Body Image 45 (2023) 355–361

Contents lists available at ScienceDirect

Body Image

journal homepage: www.journals.elsevier.com/body-image

Brief research report

Do congenital and acquired causes of visible difference predict distinct appearance-related psychosocial outcomes?

Fabio Zucchelli [a,*], Marije van Dalen [a,1], Radhika Bhatia [a], Paul White [b], Claire Hamlet [a], Diana Harcourt [a]

[a] Centre for Appearance Research, University West of the England, Frenchay Campus, Coldharbour Lane, Bristol BS16 1QY, UK
[b] Department of Engineering, Design and Mathematics, University of the West of England, Frenchay Campus, Coldharbour Lane, Bristol BS16 1QY, UK

ARTICLE INFO

Article history:
Received 28 October 2022
Received in revised form 27 March 2023
Accepted 28 March 2023
Available online xxxx

Keywords:
Visible difference
Stigma
Adjustment
Congenital conditions

ABSTRACT

Having a visible difference caused by an appearance-altering condition or injury can impact psychosocial wellbeing. It remains unestablished whether the time at which a visible difference manifests, namely pre-memory (congenital) or later (acquired), predicts psychosocial outcomes associated with adjustment. In this survey study of 331 adults with visible differences, we tested whether their type, congenital (n = 161) or acquired (n = 170), would predict four key psychosocial outcomes: Appearance satisfaction, social appearance anxiety, life disengagement and intimacy distress. To account for other potential predictors and to test whether other variables would moderate any predictive effect found from the type of visible difference, the analyses also included demographic variables, visible difference characteristics and history, and interpersonal and intrapersonal factors. Four regression models were tested. With all variables entered, we found no evidence of type of visible difference as a significant predictor of any psychosocial outcome. Instead, the only consistent predictors of outcomes were optimism, social support and the extent to which participants felt able to disguise their difference. Overall, findings do not support the idea that there is a psychosocial advantage to having a congenital nor acquired visible difference, and broadly reinforce commonalities in adjusting to any cause.

1. Introduction

A wide range of health conditions, diseases and injuries can cause an atypical appearance, commonly referred to as a visible difference. Some causes manifest from birth or pre-memory (typically defined as under 3 years; Peterson, 2021). Harris (1997) proposed that visible differences developed post-birth but pre-memory should also be recognised as 'congenital' conditions given that affected individuals will have no memory of life without the difference. Examples include craniofacial conditions like cleft lip and/or palate, craniosynostosis and microtia, as well as birthmarks, and scarring from burns or other injuries sustained during infancy. Other causes of visible difference are acquired post-memory formation, such as skin conditions (e.g., psoriasis, vitiligo), trauma (e.g., burns, limb loss), or following disease and its treatment (e.g., surgical scarring).

With appearance concerns commonplace in the general population amid sociocultural appearance pressures (Wang et al., 2019), and regular reports of intrusive reactions from others towards those with visible differences (Ryan et al., 2012), it is unsurprising that many of those affected encounter challenges in adjusting to their appearance. Research spanning individuals across a wide range of causes of congenital and acquired visible difference has demonstrated a marked prevalence of psychosocial difficulties including social appearance-focused anxiety, body dissatisfaction, low self-esteem, poor quality of life, depression and generalised anxiety compared to matched controls (Bogart, 2020; Versnel et al., 2010). Recent research has also identified appearance-focused distress in the context of romantic relationships as a pervasive difficulty in adults with visible difference (Sharratt et al., 2018a).

Various theories have been integrated to explain these psychosocial challenges encountered by many with visible differences (Kent, 2000). These models include, among others, social stigma (Goffman, 1963), social skills deficit (Rumsey et al., 1986), social anxiety (Leary & Kowalski, 1995) and body image disturbance (Cash & Grant, 1996). Kent (2000) proposed impression management as the unifying factor across these theories, wherein fear of negative

* Corresponding author.
E-mail address: Fabio.zucchelli@uwe.ac.uk (F. Zucchelli).
[1] Present address: Department of Pediatrics, Erasmus MC, University Medical Center Rotterdam, 3000 CB Rotterdam, The Netherlands.

https://doi.org/10.1016/j.bodyim.2023.03.016

appearance evaluation (social anxiety) is shaped and reinforced through possession of a socially stigmatised characteristic (namely visible difference, and for some, hypervigilant, preoccupied or otherwise stilted social behaviours (i.e. social skills deficit). Indeed, stigmatising implicit attitudes and behaviors have been indicated in the general public towards individuals with facial differences. These include suppressed empathy and social cognition, as well as avoidant behaviors mediated by disgust towards perceived disease signals (Hartung et al., 2019; Ryan et al., 2012). Cash and Grant's (1996) model and connected research highlight body dissatisfaction as an outcome associated with multiple unhealthy behaviours in the general population, including disengagement with broad life activities (Atkinson & Diedrichs, 2021). More recently, facets of positive psychology like resilience and optimism have been identified as protective factors in adults with visible differences from congenital (Ridley, 2019) and acquired causes (Watson et al., 2022).

