

Tracking our body image: An eye-tracking study on cognitive dissonance within our personal health decisions

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Abstract

Cognitive dissonance is a well-studied theory involving ideals, thoughts, beliefs, or behaviors that do not line up with one another. Naturally, this creates an internal discomfort and therefore one will try to change one of these ideals, thoughts, beliefs, or behaviors to place it in line with the others. A common way is to change a behavior to fit the inner thoughts. This eye tracking study tries to determine this change in behavior by looking at a change of attention. Participants were placed into one of two groups, a cognitive dissonance inducing group (made to feel bad about their body image) and a control group. They looked at images that were either labeled as healthy, unhealthy, or neutral, and were tracked as to where their attention was. Those in the experimental group were more likely to look at healthy images than unhealthy images than the control group. This may be due to cognitive dissonance trying to resolve itself and have the behavior (looking at the healthy images) be in line with the thought (want to have a healthier body type). This may assist further with those that struggle with social comparison and body image issues and disorders. It can help cause awareness and assist with therapy tools and treatments.

Imagine: it's January 1st and New Year Resolutions are abound, with grand plans and meaningful goals to improve one's life and have a good year. Yet, February 1st arrives – and the number of individuals who gave up on their resolutions has been estimated to be around 45% (Norcross & Vangarelli, 1988). The goal may be there –but the motivation lacks. At this moment, what does the average individual do? Do they change their behavior – and restart their goal – or do they change their attitudes – and decide that goal was not worth pursuing? Of course – it is the attitude, not the behavior, that changes most often (else, 68% of people who 'gave up smoking' might not have relapsed, as found in Gritz et al., 1988). Being torn between an ideal and a behavior can cause a disruptance in thought and mentality. This discord is known as cognitive dissonance, which under certain circumstances, can motivate change to maintain consistency (Festinger & Carlsmith, 1959). Generally, this change is seen with a new behavior and not the thought that lies inconsistent with the current behavior (Cooper, 2019). Many argue that this is due to the ease of changing a behavior compared to the difficulty in changing a deep-rooted belief (Cooper, 2019). Cognitive dissonance affects the behaviors, especially attentive behaviors, of someone in emotional distress (Harmon-Jones, 2004). While cognitive dissonance is more internal in nature – facing one's internal conflicts of behavior and attitudes, less has been explored if the external setting creating an internal discomfort of body image can push someone into a cognitive dissonance state and change their behaviors to fit a "healthier" lifestyle.

Cognitive Dissonance

Cognition refers to the process of gaining understanding through thought, senses, or experiences, and how they are applied towards how one views the world, stores information,

and take that information to guide behaviors (Rosenbaum et al., 2012). Dissonance targets tensions of a lack of consistency between two things, while consonance is when these combination of elements line up (Festinger, 1962; Harmon-Jones & Mills, 2019). Cognitive dissonance considers the intersection of these two terms - inconsistent thoughts or experiences that cause disturbance when attitudes are trying to guide behavior (Harmon-Jones & Mills, 2019). Cognitive dissonance, as with any dissonance, leaves a person feeling on edge and uncomfortable. Discomfort, however, causes a sense of motivation, and in this case, it is typically a motivation to change (Woolley & Fishbach, 2022) towards equilibrium and homeostasis. Just like a growling stomach signals the need for food, cognitive dissonance signals the need for a change (Festinger, 1962).

To decrease dissonance, the clashing thoughts and behaviors need to decrease in their differences and become less conflicting (Festinger, 1962). To do this, one can either try to remove dissonance or they can try to create consonance (Harmon-Jones and Mills, 2019). Dissonance reduction can involve attitude changes, distractions, or behavior change (Mcgrath, 2017). The difficulty of the reduction process will depend on how resistant the cognition is and how difficult or painful it will be to change as well as how much satisfaction the change will bring (Harmon-Jones & Mills, 2019). Increasing consonance, such as finding more supportive information or external such as adding a monetary justification, will also lower cognitive dissonance by adding support behind one of the cognitions to strengthen it over the conflicting cognition (McGrath, 2017; Cotton & Hieser, 1980; Knox & Inkser, 1968). Although increasing consonance is an important factor, this study focuses on dissonance reduction because it is a

more common response when there are no given resources (such as money) (Read & Miller, 1998)

Dissonance Motivation

To avoid the internal conflict, a change of behavior can be almost automatic once the inconsistency is pointed out. The motivation to change this behavior is known as a dissonance motivation (Stone & Fernandez, 2008). Dissonance motivation is highly dependent on the self-standard, how highly someone views themselves and their values (Stone & Cooper, 2001).

