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**“I didn’t realise I was such a sausage”: Men’s Accounts of Whole-body Scanning, Body
Image, and Expected Changes in Health-related Behaviours**

RUNNING HEAD: MEN’S ACCOUNTS OF WHOLE-BODY SCANNING

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Abstract

Objective: Whole-body scanning is now available in stores to assist buyers in choosing well-fitting clothes. This study was designed to investigate men's accounts of scanning, body image, and expectations of behaviour change.

Design: Ten men aged 18-39 years without histories of eating disorders or previous experience of whole-body scanning, took part in semi-structured interviews before and after scanning. Data were analysed using inductive thematic analysis.

Results: Pre-scan, men's body ideals were tall, slender, and relatively muscular. Post-scan, seven reported looking shorter, fatter, thinner, and/or less symmetrical than they hoped; three were pleasantly surprised by the images. Men were interested in scans as an objective view of their bodies and as a "wake-up call" to motivate healthy behaviours. Five men intended to change their behaviour as a result of scanning, and repeat scanning was seen as a good way to monitor behavioural changes. Participants suggested that scanning may raise body concerns in other men, though downplayed impacts on their own body image.

Conclusion: Whole-body scanning may encourage men to exercise and eat more healthily. However, men became more negative about their bodies as a result of seeing their body scans, so scanning needs to be carried out with supervision and support.

Key words: whole-body scanning; body image; body concerns; men; exercise; healthy eating

“I didn’t realise I was such a sausage”: Men’s Accounts of Whole-body Scanning, Body Image, and Expected Changes in Health-related Behaviours

Whole-body scanning has become increasingly accessible to both men and women in the UK (Gill, 2015). Scanning is now available in clothes stores and supermarket chains where people are able to scan their bodies as a way to determine body size, and inform sizing choices for clothes purchases (Griffiths, 2014; McCrum, 2015). Whole-body scanning generates an accurate three-dimensional (3D) image of the body from which body measurements can be produced, and enables accurate and detailed assessment of the body. People use whole-body scanning to obtain clear images of external body shape, including those working in the clothes industry who need accurate measures to optimize garment fit (Istook, 2000). Scans provide views of bodies from all possible angles (Loker, Ashdown & Carnrite, 2008), so have the potential to impact on body image and could also motivate behaviour change (Grogan et al., 2017). However, no studies to date have investigated men’s responses to seeing their own scans, and potential impacts on behaviour change in men have never been investigated.

Scanning takes only a few minutes. People first undress to their underwear and are scanned in a private cubicle or curtained area. The resulting scan image can be viewed as a 3D screen image that can be rotated and viewed from all angles, and as a 2D printed version of the scan with a list of key measurements that can be passed to participants to take away with them to use, for example, when buying new clothes. Although scanners can show photorealistic images, most use some form of surface representation of the body such as the point cloud data shown in Figure 1.

INSERT FIGURE 1 ABOUT HERE

Although scanning is becoming more and more common, and body scans are available to men in some clothes retailers in the UK, no studies have yet investigated men’s responses to

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seeing their own scans. There is some existing work with women showing that 18-40 year olds report finding scan images informative in providing a realistic and objective view of their bodies (Grogan, Gill, Brownbridge, Kilgariff & Whalley, 2013), and that viewing scans can act as a source of motivation to improve diet and increase levels of physical activity in women aged 18-81 years (Grogan, Gill, Brownbridge, Warnock & Armitage, 2016). In a more recent study (Grogan, Siddique, Gill, Brownbridge, & Armitage, 2017), 14 women aged 22-45 took part in semi-structured interviews before and after scanning. Women reported that scans did not look as expected, and participants expressed 'surprise' and 'shock' on seeing the scans. Participants focused on perceived negative aspects of their bodies as revealed in scan images, and women who were currently exercising and eating healthily reported that the scan provided additional motivation to maintain, and in nine cases to increase, those behaviours. Two women who neither exercised nor ate healthily said that they would not increase physical activity or change their diets significantly following scanning, and it was concluded that whole-body scanning may enable maintenance or even accelerate improvements in physical activity and healthy eating in women, though is unlikely to be useful in promoting initiation of these behaviours (Grogan et al., 2017).

