

RESEARCH ARTICLE

Exploring the mediating effect of camouflaging and the moderating effect of autistic identity on the relationship between autistic traits and mental wellbeing

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Abstract

Mental health difficulties are prevalent among autistic adults. Camouflaging (behaving differently to fit in) may be a mechanism by which autistic traits and mental health difficulties relate to each other, but little research has considered the role of different facets of camouflaging. Additionally, autistic identity might buffer against camouflaging and mental health difficulties. This research aims to explore the mediating effects of camouflaging behaviours on the relationship between autistic traits and both positive and negative mental wellbeing, as well as how autistic identity might moderate the relationship between autistic traits and camouflaging, and also mental health. Data were available for 627 autistic adults, recruited through volunteer databases and social media. Participants completed measures of autistic traits, anxiety, depression, positive wellbeing, camouflaging behaviours (compensating for difficulties, masking, and assimilating/putting on an act) and autistic identity. Mediation and moderated mediation models were tested, applying 95% bootstrapped CIs (10,000 resamples) and including age, gender and diagnosis as covariates. There were no significant direct effects between autistic traits and mental wellbeing. Assimilation was a significant mediator of all mental wellbeing measures, and compensation was a significant mediator of positive wellbeing only. Autistic identity was not a significant moderator. Assimilation and compensation should be considered when offering psychological interventions to support mental wellbeing of autistic people. Additional research into external drivers of camouflaging (e.g. stigma) and mechanisms by which camouflaging impacts mental wellbeing, such as autonomy, authenticity, skill mastery and community, may identify other areas of support. Concurrently, societal change is necessary to reduce the need to camouflage.

Lay Summary

Putting on an act to fit in is linked to worse depression, anxiety, suicidality, and positive wellbeing. Compensating for difficulties is linked to better positive wellbeing. A positive autistic identity did not change this. We should explore why changing how you act and compensating have this effect, so we can give better support and improve wellbeing for autistic people. We should also reduce stigma from society, so autistic people do not need to change their behaviour to try to fit in.

KEYWORDS

autism spectrum disorder, camouflaging, mental health, social identification, wellbeing

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INTRODUCTION

Mental health difficulties are reported to be higher for autistic individuals than non-autistic individuals, across a range of conditions (Croen et al., 2015; Jolliffe et al., 2022; Nimmo-Smith et al., 2020) and relatively stable over time (Hedley et al., 2019). Hollocks et al. (2018) conducted a meta-analysis of 30 studies ($N = 26,070$) focusing on autistic adults published between 2000 and 2017. Current and lifetime rates of any anxiety disorder were 27% (CI: 17%–37%) and 42% (CI: 35%–50%), respectively, and 23% (CI: 17%–29%) and 37% (CI: 27%–47%) for depressive disorder. In another review, current diagnosed rates of anxiety disorders were similar at 20% (CI: 17%–23%), but depressive disorders were slightly lower at 11% (CI: 9%–13%), though the authors noted variation based on sample type, for example clinical vs. population-based (Lai et al., 2019). Reviewing systematic reviews and meta-analyses, Hossain et al. (2020) identified rates between 1.47% and 54% for anxiety disorders across eight reviews and 2.5% and 47.1% for depressive disorders across six reviews. In addition, Hossain et al. (2020) reported rates of suicidal ideation and attempts ranging from 10.9% to 66% and 1% to 35%, respectively, across five reviews. Positive wellbeing is also reported to be lower for autistic adults compared to the general population (Ayres et al., 2017; van Heijst & Geurts, 2014).

Research demonstrates the relationship between autistic traits and measures of positive and negative wellbeing. In general population samples, positive associations have been reported between autistic traits and anxiety, depression and suicidality (Fietz et al., 2018; Freeth et al., 2012; Ishizuka et al., 2022; Liew et al., 2015; Pelton & Cassidy, 2017; Rai et al., 2018; South et al., 2020), as well as negative associations with positive wellbeing (McKenzie et al., 2022; Ratner et al., 2023; Stimpson et al., 2021). Additionally, higher autistic traits have been demonstrated in individuals with anxiety and depression (e.g. Radtke et al., 2019; van Steensel et al., 2013). Very little research has directly investigated the relationship between autistic traits and mental health in autistic individuals (see, e.g., Cassidy et al., 2018; Kim et al., 2021; Rai et al., 2018; Scheeren et al., 2022). Investigating this dimensional impact may aid in understanding how autistic traits relate to mental health of autistic individuals.

Given the prevalence of mental health difficulties and their putative relation to autistic traits, it is important to understand the mechanisms behind this relationship and to help guide support and interventions. Camouflaging refers to actions that aim to conceal autistic traits, in an attempt to minimise visibility of autism (Hull et al., 2017; Livingston et al., 2020). Camouflaging behaviours might include rules for maintaining eye contact or using social scripts; hiding traits, by suppressing reactions to sensory differences or stimming; or putting on a persona to

appear more sociable (Bargiela et al., 2016; Cook, Crane, et al., 2021; Hull et al., 2017). According to social identity approaches, the ability to hide lower-status characteristics predicts ability to pass in a higher-status (e.g. neurotypical) group (Wilson & Brune, 2012). Autistic people are traditionally blamed for miscommunications with non-autistic individuals (Milton, 2012), supporting the perception of autism as lower status by society. Thus, camouflaging might be an attempt at upward social mobility to manage stigma (Dirth & Branscombe, 2018). Alternatively, camouflaging might be a protective mechanism against the perceived deficits and associated stigma surrounding autistic differences, as opposed to a choice about how to present oneself (Pearson & Rose, 2021).