Dissonance motivation will more likely occur when the experienced feeling is negative or not in line with someone's self-standard (Stone & Fernandez, 2008; Stone & Cooper, 2001). It can be thought of as doing a behavior that is hypocritical to a thought or value, or vice versa.

Action-Based Model

The action-based model is the idea that the dissonance motivation guides the actions of someone. The inconsistent cognitions lead to discomfort and therefore an organism must change their behavior to become consistent with their thought (Harmon-Jones, 2004). The mind is signaled that something is wrong, and the body must correct this feeling back to its regulated baseline (Stone & Cooper, 2001). This would imply if a high self-standard, a strong criterion for oneself, became questioned or pointed out to be inconsistent with a behavior being performed, it would then lower. This lowering typically comes with a change in behavior and should be seen to end the internal conflict (Stone & Cooper, 2001).

In a classic example, Festinger and Carlsmith had participants complete a boring task and then had some tell the next group of participants how enjoyable it was. They then asked questions to see how they rated the experience and found that people believed the activity was

interesting. They saw participants had a convincing falsehood rather than a lie when their standards were put into question (Festinger & Carlsmith, 1959). When put into an emotionally distressing environment, many times, individuals' self-standards will lower. This lowering will provoke a change in behavior, allowing for dissonance to be more likely as one seeks out behavior changes to escape the distress (Stone & Fernandez, 2008). The action-based model would imply that this emotionally distressing situation may be enough to provoke a change to reduce inconsistencies so the body can return to baseline.

Cognitive Dissonance & Attention

Behaviors can come in all different shapes and forms, so narrowing down which behavior will change in each situation is difficult. It is important to find a behavior that would be trackable and observable if a person felt the need to lower their dissonance by changing their behavior. Attention can be classified as a behavior (Krauzlis et al., 2023) and is one that is easily observed. But why would attention be a correlated behavior with cognitive dissonance? Some attention, such as *selective exposure*, directs the individual to seek information that is in line with one's views (Schmuck et al., 2020), while other attention, such as *selective avoidance*, is when the individual steers clear of anything that is out of line with one's views (Beckers & Craske, 2017).

Cognitive dissonance has been found to be linked to selective exposure because participants may experience less dissonance when seeking out their specific views (Ploger et al., 2021; Fink-Lamotte et al., 2021). This may not occur automatically, so changing to this type of attention strategy would be beneficial to decrease dissonance (Ploger et al., 2021). Selective avoidance can also be an option as to why attention may shift. This would be because they

would be directing attention away from thoughts and information that challenge existing ideals (Sun et al., 2016). Both of these shifts in attention could occur if a self-standard was lowered and emotional distress occurred, but which type would not be known.

Body Image

Motivation is an important role in everyday life to keep us going, so having a strong understanding behind the motivation is important. But if there is no application behind the research of motivation, its purpose becomes lost. Body image, whether positive or negative, is reliant on motivation (Homan & Tylka, 2014). A positive body image was correlated towards a motivation that wasn't towards weight loss and appearance, but rather that exercising without these intents raised body image positivity (Homan & Tylka, 2014). Body image and cognitive dissonance have been linked through therapeutic interventions in hopes of lowering dissonance to release any negative behaviors that may lead to someone's ideal body image (Witcomb et al., 2013). Dangers can come with having dissonance related to body image if it leads to maladaptive behaviors. This dissonance, however, if not used in a harmful manner, may motivate someone to change a behavior. Furthermore, it may allow for further understandings that could help shape interventions towards a positive body image.