No randomised controlled trials of impacts of whole-body scanning have been published to date, though findings from qualitative studies with women are consistent with suggestions (e.g. Grogan & Masterson, 2012) that appearance-based interventions can change health behaviour. However, existing studies do not tell us about the likely impact of using whole-body scanning with men. Although men have historically been under less pressure than women to look attractive, there is general consensus that men are now under increased societal pressure in relation to their appearance (Franko *et al.*, 2015; Murray & Touyz, 2012; Hall, 2015), and during the last decade, psychologists have become increasingly interested in men's body image and male embodiment (Gough & Robertson, 2010; Grogan, 2017;

McCreary, 2012). It has been suggested that many men worldwide aspire to a muscular mesomorphic shape characterized by average build with well-developed muscles on chest, arms, and shoulders, and slim waist and hips (Franko *et al.*, 2015; Thompson & Cafri, 2007). It has also been argued that men's body dissatisfaction has increased significantly in the last thirty years as a direct result of increased objectification of the male body and consequent societal pressure for men to look slender and muscular to conform to masculine gender roles (Griffiths, Murray & Touyz, 2015; Hall, 2015; Monaghan, 2008; Smith, Ruttly & Olrich, 2016). Given that increasing number of men are dissatisfied with some aspect of their bodies (Franko *et al.*, 2015; Murray & Touyz, 2012; Smith Ruttly & Olrich, 2016), men may be susceptible to appearance-related behaviour change interventions. Indeed, studies focusing on age-appearance facial morphing have shown that appearance-related motives can encourage healthier intentions and behaviours in relation to men's smoking (Flett *et al.*, 2017) and sun protection (Williams *et al.*, 2013). However, no studies to date have considered men's responses to whole-body scanning.

Given whole-body scanning is now widely accessible, it is important to understand possible impacts on men's body image. Work with women (e.g. Grogan *et al.*, 2017) has shown that scanning may encourage unhelpful body critique, but impacts on men are currently unknown. If seeing 3D scans of their bodies encourages men to be more critical of perceived flaws, then this is important information for those using scans in public spaces as it may mean that additional safeguards are required. It is also important to investigate likely impacts of scanning on health-related behaviours to see whether whole-body scanning promotes healthy eating and moderate exercise, or whether it is likely to promote unhealthy behaviour change in men. Work with women suggests that scanning may promote maintenance of exercise and healthy eating in women though not negative health-related behaviours such as over-exercise or dietary restraint (Grogan *et al.*, 2017). However, impacts

on men are unclear, and given pressures on men to be slender and muscular (Hall, 2015; Smith et al., 2016), it is possible that negative health-related behaviours might be promoted inadvertently in men following whole-body scanning if body scanning promotes body dissatisfaction in men. Work with adolescents and adult men has shown that low body satisfaction can lead to unhealthy behaviours such as over-exercise and anabolic steroid use (Smith et al., 2016), ephedrine use (Hall, Grogan & Gough, 2015), and disordered eating (Griffiths, Murray, & Touyz, 2015). Alternatively, if men experience body scanning primarily as a motivator to take care of their bodies through regular exercise and healthy eating then scanning may exert a positive impact on their health.

At present, likely effects of whole-body scanning on men's body image and behaviour are unclear because existing studies of body scanning and body image are based on women (e.g. Grogan et al., 2016; Grogan et al., 2017), so we do not know the likely impact of scanning on men. This is the first study to investigate men's experiences of whole-body scanning, and the first to explore impacts on body image and expected changes in health-related behaviours. In-depth, semi-structured interviews were conducted with men before (to investigate expectations and pre-scan body image as well as pre-scan health behaviours) and after scanning (to investigate experiences of scanning, and self-reported impact on body image and any expected changes in health behaviours), to help us to understand positive and negative impacts on body image, and possible changes to health-related behaviours such as physical activity and healthy eating.

Method

Design

Men were interviewed before and after whole-body scanning. Interviews were semi-structured, covering pre-set topics but also allowing space for unexpected issues to be covered as part of the interview process, following Willig (2013). In this research, we

adopted a critical realist perspective; we recognise that it is possible to acquire an insight into people's experiences through their accounts, but also that we as researchers have a role in constructing knowledge, so we were mindful to be reflexive throughout the process of data collection and analysis (Madill *et al.* 2000; Willig, 2013). We reflected on our experiences at all stages of the project, and had regular discussions about possible reactive processes in the interviews. Once data were collected, we were mindful of our positions, in relation to gender and age in particular, when interpreting the data set, and paid particular attention to producing an analysis that seemed true to the accounts presented whilst being aware of the likely constraints on men's disclosure of being interviewed by a young female interviewer.

Participants

Ten men aged 18-39 years were recruited from advertisements for a study on body scanning and health behaviours sent to staff and students at [Universities blinded for review], UK. Data saturation (Saumure & Given, 2008) was reached after the seventh interview, and we stopped recruiting new participants at that point but interviewed all men who had already signed up for the study. BMI ranged between 19.2 and 26.6. Participant characteristics are shown in Table 1. Men with self-reported histories of eating disorders were excluded from the study.

INSERT TABLE 1 ABOUT HERE

The Interviewer

The interviewer (second author) was a White British woman aged 20 years.

Apparatus and Materials

Scanners. Two Size Stream version 9 body scanners were used (one at each University).

These use 14 IR depth sensors to generate a 3D body model from point cloud data and measurement extraction. Body scans were visually assessed for accuracy before

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measurements were extracted using Size Stream software version 5.0.1; a range of body measurements were provided within the software and are standard measures relevant for clothing applications (Size Stream, 2016).