Intuitively, there are likely to be marked divergences between the experiences of growing up with a visible difference to those of acquiring a difference post-memory formation. As noted by Bogart (2020), specifically in facial palsy, two opposing hypotheses may be logically presented. On one hand, it may be expected that individuals with congenital forms of the condition may be more likely to adjust better to their difference given its longstanding nature, compared to those who acquire facial palsy, who may encounter a greater shock to their identity and body image. Logically this argument should apply to the broader 'congenital' condition category; that is, inclusive of individuals who have acquired a visible difference post-birth but pre-memory. For this group, the early stages of identify formation (which coincides with the development of autobiographical memory) would incorporate their different appearance (Harris 1997). Conversely, individuals with congenital facial palsy may be expected to experience greater adjustment challenges, after encountering notable disruption to their social development through a childhood of looking different to their peers. Comparing these two groups, Bogart (2020) found evidence for a 'congenital advantage', whereby those with congenital facial palsy reported more favourable scores on measures of emotional clarity, anxiety and depression than those with acquired facial palsy.

A similar congenital advantage was seemingly apparent in a study involving adults with a wide range of visible differences in measures of appearance satisfaction and life engagement (Zucchelli et al., 2020). However, only participants who reported a visible difference from birth were included in the congenital category, and background factors proposed to influence psychosocial outcomes in the population such as subjective noticeability of the difference, age of acquisition, perceived social support and sociocultural appearance pressure (Hotton et al., 2020; Moss, 2005) were not accounted for in the analysis. In a smaller study, Versnel et al. (2010) found no differences in appearance satisfaction between adults born with "extensive rare facial cleft" (p.1643) and traumatically acquired facial differences.

Combined, it remains unclear whether a systematic congenital advantage exists in the psychosocial adjustment of individuals across the wide array of visible difference causes. The intrapersonal and interpersonal processes that moderate adjustment could also potentially differ based on whether a visible difference is congenital or acquired, which would have implications for the type of psychosocial support indicated for each group.

The aim of this study was to test the congenital advantage hypothesis across the gamut of causes of visible difference, by investigating whether the type of visible difference (in terms of congenital or acquired) predicts psychosocial outcomes associated with adjustment difficulties in individuals with visible difference; specifically, social appearance anxiety, appearance dissatisfaction, life disengagement and intimacy distress. Other possible predictors in the form of demographics, visible difference characteristics and history, interpersonal factors such as social pressure to modify one's appearance and social support, and intrapersonal variables like optimism and resilience, will be accounted for in the analysis. In the case of gender, for example, heightened appearance pressures for women may exert a greater psychosocial impact of living with an atypical appearance (e.g., Hotton et al., 2020). Similarly, the challenges of living with a visible difference could be compounded by social marginalisation particularly prevalent in those from minority ethnic groups (Zucchelli et al., 2022). Our secondary aim was to determine whether differences exist in how these interpersonal and intrapersonal factors moderate the separate predictive relationships between type of visible difference and psychosocial outcomes.

2. Methods

2.1. Participants

To be included in analysis, participants had to self-report as having a visible difference. The sample comprised 331 participants (231 women) with a mean age of 31.25 years (SD = 11.12; range = 18–75). The sample was evenly split into participants with a congenital condition (n = 161) and an acquired visible difference at age 3 and above (n = 170). Eleven (6.8%) of those with a congenital condition reported developing their visible difference at age 1 or 2. Table 1 shows participants' demographic and visible difference characteristics.

Table 1
Participant characteristics.

	Congenital (n = 161)	Acquired (n = 170)	Total (n = 331)
Gender *n* (% within category)			
Women	96 (62.75)	135 (79.88)	231 (71.74)
Men	57 (37.25)	34 (20.12)	91 (28.26)
Age, mean (SD)	30.65 (10.87)	31.82 (11.35)	31.25 (11.12)
Ethnicity *n* (% within category)			
White	123 (77.36)	132 (78.57)	255 (77.98)
Asian/Asian British	17 (10.69)	15 (8.93)	32 (9.79)
Mixed/multiple ethnic groups	10 (6.29)	8 (4.76)	18 (5.50)
Black/African/Caribbean	2 (1.26)	2 (1.19)	4 (1.22)
Other	7 (4.40)	11 (6.55)	18 (5.50)
[a]Type of visible difference *n* (% within category)			
Craniofacial condition	94 (58.39)	0 (0)	94 (28.40)
Skin condition	9 (5.59)	49 (28.49)	58 (17.52)
Facial palsy	13 (8.07)	31 (18.24)	44 (13.29)
Scoliosis	2 (1.24)	26 (15.29)	28 (8.46)
Birthmark	21 (13.04)	2 (1.18)[b]	23 (6.95)
Injury or surgery-related	2 (1.24)	17 (10.00)	19 (5.74)
Atypical hair loss	0 (0)	19 (11.18)	19 (5.74)
Eye condition	12 (7.45)	6 (3.53)	18 (5.44)
Albinism	13 (8.07)	0 (0)	13 (3.93)
Atypical hair growth	0 (0)	8 (4.71)	8 (2.42)
Neurofibromatosis	1 (0.62)	3 (1.76)[b]	4 (1.21)
Atypical limb development	2 (1.24)	1 (0.59)[b]	3 (0.91)
Other[c]	2 (1.24)	17 (10.00)	19 (5.74)
Age of acquisition, mean (SD)	0.17 (0.58)	19.25 (12.45)	9.94 (13.06)
Years since acquisition, mean (SD)	29.2 (9.96)	11.65 (9.75)	20.23 (13.20)

[a] Where participants reported multiple causes of visible difference, the type presented is the cause rated as most noticeable to them.
[b] Refers to a congenital condition which can develop into a visible difference later in life.
[c] Refers to causes of visible difference that do not fit under the above types. Examples include acquired jaw malocclusion and Pectus (atypically shaped chest wall).