Body image is particularly important for overall mental health and concerns all ages when regarding health. It is a strong influencer towards a vulnerability of psychological health issues (Gillen & Markey, 2015). Mental health is associated with the development of psychopathologies, abnormal cognition, especially when in a high stress environment (Marin et al., 2011). Henceforth, cognitive dissonance may have a link to mental health. Although not much research has been done to investigate this link, cognitive dissonance reduction therapy

has been used on some mental illness populations, such as schizophrenia (Levine et al., 1998). For body related disorders in particular, cognitive dissonance prevention has been seen to lower thin-ideal internalization and negative emotion toward food (Becker et al., 2010). One study showed that those who were high in their religious beliefs were less effected by external threat and the cognitive dissonance around their religious beliefs (Van Tongeren et al., 2021). This suggests that centrality of one's identity may be a protective factor against the dissonance feeling. An eye track study measured the amount of time people stared at thin, normal, and muscular images and compared the time to if they had high or low body dissatisfaction (Cho & Lee, 2013). It was seen that those with more body dissatisfaction stared more at the muscular photos, as well as rated the muscular images more attractive than those with lower body dissatisfaction. This study isn't a direct correlation to dissonance, however, it does involve attention and how it relates to the social comparison theory (Cho & Lee, 2013). The social comparison theory describes the reasoning and process of evaluating values, beliefs, and thoughts and comparing them to what others think (Powdthavee, 2014). This comparison may help trigger some feelings of doubt which may lead to some dissonance. If one is confident in their own body image, they may hold higher self-identity, which would make them less vulnerable of social comparison and less likely to experience dissonance.

Eye tracking and Attention

Physiological measures are important to determine if this mental disruption does in fact motivate a behavior change. One type of behavior change that could be measured, as previously mentioned, could be attention. Changing the attention from an incongruent thought or image to a congruent thought or image should be a way to try to decrease any cognitive

dissonance. The physiological measures would then be able to show the change in behavior that would ease the cognitive disruption. Attention can be measured using an eye tracking device. Eye tracking has been used to show higher attention towards ideological consistency (Schmuck et al., 2020). By using an eye tracking device, and images that represent congruent and incongruent thoughts, it can be seen where the attention goes. However, if the attention does change, it will not be known as to why (selective exposure or selective avoidance). The device will only be able to detect which image is being looked at and when it is being looked at. Eye tracking has previously been used to try and measure related items to cognitive dissonance, such as decision making (Guazzani et al., 2015), as well as emotion recognition (Schmid et al., 2011). Eye tracking thus serves as an indirect measure of cognitive dissonance, focused particularly on changes in attention.

In this study, the goal is to provoke that change in attentive behavior. However, in the grand scheme of research, this would allow us to see how the body responds to the internal conflict with their attention. It may also give the scientific field insight into how self-standard may relate to social comparison. This social comparison is frequent in everyday life, especially now with social media platforms. If this study can show how attention may create dissonance when a self-standard is lowered, it may be able to invent coping skills to deal with the negativity that may come with social comparison.

Method

Participants

50 college students from a small, midwestern college were recruited by a school wide email for an eye tracking study with a \$10 incentive. They were split into two different groups,

experimental and control. These groups were randomly assigned by a random number generator. Table 1 shows the demographics of all participants in each group. All participants were told there would be food related stimuli, and if they would be affected by this then they were asked to not consent with the experiment. There were 28 females, 20 males, and 2 nonbinary students. 2 students identify as African American, 3 were South East Asian, 1 was Middle Eastern, 42 were White, and 2 identified as other. All participants (50) were non-Hispanic.

Data Acquisition

A Tobbi T60 was used to record the eye tracking data. Participants eyes were calibrated prior to each session by following a red dot on the screen with their eye gaze. The software tracks participants' eye location every 16 milliseconds. They were also instructed not to move their head once the calibration began till the end of the experiment. After the session was complete, the data was then exported to then be analyzed in R. The Tobbi T60 allows for a specific selection of area of interest. Therefore, each image was able to have its own area of interest surrounding the healthy, unhealthy, or neutral picture.

Eye Tracking Room

The participants were brought into a building that typically hosts the psychology courses on the college campus. The room that contained the eye tracking device in it was minimalistic. Inside the room, there was the eye tracker, a closed cabinet, and a table with nothing on top. There were also 4 posters hanging on the wall. The minimalistic room was important because the attention wanted to be towards the posters, with less items in the room, this heightened the chance of the participant paying attention to the posters. For the experimental group, these

posters were of 4 models, shirtless or in bikinis/underwear. The goal of these posters was to induce a sense of discomfort and emotional distress. For the control group, these posters were psychology posters, which would be consistent within the psychology department rooms (see Supplemental Material A).