Topic List. Open-ended pre- and post-scan questions were designed to access men's expectations prior to scanning, and their experiences of being scanned (adapted from Grogan et al., 2017, and including more specific questions on physical activity). Men were asked about expectations and experiences of the scanner process, body image, health-related behaviours such as eating and physical activity, how other men might be impacted by the procedures, and how we might develop a scanning intervention designed to encourage healthy eating and physical activity.

Procedure

Ethical clearance was obtained through [blinded for review] University ethics committee. Prior to attendance at the scanner laboratory, men were sent an information sheet describing the project. All participants were first briefed, completed consent forms, and then the digital recorder was turned on. Pre-scan questions were asked flexibly to enable men to raise unexpected issues. Once all issues had been covered and participants agreed that they had nothing to add, the audio recorder was turned off and men were whole-body scanned and shown their scans on the computer screen. These 3D images could be rotated on the screen to see their bodies from all angles, and participants were given as long as they wished to view their images. They were then given a hard copy of the image and a set of measurements (see Figure 1). The audio recorder was then turned on again and the post-scan questions were asked flexibly, leaving space for unexpected issues to arise. Once the conversation had come to a natural end, participants were fully debriefed and given contact details of the researcher for any further information.

Data Analysis

Braun and Clarke's (2006) semantic-level inductive thematic analysis approach was employed to identify themes and allowed an in-depth analysis of the data. In this we focused on the explicit or surface meanings of the data, progressing from identification of patterns in semantic content to consider broader meanings and implications in relation to previous literature (Boyatzis, 1998; Frith & Gleeson, 2004; Willig, 2013). Initial identification of patterns in the data commenced after the first interview and continued through the data collection process. The first author noted some initial patterns as she listened to the audio-recordings following each interview. When all ten interviews had been transcribed, data were described, summarised, and then interpreted in relation to broader implications. The first author read all transcripts several times whilst taking notes. Following production of a list of possible themes and associated quotes, the second author checked and modified these to produce a set of agreed themes which were then discussed with the first author and theme titles and quotes were agreed. These were then sent to the remaining authors, who cross-checked against the transcripts. The research team comprises both men and women, aged between 20s-50s, all White British, and we are academics from Departments of Psychology and Clothing/Materials. We all agreed the final set of themes that appear below.

Results

Six themes were identified. These are described below with illustrative quotes. Pseudonyms indicate the speakers' identities (see Table 1), all quotes are verbatim, and no words or other utterances have been removed. Square brackets provide additional information where necessary, and numbers in round brackets indicate length of pauses in seconds with (.) indicating a pause briefer than one second.

Theme 1: The importance of being slender, muscular, and tall

Pre-scan, all men expressed body shape ideals that reflected societal ideals for men's bodies (slender, tall, and relatively muscular). For instance, David says "the more muscly well-built

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tall men are generally seen as more attractive”, and Ghalib, when citing his body ideal, “Erm (2), lean, quite muscular (.) not too big”, and Harry “Erm (4) relatively athletic not super bulky or anything like that but erm (.) relatively muscular and like low body fat”. All expressed some minor body concerns ahead of the scan, although all said they were generally happy with how they looked. One key area of concern was fear of being overweight, linked to unfavourable comparisons with slender ideals. Andrew wanted to be “a bit slimmer than I am at the moment” and Brian would like to get rid of what he saw as excess weight around his mid-torso. Brian, Callum, and David would like to be more muscular, and Callum and Brian would like a “six-pack” [muscle abdomen with low fat levels]) “If I had a six pack, like a clearly visible six pack, I would be very happy” (Brian). Ethan would also like to be “a bit more toned” as he had been when he used to go to the gym regularly, and would like to be “more chiselled”, Ghalib would like to improve “my mid-section, my core (.) my abs”, and Jack would like his legs to be bigger “my legs are quite skinny”.

Harry, who was generally highly satisfied with how he looked, would like to reduce his body fat levels pre-scan “my body fat percentage is probably a little bit too high for my liking (.) it’s probably at around 16% to 17% and I’d rather it be around 12%”, though he did not want to look “skinny” and looking too thin was seen as just as problematic as being overweight by the men interviewed here. Harry had been unhappy when he was skinnier “once upon a time I was a lot skinnier and I was a lot unhappier then but now I’m not as skinny now”. Callum represented himself as a “tiny scrawny person” which he compares unfavourably with his ideal of being “broad” and “muscly”.

