In this paper I discuss what I call the *oversized experiences* that anorexic patients suffer from. It has been known for some time that anorexic patients mentally picture their bodies as larger than reality. Whilst this constitutes one kind of oversized experience, I claim there is another, less explored kind. This is an experience of the body as oversized in relation to the affordances of its environment. I discuss recent evidence suggesting anorexic patients exhibit distorted affordance perception. I then discuss how this distorted affordance perception causes oversized experiences of the body. Along with socio-cultural influences, I claim oversized experiences ground negative propositional attitudes regarding body size.
1. Introduction

It has been shown that fat-phobic anorexic patients mentally represent their bodies as larger than reality (Smeets et al., 1997; Keizer et al., 2013; Spitoni et al., 2015). Anorexia researchers usually focus on how these distorted representations arise (e.g. through top down or bottom up influence) (Smeets & Panhuysen, 1995). Instead, the focus of this paper will be what kinds of experiences arise from these distorted body representations. I call these oversized experiences and will explore what role they play in maintaining the disease.

The first kind of oversized experience I discuss is caused by distortion of the perceptual component of the body image, the body percept (Gallagher, 2005, p. 25). Following Schilder, the body percept can be defined as “the picture of our own body which we form in our mind, that is to say the way in which the body appears to ourselves” (1935, p. 11). Having distorted (specifically, oversized) body percepts causes patients to mentally picture their bodies as oversized. This constitutes one kind of oversized experience.

The second kind of oversized experience arises from distortion in what’s known as the body schema. The body schema is a representation of the body used for both motor control and motor simulation (de Vignemont, 2010; Keizer et al., 2013). I suggest that body schema distortion leads patients to have a faulty perception of their ability to act within an environment. Just like mentally picturing the body as oversized, this faulty perception also constitutes an oversized experience of the body.

Along with influence from socio-cultural factors, these oversized experiences help ground patients’ negative attitudes about their body size. Because these propositional attitudes help motivate harmful dieting behaviour, oversized experiences play an integral part in maintaining the disease.

2. The Body Affect

Before describing the different kinds of oversized experiences, I will discuss the kinds of propositional attitudes they help ground. These propositional attitudes belong to what is called the body affect, which can be defined as a group of propositional attitudes that reflect “the subject's emotional attitude toward his/her own body” (Gallagher & Cole, 1995, p. 371). The body affect is considered ‘disturbed’ in anorexia, due to the kinds of negative propositional attitudes anorexia patients have about their body size (Skrzypek, Wehmeier & Remschmidt, 2001). I will briefly discuss two kinds of these propositional attitudes: body size dissatisfaction and beliefs about being ‘fat’.

2.1 Body Dissatisfaction

The first group of propositional attitudes I will discuss are categorised as body dissatisfaction. Body dissatisfaction can be defined as “negative subjective evaluations of one’s physical body, such as figure, weight, stomach and hips” (Stice & Shaw, 2002, p. 985). This involves the formation of propositional attitudes that reflect dissatisfaction with an aspect of the body; in the case of anorexia, this aspect is
the size or shape of body parts. Body dissatisfaction is generally measured by structured interview or self-report questionnaire (Cash & Deagle, 1997). Patients are asked to rate their satisfaction with the size of different body parts or presented with propositions such as “I think my stomach is too large” and asked to reply with a measure of their agreement/disagreement with the statement (Garner, Olmstead & Polivy, 1983).

Other tests include figural drawing scales. These show different silhouettes of body sizes and participants are instructed to select which silhouette matches their current body and which represents their ideal body. Body dissatisfaction is then calculated as the discrepancy between these two figures (Menzel, Krawczyk, Thompson, 2011).

2.2 Beliefs

Another group of propositional attitudes related to anorexia that are less often discussed are beliefs about body size. It has been shown that, along with dissatisfied attitudes, anorexic patients hold false beliefs about their body size. These beliefs take forms such as “I am not thin now at 42kg”, “I am fat now at 49kg” and “I am fat now at 49 kg and I must lose 5 kg to regain a normal weight” (Konstantakopoulos et al., 2012, p. 483).

The delusionality of size related beliefs is rated dimensionally, with the hallmark feature of delusionality being ‘conviction’, i.e. how strongly a belief is held (Oulis et al., 1996; Jones and Watson, 1997). Whilst some anorexic patients count as having completely delusional beliefs about appearance, the majority are considered ‘insightful’, i.e. aware of their mental illness as the cause of such beliefs (Steinglass et al., 2007; Konstantakopoulos et al., 2012; Hartmann et al., 2013; Mountjoy, Farhall & Rossell, 2014).

Beliefs about body size are sometimes categorised as a third component of body image disturbance, the ‘cognitive’ component (Menzel, Krawczyk & Thompson, 2011; Delinsky, 2011; Gaudio & Quattrocchi, 2012). However, this terminology isn’t common. Due to the similarities between body dissatisfaction and beliefs about body size, I will group them both together under the body affect category.

