Abstract

Despite the importance of making sure that psychological interventions are safe, research including both positive and negative effects of novel internet-delivered support is scarce. The aim of our study was to explore whether, and in what way, a new intervention for adolescents distressed by a visible difference (YP Face IT; YPF, Norwegian version) led to positive and/or negative outcome changes. Participants were 79 adolescents (62.00% girls; M_{age} = 13.84, *SD* = 1.73), with a visible difference. All had access to the YPF programme and answered questionnaires assessing social anxiety and body esteem pre- and post-intervention. Analyses included calculations of statistical as well as clinically significant and reliable changes. Results showed that fewer participants reported clinical levels of social anxiety and low body esteem after access to YPF. Results also indicated that participants who had a positive pre- to post-intervention change had lower levels of perceived self-worth pre-intervention, and spent more time on the intervention than those with a negative pre- to post change. Three participants showed a clinically significant negative *and* reliable change in social anxiety or body esteem from pre- to post-intervention. However, based on an examination of these participants' characteristics, preliminary findings support the safety of YPF.

Keywords: internet intervention, appearance, visible difference, adolescence, social anxiety, body image

1. Introduction

Living with an appearance-affecting condition or injury can negatively impact adolescents' psychological well-being and health (Rumsey & Harcourt, 2007). Young Person's Face IT (YP Face IT; YPF; Williamson et al., 2016), a web-based self-guided psychosocial intervention building on techniques from cognitive behavioural therapy (CBT) and social skills training (SST), has demonstrated promising results in reducing psychological distress (e.g., in terms of social anxiety) among adolescents with a visible difference (Zelihić et al., 2022). However, good intervention effects do not capture the proportion of participants who do or do not benefit from an intervention as intended, and interventions with good results can still include participants who do not respond to treatment or who deteriorate (Fenski et al., 2021). Despite the importance of making sure that interventions are safe, studies focusing on potentially adverse outcomes are generally lacking, and the need to further investigate negative effects especially in relation to novel internet-delivered interventions has been emphasised (Andersson et al., 2019; Gullickson et al., 2019; Rozental et al., 2018). Therefore, the present study aimed to further explore potential positive *and* negative effects following participation in the Norwegian version of the YPF programme.

1.1. Visible difference in adolescence

Self-perceptions about one's body and appearance can be a source of psychological and social distress, especially during adolescence (Ricciardelli & Yager, 2016). Relatedly, having an appearance that deviates from societal ideals of attractiveness may make some adolescents particularly vulnerable to appearance concerns and stigmatising experiences (Crerand et al., 2020; Masnari et al., 2012). A range of congenital and acquired conditions can affect facial or bodily appearances and lead to what is referred to as a visible difference (Rumsey & Harcourt, 2007). Congenital conditions include craniofacial (e.g., cleft lip/palate) and skin conditions (e.g., eczema or psoriasis) and acquired conditions may result from

medical interventions (e.g., hair loss from radiation therapy) or accidental traumas (e.g., traffic injuries and burn scars). There are no accurate prevalence rates for people living with a visible difference. However, estimates from the UK (Changing Faces, 2010) suggest that 2.27% of the population has a significant, congenital or acquired, visible difference. Given that approximately 400 000 adolescents aged 12–17 live in Norway, this suggest around 8000 may have a visible difference (Statistics Norway, 2021).

Previous studies suggest that adolescents with a visible difference are at risk of experiencing elevated psychological distress, including anxiety (De Vere Hunt et al., 2020; van Dalen et al., 2020) and negative body image (Huang & Su, 2021; King, 2018; Ngaage & Agius, 2018; Provini et al., 2021) and may also struggle with interpersonal difficulties, such as fear of negative evaluations and increased concerns in peer and romantic relationships (Feragen et al., 2016; Griffiths et al., 2012; Shapiro et al., 2015). In addition, many encounter stigmatising experiences or intrusive behaviours (e.g., teasing, bullying, staring, or unwanted questioning and attention from others), which have been linked to reduced psychological adjustment and health-related quality of life (Masnari et al., 2012; Masnari et al., 2013; Tiemens et al., 2013).

1.2. Visible difference and available support

Support for adolescents with a visible difference typically focuses on biomedical interventions, for example medical and surgical procedures to ‘correct’ or ‘ameliorate’ appearance differences. Although studies have shown that biomedical interventions may improve social confidence (Myhre et al., 2021), they do not guarantee enhanced psychosocial functioning, and thus psychological interventions have evolved as an adjunct or alternative to biomedical approaches (Bemmels et al., 2013; Paraskeva et al., 2021; Rumsey & Harcourt, 2007). Psychosocial support usually draws on a wide range of therapeutic approaches and techniques, such as CBT, SST, psychoeducation, mindfulness, and acceptance and

commitment therapy (Harcourt et al., 2018). Interventions incorporating techniques based on CBT and SST have specifically shown potential in improving psychosocial well-being and promoting adjustment in adolescents with a visible difference (Jenkinson et al., 2015; Williamson et al., 2019). For instance, adolescents with burn injuries have reported less withdrawal from social situations after completing an SST intervention (Blakeney et al., 2005), and children and adolescents with craniofacial and scarring conditions reported a reduction in anxiety levels, after completing an intervention based on SST and individual face-to-face CBT sessions (Maddern et al., 2006).