2.2. Procedure

Between September 2018 and July 2021, we sent all individuals who had signed up to the research centre's participant pool information about an online survey and a survey link, which provided an information sheet and a consent checklist. Ethical approval was provided by the university faculty research ethics committee prior to data collection. Consenters were then asked to provide data on demographics, their visible difference characteristics and history (where relevant), and multiple psychosocial measures. This study reports on a subset of survey participants (i.e. those with visible differences) and measures pertaining to the research question. Of 391 participant pool members with visible differences, 331 completed the survey, meaning a response rate of 84.6%.

2.3. Measures

2.3.1. Visible difference characteristics and history

Participants were asked to select their cause(s) of visible difference from a list and were invited to provide their condition if unlisted. Those reporting multiple causes (n = 188) were asked which was most noticeable to them and to answer all following questions with that cause in mind. This was the cause of visible difference subsequently used for analyses. A question asking at what age participants acquired their condition was included after March 2019. For those who did not provide age of acquisition (n = 34), the third author deduced the category using their condition information provided. Three questions rated on a 10-point scale assessed the extent to which participants perceive their visible difference as noticeable (a) when fully clothed, (b) undressed or wearing swimwear, and (c) in terms of its disguisability. Higher scores represented higher noticeability / less disguisability.

2.3.2. Intrapersonal and interpersonal factors

The Life Orientation Test – Revised (LOT-R; Scheier et al., 1994), comprising 10 statements on a 5-point scale, was used to measure participants' dispositional optimism. A higher total score indicates greater optimism. The LOT-R displays good reliability internationally (Segerstrom et al., 2011).

The Connor-Davison Resilience Scale two-item version (CD-RISC-2; Vaishnavi et al., 2007), rated on a 5-point scale, was used to measure resilience. The CD-RISC-2 shows good test-retest reliability, convergent validity and divergent validity (Vaishnavi et al., 2007).

A 4-item measure adapted for this study from the Perceived Sociocultural Pressure Scale (PSPS; Stice & Agras, 1998) with a 5-point scale was used to assess the extent to which participants felt pressured by friends, family, partners and media to change their appearance.

The Multidimensional Scale of Perceived Social Support (MPSS; Zimet et al., 1988) measured perceived social support from participants' significant others, family, and friends on a 7-point scale. Higher total scores indicate greater perceived social support. The MPSS displays strong reliability and validity (Zimet et al., 1988).

2.3.3. Appearance-related psychosocial outcomes

Body satisfaction was measured via the Body Esteem Scale for Adolescents and Adults Appearance subscale (BESAA-A; Mendelson et al., 2001), with 10 statements rated on a 5-point scale ranging from 0 = *never* to 4 = *always*. A higher mean score indicates greater appearance satisfaction. The BESAA-A displays strong reliability in adults with visible differences (Zucchelli et al., 2020).

The 6-item Fear of Negative Appearance Evaluation Scale (FNAES; Lundgren et al., 2004) was used to assess social appearance anxiety. Items are rated on a scale of 1 = *not at all* to 5 = *extremely*. A higher total score indicates greater anxiety. The FNAES has been shown to possess good reliability and reliability in college students (Lundgren et al., 2004) and in a small-scale study of adults with visible differences (Zucchelli, Donnelly, et al., 2022).

An adapted version of the Body Image Life Disengagement Questionnaire (BILD-Q; Atkinson & Diedrichs, 2021) was used to assess life disengagement across social, recreational and vocational/educational activities due to appearance concerns. The adapted BILD-Q involved 11 items rated from 1 = *hasn't stopped me at all* to 4 = *stopped me all the time* on items such as "go to work/college". This adapted version shows excellent internal consistency in adults with visible differences (Zucchelli et al., 2020).

The 16-item Centre for Appearance Research Romantic Relationships and Intimacy Scale (CARRIS-16; Sharratt, Moss, Jenkinson, Clarke, & Rumsey, 2018b) was used to assess appearance-focused distress experienced within romantic relationships. Participants responded to items using a 6-point scale ranging from 1 = *strongly disagree* to 6 = *strongly agree*. A higher summed score indicates more appearance distress within romantic relationships. The CARRIS-16 shows good discriminant validity, and internal and test-retest reliability in adults with various causes of visible differences (Sharratt, Moss, Jenkinson, Clarke, & Rumsey, 2018b).

2.4. Data analysis

We aimed to sample $N \geq 110$ in both congenital and acquired groups, with differences between the groups assessed in the regression models via a dummy coded variable. A sensitivity power analysis indicated that these sample sizes would have ≥ 80% power to examine mean differences between the congenital and acquired groups, if an only if, the standardised effect (Cohen's d) for group differences is 0.4 (approximately equal to a point bi-serial correlation coefficient of 0.2). For the secondary research question, a sensitivity power analysis showed that a combined sample size of $N >= 200$ would yield > 80% power for an absolute semi-partial correlation as small as 0.19. Item-level missing data were handled using Available-Item-Analysis, and scale-level missing data, the extent of which is shown in Table 2 for each scale, were handled using Available-Case-Analysis (ACA) in the primary analysis. Using a binomial logistic regression with data missing (on any outcome variable) versus not missing as the outcome, no demographic variables were found to be associated with data missingness, indicative of data missing completely at random (MCAR; Supplementary File 1). As a post-hoc sensitivity analysis of the ACA findings, we used multiple imputation and reran the analyses.