In support, autistic traits are associated with camouflaging (Cook, Hull, et al., 2021; Hull et al., 2019; Milner et al., 2022; Scheerer et al., 2020). Attempts to camouflage have not only been reported as exhausting by autistic individuals (e.g. Bradley et al., 2021), but might also prevent individuals from seeking reasonable adjustments, while unsuccessful social mobility attempts might reinforce/encourage integration of negative stereotypes and personal responsibility for difficulties (Dirth & Branscombe, 2018; Goffman, 2009). These consequences of camouflaging could influence mental health difficulties experienced by autistic individuals. Indeed, qualitative research suggests that camouflaging is associated with mental health difficulties (Bargiela et al., 2016; Cage et al., 2018; Tierney et al., 2016), though quantitative results are more equivocal. Cage and Troxell-Whitman (2019) found that autistic adults classified as high camouflagers had significantly higher anxiety but not depression scores. In contrast, Lai et al. (2016) found significant correlations between camouflaging and depression (but not anxiety) for men, but not women. Research has demonstrated the predictive power of camouflaging in addition to autistic traits on anxiety, depression, psychological distress (encompassing depression, anxiety and stress) (Beck et al., 2020; Hull et al., 2019) and its negative relationship to positive wellbeing (Cage et al., 2022). Results conflict more for suicidality (Beck et al., 2020; Cassidy et al., 2018). Cassidy et al. (2020) found camouflaging was a significant partial mediator of the relationship between autistic traits and suicidality in a student sample, but only in conjunction with thwarted belonging.

Camouflaging encompasses different facets (Cook, Crane, et al., 2021; Hull et al., 2019; Livingston et al., 2020), which may have a differential impact on the relationship between autistic traits and mental health. In the Camouflaging Autistic Traits Questionnaire (CAT-Q), Hull et al. (2019) specify three constructs: compensation, that is strategies used to offset difficulties in social situations (e.g. using scripts for conversation, copying facial expressions); masking, that is hiding autistic characteristics (e.g. making eye contact, hiding stims); and assimilation, that is putting on a persona (e.g. forcing oneself to

interact). Very little research has investigated these constructs independently, and efforts to understand the differences are compounded by interchangeable terminology usage, making it more difficult to know which construct is being assessed (Fombonne, 2020).

Compensation can be operationalised as a difference between perceived behaviour and ability. Livingston, Colvert, the Social Relationships Study Team, Bolton and Happé (2019) defined high compensators as those with good social skills despite poor theory of mind. Using this definition, high compensators reported higher anxiety levels than low compensators. Hull et al. (2019) reported correlations between CAT-Q factor scores and mental health for autistic people. They found significant positive correlations between all three factors and anxiety and depression, whereas only assimilation was significantly negatively associated with positive wellbeing. In contrast, Cassidy et al. (2020) identified significant correlations between all three CAT-Q factors and anxiety, depression, and suicidality. In addition, they identified a specific mediating role of assimilation (alongside thwarted belonging) in the relationship between autistic traits and suicidality. However, they did not explore the mediating role of compensation or masking independently of total CAT-Q score; therefore, it is not possible to determine whether any specific factor plays a more important mediating role.

Social identity approaches suggest that when group status movement is unalterable, members may use strategies to promote a positive identity, such as altering perceptions of characteristics traditionally considered negative or placing emphasis on valued characteristics that are specific to the group (Wilson & Brune, 2012). As such, autistic identity might moderate the relationship between autistic traits, camouflaging and mental health difficulties. Autistic identity relates to an individual's self-concept as an autistic person, their perceptions of this group identity (McDonald, 2016). We differentiate between an individual's feelings about their identity as an autistic person, and the loss of personal identity frequently cited as a consequence of camouflaging (Bargiela et al., 2016; Bradley et al., 2021; Hull et al., 2017), or external attitudes from others. Autistic identity has previously been defined as the extent an individual considers autism as a positive but valid difference or a disability; context-specific or consistent across contexts; adding positive or negative abilities; and consisting of changeable or fixed attributes (McDonald, 2016). While autistic traits alone are not expected to predict autistic identity, identity may influence the impact of autistic traits on other experiences. For example, a strong autistic identity may buffer the impact of autistics characteristics on mental health difficulties. Furthermore, someone with a strong autistic identity may not feel the need to camouflage their autistic traits to the same extent as someone who does not value their autistic identity as much.

Cage and Troxell-Whitman (2020) found a complex relationship between identity and camouflaging, whereby

higher autistic identity alone increased camouflaging, suggesting a conflict between identification and action, but decreased camouflaging when mediated by disclosure. Findings vary regarding the relationship between autistic identity and mental wellbeing. Maitland et al. (2021) found that positive autistic identity negatively predicted depression but not anxiety and positively predicted positive wellbeing, in addition to autistic traits. Exploring personal (autistic identity) and external acceptance, Cage et al. (2018) found that personal (alongside external) acceptance negatively predicted depression, but not anxiety. Cooper et al. (2022) demonstrated that autistic identity was related to increased positive wellbeing and decreased social anxiety, when controlling for autistic traits. Autistic identity, as measured by negative feelings (exclusion/dissatisfaction), was also significantly negatively associated with positive wellbeing, when controlling for other factors, whereas positive feelings (autism pride) was not a significant predictor (Corden et al., 2021). To date, no research has considered the role of autistic identity on suicidality. This paints a complex picture of the role of autistic identity, which may be compounded by use of different scales, adapted from general social disability and identification instruments. An autism-specific measure may clarify findings. To summarise, autistic identity has been associated with both camouflaging and mental health (when controlling for autistic traits), but the identified relationships vary and no research has yet explored the role of autistic identity in the relationship between autistic traits, camouflaging and mental health.

Evidence shows associations between specific facets of camouflaging and both autistic traits and positive and negative wellbeing individually. However, research has not explored these facets of camouflaging in combination to understand whether any camouflaging facets are of greater importance to the relationship between autistic traits and mental wellbeing. Furthermore, while some evidence supports a relationship between autistic identity and both mental wellbeing and camouflaging, again, evidence is lacking regarding its relationship with specific camouflaging facets. This study aimed to explore (1) the mediating effect of camouflaging facets on the relationship between autistic traits and mental wellbeing, and (2) the moderating effect of autistic identity on the relationship between autistic traits and both mental wellbeing and camouflaging facets, respectively. Given the wealth of evidence demonstrating associations between autistic traits and mental wellbeing, we predict that there will be a direct effect of autistic traits on depression, anxiety, suicidality and positive wellbeing. We also predict an indirect effect (mediation) by camouflaging, but given that camouflaging is a multidimension construct, we will treat the subscales as parallel mediators. This allows both a test of the total indirect effect through camouflaging and the examination of the specific components that make up the overarching construct. Finally, based on the argument above that stronger autistic identity may buffer the