Procedure

Participants arrived outside of the eye tracking room. They were then given the consent form, and if agreed to the study, brought into the eye tracking room. They were then instructed to sit in the experiment chair and then heard the researcher say, “I need to check on one more thing before we begin, I will be right back.” The researcher then left for exactly 2 minutes so the participant would be able to be emerged into the room and become aware of the posters. Once returned, the participants attention was ushered towards the eye tracking device to initiate the experiment. They were prompted to calibrate their eyes with the screen and then began the experiment. Once 24 trials were completed, the eye tracking portion of the study concluded. The participant was then given a survey that asked about their personal beliefs of their body image as well as their self-esteem levels (see below). This self-report can be analyzed along with the physiological measures. Once they finished the survey, the participant was debriefed, paid, and thanked.

Image Selection

The image pool began with 65 stock images that were found online and thought to portray the categories healthy, unhealthy, or neutral. There were 20 healthy images, 20 unhealthy images, and 25 neutral images. In a pilot study, all 65 images were reviewed by 50 online participants, who were asked to rate the images from 1 to 7 from healthy to unhealthy. Average unhealthy

scores were calculated per image. Means were used to calculate which images were seen as most healthy, unhealthy, and neutral. The top 12 healthy images were those that were closest to a rating of 7. The top 12 unhealthy were those that were closest to the rating of 1. The top 18 neutral images were those that were closest to a mean of 3.5 (both higher and lower). These were the images chosen for the eye tracking study (See Supplemental Material B and C for all 65 photos and their average scores).

Questionnaires and Scales

Because how the participant views themselves may be correlated with how the participant chooses to view various images and manage their cognitive dissonance, we utilize two measures to control for participant's body image views and their own self-esteem.

The Body Image Disturbance Questionnaire, BIDQ, was given to participants and measured body image disturbance (Cash et. al, 2004). This questionnaire would help to control for those who already have a poor body image, especially if they are placed in the experimental group. To interpret the questionnaire, the mean of all seven items is found from the Likert scale from 1 to 5, anchored at not at all/none and extremely/extreme where these should be the words for 1 and words for 5. An example of a question on this scale would be: "Are you concerned about the appearance of some part(s) of your body, which you consider especially unattractive?" (see Supplemental Material D).

The other scale used was to measure their self-esteem. (Rosenberg, 2015). This was a Likert scale from 1 to 4 containing 10 questions, anchored at strongly disagree to strongly agree where these should be the words for 1 and words for 4. An example of a question on this scale would be: "On the whole, I am satisfied with myself" (see Supplemental Material E).

The means, standard deviations, Cronbach's alphas, and correlations of the measures are shown in Table 1.

Eye Tracking Experiment

Participants were shown two images side by side for a total of 24 trials. These images either portrayed a healthy, unhealthy, or a neutral picture (i.e., dumbbell, cake, house respectively). Each trial had a picture from a different category (healthy/unhealthy, healthy/neutral, unhealthy/neutral). The participant saw 24 trials, with 6 healthy/unhealthy, 6 healthy/neutral, 6 unhealthy/neutral, and 6 neutral/neutral as a control condition. The order of trials was fully randomized for each participant. Between these trials they were prompted with a task. This task had them move their eyes to a prompted section as fast as possible for a visual search task. They were told to find the red circle and once found, keep their eyes focused on it until the next image appeared for "recording purposes". This measure is to ensure that the participant feel as though they are doing an experimental task and not just looking at a slide show of pictures. They were provided with 2 practice rounds of image/visual task before the real trials began and were able to ask questions if needed during those practice rounds.

Results

Table 1

Pearson correlation matrix and descriptive statistics of main study variables

	Max Time (ms)	BIDQ	Self Esteem	Mean	SD	α
Max Time (ms)	--	--	--	1979.14	1008.58	--
BIDQ	0.04***	--	--	2.26	0.98	0.94
Self Esteem	-.03	-0.52***	--	28.68	5.64	0.90
Age	-.04	0.00	0.24***	19.82	1.28	--

Note: *** represents $p < .001$ level, controlling for multiple comparisons.