2.3 Why Care about Body Affect?

Anorexia is a complicated disorder with multiple biological, psychological, developmental, and sociocultural etiologies (Rikani et al., 2013). In this paper, I am not attempting to offer a complete account of the causal factors involved in the onset and maintenance of anorexia. Rather, my focus is on a much smaller piece of the puzzle. We know that, in general, propositional attitudes have motivational force in regards to behaviour. For example, body dissatisfaction has independent motivational force. When people are dissatisfied with the width of their abdomens this motivates dieting behaviour (to make their abdomens thinner). This is why body dissatisfaction is generally considered to be a key factor in the development and maintenance of anorexia and other eating pathologies (Freeman et al., 1985; Stice, 2000; Striegel-Moore & Cachelin, 2001; Stice & Shaw; 2002; Striegel-Moore et al., 2004). Beliefs also have motivational force, when combined with desires. When people believe they are fat but desire to be thin, this motivates them to diet.
Given that anorexic patients are dissatisfied with their body size and believe parts of their bodies are ‘fat’, it’s fair to presume these attitudes play some motivational role in the harmful dieting behaviour associated with the disease. If we can properly map out the etiology of these particular attitudes we are in a better position to change them. Therefore modeling size related propositional attitude formation is an important step towards better understanding the disease as a whole.

2.4 Oversized Experiences

I have claimed that, given the motivational force propositional attitudes have, it seems likely the body affect plays a role in causing harmful behaviour. An important question to ask then, is how these attitudes arise? To answer this question I will adopt an approach from the study of monothematic delusions.

Monothematic delusions are disorders where patients hold delusional beliefs related to one specific theme (e.g. Capgras patients believe their spouse has been replaced with an imposter). The empiricist approach to explaining monothematic delusions claims that abnormal beliefs are grounded in abnormal experiences (Bayne & Pacherie, 2004). Even if most anorexic patients don’t count as holding delusional beliefs, their propositional attitudes about body size are certainly abnormal—it’s abnormal for someone to believe she is fat and be dissatisfied with how large she is when, in-fact, she is extremely thin. As such, I will adopt the empiricist approach and try to explain these propositional attitudes by looking for abnormal experiences that anorexic patients suffer from, ones related to the content of these attitudes. I will claim that anorexia patients have abnormal experiences of their bodies, specifically of their bodies as oversized.

3. The Body Percept

One way patients experience their bodies as oversized is by mentally picturing them as oversized. This oversized experience is caused by distortion of the body percept, “the picture of our own body which we form in our mind” (Schilder, 1935, p. 11).

It has been shown that anorexic patients exhibit oversized body percepts, causing them to mentally picture their bodies as oversized. Evidence of this comes from body size estimate (BSE) tasks, which aim to measure the body percept through a variety of different methods such as modifying distance between light points on a wall to match the width of one’s body part, drawing one’s body size on a wall or selecting a silhouette that best matches one’s body size (Skrzypek, Wehmeier & Remschmidt, 2001). Whilst there has been a good deal of disagreement in the past regarding the reliability and usefulness of the many different BSE methods, independent critical evaluation of BSE methods and meta-analysis of previous studies have concluded that anorexia patients do overestimate their own body size (Smeets, 1997; Smeets et al., 1997; Cash & Deagle, 1997; Farrell et al., 2005; Gardner & Brown, 2014).

Overestimation in BSE tasks appears to result from over-representation rather than a distortion in perceptual abilities. Anorexic patients show no overestimation in evaluation of inanimate objects (Slade & Russell, 1973; Bowden et al., 1989). Furthermore, Smeets and colleagues found patients show no difference in sensitivity of size perception tests when showed photographs of their own and others bodies (Smeets et al., 1999; also cf. Gardner, & Moncrieff, 1988). Finally, as Smeets and colleagues (1999) point out, BSE tasks require patients to estimate body size without
looking at their body either directly or in a mirror. Therefore the size content informing these tasks must be stored (i.e. it must come from the body percept). As such, we can conclude that anorexic patients’ body percepts represent their bodies as larger than reality, causing them to mentally picture their bodies as larger. This mental picturing of the body as oversized constitutes one kind of oversized experience.

### 3.1 Oversized Experiences and Body Affect Disturbance

A relationship between mentally picturing an oversized body percept and body dissatisfaction seems plausible—patients might be basing their negative propositional attitudes off their own mental picture of themselves. This possibility coheres with multiple studies showing a correlation between body percept distortion and body dissatisfaction (Gardner & Tockerman, 1993; Cash & Deagle, 1997; Sunday et al., 1992; Keizer et al., 2011; Waldman et al., 2013). The idea that anorexia patients are basing their attitudes of dissatisfaction on a (false) mental picture of their body size, rather than their actual size also explains why, unlike in healthy controls, body dissatisfaction in anorexia shows low correlation with BMI or body size (Ben-Tovim & Crisp, 1984; Ben-Tovim et al., 1990; Goldzak-Kunik et al., 2012). As Goldzak-Kunik and colleagues write, “anorexia patients are dissatisfied with their body image irrespective of its true dimensions and, hence, remain dissatisfied irrespective of their precipitous weight loss” (2012, p. 279).