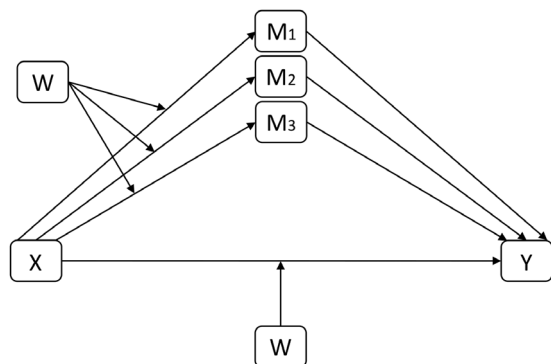


FIGURE 1 Conceptual diagram of Model 8 (moderated mediation with parallel mediators) in Hayes PROCESS, indicating the direct and indirect pathways tested in this study. Model 4 tests the parallel mediators without inclusion of the moderators. X = autistic traits; Y = anxiety, depression, suicidality or positive wellbeing; M1 = compensation; M2 = masking; M3 = assimilation; and W = autistic identity.

impact of autistic traits on mental wellbeing and reduce the desire to camouflage, we propose that autistic identity moderates both the direct and indirect (autistic traits to camouflaging) effects. Figure 1 illustrates these pathways.

METHODS

Participants

Data were collected from 627 autistic adults (inclusion criterion: 18+ years), recruited through the Autistica Discover Network volunteer database and social media platforms (Facebook, Twitter, Reddit). This project was part of a wider study to understand the causes and consequences of camouflaging for autistic and non-autistic individuals. Here we report the data from the autistic sample. As with previous research, our sample included individuals who self-identify as autistic (Brice et al., 2021; Cassidy et al., 2021; Mason et al., 2018; Moore et al., 2021). Table 1 shows demographic characteristics. A favourable ethical opinion was obtained from Newcastle University Faculty of Medical Sciences Research Ethics Committee (2031/7676). All participants provided informed consent.

Measures

Autism Spectrum Quotient-10 Item Version (AQ-10; Allison et al., 2012a)

The AQ-10 is a 10-item screening tool used to assess autistic traits in adults, adapted from the 50-item Autism Spectrum Quotient (Baron-Cohen et al., 2001). The AQ-10 is scored on a 4-point Likert scale from definitely

agree to definitely disagree, items are scored 0 or 1, and total scores range from 0 to 10. Thresholds for full screening are >6 . Internal reliability in autistic populations was good ($\alpha = 0.85$), and large correlations with the AQ-50 ($r = 0.92$, $p < 0.0001$) indicate excellent convergent validity (Allison et al., 2012b). Internal reliability in our sample was poor ($\alpha = 0.58$). Removal of items would not improve internal reliability in our overall sample.

Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983)

The HADS measures experiences of anxiety and depression during the previous week. It is a 14-item scale, with 7 items measuring anxiety and 7 depression, using a 4-point Likert scale between 0 and 3 with varying item response options. Total anxiety/depression scores range from 0 to 21; a score of ≤ 7 suggests no anxiety/depression is present, 8–10 indicates mild anxiety/depression, 11–14 indicates moderate anxiety/depression, and 15–21 indicates severe anxiety/depression. In autistic samples, internal reliability on the HADS was good for anxiety ($\alpha = 0.83$) and acceptable for depression ($\alpha = 0.65$), convergent validity was excellent for both, shown through medium, negative correlations with a measure of wellbeing (anxiety: $r = -0.45$ [CI: -0.59 ; -0.28] and depression: $r = -0.60$ [CI: -0.69 ; -0.49]), and divergent validity was acceptable (e.g. medium correlations between HADS anxiety and depression, $r = 0.34$; Uljarević et al., 2018). In our sample, internal reliability was good (anxiety $\alpha = 0.80$ and depression $\alpha = 0.82$).

Suicidal Behaviours Questionnaire-Autism Spectrum Conditions (SBQ-ASC; Cassidy et al., 2021)

The SBQ-ASC is a 5-item measure of suicidal thoughts and behaviours for autistic people, adapted from the SBQ-R (Osman et al., 2001). Item response options and scoring vary. Total scores range from 0 to 26. An indicative cut-off of 12.5 is recommended, correctly classifying 88% of autistic adults based on item 1 (lifetime suicide attempts) on the SBQ-R. In an autistic sample, internal reliability was acceptable ($\alpha = 0.79$), test-retest reliability was strong ($r_s = 0.927$), and convergent validity, compared to the SBQ-R, was high ($r_s = 0.877$). In the current sample, internal reliability was acceptable ($\alpha = 0.75$).

Warwick-Edinburgh Mental Well-Being Scale (WEMWBS; Tennant et al., 2007)

The WEMWBS is a 14-item measure of positive wellbeing covering positive affect, satisfying interpersonal relationships and positive functioning, using positively worded

TABLE 1 Demographic characteristics of the sample ($N = 627$).

	<i>N</i> (%)	Mean	SD	Min	Max
Age	627 (100)	34.15	12.96	18	70
Gender					
Woman	326 (52.00)				
Man	121 (19.3)				
Non-binary	123 (19.6)				
Self-describing/prefer not to say	57 (9.1)				
Highest level of education					
Doctoral degree	31 (4.9)				
Master's degree	112 (17.9)				
Undergraduate degree	184 (29.3)				
A levels or equivalent	103 (16.4)				
Apprenticeship	8 (1.3)				
5+ GCSEs or equivalent	32 (5.1)				
1–4 GCSEs or equivalent	25 (4.0)				
No qualifications	30 (4.8)				
Other qualification	83 (13.2)				
Prefer not to say	19 (3.0)				
Employment status ^a					
Employed full time	181 (28.9)				
Employed part time	113 (18.0)				
Volunteer	13 (2.1)				
Unemployed	125 (19.9)				
Retired	23 (3.7)				
Student	157 (25.0)				
Prefer not to say	15 (2.4)				
Diagnosed mental health condition					
Yes	484 (77.2)				
No	135 (21.5)				
Prefer not to say	8 (1.3)				
Mental health condition ^a					
Anxiety disorders	377 (60.1)				
Bipolar disorder	30 (4.8)				
Depressive disorders	369 (58.9)				
Obsessive compulsive disorder	81 (12.9)				
Schizophrenic disorders	5 (0.8)				
Eating disorders	86 (13.7)				
Personality disorders	43 (6.9)				
Trauma or stress disorders	154 (24.6)				
Other	85 (13.6)				
ASD diagnosis					
Formal diagnosis	374 (59.6)				
Suspected – pursuing diagnosis	126 (20.1)				
Suspected – not pursuing diagnosis	127 (20.3)				
Age of diagnosis	374 (100)	29.28	15.59	1	67