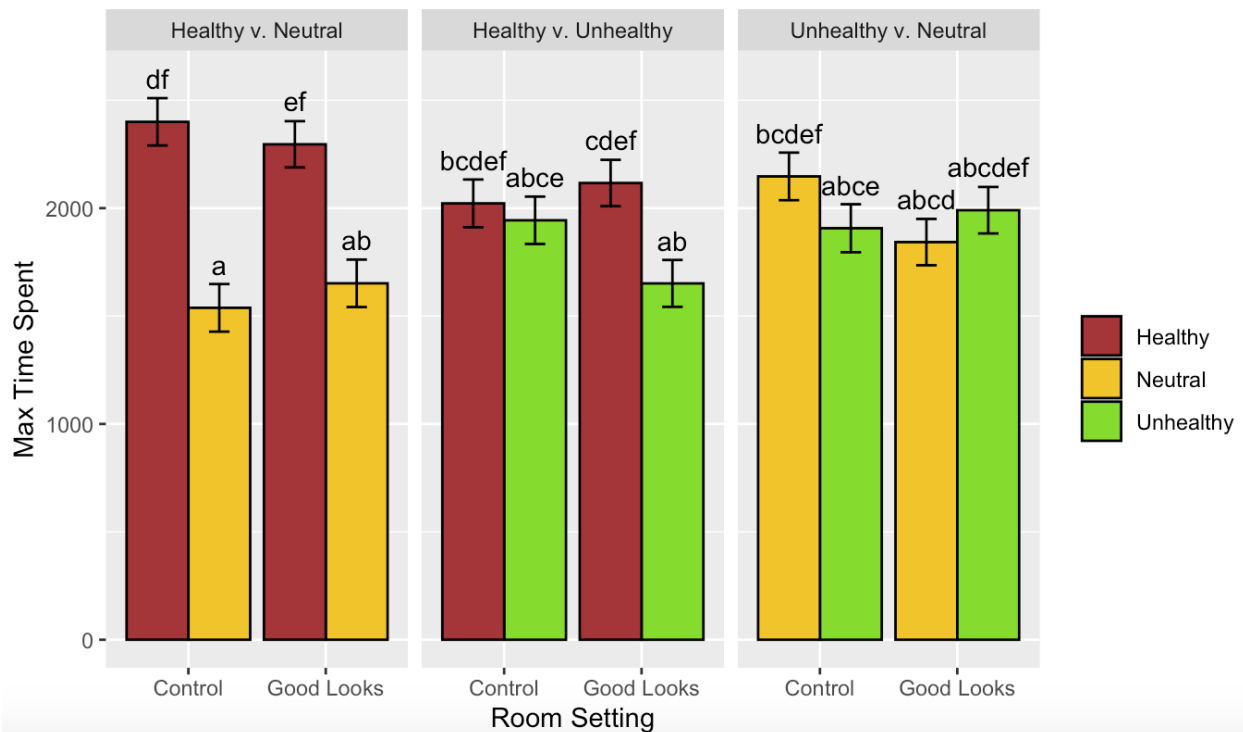
A correlation was run as a manipulation check to see if any factors were overlapping with others. Table 1 shows there is a high correlation between BIDQ and Max Time ($r = 0.04$, $p < .001$), the BIDQ and Self Esteem survey answers ($r = -0.52$, $p < .001$), and age and the self-esteem survey answers ($r = 0.24$, $p < .001$). There were no other significant correlations.

Since the Tobii software tracks the participant's eye location every 16-17 milliseconds, for a 5-minute study duration, for fifty participants, there are an extreme number of observations per participant (a total of 391,156 observations). However, due to participant movement, some trials lost the participant's eye gaze and thus did not capture their eye location. These were set to missing, leaving a total of 264,652 observations. After cleaning, we averaged the total amount of time that participants were looking at each of the possible photos in the three experimental conditions (Healthy image in Healthy/Unhealthy, Unhealthy image in Healthy/Unhealthy, Healthy image in Healthy/Neutral, Neutral image in Healthy/Neutral, Unhealthy image in Unhealthy/Neutral, Neutral image in Unhealthy/Neutral). Since there were six photos of each combination, the total observations per participant was 36 observations.