It was notable how consistent and uniform these men’s body ideals were pre-scan, showing that men personally valued a toned and fit looking body. Also, that although most men reported areas of body dissatisfaction, none reported being overly concerned about these, and in fact most minimised their concerns using qualifiers such as “a bit”. Both Brian and

Andrew minimised the change they desired using the phrases “a bit slimmer”/“a little bit of extra weight”, and this was seen throughout the transcripts. For instance Ethan would like to be “a bit more toned”. Men reported very subtle levels of dissatisfaction. Most men also stressed that they were generally “happy”/“OK” with their bodies pre-scan, and were not necessarily trying to emulate the muscular and slender ideal. For example, Callum stresses the importance of being realistic about what is achievable, laughing about not having “an amazing body” or being “ecstatic” about how he looks:

CALLUM: Erm (.) I’m okay with it, I’m not ecstatic about it like I’m not like, oh my god look at my amazing body but you know you have to be realistic about it and that’s what I am and there’s not much I can do about it [LAUGHING].

Theme 2: Comparisons between scan images and expectations: pleasant and not-so-pleasant surprises

Post-scan, all participants reported that the scan image looked generally as they had expected. For instance, Brian said the image was “not majorly different from what I thought” and Andrew “Erm (.) it’s pretty much what I expected”. However, there were elements that surprised each of them. For three of the men (Francis, Ghalib, and Ian), the scan was a pleasant surprise. Francis felt that it was strange (“weird”) to see a full image of his body, but was generally positive about the image. Ian had expected that he would see “a bit of a belly” on his scan image, so was generally pleased that he looked slimmer than he had expected:

IAN: Erm (.) yeah, it’s what I expected really it’s a bit slimmer than I thought it would be; I thought I’d have a bit of a belly but I don’t so...that’s a positive.

For seven of the men, the image was perceived as problematic in some way. Looking shorter than expected was seen as problematic, and Harry felt he looked shorter and broader on the scan than expected:

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HARRY: It might be completely not the sort of thing...but I feel like I look shorter. I don't know if it's just because(.) well maybe I look a bit, erm (.) broader than I was expecting so because I'm a little bit wider than I was expecting than maybe that means I think I'm shorter, possibly.

Callum felt that the scan image had changed the way he viewed his body "it does change the way you see your body, like 2D is a bit different but seeing it in 3D you definitely get a bit more", and noted that his "belly" was visible on the scan, validating his previous concerns that he had too much abdominal fat:

CALLUM: I've been telling my friends I think I'm developing a bit of a belly lately and everyone has been so dismissive of it like (.) don't be ridiculous. I can actually see it in the scan so I can be like, yeah look.

Lack of body symmetry was identified as a new body-related problem that had not been noticed prior to viewing the scans by Ethan, David, and Ghalib, and was experienced as an unpleasant surprise when viewing the scans. Ethan was surprised by the lack of symmetry in his left and right arms "I can see the difference between my left and right arms". Ghalib also noted that his "left shoulder slopes down a bit" which he links to carrying a heavy gym bag on that shoulder. David's response was probably the most negative, noting his shoulder slant (which he links to playing computer games) and his "sausage-shaped" body [which he defines later as "short and thick"]:

DAVID: well as I say negative I look like a sausage (.) positive... (2) ah, negative actually look at that shoulder slant, what will that be from? It might be from years of playing computer games actually now that I think about it but besides that mustn't grumble (.) its fine, yeah.

Theme 3: Being rational - interest in the images and measurements

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Five of the men preferred to focus on the scanner technology and measurements rather than the scan images themselves, and were very interested in how the scanner worked and the images produced, and all men used the word “interesting” to describe the experience of being scanned and seeing the images and measurements. For instance, Ian said “it was just interesting to see how it all worked”, and Andrew:

ANDREW: Erm (2), I suppose it’s just interesting really to see the scan and get all these vast array of measurements (.) which is like every body measurement I can possibly think of and quite a few that I didn’t think of. You’ve very helpfully (.) kind of pointed out some of the main ones here (.) so yeah. it’s funny to have all those figures down there that relates to you.

One key discussion point that emerged from the men’s accounts was the accuracy of the scanner relative to other indicators of body weight such as weighing scales. For instance, Brian talked about how weighing scales were unreliable because they were influenced by recent liquid intake, whereas the scanner image was free from the impact of recent fluid ingestion, suggesting that he was highly aware of impacts of recent fluid intake on weight:

BRIAN: Erm (3) I think it’s a lot more accurate than the standard, you know (.) standing on the scales thing because standing on the scales is so... you know it depends what time of day it is and weather you’ve just had a litre or pint of water, I mean that’s half a kilogram right there!

Callum and Francis compared the scanner to looking at their bodies in a mirror, and felt that the scanner added something important to their understanding of how their bodies looked because it showed the body in 3D. Francis notes “It was definitely interesting looking at the results and seeing it, sort of mapped out rather than just in the mirror”, and Callum, who avoided mirrors, was impressed with relatively comprehensive view of the body presented in the 3D images produced by the scanner:

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CALLUM: Mirrors are quite weird and I tend to avoid those. Like... first of all I don't have any full body mirrors and then mirrors are very 2 dimensional pictures so it's very hard to (.) you normally can see your front you never see the whole picture of what you look like.