In terms of internet-based support, emerging research indicates that internet-delivered interventions (e.g., iCBT) can be effective in treating a wide range of psychological difficulties (Barak et al., 2008; Vigerland et al., 2016), such as anxiety (Stjerneklar et al., 2019) and depression (Topooco et al., 2019) in community samples of young people. Internet-delivered support also offers specific benefits to adolescents experiencing challenges related to a visible difference. Since access to specialised psychosocial support and treatment is very limited for those struggling with a visible difference (Harcourt et al., 2018) and raising appearance issues face-to-face with healthcare professionals tends to be experienced as sensitive and difficult (Williamson et al., 2010), internet-based interventions offer easily accessible support with greater anonymity and confidentiality (Griffiths et al., 2012).

1.3. YP Face IT (YPF)

To date, YPF is the only web-based intervention developed for adolescents with a visible difference. YPF was developed at the Centre for Appearance Research based at the University of the West of England, Bristol, UK, in close collaboration with adolescents with visible differences and their parents, clinical experts, and health professionals (Williamson et al., 2016; Williamson et al., 2019). The therapeutic content is based on CBT and SST, and the programme consists of seven weekly sessions and an additional booster session (Williamson

et al., 2016). Each session is completed independently and is intended to take around 30-40 minutes. Sessions provide support on how to adjust to common challenges related to having a visible difference and encourage adolescents to practice strategies through interactive and homework activities (for a more detailed description of the intervention, see Williamson et al., 2016).

The feasibility and acceptability of YPF has been explored in several studies and countries (Feragen, 2017; Riobueno-Naylor et al., 2019; van Dalen et al., 2021; Williamson et al., 2019), demonstrating YPF as a promising intervention acceptable to adolescents. Moreover, the UK pilot study indicated a positive impact of YPF on adolescents' symptoms of social anxiety and body esteem (Williamson et al., 2019). The effectiveness of YPF in improving body esteem and reducing symptoms of social anxiety, perceived stigmatisation, and life disengagement, was also recently evaluated with Norwegian and Dutch participants via an RCT (Zelihić et al., 2022) and found that adolescents in the intervention group had significantly lower levels of social anxiety post-intervention compared with the control group.

1.4. Identifying subgroups in psychological internet-delivered interventions

Identifying and finding out what characterises those who benefit *above-average* from an internet-delivered intervention or who might have *negative* intervention-related effects is particularly useful to inform patient referral by clinicians. However, lack of investigation into more extreme responses to interventions is a common problem (Barlow, 2010; Rozental et al., 2018), resulting in part from the tendency for intervention studies to focus on average effects. Although such studies may shed light on variables of significance and show good intervention effects at a group level, specific information about subgroups who may particularly benefit from or, more importantly, be harmed by an intervention may not be identified (Fenski et al., 2021). Hence, there have been numerous calls for more research on negative outcomes of psychological interventions in general, as well as specifically within the field of internet-

delivered interventions (e.g., Andersson, 2016; Gullickson et al., 2019; Rozental et al., 2014; Rozental et al., 2017).

In their study exploring the feasibility and acceptability of YPF in the UK, Williamson et al. (2019) concluded that there was no evidence of adverse events. This conclusion was based on analyses of outcome measures, from following up with participants who withdrew and from participants' qualitative responses to activities in the YPF programme, but not from analyses of individual outcome measure scores. To our knowledge, no other YPF study or intervention study aimed at adolescents with a visible difference has specifically studied negative effects or has captured and compared the proportion of participants who do and who do not benefit from the intervention. The few studies that have investigated potential harm from internet-delivered treatments often find a small proportion of participants who experience negative intervention effects (Andersson et al., 2019; Boettcher et al., 2014; Fenski et al., 2021; Rozental et al., 2017). Identifying these potential subgroups and individuals and examining their characteristics is a crucial step to help both researchers and practitioners understand how YPF can be used safely and have the greatest impact.

1.5. Aim

The aim of our study was to explore potential subgroups of participants with positive and negative outcomes following the execution of an RCT to examine the effectiveness of a new web-based intervention for adolescents distressed by a visible difference (YPF, Norwegian version). We also wanted to investigate whether YPF led to clinically significant and reliable changes. To further explore the safety of YPF, an emphasis was put on investigating participants with negative change scores. Positive change was defined as a decrease in social anxiety scores and an increase in body esteem scores, and negative change was defined as an increase in social anxiety scores and a decrease in body esteem scores. Specific research questions were:

(1a) How many adolescents show positive, negative, or no change in outcome scores following YPF?

(1b) Are there any significant differences between the positive change subgroup and the negative change subgroup in terms of pre-intervention perceived self-worth or engagement with the YPF programme?