^aMultiple responses possible; percentages reported as a proportion of the total *N*.

items. The scale uses a 5-point Likert scale from none of the time to all of the time, and scores range from 14 to 70. No thresholds are provided for this measure, but higher

scores equate to elevated positive wellbeing. In a combined sample of autistic and non-autistic adults, internal reliability was high ($\alpha = 0.92$; Hull et al., 2019). Convergent and

divergent validity were also acceptable, showing positive correlations with measures of life satisfaction (e.g. SWLS: $r = 0.73$, $p < 0.01$) and negative correlations with mental ill health (e.g. GHQ-12: $r = -0.53$, $p < 0.01$; Tennant et al., 2007). In our sample, internal reliability was excellent ($\alpha = 0.91$).

Camouflaging Autistic Traits Questionnaire (CAT-Q; Hull et al., 2019)

The CAT-Q is a 25-item, self-report measure used to assess the degree to which adults camouflage autistic traits. It consists of a total score and three factors. The compensation factor includes 9 items measuring behaviours designed to make up for difficulties. The masking factor comprises 8 items designed to capture behaviours that hide autistic characteristics. The assimilation factor contains 8 items to measure efforts to perform or put on an act. Items are scored on a 7-point Likert scale from strongly disagree to strongly agree, with total scores ranging between 25 and 175. Higher scores reflect higher levels of camouflaging, and while there are no published cut-offs, Hull et al. (2021) have suggested a threshold of 125, at which risk of anxiety and depression is greatest. Internal reliability ranged from good to excellent in a combined sample of autistic and non-autistic participants (total: $\alpha = 0.94$; compensation: $\alpha = 0.91$; masking: $\alpha = 0.85$; and assimilation: $\alpha = 0.92$) and in our sample ranged from good to excellent (total: $\alpha = 0.90$; compensation: $\alpha = 0.88$; masking: $\alpha = 0.85$; and assimilation: $\alpha = 0.80$).

Autism Spectrum Identity Scale (ASIS; McDonald, 2017)

The ASIS is a 22-item measure of autistic identity across four domains: positive difference (vs. disability), context-specific (vs. consistent across contexts), spectrum abilities (vs. only adding negative attributes) and changeability (vs. fixed autistic attributes). Items are measured on a 5-point Likert scale from strongly disagree to strongly agree, and total scores range from 22 to 110. No cut-offs have been published, but higher scores indicate a more positive autistic identity. Internal reliability in the validation sample ranged from poor to good (positive difference: $\alpha = 0.84$ – 0.88 ; context-specific: $\alpha = 0.84$ – 0.89 ; spectrum abilities: $\alpha = 0.77$ – 0.83 ; changeability: $\alpha = 0.55$ – 0.67 ; McDonald, 2016, 2017, 2020). Total score reliability was not published in these studies, but in our sample, this was acceptable ($\alpha = 0.77$).

Procedure

Participants completed the survey online on Qualtrics. They provided demographic information and then

completed a large mental health and camouflaging survey, including measures not reported in this paper. Participants completed measures relevant to this study in the following order: AQ-10, ASIS, CAT-Q, HADS, SBQ-ASC and WEMWBS. Participants were given the option to skip mental health questionnaires if they felt that these would cause distress and could take breaks and return to the survey later.

Data analysis

Data were prepared and analysed using IBM SPSS Statistics Version 28 (IBM Corp, 2021). Scale items were recoded and reverse-scored according to their respective manuals, and total scores were calculated for autistic traits (AQ-10), anxiety and depression (HADS), suicidality (SBQ-ASC), positive wellbeing (WEMWBS), compensation, masking and assimilation camouflaging factors (CAT-Q) and autistic identity (ASIS). Where $<20\%$ of items were missing for a variable for a participant (Peng et al., 2006), person-mean substitution was used to calculate a total score based on that individual's mean score (Peyre et al., 2011; Schafer & Graham, 2002). Missing value analysis revealed that between 0.6% and 37.5% of the data were missing, and Little's MCAR was nonsignificant ($\chi^2(74) = 82.82$, $p = 0.226$); thus, data are likely to be missing completely at random. No outliers were identified. Kurtosis was evident for CAT-Q Assimilation; therefore, we applied a Box-Cox transformation (lambda: 2).

Prior to mediation/moderated mediation analyses, we conducted Pearson and point-biserial correlations between variables and demographic characteristics (age and gender (dummy coded into three variables: cisgender woman, cisgender man and non-binary) and diagnostic status (dummy coded into three variables: formal diagnosis, pursuing diagnosis and not pursuing diagnosis)).

To test our model, we started with the mediation and then built on this by adding in the moderator to the analyses. We ran mediation using Model 4 in PROCESS v4.2 (Hayes, 2013) macro for SPSS, to test the direct effects (autistic traits \rightarrow mental wellbeing), as well as parallel indirect effects (compensation, masking and assimilation). Next, we ran moderated mediation using Model 8 (moderator: autistic identity). Figure 1 indicates where in the model each variable was entered. For the purposes of interpretation of the model only, positive wellbeing and autistic identity were reversed, so higher scores indicate worse positive wellbeing/autistic identity. Age, gender (reference variable: self-describe) and diagnostic status (reference variable: not pursuing a diagnosis) were entered as covariates. We used percentile bootstrapping with 10,000 resamples at 95% upper and lower confidence intervals. Non-significant pathways are indicated by confidence intervals overlapping zero; effect sizes are indicated by standardised B values.