Ethan was extremely interested in the different measurements produced, linking with clothes fit and body symmetry. He notes that there were slight differences in the left and right sides of his body but says that he is "interested" in these differences rather than concerned about them, repeating the word "interesting" four times in the quote below:

ETHAN: Erm (.) it was just an interesting experience I've never had my body scanned in any way before; it was interesting to see. It puts things into perspective and (.) like I'll never have to worry about getting clothes fitted again not unless there's a drastic change. I didn't realise there was so many different measurements and one thing I did notice which was interesting and quite cool to see is that it compares your left and right side, like all your measurements. Your shoulders, your arms legs, thighs, ankles whatever it might be and you can sort of see there is slight differences. My right side is significantly (.) larger in almost every aspect than my left is, which is strange I thought it would be fairly more even, like there's a centimetre difference. No (.) yeah, it's very interesting.

Theme 4: The challenge of reality: other men's likely responses to scan images

All participants reported that other men might find the scanner experience challenging, although only Callum said that he had found it personally challenging "having an honest look on yourself can be quite hard sometimes". These reports suggested that men saw their experiences and those of other men very differently, distancing possible negative impacts from their own experiences of scanning which were framed more positively. Andrew was concerned that other men could develop "major hang ups about their body size and their body

shapes”, and stressed the fact that scanning needed to be done with caution to avoid other men over-exercising, restraining their eating, or over-eating because they feel bad about how their bodies look on the scan. Ethan suggested “It could upset you”, and Ghalib felt that other men would be “probably not as comfortable as I was in there”, and that being in the scanner booth “might be a little bit daunting for them”, projecting much more negative experiences onto other men than he reported himself. Ian felt other men might find the images “a bit unsettling” if they have “let themselves go”. David links possible responses to the degree of control that men might have over changing their body shape and size, saying that if people are faced with the reality of how they look and feel that they cannot change it, they are likely to be unhappy:

DAVID: Erm (3) well I mean if you know that you really don’t look nice like if you really know you don’t look nice and you’re not happy with it but also can’t change it and then to get a printed out image of you scanned thinking yeah, this is actually what everyone else sees as well, you might feel a bit sad. It might be one of those things where you actually rather avoid the mirror and the scanner, that the only thing I can really think of.

Jack argued that men with poor self-image might avoid being scanned, and might also feel even worse about the way they look after being scanned:

JACK: It depends on their self-image (2) erm... if it’s a negative self-image and they see themselves like that then(.) they might think less of themselves even more.

Theme 5: A wake-up call

For some of the men, seeing their scan acted to motivate increased exercise. For instance, Callum, who avoided the gym and physical activity, said that he was now motivated to exercise “Erm (2) I need to go to the gym”. However, he was not sure how long this

motivation would last, and whether he would actually change his behaviour and go to the gym:

CALLUM: But it did change my reserve [sic] around the gym...well I say that now, I don't know how long it's going to last obviously and if I'll honestly go to the gym

Callum's response shows that he was somewhat sceptical about whether the impact of seeing how his body looked would translate into actual change in his behaviour, though was certainly intending to change his behaviour through increasing his gym attendance. His response suggests that his intentions were positive, though his expectations as to actual behaviour change were less certain. David was also motivated to "get more toned up and work more on my physique" after the scan as he "didn't realise I was such a sausage, I'm just really short and thick". Obviously, this may be a short-term change in intentions, but his response suggests that in the short-term, his intentions towards exercise had changed. He argues that seeing the scan might also be an effective impetus for change for other men, likening seeing the scan to the kind of critical incident where people see a particular photograph of themselves that motivates positive behaviour change:

DAVID: You see quite a few adverts and stuff where people say they saw one bad photo of themselves and that's when they realised they needed to change something and I suppose even though this isn't a bad picture it could be the same impetus for change in that they see that and they might think (.) right, that's not okay I want to look different.

Ian and Jack were also motivated to exercise and eat more healthily after seeing the scans, and also suggested that body scanning might be an effective way to persuade other men to exercise more. Ian links this to the degree of objectivity of the scan and measurements, suggesting that this information gave people the option to take control and try to lose weight:

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IAN: This is just an objective (.) like...test so it's not just someone saying you need to lose weight, it actually shows you this is what you look like(.) so it's up to you really if you want to lose weight.

Ethan (who did not exercise or eat healthily at the time of the scan) said that scanning had no direct impact on him, though may have an effect on other men, mirroring the different projections to other men seen when participants talked about impacts on body image. He reported that seeing the scan might be an effective way to persuade *other* men to initiate exercise if the scan image did not fit with their ideals, and felt it would be an effective wake-up call for other men:

ETHAN: It serves as a very good wakeup call (.) erm (.) so, yeah. As I said seeing this on paper could definitely make you want to change to fit the image you want for yourself, erm (.) because this will show you an image whether or not you like it will be up to you but it is what it is there's not (.) sort of (.) lying; it's not beating around the bush or anything like that so it would make you want to change certain things if you weren't happy with them (.) yeah, I definitely think it does.