(2a) How many adolescents show a change (positive or negative) in one of the outcomes (social anxiety and body esteem) that can be classified as clinically significant and reliable?

(2b) What factors characterise the participants with a clinically significant and reliable negative change in social anxiety and/or body esteem?

2. Methods

The present study was conducted as part of a larger project [redacted] The present study is a follow-up study [redacted] To date, other publications from the [redacted] project include a study [redacted]), as well as a qualitative study exploring [redacted] The study was conducted at the [redacted] reviewed by the Regional Committee for Medical Research Ethics [redacted]), and accepted by the [redacted] Data Protection Office.

2.1. Participants

Seventy-nine participants (62.00% girls) were included in the present study. Mean age was 13.84 years (*SD* = 1.73; range 11-18). Regarding type of condition resulting in a visible

difference, 66.70% of the participants (both boys and girls) had a craniofacial condition, 16.70% of the boys and 18.80% of the girls had visible difference relating to body form, 10.30% (13.30% of the boys and 8.30% of the girls) had a skin condition, and 5.10% (3.30% of the boys and 6.30% the girls) had scarring. Regarding completion of the YPF intervention, the participants had on average completed 66.80% (*SD* = 31.71, range = 2-90) of the programme. Number of sessions completed ranged from 1 to 8, with 60.80% of the participants completing all eight sessions (including the booster session). On average, girls' completion rate (68.69%) was higher than boys' (63.70%), but this difference was not statistically significant ($p = .50$).

2.2. Procedure

Recruitment took place between April 2019 and February 2021. Participants were recruited nationwide via specialist treatment units, local healthcare services, patient organisations, and media and social media platforms (for more details regarding recruitment [redacted] All participants were screened for eligibility using the following inclusion criteria: (1) age between 12-17 years with a visible difference and self-identified appearance-related distress, teasing or bullying; (2) access to the internet and a home computer or tablet; (3) minimum reading level corresponding to that of a 12 year-old; and (4) normal or corrected-to-normal vision. Exclusion criteria were: (1) a diagnosis of clinical depression, psychosis, eating disorder, and post-traumatic stress disorder (PTSD), or within 12 months of traumatic injury (as adolescents with these conditions were considered to primarily be in need of other interventions); (2) learning disabilities that would impede understanding of the intervention content; and (3) currently receiving a psychological face-to-face intervention. Six participants were excluded from the study based in inclusion/exclusion criteria; specifically due to age (not being between approx.12-17 years) or having learning disabilities. In addition, one participant was excluded due to concurrent diagnoses of eating

disorder and clinical depression. After screening, informed consent was obtained from participants and, for participants <16 years, their primary caregivers. Participants then completed the baseline questionnaire and were subsequently randomised to either the intervention or the waiting list control group.

Throughout the project, participants completed questionnaires on four occasions: (1) baseline; (2) 7-week follow-up/T2; (3) 3-month follow-up/T3; and (4) 6-month follow-up/T4. The questionnaires were administered via a secure online data collection platform approved by [redacted]. Participants received a multi-choice gift card after completing questionnaires at T2, T3, and T4 (700 NOK in total).

The intervention group completed the intervention (7 sessions + booster session) between baseline and T3, and the waiting list control group completed the intervention between T3 and T4. In the present study, all participants with access to the YPF programme were included, whether they were from the intervention group or the control group. In our calculations of intervention effect, we included the baseline and T3 data for the participants from the original intervention group (i.e., representing pre- and 3-months post intervention) and T3 and T4 for the participants from the original waiting list control group (i.e., representing pre- and 3-months post-intervention). For clarity, throughout we refer to the baseline/T3 versus the T3/T4 data points as pre-intervention and post-intervention. Since we merged participants with different, but corresponding, data points in the present study, we first tested for differences between the intervention group and the waiting list control group on outcome measures pre- or post-intervention. There were no significant differences between the two groups: pre-intervention social anxiety: $t(77) = -1.07$, $p = .289$; pre-intervention body esteem: $t(77) = 1.56$, $p = .123$; post-intervention social anxiety: $t(70) = 0.51$, $p = .613$; post-intervention body esteem $t(70) = 0.209$, $p = .835$.

Participants (n = 14) that logged on to the programme but did not start any of the sessions were excluded from the present study.

2.3. Measures

2.3.1. Social anxiety

The total score of the Social Anxiety Scale for Adolescents (SAS-A; La Greca & Lopez, 1998) was used to assess experiences of social anxiety. SAS-A contains 18 items (plus 4 filler items not included in the scoring), rated on a five-point scale ranging from 1 (*not at all*) to 5 (*all the time*). Items include "I worry about being teased" and "It's hard for me to ask others to do things with me". The total sum of SAS-A has a possible range from 18 to 90, where higher scores indicate higher levels of social anxiety.

2.3.2. Body esteem

The Appearance Esteem subscale (BE-Appearance) of the Body Esteem Scale for Adolescents and Adults (BESAA; Mendelson et al., 2001) was used to assess body esteem. The subscale contains 10 items rated on a scale ranging from 0 (*never*) to 4 (*always*). Statements include "I worry about the way I look" and "I look as nice as I'd like to". After negatively worded items have been reversed, item scores are averaged (range 0-4); higher mean values indicate higher appearance esteem.