Given how comparatively little research has been done into beliefs and anorexia, I’m unaware of any evidence linking body percept distortion and beliefs about body size. However, as in the case of body dissatisfaction, there is prima facie plausibility to the scenario that mentally picturing the body as oversized reinforces beliefs about being fat. For example, if every time we mentally pictured our body, it appeared to us as oversized, this might cause it to match our visual standard for what constitutes a ‘fat’ body. This could reinforce the belief ‘I am fat’.

Another route through which mentally picturing the body as oversized might cause ‘fat’ beliefs and size dissatisfaction is through social comparison (Wheeler & Miyake, 1992; Leahey, Crowther & Mickelson, 2007; Myers, Crowther & Watson, 2009). If anorexia patients compared the size of others’ bodies with their own body percept then, granted their body percept was distorted enough to be larger than average, they might conclude that they were bigger than most people. In support of this possibility, it has been suggested that comparison of body size is a behaviour that anorexia patients regularly engage in (Corning et al., 2006; Alleva et al., 2013, p. 99). In an analysis of interview transcripts from 32 anorexia patients, Espeset and colleagues write, “participants also said that they obsessively compared themselves with other people, especially other patients with eating disorders or women their own age” (2012, p. 524).

### 3.2 Socio-Cultural Processes and Body Affect Disturbance

If mentally picturing the body as oversized grounds negative body affect, it doesn’t do so independently. Socio-cultural processes are also integral to negative body affect in anorexia. They help explain the high prevalence of anorexia amongst women and in western cultures that value thinness (Bulik et al., 2005; Makino, Tsuboi & Dennerstein, 2004). There is also extensive research drawing links between socio-cultural processes and body dissatisfaction (Wertheim et al., 1997; McCarthy, 1990; Stice, 2002; Stice & Shaw, 2002; Shroff & Thompson, 2006).
When combined with oversized experiences, socio-cultural processes can influence body affect in numerous ways. For example, they can cause subjects to internalise thin body ideals (Stice & Shaw, 2002). These thin body ideals, combined with mentally picturing the body as oversized (i.e. not matching these ideals) could cause body dissatisfaction. Likewise, socio-cultural processes help define evaluative terms such as ‘fat’ and ‘thin’. Mentally picturing the body as meeting (or not meeting) one’s visual standards for these terms can reinforce beliefs such as ‘I am fat’ and ‘I am not thin’. I won’t address exactly which socio-cultural factors influence body affect and how they do so. Although this is an integral part of the puzzle, it has been given a lot of attention (Stice et al., 1994; Dimen, 1998; McKinley, 2011). Instead my goal is to understand what role oversized experiences play in the disease.

3.3 The Causal Model

I will now present an initial causal model of body affect whereby both socio-cultural processes and oversized experiences jointly cause the propositional attitudes of the body affect (see fig. 1 below).

Figure 1: The causal model.

In this model, having a distorted body percept causes oversized experiences. These oversized experiences consist of mentally picturing the body as oversized. When combined with socio-cultural processes, they reinforce the size related propositional attitudes of anorexic patients’ body affects. In Chapter 5, I will expand this model by exploring what other kinds of oversized experiences can arise from distorted body representations.

3.4 The Role of Oversized Experiences: Onset or Maintenance?

The causal relationship between oversized experiences and body affect represented in this model might be classified in two different ways, in terms of original causation or
ongoing causation. A model of original causation would explain which experiences first caused the attitudes under question (e.g. ‘I am fat’, ‘I am dissatisfied with my body size’).

However, we do not know whether, prior to the disease, anorexic patients exhibit oversized body percepts. It might be the case that neurological damage resulting from the starvation and chronic stress associated with anorexia causes distortion of body representations (Riva, 2011, p. 256). In this case patients could have these propositional attitudes prior to the onset of the disease, purely as a result of socio-cultural processes. Therefore, I will remain neutral on the issue of original causation and instead present the above model as one of ongoing causation. As such, I only claim that oversized experiences are a factor in the maintenance of the disease.

3.5 Links between the Causal Model and Anorexia Literature

I will now draw some links between this causal model and other claims made in the anorexia literature. For example, this model coheres with the claim that body dissatisfaction is a more integral aspect of the disease than body percept distortion (Cash & Deagle, 1997; Sepulveda, Botella & Leon, 2002). In this model, distortion of the body percept only drives one causal component of negative body affect. So it’s possible that, in many patients, it plays only a minor causal role (with socio-cultural processes playing the larger role). Because oversized experiences are only one causal component of negative body affect, body percept distortion cannot be a sole predictor for harmful dieting behaviour.