However, Harry thought that only more confident people would sign up for body scanning, so it would probably not attract people who were not exercising or eating healthily, so doubted that it would be an effective tool for helping people to initiate exercise or healthy eating:

HARRY: Well it is a little bit nerve wracking, erm (4) erm (.) I mean (8) I think it probably requires a certain amount of confidence to do it in the first place (.) erm (3) so that I guess, it might be the sort of thing where it attracts people(.) like preaching to the choir, if you know what I mean, rather than attracting people who it might be more helpful for.

Theme 6: A mechanism for other men to track progress

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Participants argued that the responses of other men to being scanned and seeing scans would vary depending on prior levels of motivation for physical activity, but that scanning would be a useful maintenance tool. Brian suggested that this motivation “has to be there already”, and Andrew in particular argued that people who were already motivated to exercise might be likely to maintain their exercise programmes after seeing the scans, but doubted that it would have any significant impact on people who had not yet initiated exercise:

ANDREW: Erm (3) potentially, I also kind of think if you’re like me and you and you’re trying to do more physical exercise anyway it might just motivate you to carry on. I don’t know to what extent it would motivate other people, who aren’t doing that much physical exercise, to start making an effort.

Both Brian and David thought that body scanning might be an effective way for people already exercising and eating healthily to check their progress, and noted that it would be much more effective as a tracking mechanism than weighing scales.

BRIAN: Erm (.) so(.) erm, I think this is probably (.) if you were to do this say once a week (.) erm...it would be much better for tracking progress than standard scales.

David also noted that scanning would help to “keep people on board” with exercise, through giving them positive reinforcement of seeing subtle changes in their bodies, enabling men to plot changes using the measurements and images (linking to accounts presented in the third theme above), which would enable men to plot more subtle differences than would be possible using alternatives such as weighing scales:

DAVID: If you have it in categorical measurable terms it might make people feel better and keep them motivated because even though they might not be able to see the progress they can read the results and that might keep people on board because they can see this is working and this is changing. They can also compare before and after pictures (.) which will keep them onto it I think, so...yes (.) very good!

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Francis also thought that the scan would be an effective motivator for men already exercising, to “push them” to carry on and maintain their exercise, as well as to increase their exercise, to “do a lot more”. When asked about healthy eating directly, he concurred that seeing his own scan had encouraged maintenance of healthy eating:

FRANCIS: I think so yeah because I think it would, sort of push me to carry on and do a lot more and be a lot more active [INTERVIEWER: Does it affect your feelings about healthy eating? Or changing your drinking habits?] FRANCIS: Yeah... just keep on track with healthy eating like said before.

Discussion

Summary of key findings

This study set out to try to understand possible impacts on body image as well as likely changes to health-related behaviours such as physical activity and healthy eating as a result of whole-body scanning. Pre-scan, all men said they were generally satisfied with the way they looked, and minimised the changes they would need to make to reach their ideals using the phrase “a bit” (slimmer/more toned). All expressed some areas of concern/dissatisfaction prior to scanning including being insufficiently tall, not muscular enough, and having abdominal fat. Post-scan, three men were surprised because they looked more slender than expected, but most found areas of the body to critique, including new concerns resulting directly from seeing the scan image such as lack of symmetry between the two sides of the body, suggesting some increases in body-related concerns.

Five men (Callum, David, Francis, Ian and Jack) presented accounts suggesting that they were motivated to change their diets or exercise programmes as a direct result of seeing the scans. Accounts represent men’s stated intentions at the time of the scan, so obviously may not link objectively to changes in behaviour (Sniehotta, Scholz, & Schwarzer, 2005). Also, where participants explicitly differentiated between intentions to change behaviour and expected

change in behaviour, intentions were more positive than expectations which is important since expectations can give a better indication of likely change in behaviour than intentions (Armitage et al., 2015). This is seen most clearly in Callum's account (Theme 5) where he says he intends to attend the gym having seen the scan image, though is skeptical about whether he will actually do this. Further work is needed to ascertain impact on change in observable behaviour following scanning. However, it is interesting that at least at the point of the scan, five men intended to make behavioural changes in favour of increases in exercise and healthy eating.

All men argued that the scan would be most likely to act as a "wake-up call" to engage in physical activity or eat more healthily in other men, and would be a useful maintenance technique for tracking progress of fitness programmes. The objectivity of the measures and scan were generally seen as useful and men were impressed by the technology and its detail and accuracy.