To answer both research questions, multiple regression analyses were conducted for each psychosocial outcome. In each analysis, all

Table 2
Number of available cases *(n)*, Cronbach's alpha (α), Means *(M)* and Standard Deviations *(SD)* for self-report scales.

Measures	Available cases (*n*)	α	*M*	*SD*
Optimism (LOT-R)	321	0.84	11.57	4.70
Resilience (C-DRS-2)	317	0.76	5.32	1.63
Perceived social pressure (Adapted PSPS)	283	0.62	9.49	4.04
Perceived social support (MSPSS)	293	0.91	5.00	1.25
Body satisfaction (BESAA-A)	313	0.92	1.54	0.90
Social appearance anxiety (FNAES)	302	0.93	20.15	6.53
Life disengagement (Adaptted BILD-Q)	300	0.89	1.66	0.65
Intimacy distress (CARRIS-16)	290	0.90	47.08	17.42

Note. LOT-R = Life Orientation Test – Revised; C-DRS-2 = Connor-Davison Resilience Scale – 2; Adapted PSPS = Adapted 4-item Perceived Sociocultural Pressure Scale; MSPSS = Multidimensional Scale of Perceived Social Support; BESAA-A = Body Esteem Scale for Adolescents and Adults – Appearance; FNAES = Fear of Negative Appearance Evaluation Scale; Adapted BILD-Q = Adapted 11-item Body Image Life Disengagement Questionnaire; CARRIS-16 = Centre for Appearance Research Romantic Relationships and Intimacy Scale.

Table 3
Regression analysis for appearance satisfaction as measured by the BESAA-A.

BESAA-A	*B (SE)*	95% CI for *B*		*β*	*p*	Part correlation
		LL	*UL*			
Age	0.00 (0.00)	-0.01	0.01	-0.04	0.480	-0.04
Gender[a]	-.10 (0.12)	-0.32	0.12	-0.05	0.380	-0.04
Ethnic group: Mixed[b]	-.41 (0.21)	-0.82	0.01	-0.10	0.054	-0.10
Ethnic group: Asian[b]	.33 (0.16)	0.02	0.64	0.11	0.036	0.11
Ethnic group: Black[b]	.39 (0.38)	-0.37	1.14	0.05	0.313	0.05
Ethnic group: Other[b]	-.12 (0.21)	-0.53	0.29	-0.03	0.565	-0.03
Type of Condition[c]	.14 (0.45)	-0.73	1.02	0.08	0.749	0.02
Age of acquisition	0.00 (0.01)	-0.01	0.01	0.01	0.933	< 0.01
Noticeability (dressed)	-0.01 (0.02)	-0.06	0.03	-0.05	0.548	-0.03
Noticeability (undressed)	0.01 (0.03)	-0.04	0.06	0.02	0.799	0.01
Disguisability	-0.07 (0.02)	-0.11	-0.03	-0.21	0.002 *	-0.16
Optimism (LOTR)	0.09 (0.04)	0.02	0.16	0.47	0.015 *	0.13
Resilience (CDRISC2)	0.14 (0.11)	-0.07	0.35	0.26	0.178	0.07
Social Support (MPSS)	0.11 (0.12)	-0.13	0.35	0.15	0.363	0.05
Type of condition x Optimism	-0.02 (0.02)	-0.06	0.03	-0.20	0.395	-0.04
Type of condition x Resilience	-0.04 (0.07)	-0.17	0.09	-0.16	0.546	-0.03
Type of condition x Social support	0.02 (0.08)	-0.13	0.18	0.08	0.772	0.01

Note. [a] Men is reference category; [b] White is reference category; [c] Congenital is reference category.
*Significant after correcting for multiple testing.

predictors were entered into the model. To answer the secondary research question of whether interpersonal and intrapersonal variables would moderate the relationship between the type of condition and outcomes, interaction terms for the type of condition and the interpersonal and intrapersonal variables were created and entered into the model. To account for multiple testing, the False Discovery Rate (FDR) method was used (Benjamini & Hochberg, 1995) for each regression analysis with all predictors entered.

3. Results

Descriptive data for each scale are presented in Table 2. Due to a questionable Cronbach's alpha value for PSPS (α = 0.62), we conducted a sensitivity analysis to determine the robustness of findings with PSPS included in the regression analyses. Using principal component analysis of the PSPS, the reliability of the principal component (α = 0.64) negligibly increased from the PSPS scale score. Replacing PSPS scores with the principal component scores in the regression analyses also altered the findings on multiple variables. We therefore determined that PSPS introduced unacceptable measurement error and excluded it from further analysis.

Across all four multiple regression analyses, the type of visible difference in terms of congenital or acquired cause did not predict any of the outcomes.

3.1. Appearance satisfaction

Using appearance satisfaction as the outcome variable (shown in Table 3), the overall model significantly predicted appearance satisfaction ($F(17, 235) = 8.92$, $p < .001$, $R^2 = .39$). The only significant variables which independently positively predicted appearance satisfaction were participants' perceived disguisability of their visible difference and optimism.

3.2. Social appearance anxiety

The model for social appearance anxiety is displayed in Table 4. The overall model explained a significant amount of variability in social appearance anxiety ($F(17,235) = 6.45$, $p < 0.001$, $R^2 = 0.32$). Having a visible difference perceived as easier to disguise predicted less social appearance anxiety, as did optimistic disposition, and Asian compared to white ethnicity.