A 3 (Image Type: Healthy, Unhealthy, Neutral) measured within x 2 (Room Condition: Control or Experimental) measured between x 3 (Pairing: H|U, H|C, U|C) measured within mixed subjects ANOVA was run controlling for BIDQ and Self Esteem. There was a significant three-way interaction ($F(1, 1578.03) = 12.88, p < .001, \eta^2 = 0.007$) that moderated three different main effects (Figure 1). The main effect between image type and room condition was significant ($F(1, 1578.10) = 14.55, p < .001, \eta^2 = 0.008$). The image type on its own ($F(2, 1578.10) = 43.20, p < .001, \eta^2 = 0.050$) as well as the room condition ($F(2, 1577.95) = 13.10, p < .001, \eta^2 = 0.015$) on its own were also both statistically significant main effects. Nothing else in this large ANOVA was significant, but again, all these main effects were conditional. To understand the three-way interaction, we analyze each Image Type by Room Condition at each level of Pairing.

Figure 1

Max time predicted by 3-way interaction of pairing of photo, room condition, and type of photo being looked at.

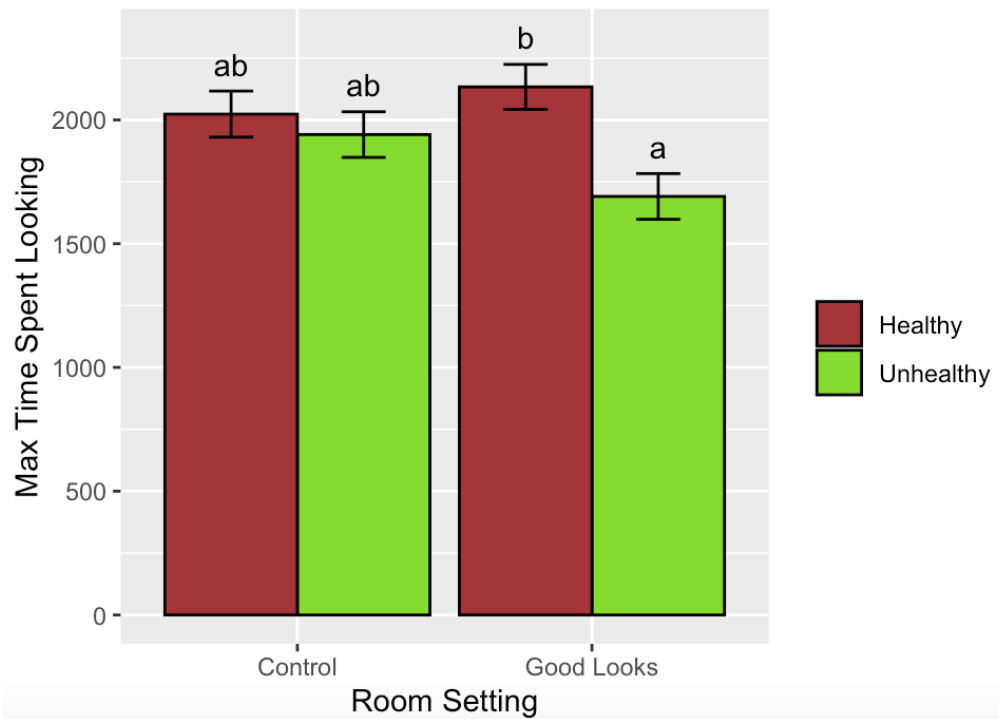


Note. Whiskers represent ± 1 standard error. Similar letters indicate similar findings. Therefore, if the no letter is shared, then they are statistically significant from each other controlling for multiple comparisons.

