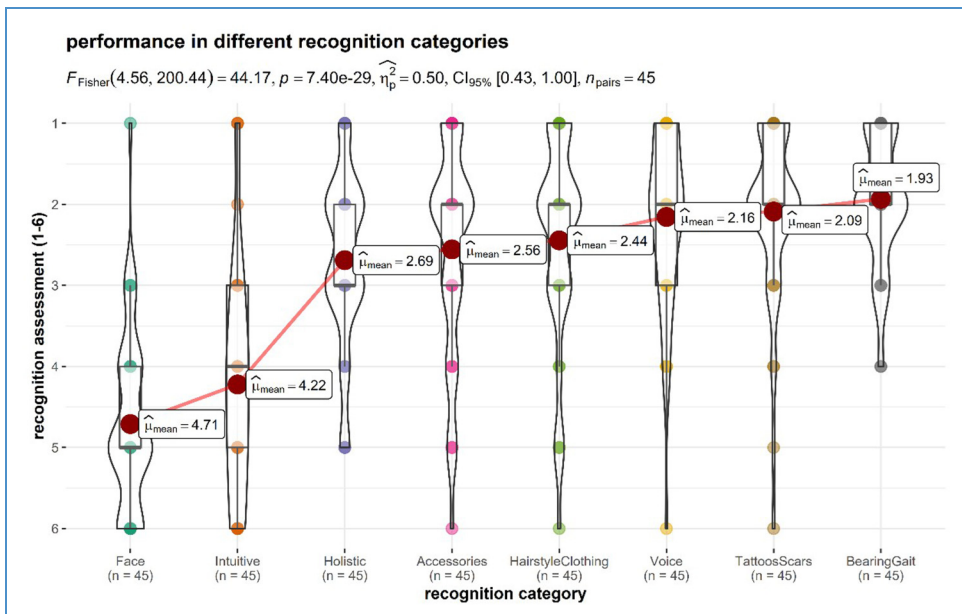


Figure 3. Statistical view of the data split by the research categories on which participants reported their self-assessed performance levels, with 1 being best, 6 being worst. The violin plots show the distribution of values, and the box plots show the median (middle value of the box) and the lower and upper quartiles. Mean values are indicated by bold points. Overall inference statistics are provided by a one-way within-participants ANOVA based on Welch approximation to the degrees of freedom, yielding a significant, large effect (see J. +- of partial eta-squared of .50. The effective n (which is lower than the total sample size due to missing cells) is given in parentheses).