TABLE 2 Descriptive statistics for measures of autistic traits, anxiety, depression, suicidality, camouflaging and autistic identity.

	<i>N</i>	Min	Max	Mean	SD
Autistic traits	623	1	10	7.78	1.82
Anxiety	453	1	21	12.87	4.13
Depression	453	0	21	8.14	4.48
Suicidality	392	4	32	14.86	6.93
Positive wellbeing	449	14	70	37.67	9.13
Camouflaging total score	515	45	173	129.46	22.34
Compensation	515	9	63	44.88	11.08
Masking	515	8	56	40.15	9.58
Assimilation	514	11	56	44.41	7.43
Autistic identity	558	22	88	62.49	10.51

RESULTS

Table 2 shows descriptive data for each variable. For autistic traits, 79.9% met criteria for additional screening. Increased risk from camouflaging was evident for 63.9%. For anxiety, 12.1% showed no/minimal anxiety, 16.1% mild anxiety, 34.4% moderate anxiety and 37.5% severe anxiety. Depression scores were lower; 47% showed no/minimal depression, 23.8% mild depression, 20.8% moderate depression and 8.4% severe depression. The indicative cut-off for suicidality was met by 59.3% of participants. While they do not provide cut-off scores, the mean score as a percentage of the maximum score was 56.8 for the ASIS and 53.81 for WEMWBS.

Table 3 shows correlations between variables and demographic characteristics. Autistic traits showed small, significant correlations with all mental health variables, compensation and medium correlations with assimilation. Anxiety had small-medium significant correlations with all camouflaging variables, suicidality had small significant correlations with compensation and assimilation, and depression and positive wellbeing had medium correlations with assimilation. Small, significant correlations were evident between autistic identity and depression, suicidality, positive wellbeing, compensation and assimilation.

All mediation outputs are displayed in Table 4 (see File S1 for regression tables for each arm of the model). Significant pathways are presented in Figure 2. There was no significant direct effect for autistic traits on any of the outcome variables, refuting our first prediction. For all outcomes, there was a significant, positive indirect effect through assimilation. Positive wellbeing also had a significant, negative indirect effect through compensation. Models predicted 12%–19% of the variance (R^2 anxiety: 0.16; depression: 0.13; suicidality: 0.12; positive wellbeing: 0.19). Our mediation prediction was supported, though not all camouflaging factors were significant.

There was no moderating effect of autistic identity on any direct (anxiety: $F(1,436) = 0.48$, $p = 0.4886$; depression: $F(1,436) = 0.57$, $p = 0.4551$; suicidality: $F(1,376)$

$= 0.01$, $p = 0.9319$; and positive wellbeing: $F(1,430) = 2.38$, $p = 0.1237$) or indirect (Table 5) effects, refuting our moderated mediation predictions.

DISCUSSION

This is the first study to investigate the parallel mediating effects of compensation, masking and assimilation and the moderating effects of autistic identity on the relationship between autistic traits and mental wellbeing in a sample of autistic adults. Full mediation was found; the relationship between autistic traits and mental wellbeing was only significant through its relationship with camouflaging. Regarding camouflaging, assimilation negatively impacted all areas of mental wellbeing, whereas compensation specifically related to improved positive wellbeing and masking had no impact. Autistic identity did not moderate the relationships between autistic traits, camouflaging and mental health.

The direct effect between autistic traits and mental wellbeing was not significant when camouflaging was included in the model, suggesting that autistic traits are associated with mental health difficulties through their relationship to camouflaging. Most prior research has considered the role of autistic traits and camouflaging on mental health independently of each other (Cassidy et al., 2018; Hull et al., 2019; Lai et al., 2016). In support of our findings, Beck et al. (2020) used three measures of autistic traits and found that none were significant predictors of psychological distress or suicidality when entered with camouflaging, which was significant. Conversely, Cassidy et al. (2020) reported a direct effect between autistic traits and suicidality, when including camouflaging as a mediator. However, Cassidy et al. (2020) used an undergraduate student sample, and it may be that differences exist based on autism affiliation or extent of autistic traits, which could be explored in future research.

Considering indirect effects, masking did not mediate the relationship between autistic traits and any measure of mental wellbeing. Research to date has only considered correlations between masking, autistic traits and mental wellbeing. However, Hull et al. (2019) found that masking was significantly associated with autistic traits in their non-autistic sample, but not in their autistic sample, suggesting that the role of masking might vary with awareness of autism affiliation. This knowledge may allow disclosure and reduce mental health difficulties associated with masking (Cage & Troxell-Whitman, 2020), which could be investigated in future research. Hull et al. (2019) also found significant correlations with anxiety and depression, whereas masking only correlated with anxiety in our sample. Our findings add to the literature base by indicating that attempts to hide autistic characteristics do not impact on mental wellbeing, when accounting for other facets of camouflaging.