Both SAS-A and BE-Appearance were translated from English to Norwegian for the purpose of the current project, using back-translation procedures (Brislin, 1970). In our study, baseline internal consistencies (Cronbach's alphas) were α = .95 for SAS-A, and α = .94 for BE-Appearance.

2.3.3. Perceived self-worth

The Global Self-Worth subscale from the Self-Perception Profile for Adolescents (SPPA, Harter, 1988; Norwegian version, Wichstrøm, 1995) was used to assess pre-

intervention perceived self-worth. As stated in the manual (Harter, 2012), Global Self-Worth constitutes a general perception of the self, similar to self-esteem, and in our study perceived self-worth was used as an indicator of participants' levels of pre-intervention psychological distress. The subscale contains five statements, including "I´m generally happy with myself". Responses are given on a scale from 1 (*Describes me very poorly*) to 4 (*Describes me very well*). A mean score ranging from 1 to 4 is computed, with higher scores indicating higher perceived self-worth. In our study, Global Self-Worth had an internal consistency of α = .93 at baseline.

2.3.4. YPF engagement.

Participants' engagement with the programme was measured in four ways: (1) number of sessions completed; (2) average time spent per session (in minutes, and computed as total time spent on YPF divided by number of sessions completed); (3) average time spent on YPF in total (in minutes); and (4) average time to complete the programme (in weeks).

2.4. Data analyses

All analyses were carried out using the IBM Statistical Package for the Social Sciences Software (SPSS, version 26). Level of significance was set to .05 (two-tailed). Rates of missing data in study variables (YPF engagement, Global Self-Worth, and pre- and post-intervention SAS-A and BE-Appearance) were low and missing completely at random (MCAR), as indicated by non-significant Little's MCAR test (p = .557). One participant was missing data for YPF engagement, and one participant was missing data for Global Self-Worth. Two participants had missing data on pre-intervention SAS-A (missing one vs. two items). Two participants were missing one item each on pre-intervention BE-Appearance. At post-intervention, one participant was missing one item on SAS-A, and three participants were missing items on BE-Appearance (one participant had two missing items and two participants had one missing item). Seven participants were lost to follow-up. Since rates of

missing items were very low for SAS-A and BE-Appearance, mean values for participants' missing items were calculated based on the remaining items. Otherwise, listwise deletion was applied to handle missing data.

The analyses were performed in two parts: (1) to answer research questions 1a and 1b, positive and negative change following intervention completion was examined and subgroups were compared on level of pre-intervention distress and programme engagement (using *t*-test and absolute values of the change scores); and (2) to answer research questions 2a and 2b, clinically significant and reliable change were explored, and characteristics of participants with a negative clinically and reliable change were examined. The extent of clinically significant and reliable change in the two outcome measures was calculated using methods reported by Jacobson and Truax (1991). For social anxiety (SAS-A), clinical cut-offs to calculate clinically significant change were based on recommendations in the manual (La Greca, 1999). To calculate a cut-off score for clinically significant change in body esteem (BE-Appearance), we used methods reported by Jacobson and Truax (1991). Hence, we calculated a cut-off score based on the midpoint between clinical and non-clinical populations. The population data was taken from a Swedish body image study with 13-year-olds (Nelson et al., 2018), with a non-clinical BE-Appearance value of 2.71 (.84) and a clinical value of 1.50 (.80). These values are also approximately in line with previously reported BE-Appearance means in clinical and non-clinical adolescent samples (e.g., Altenburger et al., 2014; Brennan et al., 2017; Madan et al., 2008; Mendelson et al., 2001). In short, Reliable Change Index (RCI) specifies the amount of change an individual participant must show on a specific measure between two time-points for that change to be *reliable*, i.e., larger than that expected due to measurement error alone (Jacobson & Truax, 1991). RCI's are computed by dividing the difference between the individual's pre-test and post-test scores by the standard error of the difference (SE_{diff}) between the two scores. SE_{diff} is estimated

using the standard deviation and reliability score of the measure. In our study, RCI's were based on internal consistency estimates in the present sample (α = .95 for SAS-A, and α = .94 for BE-Appearance), which are in line with previous reported estimates among Nordic adolescents (e.g., Nelson et al., 2018; Ranta et al., 2012).

3. Results

3.1. Positive vs negative change after intervention completion

As displayed in Table 1, 42 participants had a decrease in social anxiety scores (i.e., positive change), and 20 participants had an increase in social anxiety scores (i.e., negative change), from pre- to post-intervention. The mean change score in the positive change subgroup (M = -10.24, SD = 6.89) was significantly higher than the mean change score in the negative change subgroup (M = 6.15, SD = 4.06): $t(60) = 2.45$, $p < .05$, d = 0.72, 95% CI [0.75, 7.42]. Forty-three participants had an increase in body esteem (i.e., positive change) and 24 participants had a decrease in body esteem (i.e., negative change), from pre- to post-intervention. The mean change score in the positive change subgroup (M = 0.61, SD = 0.39) was higher than the mean change score in the negative change subgroup (M = -0.45, SD = 0.32), although not significant: $t(65) = 1.74$, p = .09, d = 0.45, 95% CI [-0.02, 0.35].