The above model is also compatible with theories that put the need for control as central to the disease (Fairburn, Shafran & Cooper, 1999). My focus is on the mismatch between how anorexia patients mentally represent their bodies and how their bodies actually are. This mismatch might result in a frustration of attempts for control because patients can’t ever line up how they mentally picture their bodies with their ideal body size. This could lead to increasingly obsessive dieting behaviour. However, I remain neutral on where the need for control arises from or why it manifests in an attempt to control the size of the body.

Finally, I claim that the model I have proposed is superior to a purely socio-cultural model of body dissatisfaction. Tiggeman writes:

At its simplest, the sociocultural model holds that (1) there exist societal ideals of beauty (within a particular culture) that are (2) transmitted via a variety of sociocultural channels. These ideals are then (3) internalized by individuals, so that (4) satisfaction (or dissatisfaction) with appearance will be a function of the extent to which individuals do (or do not) meet the ideal prescription. (2011, p. 13)

Although the socio-cultural model might account for body dissatisfaction in neurotypical subjects, it’s unlikely that socio-cultural processes are the only causally relevant factor in anorexia. From BSE tasks, we know that anorexia patients exhibit oversized body percepts. It seems unlikely that mentally picturing the body as oversized would have no effect on propositional attitudes about body size. Furthermore, body percept distortion helps to explain why these propositional attitudes persist even after patients have achieved extremely thin body sizes.

One could argue that patients have normative body size ideals and standards for what constitutes ‘thin’ that are so extreme that they can never physically attain
them. If this were the case then negative body affect could be explained with a purely socio-cultural model. However, while this scenario might explain ongoing body dissatisfaction, it can’t explain beliefs about body size.

Although normative ideals usually only apply to our own bodies, standards for what constitutes ‘fat’ and ‘thin’ bodies should be applied universally. If a patient’s standard for ‘thin’ was so extreme that even she didn’t match it then she should judge anybody that looked larger than her as ‘fat’. Given how thin most anorexic patients are, she should come to the conclusion that almost everybody she saw was fat. This clearly isn’t the case. In-fact, some evidence shows that subjects high in eating disorder symptomatology are more likely to judge others as ‘thin’ (Alleva et al., 2013). Therefore, it seems anorexia patients only form these beliefs in regards to themselves; they don’t believe everyone they see is ‘fat’.

The importance of oversized experiences of one’s body is evident in the following excerpt from a structured interview with a patient:

I know another girl with anorexia, we are exactly the same height and weight. But we both feel three times as big as the other. We have even taken pictures of ourselves. In fact, I feel three or four times as big as she is. … (Leah, BMI 15). (Espeset et al., 2011, p. 185, my italics)

Presumably Leah doesn’t believe her friend is ‘fat’, this is why she stresses the importance of feeling bigger than she is. If only socio-cultural forces were at play then Leah would simply consider herself, her friend and most other people she sees as ‘fat’. As such, my model is superior to a purely socio-cultural model.

4. The Body Schema

In the above causal model, oversized experiences help ground anorexic patients’ size related propositional attitudes (negative body affect). However, I have only discussed experiences consisting of mentally picturing the body as oversized. In recent years evidence has started to emerge showing anorexic patients’ body percepts aren’t the only body representations that are distorted. I will give an overview of this recent evidence before discussing how it can contribute to a different kind of oversized experience.

The body schema is a representation of the body used for both motor control and motor simulation, including conscious motor simulation (motor imagery) (Keizer et al., 2013; de Vignemont, 2010). As in the case of the body percept, it has recently been shown that anorexic patients have an oversized body schema (Guardia et al., 2010; 2012; Keizer et al., 2013; Metral et al., 2014). It’s known that when passing through apertures, healthy controls start to turn their shoulders at a similar shoulder to aperture width ratio; what’s referred to as the critical point (Warren, 1984; Warren & Wang, 1987). However, it has recently been shown that, when passing through apertures, anorexic patients start to turn their shoulders at a higher critical point than controls (Keizer et al., 2013; Metral et al., 2014). This bias is also found in conditions where patients mentally simulate themselves walking through an aperture (Guardia et al., 2010; 2012; Metral et al., 2014). Furthermore, the bias is not present when patients are asked to mentally simulate an experimenter walking through an aperture (Guardia et al., 2012). What this shows is that anorexic patients’ body schemas are distorted, representing their bodies as oversized. This distortion effects their motor control and motor simulation abilities.
So far all the evidence shows is that anorexic patients’ body schemas represent their shoulders as wider than reality. However, it seems likely that distortion of the body schema’s spatial content should be evident in other dimensions also. Some preliminary evidence in support of this can be found in Keizer and colleagues (2013) study. Apart from their aperture-walking conditions, these researchers also had patients complete a BSE task: drawing a line estimating the distance between their shoulders. As predicted, anorexic patients overestimated their shoulder width in this task.