TABLE 3 Pearson correlations between autistic traits, anxiety, depression, suicidality, camouflaging, autistic identity, age, gender and diagnostic status.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Autistic traits	–															
<i>N</i>	623															
2. Anxiety	0.193 ^b	–														
<i>N</i>	450	453														
3. Depression	0.128 ^b	0.526 ^b	–													
<i>N</i>	450	453	453													
4. Suicidality	0.155 ^b	0.350 ^b	0.503 ^b	–												
<i>N</i>	390	388	388	392												
5. Positive wellbeing	–0.197 ^b	–0.586 ^b	–0.761 ^b	–0.489 ^b	–											
<i>N</i>	446	431	431	390	449											
6. Compensation	0.217 ^b	0.231 ^b	0.046	0.102 ^a	–0.059	–										
<i>N</i>	512	453	453	392	448	515										
7. Masking	–0.071	0.173 ^b	0.031	0.005	–0.017	0.543 ^b	–									
<i>N</i>	512	453	453	392	448	515	515									
8. Assimilation	0.306 ^b	0.359 ^b	0.321 ^b	0.235 ^b	–0.391 ^b	0.420 ^b	0.299 ^b	–								
<i>N</i>	511	452	452	391	447	514	514	514								
9. Autistic identity	–0.056	–0.078	–0.158 ^b	–0.192 ^b	0.252 ^b	0.112 ^a	0.087	–0.187 ^b	–							
<i>N</i>	556	452	452	392	447	513	513	512	558							
10. Age	0.035	0.013	0.05	–0.079	–0.009	–0.182 ^b	–0.037	0.097 ^a	0.089 ^a	–						
<i>N</i>	623	453	453	392	449	515	515	514	558	627						
11. Cisgender woman	–0.074	0.063	–0.034	0.01	–0.035	0.047	0.145 ^b	0.082	0.014	0.165 ^b	–					
<i>N</i>	623	453	453	392	449	515	515	514	558	627	627					
12. Cisgender man	0.055	–0.106 ^a	–0.069	–0.089	0.112 ^a	–0.191 ^b	–0.185 ^b	–0.087 ^a	0	0.076	–0.509 ^b	–				
<i>N</i>	623	453	453	392	449	515	515	514	558	627	627	627				
13. Non-binary	0.008	0.02	0.085	0.066	–0.035	0.102 ^a	0.043	0.006	–0.03	–0.208 ^b	–0.514 ^b	–0.242 ^b	–			
<i>N</i>	623	453	453	392	449	515	515	514	558	627	627	627	627			
14. Formal diagnosis	0.090 ^a	–0.046	0.053	0.123 ^a	–0.043	–0.161 ^b	–0.116 ^b	–0.055	–0.045	0.141 ^b	0.036	0.122 ^b	–0.126 ^b	–		
<i>N</i>	623	453	453	392	449	515	515	514	558	627	627	627	627	627		
15. Pursuing diagnosis	0.007	0.124 ^b	0.048	0.067	–0.102 ^a	0.170 ^b	0.097 ^a	0.131 ^b	–0.005	–0.166 ^b	–0.028	–0.084 ^a	0.073	–0.610 ^b	–	
<i>N</i>	623	453	453	392	449	515	515	514	558	627	627	627	627	627	627	

TABLE 3 (Continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
16. Not pursuing diagnosis	-0.117 ^b	-0.065	-0.111 ^a	-0.215 ^b	0.151 ^b	0.029	0.046	-0.062	0.06	-0.007	-0.016	-0.065	0.081 ^a	-0.613 ^b	-0.253 ^b	-
N	623	453	453	392	449	515	515	514	558	627	627	627	627	627	627	633

^aCorrelation is significant at 0.05 level.

^bCorrelation is significant at 0.01 level.

Conversely, assimilation was a significant mediator of the relationship between autistic traits and anxiety, depression, suicidality and positive wellbeing. This suggests that increases in autistic traits are associated with increased levels of assimilation (or putting on an act in order to fit in), which is in turn associated with a negative impact on mental wellbeing. Our findings corroborate previous correlations (Cassidy et al., 2020; Hull et al., 2019). Only one other study has investigated the mediating role of assimilation (Cassidy et al., 2020), and it supports our findings broadly, though the picture is slightly different – assimilation was a serial (but not single) mediator of the relationship between autistic traits and suicidality, alongside thwarted belonging, which we did not include in our model. Sense of community and belonging is important for wellbeing (Cage et al., 2022; Cooper et al., 2022; Janse van Rensburg & Liang, 2023), and it would be interesting to investigate this impact on other areas of mental wellbeing.

Assimilation can lead to relationships that are not natural or genuine (linking to thwarted belonging), which may impact on mental wellbeing (Cassidy et al., 2020). Deneulin and McGregor (2010) propose that wellbeing is formed through an interplay between the individual's values and the sociocultural context in which they are situated. When individual and sociocultural expectations do not align, autistic people may feel it necessary to behave in ways that violate their beliefs. Authenticity in our everyday actions is important for wellbeing at work, home and on social media (Bailey et al., 2020; Sutton, 2020; van den Bosch & Taris, 2014), and values-consistent behaviour is related to quality of life in individuals with generalised anxiety disorder (Michelson et al., 2011). With conflicts between sociocultural and individual values comes a power dynamic that must be navigated to achieve personal wellbeing (Deneulin & McGregor, 2010). Kifer et al. (2013) have demonstrated the importance of having the power to behave authentically for wellbeing in general and at work, in romantic relationships and in friendships. Interpreted within this power dynamic, even when assimilation leads to positive outputs, lack of power to choose to behave differently (given the consequences; Cage & Troxell-Whitman, 2019) may impact on wellbeing. Exploring how inauthentic, values-inconsistent behaviour and power dynamics drive the negative impact of assimilation in the relationship between autistic traits and mental wellbeing may allow more tailored support for autistic individuals.

Compensation was a significant mediator of the relationship between autistic traits and positive wellbeing. This suggests that increases in autistic traits are associated with increased levels of compensation, which is associated in turn with higher positive wellbeing. Previous research is limited and conflicting in this area; Hull et al. (2019) found a correlation between compensation and positive wellbeing in a non-autistic but not autistic sample, while Livingston et al. (2019) demonstrated increased

TABLE 4 Total, direct and indirect effects of compensation, masking and assimilation as mediators between autistic traits and anxiety, depression, suicidality and positive wellbeing.

Outcome	Effect	Index	SE	LLCI	ULCI	
Anxiety (<i>N</i> = 449)	Total effect	0.4614 ^a	0.1092	0.2468	0.6759	
	Direct	0.2434	0.1273	-0.0067	0.4936	
	Indirect effect(s)	Total	0.0961 ^a	0.0265	0.0469	0.1494
	Through:	Compensation	0.0167	0.0145	-0.0105	0.0461
	Masking	-0.0032	0.0044	-0.0140	0.0037	
Depression (<i>N</i> = 449)	Total effect	0.2763 ^a	0.1159	0.0485	0.5041	
	Direct	0.0710	0.1333	-0.1910	0.3330	
	Indirect effect(s)	Total	0.0849 ^a	0.0259	0.0359	0.1382
	Through:	Compensation	-0.0205	0.0152	-0.0529	0.0075
	Masking	-0.0002	0.0041	-0.0088	0.0087	
Suicidality (<i>N</i> = 389)	Total effect	0.5123 ^a	0.1865	0.1455	0.8790	
	Direct	0.1746	0.2033	-0.2251	0.5742	
	Indirect effect(s)	Total	0.0882 ^a	0.0258	0.0404	0.1418
	Through:	Compensation	0.0025	0.0163	-0.0306	0.0354
	Masking	0.0053	0.0066	-0.0039	0.0222	
Positive wellbeing (<i>N</i> = 444)	Total effect	0.9079 ^a	0.2424	0.4316	1.3843	
	Direct	0.3519	0.2651	-0.1692	0.8730	
	Indirect effect(s)	Total	0.1114 ^a	0.0261	0.0607	0.1638
	Through:	Compensation ^a	-0.0268 ^a	0.0145	-0.0582	-0.0008
	Masking	0.0034	0.0051	-0.0056	0.0152	
		Assimilation	0.1348 ^a	0.0256	0.0865	0.1871

Note: Indirect effects used bootstrapped SE, LLCI and ULCI.