Further, we explored potential differences in pre-intervention levels of perceived self-worth, and in time spent on the programme, between the positive change subgroup and the negative change subgroup. For social anxiety (SAS-A), the positive change subgroup (M = 2.65, SD = 0.75) displayed lower levels of perceived self-worth than the negative change subgroup (M = 3.03, SD = 0.78), although this difference was not significant: $t(59) = -1.82$, p = .073, d = .50, 95% CI [-0.81, 0.04]. The positive change subgroup spent significantly more time (in minutes) on the YP Face IT intervention (M = 224.28, SD = 140.31) than the negative change subgroup (M = 142.42, SD = 115.49): $t(59) = 2.22$, $p < .05$, d = .61, 95% CI [8.16, 155.57]. For body esteem (BE-Appearance) the positive change subgroup (M = 2.68, SD =

0.75) displayed significantly lower levels of perceived self-worth than the negative change subgroup (M = 3.09, SD = 0.83): $t(64) = -2.07$, $p < .05$, $d = .52$, 95% CI [-0.81, -0.02]. The positive change subgroup spent more time (in minutes) on the YP Face IT intervention (M = 240.06, SD = 153.64) than the negative change subgroup (M = 169.29, SD = 110.77), although this difference was not statistically significant: $t(64) = 1.95$, $p = .055$, $d = .50$, 95% CI [-1.68, 143.22].

3.2. Clinically significant and reliable change

3.2.1. Social anxiety (SAS-A)

Using a SAS-A score of > 50 as a marker for clinically significant social anxiety (La Greca, 1999), 28 participants (35.40%) had pre-interventions scores indicating clinically significant social anxiety. Post-intervention, 18 participants (25.00%) had a SAS-A score of > 50. The reduction in number of participants with clinically significant levels of social anxiety from pre- to post-intervention was statistically significant: X2(1, N = 72) = 25.02, p <.001, φ = .59. In terms of reliable change, there was greater reliable change in the direction of improvement than worsening (see Table 2), although only six participants had a change score that was clinically significant and reliable. Two participants had scores indicating average levels of social anxiety pre-intervention, but scores indicating clinically significant social anxiety post-intervention, with a reliable change. Four participants went from clinically significant social anxiety pre-intervention to average levels of social anxiety post-intervention, with a reliable change. The two participants with reliable and negative change scores (i.e., clinically significant levels of social anxiety post-intervention; see Table 3) were both girls with craniofacial conditions; one was from the intervention group and one from the waiting list control group. Both had spent little time using the YPF programme (only completing the first session with one of them only spending one minute on the session), and did not display negative change in appearance esteem.

3.2.2. Body esteem (BE-Appearance).

Using methods reported by Jacobson and Truax (1991), a clinical cut-off score was calculated as 2.105 for BE-Appearance. Based on this criterion, 35 participants (44.30%) had a clinically significant low body esteem (<2.10) pre-intervention. At post-intervention, 22 (30.60%) participants had BE-Appearance scores indicating a clinically significant low body esteem. The reduction in number of participants with clinically significant low levels of body esteem from pre- to post-intervention was statistically significant: $X^2(1, N = 72) = 29.59$, $p < .001$, $\varphi = .64$. In terms of reliable change, there was greater reliable change in the direction of improvement than worsening (see Table 2). One participant had a reliable and clinically significant negative change score, and eight participants went from clinically significant low body esteem pre-intervention to levels of ≤ 2.10 body esteem post-intervention (with reliable change). The one participant with a reliable and negative change score (i.e., clinically low levels of body esteem post-intervention; see Table 3) was a girl from the intervention group with a condition related to body form. She did not display a negative change score in social anxiety and had spent 109 minutes on the YPF programme (total sample $M_{minutes} = 201.22$; $SD = 141.76$).

4. Discussion

The present study explored potential subgroups of participants with positive and negative outcomes following access to the web-based intervention YPF and investigated whether YPF led to clinically significant and reliable changes. Relating to our research questions we found that: (1a) Approximately 60% of adolescents showed a positive change in outcome scores following YPF, and approximately 30% showed a negative change; and (1b) Participants who showed a decrease in social anxiety or an increase in body esteem post-intervention, reported lower levels of perceived self-worth pre-intervention, and had spent more time on YPF than those with a negative change (medium effect sizes; Cohen, 2013). We

also found that: (2a) 8.34% of our participants had clinically significant and reliable change in social anxiety, and 12.50% had clinically significant and reliable change in body esteem; and (2b) Three participants had a clinically significant and reliable *negative* change in social anxiety or body esteem post-intervention, and based on an examination of background characteristics, preliminary findings indicating that YPF is safe were supported. Our results are further discussed below.