3.3. Life disengagement

Table 5 shows the model for life disengagement. The overall model was significant, explaining 39% of variance in life disengagement scores ($F(17, 235) = 8.98$, $p < 0.001$, $R^2 = 0.39$). In terms of unique predictors, only perceived social support predicted less life disengagement.

3.4. Intimacy distress

For intimacy distress (see Table 6), the regression model accounted for 39% of variance in intimacy distress scores ($F(17, 231) = 8.70$, $p < 0.001$, $R^2 = 0.39$). Male gender as well as Asian and black ethnicity predicted less intimacy distress compared to white ethnicity. Social support also predicted less intimacy distress.

Rerunning the regression analyses using the imputed dataset (n = 287) for each outcome retained all the above significant findings, including after correcting for multiple testing (Supplementary File 2).

3.5. Differential moderation of outcomes

The finding that type of visible difference (congenital or acquired) did not predict any outcomes negated the second research question. Notwithstanding, none of perceived social support, resilience nor optimism significantly moderated the relationship between visible difference type and any outcome.

4. Discussion

The findings from this study do not support the congenital advantage hypothesis for adults living with visible differences. That is, adults whose visible difference has existed since birth or pre-memory seem not to fare differently on average in appearance-specific psychosocial adjustment to those who have acquired their difference post-memory formation. Given the unifying feature of the many causes of visible difference is their impact on appearance, we chose to focus on appearance-specific adjustment. This is opposed to more generic psychosocial outcomes such as anxiety and depression, which could create artefact findings based on other facets of some conditions such as impaired functionality, pain or other medical issues. This study therefore contributes a more precise yet generalisable finding, showing that across the wide spectrum of causes of visible difference, the timing of one's difference appears less

Table 4
Regression analyses for social appearance anxiety via the FNAES.

FNAES	*B (SE)*	95% CI for *B*		*β*	*p*	Part correlation
		LL	*UL*			
Age	-0.04 (04)	-0.11	0.04	-0.06	0.370	-0.05
Gender[a]	1.20 (0.85)	-0.47	2.87	0.08	0.157	0.08
Ethnic group: Mixed[b]	.26 (1.59)	-2.88	3.40	0.01	0.872	0.01
Ethnic group: Asian[b]	-3.28 (1.19)	-5.62	-0.93	-0.15	0.006 *	-0.15
Ethnic group: Black[b]	-5.08 (2.88)	-10.76	0.60	-0.10	0.079	-0.09
Ethnic group: Other[b]	1.40 (1.59)	-1.72	4.53	0.05	0.377	0.05
Type of Condition[c]	2.22 (3.37)	-4.41	8.85	0.17	0.509	0.04
Age of acquisition	0.03 (0.05)	-0.06	0.12	0.07	0.469	0.04
Noticeability (dressed)	-0.06 (0.17)	-0.39	0.26	-0.03	0.696	-0.02
Noticeability (undressed)	0.17 (0.19)	-0.20	0.55	0.06	0.360	0.05
Disguisability	0.52 (0.17)	0.19	0.85	0.22	0.002 *	0.17
Optimism (LOTR)	-0.66 (0.27)	-1.20	-0.12	-0.49	0.016 *	-0.13
Resilience (CDRISC2)	-0.34 (0.80)	-1.90	1.23	-0.09	0.672	-0.02
Social Support (MPSS)	0.39 (0.91)	-1.40	2.19	0.08	0.667	0.02
Type of condition x Optimism	0.15 (0.17)	-0.18	0.48	0.22	0.379	0.05
Type of condition x Resilience	-0.12 (0.50)	-1.10	0.86	-0.07	0.807	-0.01
Type of condition x Social support	-0.53 (0.60)	-1.71	0.66	-0.26	0.382	-0.05

Note. [a] Men is reference category; [b] White is reference category; [c] Congenital is reference category.
*Significant after correcting for multiple testing.

Table 5
Regression analysis for life disengagement, measured by the adapted BILD-Q.

Adapted BILD-Q	*B (SE)*	95% CI for *B*		*β*	*p*	Part correlation
		LL	*UL*			
Age	0.00 (0.00)	-0.01	0.01	0.03	0.655	0.02
Gender[a]	.12 (0.08)	-0.04	0.27	0.08	0.136	0.08
Ethnic group: Mixed[b]	-.04 (0.15)	-0.33	0.26	-0.01	0.811	-0.01
Ethnic group: Asian[b]	-.13 (0.11)	-0.35	0.09	-0.06	0.242	-0.06
Ethnic group: Black[b]	-.52 (0.27)	-1.05	0.01	-0.10	0.056	-0.10
Ethnic group: Other[b]	.10 (0.15)	-0.20	0.39	0.03	0.519	0.03
Type of Condition[c]	.35 (0.32)	-0.27	0.97	0.27	0.271	0.06
Age of acquisition	0.00 (0.00)	-0.01	0.01	0.06	0.471	0.04
Noticeability (dressed)	0.00 (0.02)	-0.03	0.04	0.02	0.751	0.02
Noticeability (undressed)	0.03 (0.02)	0.00	0.07	0.12	0.070	0.09
Disguisability	0.02 (0.02)	-0.01	0.05	0.08	0.229	0.06
Optimism (LOTR)	-0.04 (0.03)	-0.09	0.01	-0.28	0.139	-0.08
Resilience (CDRISC2)	0.07 (0.07)	-0.08	0.21	0.18	0.362	0.05
Social Support (MPSS)	-0.23 (0.09)	-0.39	-0.06	-0.44	0.009 *	-0.13
Type of condition x Optimism	0.00 (0.02)	-0.03	0.03	0.05	0.824	0.01
Type of condition x Resilience	-0.09 (0.05)	-0.18	0.00	-0.51	0.049	-0.10
Type of condition x Social support	0.04 (0.06)	-0.07	0.15	0.22	0.443	0.04

Note. [a] Men is reference category; [b] White is reference category; [c] Congenital is reference category.
*Significant after correcting for multiple testing.