Abbreviations: LLCI, lower level confidence interval; SE, standard error; UCLI, upper level confidence interval.

^aEffect is significant at 0.05 level.

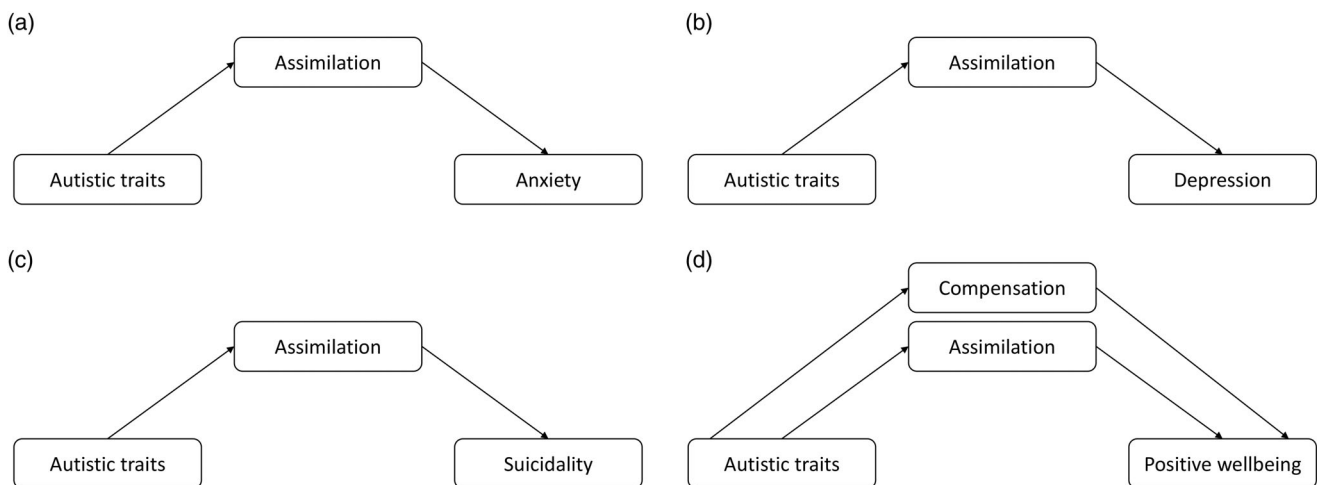


FIGURE 2 Significant direct and indirect pathways identified through mediation analyses for the relationship between autistic traits and anxiety, depression, suicidality and positive wellbeing, respectively.

anxiety in high compensators compared to low compensators, which we did not find. Livingston et al. (2019) may have captured a different construct by using the

discrepancy between cognitive skills and overt behaviour, potentially explaining these differences. Compensation may promote positive wellbeing by allowing meaningful

TABLE 5 Index of moderated mediation on the indirect pathway between autistic traits and compensation, masking and assimilation.

Outcome	CAT-Q factor	Index	SE	LLCI	ULCI
Anxiety (<i>N</i> = 449)	Compensation	0.000589	0.0010	-0.0017	0.0025
	Masking	0.000035	0.0010	-0.0025	0.0016
	Assimilation	0.003286	0.0027	-0.0032	0.0077
Depression (<i>N</i> = 449)	Compensation	-0.000514	0.0010	-0.0025	0.0018
	Masking	0.000005	0.0007	-0.0016	0.0015
	Assimilation	0.004310	0.0036	-0.0046	0.0103
Suicidality (<i>N</i> = 389)	Compensation	-0.000402	0.0014	-0.0031	0.0030
	Masking	0.000306	0.0021	-0.0025	0.0063
	Assimilation	0.005254	0.0039	-0.0030	0.0130
Positive wellbeing (<i>N</i> = 443)	Compensation	-0.000994	0.0022	-0.0049	0.0045
	Masking	-0.000073	0.0016	-0.0031	0.0037
	Assimilation	0.014185	0.0076	-0.0029	0.0282

Note: Indirect effects used bootstrapped SE, LLCI and ULCI.

Abbreviations: LLCI, lower level confidence interval; SE, standard error; ULCI, upper level confidence interval.

engagement in activities. Compensation for difficulties using other strengths has been proposed as a mechanism to increase optimism in children with reading disorders (Haft et al., 2016) and been found to support positive wellbeing and buffer against fatigue in an occupational setting (Schmitt et al., 2012), a consequence of camouflaging commonly reported by autistic individuals (e.g. Bradley et al., 2021).

Autonomy is proposed as an important mediator of the relationship between leisure activities and wellbeing (Newman et al., 2014) and has been observed in dementia literature (e.g. Nyman & Szymczynska, 2016). Thus, compensatory strategies might provide a sense of control over activities that promotes positive wellbeing for autistic individuals. Linking to this, skill mastery is a commonly described mechanism to wellbeing through activity engagement, generally and in relation to different disorders (Lal et al., 2013; Nyman & Szymczynska, 2016), which could provide a feedback loop between compensatory strategies and positive wellbeing, through access to leisure activities. Finally, leisure activities support wellbeing through the creation of community (Lal et al., 2013; Nyman & Szymczynska, 2016; Roberts & Bannigan, 2018). Where compensation allows access to a group, the subsequent group affiliation may support positive wellbeing for autistic individuals (Maitland et al., 2021). Indeed, autism solidarity also improves wellbeing (Cooper et al., 2022). Understanding how these factors play out for autistic people would allow a more comprehensive understanding of the role of compensation for wellbeing, and how to support these positive mechanisms further.