The effectiveness of YPF in reducing symptoms of social anxiety has recently been demonstrated through a RCT including a large sample of young people with a visible difference living in Norway and the Netherlands (Zelihić et al., 2022). Hence, while results from Zelihic et al. (2022) suggest that YPF decreases levels of social anxiety, the present study demonstrates that YPF also significantly reduces the proportion of young people with social anxiety/body esteem scores above the clinical range. However, it should also be noted that only a minority of our participants (5.56% for SAS-A and 11.11% for BE-Appearance) had an improvement that was classified as both clinically significant and reliable.

4.1. Differences between the subgroups with positive and the negative outcome change

Results revealed that the positive change subgroups had lower levels of perceived self-worth than those who reported higher levels of social anxiety or lower levels of body esteem after access to YPF (negative change subgroups). This aligns with previous suggestions that stronger intervention effects may be found in young people with higher levels of psychological distress at baseline (Williamson et al., 2019; Authors, submitted manuscript). Interestingly, when asked, young people with access to YPF felt that the programme might also be best suited to those with greater concern (Williamson et al., 2019).

In the current study, engagement was measured with different parameters to capture different aspects of engagement: average time spent on YPF in total (in minutes), mean time

spent on each session (corrected for the number of completed sessions), number of sessions completed, and number of weeks spent on the programme. All time variables revealed the same tendency: The more time young people invested in YPF, the greater the chances that the intervention would lead to positive changes. In addition, results showed that mean total time significantly differentiated the positive from the negative change groups. These results are line with previous research on YPF, suggesting that increased engagement may improve outcomes (Williamson et al., 2019). However, the mean total time variable does not provide precise information about the number of sessions completed. Hence, although results indicate that time spent on the intervention does predict positive change, we do not know whether completing a few sessions experienced as relevant by the young person could be as efficient in increasing psychosocial adjustment or if as many sessions as possible should be completed in order to provide effect. Future research is needed to further investigate this issue.

4.2. Negative outcome change following internet interventions

Few studies explicitly explore potential negative intervention effects (Fenski et al., 2021; Gullickson et al., 2019; Rozental et al., 2017), and this is the first study to specifically examine potential negative effects of YPF. However, two other studies (Williamson et al., 2015; Williamson et al., 2019) have included feedback from young people with access to YPF, suggesting that the programme may not suit all. Nevertheless, it is important to highlight that no intervention will suit all, and it is therefore important for clinicians to assess the young person's individual needs and monitor their experience as they progress. The effectiveness of a given intervention may also be associated with a range of other factors, such as experienced usefulness, motivation, content relevance, and nature of experienced challenges, as well as by challenges with transferring learned techniques to real-life situations (Gullickson et al., 2019). Importantly, YPF contains elements of social exposure, which is known to be effective but also highly challenging (Kendall & Peterman, 2015). Participants

opting out of the exposure parts of the programme would probably not get the intended benefits from the programme, which indicates that it might be crucial to receive sufficient support from a supervising adult (health care provider or parent) at specific stages of the intervention.

Research settings may also produce factors that hamper results. In the present study, for example, to boost recruitment, participants were offered a gift card for their participation in the RCT, and qualitative interviews from the larger study (Authors, submitted manuscript) indicate that some young people joined the project to "help others", and irrespective of their baseline levels of psychological distress or motivation for YPF. If qualitative data had been compared to quantitative findings, we might have found that young people joining the project with motivations other than seeking support for appearance-related problems would possibly be found in subgroups with negative or no changes post-intervention. However, as we did not systematically collect qualitative information about participants' reasons for joining the project, this is speculative. Future studies are encouraged to study potential motivational effects in YPF and similar interventions aimed at young people.

4.3. Is YPF safe?

Although approximately a quarter of the sample had a negative change (i.e., higher levels of social anxiety and lower levels of body esteem after access to YPF), differences between pre- and post-scores did not indicate clinically significant and/or reliable changes for most young people, and mean differences between pre- and post-scores were lower than for the positive change group. Three participants had a negative change that was clinically significant and reliable, but no common predictive variables were found that could explain the negative change. However, the clinical significance of this change warrants discussion as two young people had only completed one session, and one of them only for one minute, suggesting that negative post-scores for these two were not related to intervention content.

The third participant had completed all sessions, but total time spent on the intervention indicated a mean time of 13 to 14 minutes per session, in contrast to the recommended 30-40 minutes. It should also be noted that few young people had clinically significant and reliable changes, and a third of the sample did not demonstrate positive changes post-intervention. This could indicate that YPF does not address all young people's need for support when living with a visible difference, but also, for example, that adolescents with few psychosocial concerns at baseline felt that intervention content drew attention to or emphasised issues around their visible difference that they had not previously been aware of or concerned with before access to YPF. Still, we need to remember that very few young people had clinically significant and reliable negative changes. Hence, in summary, the present study indicates that YPF appears to be safe and has the potential to provide support to young people who experience psychosocial distress due to a visible difference. Given the current evidence, and a need for easily accessible support for young people with a visible difference, we recommend that clinicians refer to YPF when indicated.