However, the interesting thing is that based on the participants estimated shoulder width and the width of the aperture they started to rotate their shoulders at, the experimenters discovered that “that if [anorexic] patients’ shoulders were as wide as they estimated them to be, they would perform equal to [healthy controls] on body-scaled action” (p. 6). So anorexic patients are, in-fact, moving their bodies with the same dynamics as healthy controls, albeit they are moving as if their body schemas had the same shoulder width dimensions as their body percepts.

This shows that anorexic patients’ body schemas and body percepts have matching spatial content (shoulder width), despite both representations being distorted. The experimenters conclude, “stored information on body size is disturbed in anorexia, which in turn affects perception-related body image as well as action-related body schema representations” (p. 5). If distorted shoulder width parameters arise in both representations then it seems likely that this is the case with other dimensions of distortion seen in patients’ body percepts e.g. waist width, abdomen width and abdomen depth (Casper et al., 1979, p. 64; Molinari, 1995; Spitoni et al., 2015, p. 184).

5. Affordances

Along with oversized body percepts, anorexic patients’ have oversized body schemas. This causes them to interact with environments as if their bodies are larger than they are. It also causes them to perceive their ability to interact with environments as if their bodies are larger. I will now discuss how this disturbed ability to interact with the environment can result in an oversized experience of the body.

The ability to interact with our environments relates to what are called affordances. The term affordance was originally introduced by Gibson, who gave the following description: “the affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill” (1979, p. 127). To start with a simple example, a chair affords sitting on. ‘Sitting on’ is the affordance of this feature of the environment. Whilst properties of the chair such as shape, size and material substance determine whether it affords sitting, following Chemero (2003), I claim an agent’s abilities also determine affordances. So a sitting affordance is determined by the properties of the chair and the sitting ability of an agent.

We must keep in mind that many factors make up an agent’s abilities. Two obvious categories of properties that determine agent ability are dimensional properties and kinetic properties. Take the example of sitting: kinetic properties such as flexibility would determine submovement ability such as bending of the knees whilst relevant dimensional properties would include leg length and waist size.

5.1 Primary Determining Factors for Agent Ability
Consider the ability related to the affordance for lifting a 200kg barbell. Given the importance of muscle strength (a kinetic property) for this action we can define it as the primary determining factor for this ability. Compare this against the example of passing through an aperture without turning one’s shoulders. This seems like an activity where body width (a dimensional property) rather than a kinetic property is the primary determining factor.

This can be extrapolated to most affordances that involve fitting through (or into) spaces. Affordances for passing through gaps sideways are primarily determined by depth of the body (i.e. abdomen size) (Franchack & Adolph, 2013). Many ‘sitting on’ affordances are primarily determined by waist size. All these examples belong to the category of affordances where body size makes up the primary determining factor for agent ability. Because anorexic patients misrepresent their dimensional properties, this is the category I am interested in.

I will also narrow my discussion down to a subset of this category, what I call ‘can’t do’ affordances. Affordances can be perceived not only in terms of what actions the environment affords but also what actions the environment doesn’t afford. For example, some narrow shouldered people might perceive a ‘can do’ face-forward aperture passing affordance where other more broad shouldered people would perceive a ‘can’t do’ face-forward aperture passing affordance. For the purposes of understanding anorexic patients’ oversized experience, the relevant category of affordances is the category of ‘can’t do’ affordances where body size is the primary determining factor.

5.2 Perceiving Affordances

We don’t always perceive affordances. There are an infinite amount of ‘can do’ affordances given any agent-environment combination. Not only can I read a book, I can throw it in the air, put it on my head or lick it. Likewise there are an infinite amount of ‘can’t do’ affordances. I can’t fit a book in my mouth, bounce it like a basketball or tear it in half (unless I’m exceptionally strong). We clearly don’t perceive the infinite number of ‘can do’ and ‘can’t do’ affordances of every environment we’re in.

Whether we perceive an affordance depends on many factors. One necessary factor is that the environmental feature is currently available to our perceptual system. Simply put, I won’t perceive an affordance for chair sitting if I’m not perceiving the chair.

Another factor is the agent’s current motivational state. Even if a book is the current object of my perception, I won’t perceive the infinite amount of affordances related to this book and my abilities, this would be far too demanding in terms of cognitive resources. Rather, I usually only perceive those affordances relevant to my current motivational state. If I’m planning on eating the book I’ll perceive the ‘can’t do’ book eating affordance. If I feel like throwing a book in the air I’ll perceive the ‘can do’ air throwing affordance. These affordances would exist no matter what my current motivational state but this state helps determine whether I perceive them or not (Chemero, 2003, p. 193).