Clearly, facets of camouflaging relate to mental wellbeing for autistic individuals and, consequently, are a key target for intervention related to mental health difficulties. Self-determination interventions may prove valuable

in supporting autistic individuals to apply their knowledge, skills and beliefs to develop self-empowerment in their actions. Autistic adults perceive self-determination to improve wellbeing across a range of contexts (Kim, 2019) and a recent pilot demonstrated acceptability and feasibility of a neurodiverse self-determination training programme, focusing on self-awareness, goal setting, choice and decision making, problem solving, self-regulation, and conflict resolution (McDonald et al., 2022). This may allow development of boundaries around values, to facilitate authentic, values-driven behaviours, and support feelings of control over these choices. Additionally, self-compassion training may support relational conflict resolution and authenticity by employing compromise strategies rather than elevating others' needs (Yarnell & Neff, 2013). However, an integrative approach is necessary, given the strong sociocultural influence on camouflaging. This requires concerted efforts to change societal understanding and expectations. For example, while knowledge is increasing about autism, there are misconceptions (Tipton & Blacher, 2014), and non-autistic individuals show more interest in distant relationships with autistic individuals (Butler & Gillis, 2011; Gardiner & Iarocci, 2014). Brief online training about autism with students reduced stigma, increasing willingness to collaborate with and date/marry an autistic person (Gillespie-Lynch et al., 2015). Investigating the efficacy of a two-pronged approach would increase knowledge about how to reduce camouflaging and associated wellbeing difficulties for autistic individuals.

Autistic identity did not impact on the relationship between autistic traits, camouflaging and mental wellbeing, contradicting previous relationships (Cage et al., 2018; Cage & Troxell-Whitman, 2020; Cooper et al., 2022; Corden et al., 2021; Maitland et al., 2021).

We used a total score, but previous literature suggests that particular facets of identity may play a more important role than others (e.g. negative feelings over autism pride; Corden et al., 2021), which may warrant further investigation in future research. External drivers of camouflaging may be more important than internal drivers (e.g. autistic identity) for autistic individuals. The double empathy problem describes a breakdown of mutual understanding in social communication, which is traditionally blamed on autistic people (Milton, 2012) and is proposed to increase risk to mental wellbeing (Mitchell et al., 2021). Concurrently, repetitive motor behaviours, which autistic people value as important coping mechanisms, are generally not accepted (Kapp et al., 2019). Autism awareness and acceptance are key drivers behind camouflaging (Bradley et al., 2021), and external autism acceptance predicted depression (but not anxiety) for autistic adults (Cage et al., 2018). Lack of acceptance can lead to stigma. A recent review identified stigma as a negative correlate of wellbeing, as well as being a potential driver of camouflaging for autistic individuals to fit into the higher status (neurotypical) majority (Turnock et al., 2022). Importantly, this reaction to stigma is described as a protective mechanism, rather than a choice (Pearson & Rose, 2021). Thus, future research could explore how these external drivers interact with autistic identity, as well as autonomy and power dynamics in the relationship between autistic traits, camouflaging and mental health.

A major strength of our study is the large, heterogeneous sample. We have good representation from self-identifying (40%) and gender diverse individuals (non-binary and self-describing: 29%). Increasingly, higher prevalence of gender diversity is recognised among autistic individuals (Kallitsounaki & Williams, 2022), making it a priority to include a wider gender demographic in research. However, our sample only included 19% men (52% women), which may not be representative of the autistic population. While a potential limitation, our bias towards women corresponds with other survey research of autistic individuals (Ames et al., 2016; Anderson et al., 2018; Gelbar et al., 2014). Additionally, we cannot generalise beyond our sample to those with intellectual difficulties, and our sample may represent selection bias towards those interested in mental health (Rubenstein & Furnier, 2021), demonstrated by 77% with a diagnosed mental health condition.

Measurement strengths include use of scales validated for autistic individuals (CAT-Q, ASIS, SBQ-ASC), which had at least acceptable reliability in our sample. While our sample showed a wide range in autistic trait scores, there was a bias towards higher scores on the AQ-10, which might limit the ability to measure the relationships across a wider spectrum. Additionally, this measure had poor reliability in our sample, with worse reliability in the subsample who self-identify but are not pursuing a diagnosis. No research has yet explored whether the

AQ-10 is interpreted in the same way for autistic and non-autistic individuals, which might encompass some self-identifying individuals. Other measures of autistic traits, such as the Broader Autism Phenotype Questionnaire (Hurley et al., 2007), have a wider total score range and are interpreted similarly across autistic and non-autistic populations, providing a potential measure for future research that may answer these limitations. Finally, it is important to acknowledge that our cross-sectional data do not allow assessment of causality, and longitudinal data are needed to explore any potential feedback loops between camouflaging and mental wellbeing, which was not within the scope of the current study.

In conclusion, these findings have important clinical implications, indicating that assimilation and compensation should be considered when offering psychological interventions to support mental wellbeing of autistic people. Research into external drivers of camouflaging, such as stigma and acceptance, and mechanisms by which camouflaging impacts mental wellbeing, such as autonomy, authenticity, skill mastery and community, may highlight important supports. Importantly, a dual approach that supports autistic individuals, while also promoting societal change, is necessary when considering socioculturally derived behaviours.

ACKNOWLEDGEMENTS

We are grateful to all the participants who gave their time to complete the survey.

CONFLICT OF INTEREST STATEMENT

HLM, JR and SC have no relevant financial or non-financial interests to disclose. The views expressed are those of the authors and not necessarily those of Autistica.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ETHICS STATEMENTS

A favourable ethical opinion was obtained from Newcastle University Faculty of Medical Sciences Research Ethics Committee (2031/7676).

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Moore, H. L., Cassidy, S., & Rodgers, J. (2023). Exploring the mediating effect of camouflaging and the moderating effect of autistic identity on the relationship between autistic traits and mental wellbeing. *Autism Research*, 1–16. <https://doi.org/10.1002/aur.3073>