4.4. Clinical implications

The current study has two important implications that may guide the referral of adolescents to YPF. Primarily, results indicate that YPF benefits adolescents who experience higher levels of psychological distress at referral (in this study, assessed as lower levels of perceived self-worth). Hence, screening young people's levels of psychosocial distress before recommending YPF could be indicated and help identify those who may benefit the most from the intervention. Unless future research reveals that YPF could be unsafe for young people with non-clinical or other given levels of distress, we do not believe that screening using cut-offs from outcome measures is needed, but rather by an open conversation about the young person's level of appearance-related and social distress and their motivation and expectations for the programme's usefulness in coping with the daily challenges of living with

a visible difference. In our study, participants with psychiatric diagnoses (e.g., clinical depression, psychosis, eating disorder) were excluded as adolescents with these conditions were considered to primarily be in need of other kinds of support. Future studies are needed in order to explore positive and negative outcomes of the YPF for adolescents with concurrent psychiatric diagnoses and/or in conjunction with other psychological interventions. However, clinically, it is important to keep in mind that the YPF was designed for appearance-related and social distress for adolescents with a visible difference and that we do not expect it to be effective in reducing symptoms of other conditions.

Secondly, findings also suggest that time spent on YPF is positively associated with intervention effect, in line with previous testing of YPF (Williamson et al., 2019) and other recent studies assessing the effectiveness of iCBT interventions (March et al., 2018; Spence et al., 2019). Hence, adolescents referred to YPF should be encouraged to spend enough time on each session, which may increase the therapeutic effect of the programme. Future studies should further investigate indicators of beneficial intervention effects.

4.5. Limitations

The present study has several limitations that need to be considered. First, the study was limited by its sample size (e.g., indicated by large CI's), and a larger sample size would have reduced the risk of making Type II errors. A larger sample size would also have enabled, for example, statistical analyses of the subgroups with clinically significant and reliable change, as well as subgroup analyses based on gender, age, and condition. We also performed multiple *t*- and X^2-tests, without correcting for multiple testing. Not including a correction was a decision based on the explorative nature of our study (Althouse, 2016); however, future studies (preferably including larger samples) are needed to corroborate our results. Also, although insufficient time spent on YPF seems to be a main factor relating to negative outcomes changes, other possible measures were not included that could have indicated the

reasons for higher levels of symptoms after access to YPF. Qualitative interviews exploring this issue would have provided more information but were not systematically carried out.

Moreover, additional methodological issues need to be raised. Throughout the larger project, participants answered questionnaires on four occasions (baseline, T2, T3 and T4). T2 was added to capture a potential immediate short-term effect after completion of the first seven sessions, but only included one of the two main outcome measures (and was therefore not included in this study). In order to compare pre- and post-scores, baseline and T3 data were included for the participants from the intervention group (i.e., representing pre- and 3-months post intervention) and T3 and T4 for the participants from the control group (i.e., representing pre- and 3-months post intervention). We believe that the measure points correspond, but we acknowledge that they were not equal, as the control participants had waited three months to start with the programme. Nevertheless, this time point was chosen to ensure the same duration from baseline to post-intervention, which reduced the chances for other confounding time-related variables to affect outcome measures. Moreover, there are also issues associated with the method used for calculating clinically significant change (i.e., using a cut-off value). We defined clinically meaningful change as moving to or from the group 'clinically significant social anxiety' or 'clinically significant low body esteem', without taking into account how small or large the change was. However, as previously discussed by Jacobson and Truax (1991), the method of defining clinically meaningful change as moving closer to the mean of the functional population than to the mean of the dysfunctional population is usually the least arbitrary way of calculating clinically significant change. For SAS-A, the cut-off value for clinically significant change was based on recommendations in the manual (La Greca, 1999) and not values specifically for Norwegian or visible difference populations. However, previous validations in a wide range of different adolescent clinical populations (e.g., Neurofibromatosis and anxiety disorders) have supported the use of the

same cut-off values in these groups (La Greca, 1999). For BE-Appearance, there are no established clinical cut-off values, and the present study's estimate was not based specifically on means in Norwegian or visible difference populations. Therefore, results concerning clinically significant change in body esteem should be interpreted with some caution. Nevertheless, our estimates are based on similar Swedish community sample adolescent data (Nelson et al., 2018) with a clinical estimate similar to BE-Appearance scores in other clinical adolescent groups (e.g., Madan et al., 2008).

Finally, it should be taken into account that the present study partly was conducted during the COVID-19 pandemic, and we have not been able to control for possible influences of the pandemic on our results. For instance, participants were recruited before, during, and after consequential events of the pandemic, such as periods of restrictions and lockdowns (which also varied significantly among municipalities across Norway). In turn, this may have hindered or restricted the opportunities for the participants (both in the intervention and the control condition), to actively practice the social skills taught by the intervention. However, because YPF is internet-based, social restrictions and lockdowns did not impede participants' access to the programme.