Links with previous research

The present findings extend previous research that has focused on impacts of scanning on women (e.g. Grogan et al., 2017), and shed some light on potential impact on likely behaviour change as a result of scanning in men. Participants had clear, shared ideals of how men's bodies should look, and their ideals corresponded to the slender and moderately muscular ideal described in other studies (e.g. Franko *et al.*, 2015; Grogan & Richards, 2002; Holmqvist-Gattario et al., 2015), and contrasted with the slender and small-waisted, "hourglass" ideal described in studies focusing on women (Grogan et al., 2013; 2017). Being tall was also important, supporting research showing that male height as well as slenderness and muscularity are key aspects of the male ideal (e.g. Tylka et al., 2005). Men were clearly aiming for quite a specific body ideal, which was large (muscled and tall) though slender and toned (though not so slender as to appear "scrawny"), and had a "visible six pack". This kind of

athletic-looking ideal has been widely reported in other studies as a prototype of masculinity and the male body (e.g. Franko et al., 2015). It was interesting to see how uniform men's body ideals were; all presented what might be seen as traditional views on how men's bodies should look (Hall, 2015). Conformity to masculine norms has been found to predict greater muscle dissatisfaction and muscularity-oriented disordered eating (Griffiths, Murray & Touyz, 2015) as well as being a significant predictor of men's drive for muscularity, leanness and fitness (Holmqvist-Gattario et al., 2015), and further work might focus on impacts that endorsing social constructions of masculinity might have on responses to scan images.

Men interviewed here focused on both positive and negative aspects of the scan images, and seemed only mildly surprised by aspects of the scan images, which contrasted markedly with the women in Grogan et al.'s (2017) study who reported "shock" and "surprise" at how their bodies looked on the scan image. Men reported that they were concerned about specific aspects of their bodies that they had not noticed prior to the scan (David saying that he looked sausage-shaped; Callum being concerned about fat on his abdomen; David and Ethan being interested that their bodies did not look symmetrical), but all the participants presented 'rational' rather than emotional reactions to the images. Although the men we interviewed exist in a culture where it has become more acceptable than ever before for men to express an interest in their appearance (Hall, 2015), being invested in one's appearance has been traditionally linked with femininity (Gough, 2007), and men often avoid discussing appearance concerns to avoid being seen as feminine. Francis notes in his interview that "obviously body image isn't a thing that is spoken about with men, it's more with women". *Interest* is possibly easier for men to report than *concern* about how they look, or upset/emotional reactions in this societal context, particularly when interviewed by a young woman in their age range. It was notable that Ethan repeated four times how "interested" he was in the images which can be seen as his way of stressing to the interviewer that his reaction is

primarily intellectual/logical (which links with hegemonic/traditional masculinity; Connell & Messerschmidt, 2005) rather than emotional, which might be seen as an inappropriately feminine account (Gough, 2007; Gough & Robertson, 2010). Only Callum reported being personally challenged by the images, and even he commented on the usefulness of the objective scan image in validating his concerns that he had too much abdominal fat, which may be seen as a ‘rational’ account.

Interestingly, all men reported that *other* men may find both being scanned and viewing the scan images upsetting/unsettling/daunting. For instance, Harry suggested that body scanning was “nerve racking” even though he was “relatively body confident”. Ghalib suggested that other men might find being scanned “a little bit daunting”, and Ethan that other men might be “upset” if their scans did not look how they hoped they looked. Andrew in particular was very concerned that body scanning might “over-incentivise” other men, leading to over-exercise and dietary restraint, or even possibly exercise avoidance and over-eating if they felt there was no hope of change. All participants expected that other men would find scanning challenging, and may avoid being scanned, supporting work with women where it has been reported that participants felt that other women might find scanning too “real or raw” (Grogan et al., 2017). This concern for ‘other men’ mirrors the third person effect (TPE), which describes the tendency of people to assume that others are negatively influenced by forces such as mainstream media where they are not (Davison, 1983). In health contexts, it has been shown that men assume that women are more vulnerable to the impacts of idealised bodies in mainstream media on body image than they are themselves (Chia & Wen, 2010), but very little research has investigated this type of TPE effect where the ‘others’ are men.

There was some variation in self-reported eating and physical activity prior to scanning, with eight men not eating five portions of fruit and vegetables a day prior to scanning, though

seven engaged in moderate physical activity three or more times a week (Table 1). After scanning, five participants (Callum, David, Francis, Ian, and Jack) reported that they intended to change their behaviour. Accounts suggested that scans may be a useful way to maintain healthy eating and exercise in men, and particularly to track progress and motivate through showing subtle changes in the body resulting from exercise. Scanning was seen as both a “wake-up call” to persuade men to initiate exercise and healthy eating, and an effective way to enable men to maintain healthy lifestyle changes, through enabling them to see more subtle changes in their bodies resulting from physical activity and healthy eating than would be possible using weighing scales.