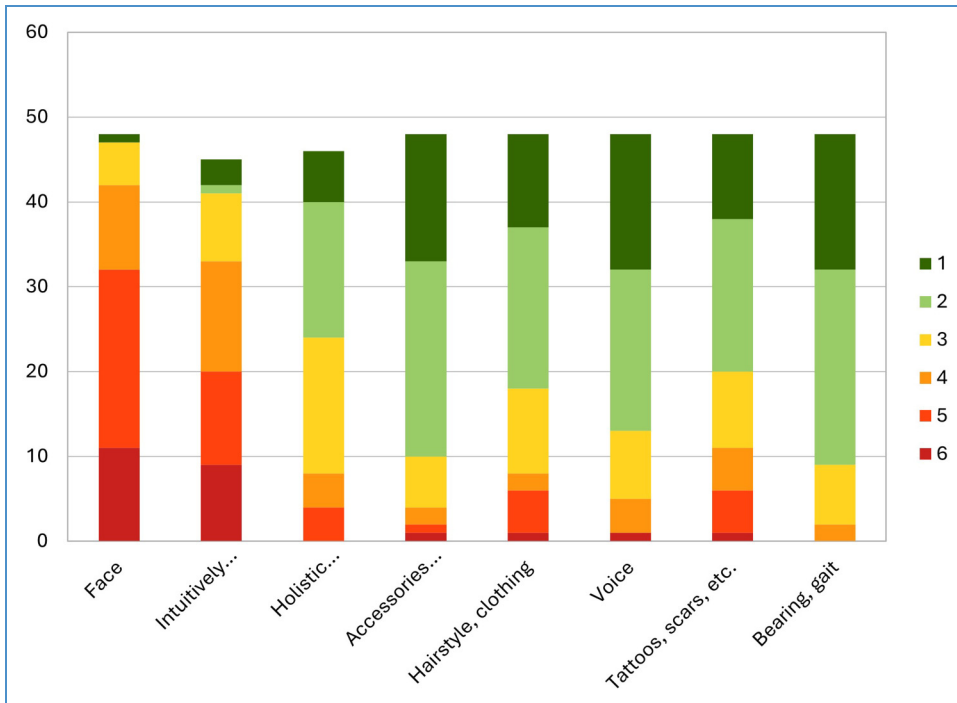


Figure 4. Self-reported person recognition skills, in German school grades, with 1 being best, 6 being worst. Persons with cPA do not recognize other people intuitively, nor by their faces. They rely on bearing and gait, voice, hairstyle, and clothing, as well as unchangeable marks (PAIQ, Question 18). cPA = congenital prosopagnosia; PAIQ = Prosopagnosia Impact Questionnaire.

conservative Greenhouse–Geisser correction of degrees of freedom due to a lack of sphericity (Mauchly’s Test for Sphericity, $W=0.105$, $p<.0001$): The overall effect of recognition category was revealed significant, $F(4.56, 200.44)=44.17$, $p<.0001$, partial eta-squared = .50, qualified as large effect (see J. Cohen, 1988). It shows that people with cPA do not suffer from a general person recognition problem, but a highly face-specific recognition deficit. Interestingly, intuitive face recognition is also impaired, meaning that, for people with cPA, person recognition is a nonintuitive, conscious effort. While the difference between face recognition and intuitive person recognition was not found as significant ($p=1$; *n.s.*), we revealed all other pairwise differences between assessments of one of these two recognition categories to all others as highly significant ($ps<.001$, Bonferroni-corrected).

Furthermore, when analyzing the relationships between assessments of the different recognition categories, we found few significant correlations (Figure 5). Gait and holistic recognition are strongly correlated, as are gait and unchanging distinctive features such as tattoos or scars. The strongest correlation occurred between hairstyle and accessories, while there was no significant correlation between hairstyle and unchanging features. Intuitive and holistic recognition were also related. Otherwise, people seem to have developed highly individual strategies to compensate for their face recognition deficits.

As stated above, most participants are not aware of any change in their face recognition skills and report no more than a moderate improvement in their ability to recognize other people.

All participants were invited to add comments of unlimited length. A collection of the most indicative comments can be found in Supplemental Table S2.