4.6. Conclusions

The present study aimed to explore potential positive *and* negative effects following participation in the Norwegian version of the YPF programme. Overall, the positive changes from pre- to post-intervention outweighed the negative as more participants experienced a positive change, the positive change was larger than the negative, and there were greater clinically significant and reliable changes in the direction of improvement than deterioration. Only a few isolated cases showed clinically significant and reliable negative pre- to post-intervention changes but were all associated with marginal YPF engagement. Hence, given evidence from the present study YPF can be safely recommended to young people with a

visible difference, particularly for those who struggle with appearance-related and social distress who are motivated to spend time on the intervention.

Funding. This work was supported by the [redacted]

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Table 1

Time usage and mean pre- and post-intervention scores, divided by group and measure

	Positive change groups			Negative change groups			No change groups		
	n	Pre *M* (*SD*)	Post *M* (*SD*)	*n*	Pre *M* (*SD*)	Post *M* (*SD*)	*n*	Pre *M* (*SD*)	Post *M* (*SD*)
SAS-A	42	47.65 (15.70)	37.42 (13.58)	20	38.15 (13.96)	44.30 (13.94)	10	28.70 (13.06)	28.70 (13.06)
BE-Appearance	43	2.01 (.87)	2.62 (.78)	24	2.80 (.80)	2.35 (.85)	5	3.55 (.33)	3.55 (.33)
Overlap (*n*)	31			11			1		

	Positive change groups		Negative change groups		No change groups	
	SAS-A	BE-Appearance	SAS-A	BE-Appearance	SAS-A	BE-Appearance
No of sessions completed (1-8)	6.60 (2.40)	6.44 (2.51)	5.15 (3.25)	5.79 (2.99)	7.60 (0.97)	8.00 (.00)
Average time/session (in minutes)	34.31 (18.90)	36.03 (19.03)	27.51 (16.20)	30.25 (15.95)	36.71 (18.22)	17.22 (11.59)
Average time total (in minutes)	224.28 (140.31)[a]	240.06 (153.64)	142.42 (115.49)[a]	169.29 (110.77)	277.20 (153.99)	136.30 (94.34)
Average time total (in weeks)	12.50 (9.20)	12.14 (9.09)	10.64 (8.26)	11.05 (7.74)	9.27 (3.04)	8.60 (3.17)

Note. Positive change is defined as higher body esteem and lower social anxiety scores, negative change is defined as lower body esteem and higher social anxiety scores. No change is indicated by a change score of 0. BE-Appearance: positive change scores range .10 – 1.80, $M = 0.61$ $SD = 0.39$; negative change scores range -.10 – -1.60, $M = -0.45$ $SD = 0.32$. SAS-A: positive change score range -2 – -25, $M = -10.24$ $SD = 6.89$; negative change score range 1 – 15, $M = 6.15$, $SD = 4.08$. Overlap indicates the number of participants displaying the same change in both measures.

[a] For SAS-A, there was a significant difference between the positive change and the negative change groups in total time (in minutes) spent on the programme: $t(59) = 2.22$, $p < .05$, $d = .61$).

Table 2

Clinically significant and reliable change (pre- to post-intervention)

	Social anxiety (SAS-A)			Body esteem (BE-Appearance)		
	Reliable change			Reliable change		
	Yes *n* (%)	No *n* (%)	Total *n* (%)	Yes *n* (%)	No *n* (%)	Total *n* (%)
No clinically significant change	17 (23.61[a])	43 (59.72)	60[b] (83.33)	14 (19.44)	45 (62.50)	59 (81.94)
Clinically significant change: improvement	4 (5.56)	5 (6.94)	9 (12.50)	8 (11.11)	3 (4.17)	11 (15.28)
Clinically significant change: worsening	2 (2.78)	1 (1.39)	3 (4.16)	1 (1.39)	1 (1.39)	2 (2.78)
Total	23 (31.94)	49 (68.06)	72 (100.00)	23 (31.94)	49 (68.1)	72 (100.00)

[a] Percentages are based on whole group totals (N =72)

[b] Nine of these participants went from average level of social anxiety to low level, as indicated by a SAS-A score of ≤ 36 (La Greca, 1999)

Table 3

Demographic information of the participants with reliable change and clinically significant negative outcome (i.e., more social anxiety or lower appearance esteem) from pre- to post-intervention.

Measure	Pre-intervention score	Post-intervention score	Group	Gender	Age	Condition	Sessions/ minutes	Clinically significant change in other measure
SAS-A	41	51	Intervention	Girl	15	Craniofacial	1/51	No (BE-Appearance)
SAS-A	48	58	Control	Girl	12	Craniofacial	1/1	No (BE-Appearance)
BE-Appearance	2.30	1.60	Intervention	Girl	17	Body form	8/109	No (SAS-A)

Note. SAS-A measures social anxiety (score range 18-90). BE-Appearance measures appearance esteem (score range 0-4). Sessions/minutes indicates number of sessions (1-8) completed by the participant and total number of minutes spent on the programme (total sample $M_{minutes}$ = 201.22, *SD* = 141.76).