Table 6
Regression analysis for intimacy distress via the CARRIS-16.

CARRIS-16	*B (SE)*	95% CI for *B*		*β*	*p*	Part correlation
		LL	*UL*			
Age	0.04 (0.10)	-0.16	0.23		0.710	0.02
Gender[a]	5.72 (2.19)	1.41	10.02	0.02	0.010 *	0.13
Ethnic group: Mixed[b]	3.61 (4.07)	-4.42	11.63	0.15	0.377	0.05
Ethnic group: Asian[b]	-11.75 (3.04)	-17.74	-5.76	0.05	< 0.001 *	-0.20
Ethnic group: Black[b]	-18.12 (7.36)	-32.62	-3.62	-0.20	0.015 *	-0.13
Ethnic group: Other[b]	-.16 (4.05)	-8.15	7.83	-0.13	0.968	< 0.01
Type of Condition[c]	-1.96 (8.70)	-19.10	15.17	0.00	0.822	-0.01
Age of acquisition	0.02 (0.12)	-0.22	0.25	-0.06	0.898	0.01
Noticeability (dressed)	0.09 (0.42)	-0.74	0.92	0.01	0.834	0.01
Noticeability (undressed)	0.80 (0.49)	-0.16	1.77	0.02	0.103	0.08
Disguisability	0.61 (0.43)	-0.24	1.47	0.11	0.159	0.07
Optimism (LOTR)	-1.21 (0.70)	-2.59	0.16	0.09	0.083	-0.09
Resilience (CDRISC2)	0.27 (2.05)	-3.76	4.30	-0.33	0.894	0.01
Social Support (MPSS)	-6.68 (2.34)	-11.29	-2.08	0.03	0.005 *	-0.15
Type of condition x Optimism	0.12 (0.43)	-0.73	0.98	-0.49	0.775	0.01
Type of condition x Resilience	-0.63 (1.28)	-3.16	1.90	0.07	0.623	-0.03
Type of condition x Social support	1.37 (1.54)	-1.66	4.40	-0.13	0.373	0.05

Note. [a] Men is reference category; [b] White is reference category; [c] Congenital is reference category.
*Significant after correcting for multiple testing.

consequential than individuals' level of optimism, perceived social support and the extent to which they feel they can disguise their difference.

The finding that perceived disguisability predicted both appearance satisfaction and social appearance anxiety extends the broadly established finding that subjective noticeability of visible difference is a better predictor of psychosocial adjustment than its objective severity (Moss, 2005; Hotton et al., 2020). That neither of the other two questions asking for participants' perceived noticeability of their difference emerged as significant predictors of any outcome requires consideration. It suggests that participants likely commonly employ concealment strategies to disguise their visible difference, regardless of how noticeable it may be without such concealment, and that this can often be adaptive. This echoes findings in which certain concealment strategies like cosmetic camouflage were associated with less social appearance anxiety for visible facial skin conditions (Balkrishnan et al., 2005).

Optimism similarly predicted appearance satisfaction and social appearance anxiety, suggesting this could serve as a protective factor against appearance-related distress in adults with visible differences. Despite typically being framed as an innate 'disposition', research shows that optimism can be cultivated through systematic practice (e.g., Sergeant & Mongrain, 2014). Intervention studies that cultivate optimism as a therapeutic tool for individuals with visible differences would be worth pursuing.

Notably, however, optimism did not predict life disengagement nor intimacy distress, which were instead predicted by perceived social support. Unlike appearance satisfaction and social appearance anxiety, which are socio-cognitive processes, life disengagement measures entirely overt behaviours (albeit via self-report). Optimism likely holds a more proximal relationship to socio-cognitive outcomes; for example, intuitively, optimism would closely influence one's expectations about future social interactions (i.e. FNAE) to a greater extent than it would influence the likelihood of acting on intentions to attend various activities (given the intention-behaviour gap). Instead, having family, friends and romantic partners who are encouraging and supportive could more directly help individuals enact intentions to engage in activities across life domains (Van Achterberg et al., 2011). Regarding intimacy distress, findings suggest that social support, especially from "a special person" (as described in a third of MPSS items) who may often be a romantic partner, as well as from friends, more directly fosters intimacy confidence than optimism.

The results also point to female gender and white ethnicity as predictors of intimacy distress. This supports qualitative research in which women with visible differences perceived their attractiveness and sexual esteem as more bound to appearance than for men (Sharratt et al., 2018a). The sociocultural explanation of heightened intimacy distress in white participants requires further exploration.