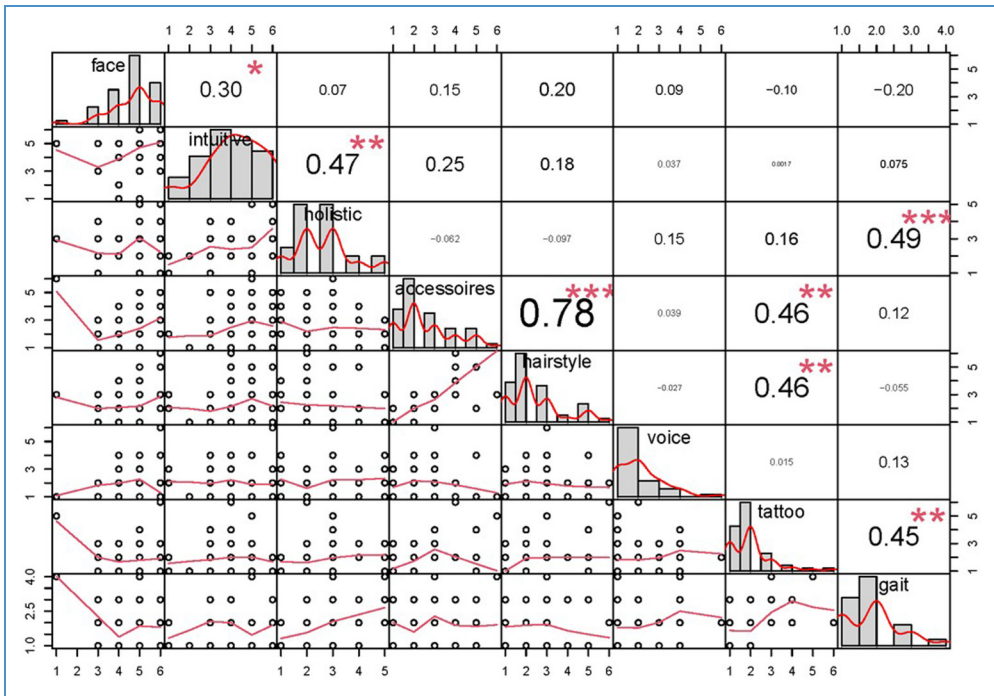


Figure 5. Pairwise correlation matrix of perceived cues derived from facial and bodily features. Histograms on the diagonal show the distributions for each cue (face, intuitive, holistic, accessoires, hairstyle, voice, tattoo, gait). Scatterplots with LOESS smoothing appear in the lower triangle, while the upper triangle displays Pearson correlation coefficients, with asterisks indicating significance levels. Strong positive associations are observed particularly between accessoires and hairstyle ($r=0.78$), holistic perception and gait ($r=0.49$), intuitive judgments and facial cues ($r=0.47$), and between tattoos and gait ($r=0.45$).

Discussion

Being diagnosed with cPA, a lifelong condition with no established therapy that may also affect one's children, can certainly cause some emotional distress. Researchers and clinicians establishing the diagnosis should be aware of this. To our knowledge, this study is the first to examine the long-term effects on patients. And it brings good news:

To our surprise, none of the participants in our study saw the diagnosis as a negative turning point in their lives—even after many years. Nobody said that the diagnosis showed any negative impact, and nearly 63.3% rated that the diagnosis had a positive or very positive effect, even though 87.8% could not improve their face recognition skills. Still, 65.3% of the participants in our study reported improved interpersonal skills after the diagnosis. However, interpersonal skills tend to improve with age (Fingerman & Charles, 2010; Grossmann et al., 2010; Reed & Carstensen, 2012) anyway. Therefore, the improvement may not necessarily be considered a consequence of the prosopagnosia diagnosis alone.

It should be noted, however, that our diagnosis always includes an interactive consultation (personal, by phone, or by video conference) of at least 1.5 hr. We explain the reasoning behind the diagnosis and the state of knowledge about the condition. We also discuss possible implications, offer further free consultation, and inform about social media groups. As cPA runs in families (De Haan, 1999; Grüter et al., 2007; Sun et al., 2024), we provide advice for prosopagnosic children and have prepared an online guide booklet for educators and teachers (https://www.prosopagnosie.de/kinder_

PABroschuere.pdf). Therefore, the positive effects of the diagnosis reported in the present study may also be influenced by the advice we provide along with the diagnosis.

We found no indication that the study participants avoid personal contact. Only one of our participants stated that they have minimal contact with other people (1 on a 7-point Likert scale), while 67.4% selected the values 5–7. People with social anxiety or even social phobia may—arguably—be less inclined to contact researchers or medical doctors about their face recognition problems and would therefore not participate in studies.

Even in scientific publications, face recognition is commonly used as a synonym for person recognition, though this intuitive assumption has been disproved (Noyes et al., 2018). When we see a person approaching from afar, we try to assess their identity by their gait, bearing, and body shape. At close range, face recognition takes over (Hahn et al., 2016).

When face recognition is blocked in an experimental setting, people may try to substitute for it with other clues, such as body shape, but may be unaware of this shift (Rice et al., 2013). People with cPA depend heavily on nonfacial clues for person recognition. Similar to observations in neurotypical persons (Hahn & O'Toole, 2017; Yovel & O'Toole, 2016), physical features such as gait and bearing convey the most important information, followed by unchanging traits like scars or tattoos. Voice is also important, corroborating the observation that voice recognition is not impaired in cPA (Liu et al., 2015; Tsantani & Cook, 2020). It has been shown that cPA is not associated with congenital phonagnosia (Biederman et al., 2018) and vice versa (Roswandowitz et al., 2014), although brain areas for face and voice recognition collaborate via direct structural connections (Blank et al., 2011; Maguinness & von Kriegstein, 2017; von Kriegstein et al., 2008).