In a 2 (Image Type: Healthy, Unhealthy) measured within x 2 (Room Condition: Control or Experimental) measured between mixed subjects ANOVA was run for further analysis after the three-way interaction, controlling for BIDQ and Self Esteem. A main effect of the Image Type was significance ($F(1, 494.13) = 12.68, p < .001, \eta^2 = 0.023$). A significant interaction between Image type and Room Condition was found $F(1, 493.91) = 5.96, p = 0.02, \eta^2 = 0.011$ (Figure 2). To explore the interaction, post-hoc contrasts using Tukey's corrections were run. Post hoc analyses revealed a significant difference between being in the experimental room and looking at Healthy ($M = 2134, SE = 90.7$) compared to Unhealthy images ($M = 1691, SE = 92.3$), where participants spent more time ($M = 442.7, SE = 104, t(504) = 4.259, p < .001$) looking at the healthy photo. No other effects were significantly different ($p's > 0.062$), where the control healthy ($M = 2023, SE = 93.2$) and unhealthy ($M = 1941, SE = 92.3$) were observed.

Figure 2

Max time predicted by 2-way interaction of the healthy and unhealthy pairing and room setting.

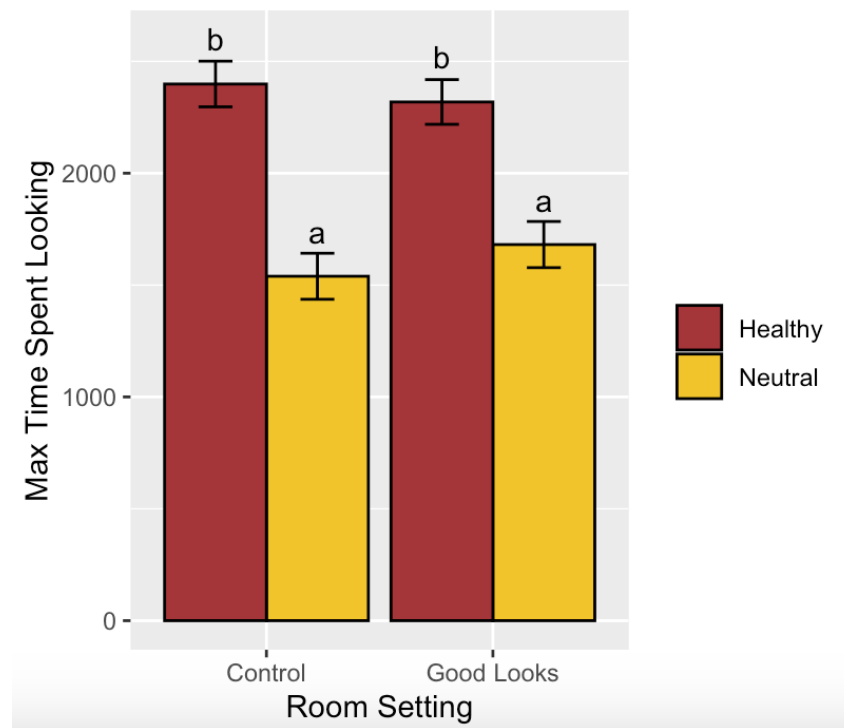


Note. Whiskers represent ± 1 standard error. Similar letters indicate similar findings. Therefore, if the no letter is shared, then they are statistically significant from each other controlling for multiple comparisons.

In a 2 (Image Type: Healthy, Neutral) measured within x 2 (Room Condition: Control or Experimental) measured between mixed subjects ANOVA was run for further analysis after the three-way interaction, controlling for BIDQ and Self Esteem. There was no significant interaction between Image type and Room Condition ($F(1, 490.96) = 1.91, p = 0.17, \eta^2 = 0.003$) (Figure 3). However, a main effect from the Image Type did show significance ($F(1, 491.02) = 87.04, p < .001, \eta^2 = 0.144$). To investigate the main effect, post-hoc contrasts using tukey's corrections were run. Post hoc analyses revealed a significant difference looking at Healthy ($M = 2359, SE = 71.1$) compared to Neutral ($M = 1610, SE = 72.4$) images, where participants spent more time ($M = 748, SE = 80.2, t(498) = 49.329, p < .001$) looking at the healthy photo.

Figure 3

Max time predicted by 2-way interaction of the healthy and neutral pairing and room setting.