In relation to the secondary research question, importantly, the disguisability of one's visible difference, optimism and social support predicted adjustment outcomes regardless of whether the condition was congenital or acquired. While undoubtedly the subjective experience of adjusting to a birthmark or craniofacial condition from birth will likely differ to that of sustaining scarring from a burns injury or developing a visible skin condition as an adult, the findings suggest that not only are adjustment outcomes comparable between these two groups, but there are no significantly different moderators of these outcomes.

Alongside its strengths, this study has limitations. The timing of recruitment spanned pre-to-mid-COVID-19 pandemic, and with it an unprecedented shift in social context. The pandemic is known to have impacted the lived experience of UK adults with visible differences (Tollow et al., 2023), so there may be limits to the generalisability of these time-sensitive findings. Similarly, as is common in self-reported surveys, the sample were self-selecting, and may not entirely represent the broader population of adults with visible differences. Over two-thirds of the sample were women, further limiting the generalisability, and although the proportions of white and Asian participants align with current UK demographic distributions, the proportion of those identifying as black was notably below the UK population, also constraining the ability to generalise findings. Finally, the exact influence of the number of years since acquiring a visible difference on the results is unknown due to its exclusion in the regression models because of high multicollinearity.

This study nevertheless offers an important addition to the field by finding no apparent advantage of developing a visible difference congenitally, nor indeed later in life, on adjusting to having an unusual appearance. The perceived disguisability of one's visible difference, optimism and perceived social support instead appear to negatively predict appearance-based difficulties across causes of visible difference. This adds further credence to the endeavour of offering evidence-based interventions both at the population level to interrupt harmful stigmatising attitudes towards those with any cause of visible difference, and at the individual level to help people with any cause of visible difference adjust to their appearance.

Data availability

The authors do not have permission to share data.

Acknowledgements

[Please see separate document for blinding purposes].

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.bodyim.2023.03.016.

References

Atkinson, M. J., & Diedrichs, P. C. (2021). Assessing the impact of body image concerns on functioning across life domains: Development and validation of the Body Image Life Disengagement Questionnaire (BILD-Q) among British adolescents. *Body Image, 37*, 63–73. https://doi.org/10.1016/J.BODYIM.2021.01.009

Balkrishnan, R., McMichael, A. J., Hu, J. Y., Camacho, F. T., Kaur, M., Bouloc, A., Rapp, S. R., & Feldman, S. R. (2005). Corrective cosmetics are effective for women with facial pigmentary disorders. *Cutis, 75*(3), 181–187.

Benjamini, Y., & Hochberg, Y. (1995). Controlling the false discovery rate: a practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society, 57*(1), 289–300. https://doi.org/10.1111/j.2517-6161.1995.tb02031.x

Bogart, K. R. (2020). Socioemotional functioning with facial paralysis: Is there a congenital or acquired advantage. *Health Psychology, 39*(4), 345–354. https://doi.org/10.1037/hea0000838

Cash, T. F., & Grant, J. R. (1996). Cognitive—behavioral treatment of body-image disturbances. In V. B. Van Hasselt, & M. Hersen (Eds.). *Sourcebook of Psychological Treatment Manuals for Adult Disorders* (pp. 567–614). Boston, MA: Springer. https://doi.org/10.1007/978-1-4899-1528-3_15

Goffman, E. (1963). *Stigma; Notes on the Management of Spoiled Identity*. Simon & Schuster,https://doi.org/10.2307/2575995

Hartung, F., Jamrozik, A., Rosen, M. E., Aguirre, G., Sarwer, D. B., & Chatterjee, A. (2019). Behavioural and neural responses to facial disfigurement. *Scientific Reports, 9*(1), 1–10. https://doi.org/10.1038/s41598-019-44408-8

Hotton, M., Huggons, E., Hamlet, C., Shore, D., Johnson, D., Norris, J. H., Kilcoyne, S., & Dalton, L. (2020). The psychosocial impact of facial palsy: A systematic review. *British Journal of Health Psychology, 25*(3), 695–727. https://doi.org/10.1111/bjhp.12440

Kent, G. (2000). Understanding the experiences of people with disfigurements: An integration of four models of social and psychological functioning. *Psychology, Health & Medicine, 5*(2), 117–129. https://doi.org/10.1080/713690187

Leary, M., & Kowalski, R. (1995). The self-presentation model. In R. G. Heimberg, M. R. Liebowitz, D. A. Hope, & F. R. Schneier (Eds.). *Social Phobia: Diagnosis, Assessment, and Treatment* (pp. 94–112). Guildford Press.

Lundgren, J. D., Anderson, D. A., & Thompson, J. K. (2004). Fear of negative appearance evaluation: Development and evaluation of a new construct for risk factor work in the field of eating disorders. *Eating Behaviors, 5*(1), 75–84. https://doi.org/10.1016/S1471-0153(03)00055-2

Mendelson, B. K., Mendelson, M. J., & White, D. R. (2001). Body-esteem scale for adolescents and adults. *Journal of Personality Assessment, 76*(1), 90–106. https://doi.org/10.1207/S15327752JPA7601_6

Moss, T. P. (2005). The relationships between objective and subjective ratings of disfigurement severity, and psychological adjustment. *Body Image, 2*(2), 151–159. https://doi.org/10.1016/j.bodyim.2005.03.004

Peterson, C. (2021). What is your earliest memory? It depends. *Memory (Hove, England), 29*(6), 811–822. https://doi.org/10.1080/09658211.2021.1918174

Ridley, M. (2019). Factors contributing towards psychological resilience in individuals with and without cleft lip and or/palate [Thesis, UWE Bristol]. ⟨https://uwe-repository.worktribe.com/output/4773877⟩.