5.3 Conscious Experience and Affordance Perception

I will now turn to the relationship between affordance perception and consciousness. In order to count as an oversized experience, patients must be conscious of these
affordance perceptions. However, just because we perceive an affordance relevant to our current motivation state, doesn’t mean we are conscious of this perception. In fact, as we navigate our environments most of the affordances related to our motivational goals are perceived unconsciously (Jeannerod, 1994).

We do things like grasp mugs in just the right way or sit down correctly on chairs without first having to consciously perceive the affordances for doing so. Likewise, anorexic patients simply turn their shoulders at higher critical points when walking through the apertures; they usually don’t consciously recognise that they have to.

However, as we navigate our environments, from time to time an affordance will be consciously perceived. This most commonly involves ‘can’t do’ affordances. For example, we reach for a mug and realise it has no handle. Had it had a handle we would have unconsciously gone through with the action (grasping). However the unexpected ‘can’t do’ affordance draws our attention, requiring us to consciously solve the problem it presents (how to grasp the mug). When events are more cognitively difficult than expected, an affordance becomes more salient. Salience can be defined as a property of affordances that determines how likely the relevant agent is to consciously perceive them.

5.4 Awareness of Constituent Relata

In order for experience of an affordance to count as a disturbed experience of body size, the experience must (in some way) be about the body. I have argued that facts about the body determine affordances but the question is what role do these facts play in the experience of affordance perception? Chemero states, “an animal typically perceives only the affordance relation, though, and not the constituent relata … I am normally not aware of anything about my climbing abilities or riser heights when I perceive that I can climb a step” (2003, p. 191). In general, this statement seems correct. When we do become consciously aware of affordances, the content we become aware of is generally in the form of ‘I can do x’ or ‘I can’t do x’. The properties that determine this ‘I can’/’I can’t’ aren’t available to the perceiver.

However, there are exceptions to this. My claim is that in cases where specific properties make up the primary determining factor for affordance ability then we necessarily become aware of these properties along with the affordance. Perceptions of these kinds of affordances relay information about the body, body-relative information (Legrand, 2006, p. 114). This information takes the form: Rba. Whereby R is a relation (e.g. too big, small, weak, inflexible etc.), b is a feature of the body and a is an action, relevant to an environmental feature (e.g. passing through an aperture).

Take the example of the ‘can’t do’ lifting 200kg barbell affordance. Perceiving this affordance isn’t simply to become aware that one can’t lift the barbell but rather than one’s arms are too weak to lift the barbell. Likewise, perceiving the ‘can’t do’ aperture passing affordance doesn’t cause one to only become aware that they can’t pass through the aperture. Rather they become aware of content along the lines of ‘my shoulders are too wide to fit through this aperture’.

So awareness of certain kinds of content accompanies affordance perception. However, it is worth briefly discussing what relation this body relative, propositional content has to the affordance perception. To cash out this relationship I will borrow from Fulkerson’s (2014) concept of inferential dependence. He writes:
[Inferential] dependence occurs when a state of indirect awareness results only from an inferential or similar cognitive process combined with an initial perceptual experience. Strictly speaking, it’s not the case that a separate experience arises from a cognitive act such as attending, judging, or inferring; instead, a state of indirect awareness is reliably and perhaps even automatically generated by an act of cognition in the appropriate perceptual circumstances. (2014, p. 86)

As a paradigmatic example of inferential dependence, Fulkerson suggests seeing a tank of gas is half empty by looking at a gauge: “it does not seem that we directly perceive the level of the gas in the tank, but we become aware of it in virtue of having a genuine visual experience of the gauge” (p. 86). Likewise we can say that indirect awareness of propositions that take the form $Rba$ is inferentially dependent on certain kinds of affordance perception experiences. Patients don’t directly perceive that they are too big for an aspect of the environment but they become aware of it in virtue of an affordance perception. Furthermore, as in the case of viewing the level of gas in the tank, this indirect awareness doesn’t require reflection or conscious effort (p. 86).

5.5 Affordances and the Body Schema

Although I have been speaking about the body relative content involved in affordance perception, it’s important to remember that the content under discussion isn’t body relative content per se. Rather, it is content relative to how the body is represented, by the body schema. The predominant idea here is that affordance perception involves motor simulation using the body schema. By simulating an object relevant action, the brain determines whether it is possible (Jeannerod 1994; 2001; for an overview see: Declerk, 2015, p. 3-5). This is why anorexic patients with oversized body schemas perceive affordances for aperture passing differently than controls, the relevant properties of their bodies are represented by their body schema and their body schema is oversized.