All in all, the person recognition process seems to work in much the same way in persons with cPA and neurotypical persons, with the exception of face recognition. cPA is obviously not a social interaction deficit, but a visual face recognition problem that the affected persons try to compensate. This may be the reason why the high incidence of the condition was not recognized until the beginning of the 21st century (Grüter & Carbon, 2010).

Although face-recognition difficulties are relatively common among autistic individuals (Griffin et al., 2021), they may not always be fully aware of such difficulties themselves (Minio-Paluello et al., 2020). In contrast, most people with cPA suffer from their deficit (Lowes et al., 2025). None of our participants reported a history of autism spectrum disorder diagnosis or treatment.

In our study, a large majority (84%) of the participants told friends, colleagues, partners, and family members about their condition. This is more than in the study by Adams et al., where only 60% explained their condition to friends or family members, and only a minority informed persons in their occupational settings. However, Adams et al. (2020) did not differentiate between colleagues and customers or students. Also, our participants received their diagnosis more than 8 years ago, and many of them took their time to reveal their deficit to other people. Most participants reported positive or indifferent reactions to their openness.

Knowledge about the condition did not improve face recognition skills. Experimental face perception and face memorizing training courses have shown some effect, though not always sustained, and not for all study participants. The benefit in daily life seems to be small (DeGutis et al., 2012, 2014; Kirsch et al., 2023).

Our results show that the diagnosis has a positive effect on most people who suspect that they suffer from some kind of face recognition deficit. In recent years, it has been discussed whether prosopagnosics are underdiagnosed if the *DSM-5* criteria are applied (Burns, 2024; but see DeGutis et al., 2023). The *DSM-5* demands that patients score -1 *SD* in at least two tests. Regardless of any tests, the patients suffer from functional prosopagnosia if they cannot match a face to a person in real life. It is a good question whether we want to tell a person with functional prosopagnosia that we cannot verify his/her problems. Maybe the use of the CMFT+ instead of the CMFT can help to cut this Gordian knot. We hope that further research can corroborate our findings.

On the other hand, would it be feasible to diagnose cPA if it is just the most troubling symptom of a more general cognitive impairment (Geskin & Behrmann, 2018; Svart & Starrfelt, 2022)? Can you call an iceberg an iceberg, even if you don't see most of it? Though this is an analogy with all the weaknesses of an analogy, it describes the problem. The most severe symptom for the patient is the long-standing and embarrassing inability to match a face to a person. Therefore, if the behavioral criteria are met, we would think it is justified to diagnose cPA.

Our results and the comments in Supplemental Table S2 should provide a better insight into the mindset of people with cPA. We showed that the diagnosis of cPA has mostly positive effects and helps people cope, at least if extensive professional consultation is made available. Our results should provide valuable information for researchers, physicians, and psychologists who work with, or plan to work with, persons suffering from cPA and who seek to provide consultation on diagnosis and during studies. We would like to stress that *any* diagnosis of a distressing, lifelong, incurable, and hereditary condition should be accompanied by an offer of professional help.

Classification

Psychological and Cognitive Sciences, Systems Neuroscience

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Author Contribution(s)

Martina Grüter: Conceptualization; Investigation; Project administration; Writing – original draft; Writing – review & editing.

Claus-Christian Carbon: Conceptualization; Formal analysis; Formal analysis; Investigation; Methodology; Project administration; Resources; Software; Supervision; Validation; Visualization; Writing – review & editing.

Thomas Grüter: Conceptualization; Investigation; Project administration; Writing – original draft; Writing – review & editing.

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Declaration of Conflicting Interests

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Supplemental Material

Supplemental material for this article is available online.

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