Results support similar work with women suggesting that viewing scans can act as a source of motivation to improve diet and maintain and increase levels of physical activity (Grogan, Gill, Brownbridge, Warnock & Armitage, 2016; Grogan, Siddique, Gill, Brownbridge, & Armitage, 2017). They also support other work suggesting that men may be susceptible to appearance-related behaviour change interventions in general (Flett et al., 2017; Williams et al., 2013). Although it has generally been argued that extrinsic motives such as appearance are unlikely to result in sustained changes in behaviour relative to intrinsic motives such as enjoyment and interest (Deci & Ryan, 2000; Vartanian, Wharton & Green, 2012), it has recently been suggested that appearance motives may be conducive to internalization (Ednie & Stibor, 2017). One interpretation of the data presented here and by Grogan et al. (2017) is that the perceived objectivity of body scanning enables internalisation of appearance-related motivations and hence expectations of maintaining improvements in physical activity and healthy eating. Further longitudinal work is necessary to determine whether body scanning actually enables long-term changes in behaviour.

One of the challenges in using scanning to promote healthy behaviour change in men is to avoid increasing body dissatisfaction, since this can lead to negative behaviour change

and increases in behaviours such as over-exercise, drugs use to develop muscles or reduce fat levels, and disordered eating which have been noted in previous work with male adolescents and adult men (Griffiths et al., 2015; Hall et al, 2015; 2016; Neumark-Sztainer et al., 2004; Smith et al., 2016). Men interviewed here were often surprised by the images, and identified particular areas of their bodies that looked less like their ideals than they had hoped.

Although they spoke positively about planning to eat more healthily/engaging in exercise, there was some indication that some of the men felt generally more dissatisfied with their bodies following scanning, such as David's comment about looking like sausage-shaped (when his ideal was slender, muscular, and v-shaped). These findings suggest that scanning should be avoided in contexts where men are able to scan themselves with no supervision or support.

Strengths and limitations

The present study provides some useful evidence of men's experiences of being whole-body scanned, and is the first to focus on men's experiences of whole-body scanning. Having a young woman interviewer seemed to put men at ease, and participants spoke honestly and fully about their experiences. The multi-disciplinary team which included academics from Clothing/Materials and Psychology, men and women, and a variety of ages also enabled us to produce an analysis that incorporated a variety of perspectives on body scanning, healthy behaviours, and body image. Also, men were shown how their bodies actually looked, mirroring the real-life experience of seeing their whole-body scans in clothes stores, rather than showing them how their bodies might change if they exercised or ate more healthily, avoiding some of the ethical concerns raised in studies where bodies are 'perfected' to show likely outcomes of exercise or healthy eating on avatar-type images (e.g. Pena & Kim, 2014); interventions where men are shown their bodies either made larger/more muscular or more slender clearly raise different and more challenging ethical issues.

There were also some potential limitations. Clearly the study is relatively small-scale, and data are qualitative, so evidence is not comparable to what might be expected from randomised controlled trials of health-related interventions. We suggest that future work uses controlled designs with larger groups of men, to investigate impacts of scanning on body image and health behaviours. Additionally, we did not ask men about their sexuality, and this was an oversight as sexuality may have a bearing on body image (Morrison & McCutcheon, 2011). Also, body-related ideals and norms may vary between male sub-cultures (Gough & Flanders, 2009), so future work needs to ask men about their sexuality. Men's orientation towards, and investment in, appearance may also affect their body image, and responses to scan images, (Hall, 2015), so is worth considering for future work. Also, men volunteered for a study on scanning and health behaviours, which are likely to have affected both who volunteered and the accounts produced; in fact Harry noted that results of scanner studies would be necessarily limited because only body-confident people would be likely to volunteer. Additionally, we only focused on immediate reactions to scanning, and long-term impacts, once men have had a chance to absorb fully the information provided, would be informative, both in relation to body image and objectively measured health-related behaviours.

Summary

Findings suggest that men who are relatively body confident, have no self-reported history of eating disorders, and are currently exercising and eating healthily may find body scanning helpful in motivating maintenance, monitoring change, and in some cases increasing exercise. However, additional body concerns were raised in some of the men interviewed, so results raise important issues for consideration before whole-body scanning can be used as a means of encouraging healthy behaviours at a public health level. Careful thought needs to go into what kinds of procedures and support are needed to ensure that men are motivated to care for

their bodies through healthy eating and moderate exercise rather than engaging in over-exercise and/or unhealthy eating, or even avoiding exercise. The increased body concerns reported by our interviewees highlight potential dangers and suggest that if whole-body scanning is used in stores and other public places, it needs to be administered with careful supervision, to avoid increasing body-related concerns. Further work is needed to understand how body scanning should be delivered in these kinds of public contexts to avoid potential harm. This is particularly urgent given that men can currently access whole-body scans in clothes retailers with no support at all, which could leave vulnerable men less body satisfied and ultimately more likely to engage in unhealthy behaviours. At present, using body scanning as part of a behaviour change intervention is not recommended until further work has been carried out to investigate impacts of scanning in well-controlled studies, with larger groups of men.

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