5.6 Affordance Perception as an Oversized Experience

We can now understand how affordance perception for anorexic patients with distorted body schemas can constitute an oversized experience. Let’s consider an ecologically relevant example. Imagine an anorexic patient who suddenly becomes aware that the seat she planned to sit on is not wide enough to accommodate the (false) body schema dimensions of her waist. She experiences the perception of the ‘can’t do’ chair sitting affordance and is forced to think the situation through. She double-checks her intuition that the chair will not support her width by consciously simulating herself sitting on the chair. Unfortunately this motor imagery task also relies on faulty body schema dimensions, so she’s now sure she can’t fit in the chair. She must consciously scan the environment for other options, perceiving the affordances of the nearby furniture to see if any will accommodate her body.

This drawn out, conscious event is an extended experience of her body as oversized—specifically as oversized in relation to features of her environment. It is a conscious reminder of false bodily limitations. This is clearly an example of an oversized experience of the body and these kinds of oversized experiences might arise in many different contexts e.g. fitting into or around furniture, or in between people in crowded spaces such as public transport.
I have already discussed how socio-cultural processes, along with a mental picture of the body (body percept) as oversized might play a role in grounding size related propositional attitudes. However, the day-to-day perception of ‘can’t do’ affordances that bring awareness to the content ‘my body is too large for x’ might also come into play.

In this picture, not only are propositional attitudes grounded by mentally picturing the body as oversized, this also happens throughout the day as patients interact with their environments. Being repeatedly made aware that they are too big for aspects of the environment grounds patients’ propositional attitudes about body size. We can now modify our causal model to include body schema distortion as causing oversized experiences (see fig 2).

![Diagram of causal model]

Figure 2: The updated causal model.

6. An Obvious Objection

An obvious objection is that these affordances would only rarely be consciously processed. Not only are we incredibly efficient at unconscious motor control, man-made environmental features are usually designed to accommodate larger bodies. Therefore, unless their jobs involve a lot of movement around very unfamiliar environments, it seems unlikely that anorexic patients would become consciously aware of many ‘can’t do’ affordances throughout the day. If this is the case then they mustn’t be able to play much of a grounding effect on the relevant ‘too big’ propositional attitudes.

6.1 Clothes Fitting Affordances

However, take the example of perceiving affordances for fitting into clothing. There are two obvious ways that visually assessing whether clothing would fit could cognitively function. The first is the same way most body size determined affordance-processing functions, via motor simulation. If this were the case then anorexic patients would underestimate what clothing could fit on them in the same way they underestimate which apertures they can fit through.
The other option is we simply look at who is wearing the clothing, evaluate their size and compare it against a mental picture of our own size. This alternative pathway for evaluating clothes fitting affordances would rely on the faulty dimensions of the body percept. Therefore, anorexic patients would still become aware of their false spatial dimensions in relation to the clothes.

Anecdotal support for patients’ distorted perception of clothes fitting affordances comes from Casper and colleagues (1979). They write, “when anorectic patients buy clothes … [they] are usually surprised to discover that they can wear an even smaller size than they anticipated” (p. 60). Perhaps the (false) anticipation that causes this surprise is due to faulty clothes fitting affordance perception.

Fitting into clothes that are seen on other people or in shop windows might be a ‘can’t do’ affordance that is consciously experienced quite regularly. Perhaps anorexic patients often mentally assess clothes they see for how well they would fit. Furthermore, the body relative content related to these kinds of affordance perceptions isn’t only relative to a feature of the environment, it is relative to another body. The content isn’t ‘my body is too big for the door’ but rather ‘my body is too big for her top’.

This social dimension raises another interesting aspect of the clothes fitting affordance experience to consider. I have already mentioned that anorexic patients correctly estimate the size of other people’s bodies. If they were to compare this size estimation with their ‘can’t do’ affordance perception for fitting into other people’s clothes, they might infer that they have bigger bodies than those whose size they are estimating.

6.2 Mental Preoccupation Determines Salience

I will make one more argument in favour of the regular frequency of affordance based oversized experience. As discussed, the salience of an affordance determines how likely a particular agent is to consciously perceive the affordance. I would now like to develop the idea that mental preoccupation helps determine the salience of an affordance.

Consider the example of a skateboarder. Skateboarders are vastly more likely to perceive skateboarding related affordances in the environment around them. Whilst most of us would look at a rail or a set of stairs and only perceive the skateboarding related affordances if prompted, these affordances would jump out at skateboarders regularly. This jumping out is a result of affordance salience and isn’t necessarily due to cognitive difficulty or current motivational state; the skateboarder might not want to skateboard at that time (perhaps they are tired or simply have other things to do). Nevertheless, because of this person’s interest in skateboarding, their preoccupation with this general theme, skateboarding related affordances become more salient and are consciously perceived more often. Likewise we can presume that skateboarders who have a greater preoccupation with skateboarding (thinking about it more often) would perceive skateboarding related affordances much more than those who only think about it occasionally.