Rumsey, N., Bull, R., & Gahagan, D. (1986). A preliminary study of the potential of social skills for improving the quality of social interaction for the facially disfigured. *Social Behaviour, 1*(2), 143–145. ⟨https://psycnet.apa.org/record/1989-23039-001⟩.

Ryan, S., Oaten, M., Stevenson, R. J., & Case, T. I. (2012). Facial disfigurement is treated like an infectious disease. *Evolution and Human Behavior, 33*(6), 639–646. https://doi.org/10.1016/j.evolhumbehav.2012.04.001

Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of the Life Orientation Test. *Journal of Personality and Social Psychology, 67*(6), 1063–1078. https://doi.org/10.1037/0022-3514.67.6.1063

Segerstrom, S. C., Evans, D. R., & Eisenlohr-Moul, T. A. (2011). Optimism and pessimism dimensions in the Life Orientation Test-Revised: Method and meaning. *Journal of Research in Personality, 45*(1), 126–129. https://doi.org/10.1016/j.jrp.2010.11.007

Sergeant, S., & Mongrain, M. (2014). An online optimism intervention reduces depression in pessimistic individuals. *Journal of Consulting and Clinical Psychology, 82*(2), 263–274. https://doi.org/10.1037/a0035536

Sharratt, N., Jenkinson, E., Moss, T., Clarke, A., & Rumsey, N. (2018a). Understandings and experiences of visible difference and romantic relationships: A qualitative exploration. *Body Image, 27*, 32–42. https://doi.org/10.1016/j.bodyim.2018.08.002

Sharratt, N., Moss, T., Jenkinson, E., Clarke, A., & Rumsey, N. (2018b). Initial validation of the CAR Romantic Relationships and Intimacy Scale (CARRIS) [UWE Bristol].

Stice, E., & Agras, W. S. (1998). Predicting onset and cessation of bulimic behaviors during adolescence: A longitudinal grouping analysis. *Behavior Therapy, 29*(2), 257–276. https://doi.org/10.1016/S0005-7894(98)80006-3

Tollow, P., Hamlet, C., Zucchelli, F., Williamson, H., & Harcourt, D. (2023). Experiences and impact of the UK lockdown amongst adults who have a facial visible difference. *Current Psychology*, 1–10. https://doi.org/10.1007/s12144-022-04089-5

Vaishnavi, S., Connor, K., & Davidson, J. R. T. (2007). An abbreviated version of the Connor-Davidson Resilience Scale (CD-RISC), the CD-RISC2: Psychometric properties and applications in psychopharmacological trials. *Psychiatry Research, 152*(2–3), 293–297. https://doi.org/10.1016/j.psychres.2007.01.006

Van Achterberg, T., Huisman-de Waal, G. G., Ketelaar, N. A., Oostendorp, R. A., Jacobs, J. E., & Wollersheim, H. C. (2011). How to promote healthy behaviours in patients? An overview of evidence for behaviour change techniques. *Health Promotion International, 26*(2), 148–162. https://doi.org/10.1093/heapro/daq050

Versnel, S. L., Duivenvoorden, H. J., Passchier, J., & Mathijssen, I. M. J. (2010). Satisfaction with facial appearance and its determinants in adults with severe congenital facial disfigurement: A case-referent study. *Journal of Plastic, Reconstructive & Aesthetic Surgery, 63*(10), 1642–1649. https://doi.org/10.1016/j.bjps.2009.10.018

Wang, S. B., Haynos, A. F., Wall, M. M., Chen, C., Eisenberg, M. E., & Neumark-Sztainer, D. (2019). Fifteen-Year Prevalence, Trajectories, and Predictors of Body Dissatisfaction From Adolescence to Middle Adulthood. *Clinical Psychological Science: A Journal of the Association for Psychological Science, 7*(6), 1403–1415. https://doi.org/10.1177/2167702619859331

Watson, J. D. K., McDonald, S. D., Henry, R. S., Pugh, M., Jr., Kuzu, D., & Perrin, P. B. (2022). Pain, mental health, life satisfaction, and understanding from others in veterans with spinal cord injury. *Rehabilitation Psychology, 67*(3), 337–343. https://doi.org/10.1037/rep0000430

Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment, 52*(1), 30–41. https://doi.org/10.1207/s15327752jpa5201_2

Zucchelli, F., Donnelly, O., Rush, E., White, P., Gwyther, H., Williamson, H., Harcourt, D., Slater, A., Sharratt, N., Hamlet, C., Guest, E., Costa, B., Parnell, J., Thornton, M., & Stock, N. (2022). An Acceptance and Commitment Therapy Prototype Mobile Program for Individuals with a Visible Difference: Mixed Methods Feasibility Study. *JMIR Formative Research, 6*(1), Article e33449. https://doi.org/10.2196/33449

Zucchelli, F., Sharratt, N., Montgomery, K., & Chambers, J. (2022). Men's experiences of alopecia areata: A qualitative study. *Health Psychology Open, 9*(2), 1–13. https://doi.org/10.1177/20551029221121524

Zucchelli, F., White, P., Williamson, H., & others (2020). Experiential avoidance and cognitive fusion mediate the relationship between body evaluation and unhelpful body image coping strategies in individuals with visible differences. *Body Image, 32*, 121–127. https://doi.org/10.1016/j.bodyim.2019.12.002