In the case of anorexia, patients have an extremely high level of preoccupation with ideas about their own body size. Mountjoy and colleagues discovered that anorexic patients think about their size related beliefs more times and for longer periods at a time during the week than schizophrenia patients think about their own delusional beliefs (2014, p. 511). Because of this preoccupation with ideas related to body size, it is fair to presume that affordances that are primarily determined by body
size (such as fitting into clothes or fitting through apertures) would be more salient for anorexic patients and, as such, more often consciously perceived.

There has also been a correlation found between public self-consciousness and heightened interest in clothing (Solomon & Schopler, 1982; Miller, Davis & Rowold, 1982). Although public self-consciousness is a broad category, it is closely related to body dissatisfaction (Kwon, 1992). Given this possible heightened interest in clothing by those with more body dissatisfaction (i.e. anorexic patients), a heightened salience for clothing related affordances might also be expected.

In the same way that skateboarding affordances remind skateboarders of their related abilities (e.g. those stairs are too high for me to jump, that rail is low enough for me to slide), size related affordances would remind anorexic patients of their (false) oversized body dimensions. This increased salience of size related affordances for anorexic patients increases the likelihood that awareness of faulty relative body dimensions happens regularly enough to significantly reinforce negative body affect.

7. Conclusion

In this paper I have discussed certain kinds of abnormal experiences anorexic patients have of their bodies. These oversized experiences come in two varieties: one is caused by distortion of the body percept and consists of mentally picturing the body as oversized. The other variety is caused by distortion of the body schema and consists of perceiving affordances which bring to awareness false facts about the body: that it is too large for various environment focused actions. These oversized experiences, along with socio-cultural factors, may play an important role in grounding negative body affect.

One important point to take from this paper is the importance of body schema distortion in the maintenance of anorexia. Body percept distortion has long been considered a relevant factor to the disease, with decades of empirical research poured into investigating it. However, it might turn out that body schema distortion, and the affordance based oversized experiences it causes, is even more important.

To answer the question of which factor is more important, the differences between these two kinds of oversized experiences need to be explored. False mental imagery isn’t exclusive to anorexia, it is an aspect of common experience. Most people have had moments where they realise their mental picture of something (e.g. what an old acquaintance looks like) doesn’t match up to reality. As such, doubting the veracity of one’s mental imagery comes easily.

Furthermore, mentally picturing the body as oversized is a known symptom of anorexia. Patients might have been made aware of this from multiple sources (e.g. doctors, friends, the media, etc.). Therefore, it’s possible that anorexia patients don’t have much confidence in the veracity of their mental pictures of themselves.

Affordance based oversized experiences, however, come with a kind of intuitive certainty. Perceiving an affordance involves becoming intuitively certain of the ability (or inability) to act in a certain way; we just know we can fit through the gap or sit on the chair. When anorexic patients see clothes they might become not only aware but intuitively certain they won’t fit in them. The relative confidence in this kind of experience might allow it to play a stronger role than mental imagery in grounding propositional attitudes.

Further differences between these two kinds of oversized experiences should be explored. Once we understand their qualitative differences, differences in the contexts in which they arise and their relative frequencies, we will be in a better
position to judge which kind of oversized experience plays a stronger role in reinforcing negative body affect. This represents a promising direction for future research.

Notes

1 There are some types of anorexia which don’t involve fat phobia. Patients’ reasons for starving themselves generally involve complaints of gastric pain rather than fear of gaining weight (Lee, 2001; Lee & Kwok, 2005). Because non-fat phobic anorexia does not seem to involve distorted body representations, I will restrict my discussion to fat-phobic type anorexia in this paper.

2 Gallagher uses the term ‘body percept’ to refer to a broad category of perceptual experiences of the body. Instead I am using this term as a shortened version for what anorexia researchers call ‘the perceptual component of the body image’. This refers to a specific body representation, rather than a group of kinds of experiences.

3 Not only does this causal explanation for body dissatisfaction seem plausible, it is presupposed in figural drawing scale tests of body dissatisfaction. These measure body dissatisfaction as the discrepancy between how someone pictures their body size (body percept) and how they picture their ideal body size (normative body ideal) (Menzel, Krawczyk & Thompson, 2011, p. 155; Gardner, Jappe, & Gardner, 2009; Gardner & Brown, 2010).

4 Multiple different agent properties generally determine abilities; there won’t always be one clear primary determining factor. However, with cases in which there is a clear primary determining factor (such as aperture passing), this factor is obvious.

5 In his paper Kwon calls his measure of body dissatisfaction “body consciousness”. However, what this test really measured was body satisfaction, Kwon writes, “the focus of this present investigation was on body consciousness affected by one’s body weight. Therefore, body consciousness questions included in the survey focused on participant’s degree of satisfaction related to actual body weight, hips, thighs, and waist.” (1992, p. 298).
References