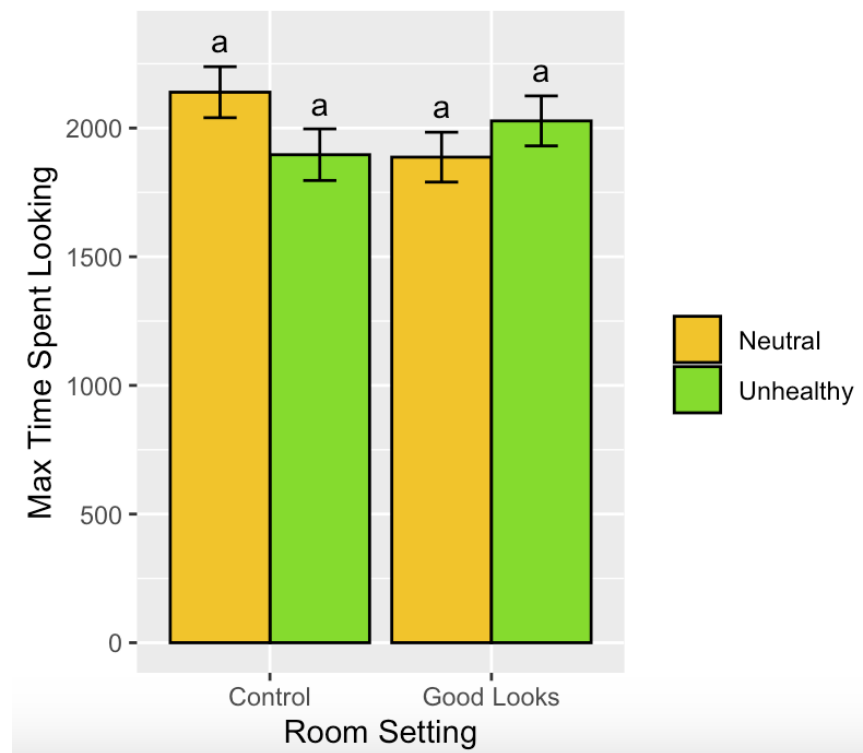


Note. Whiskers represent ± 1 standard error. Similar letters indicate similar findings. Therefore, if the no letter is shared, then they are statistically significant from each other controlling for multiple comparisons.

In a 2 (Image Type: Unhealthy, Neutral) measured within x 2 (Room Condition: Control or Experimental) measured between mixed subjects ANOVA was run for further analysis after the three-way interaction. BIDQ and Self Esteem was still controlled for. A significant interaction between Image type and Room Condition showed $F(1, 495.64) = 4.45, p = 0.04, \eta^2 = 0.008$ (Figure 4). No main effects were significant. To explore the interaction, post-hoc contrasts using Tukey's corrections were run. Post hoc analyses also revealed no significance with experimental Unhealthy ($M = 2028, SE = 97.1$), experimental Neutral ($M = 1887, SE = 96.8$), control Unhealthy ($M = 1897, SE = 100.3$), and control Neutral ($M = 2139, SE = 99.1$).

Figure 4

Max time predicted by 2-way interaction of the unhealthy and neutral pairing and room setting.



Note. Whiskers represent ± 1 standard error. Similar letters indicate similar findings. Therefore, if the no letter is shared, then they are statistically significant from each other controlling for multiple comparisons.

Discussion

Cognitive dissonance is a complex idea with many changing variables that could be a reasoning behind why or how it may occur. This study simplified cognitive dissonance down to its roots to try to find a stronger understanding behind its concept. By narrowing down cognitive dissonance to either an *avoid the negative* approach or *go toward the positive* approach, a simple eye tracking study could be performed. It was hypothesized that with either of these approaches, participants would look more at healthy images than particularly unhealthy, but also neutral, images if they were put in a state of discomfort. Again, this state of discomfort was to provoke the state of cognitive dissonance and was done through being in a room with posters of models.

It was seen that the hypothesis was supported in that participants looked at healthy images for a longer period of time than unhealthy images when they were put in a state of discomfort. It could be seen to be due to them avoiding the unhealthy image for feeling bad about themselves and changing their attention (behavior) away from the unhealthy image. Or, it could have been that they placed their attention towards the healthy images to be compliant with the thought of wanting to be healthier. Either option would ease the mental dissonance and would help to reduce the internal state of distress.

When comparing the healthy images to neutral, it was thought that the healthy would be observed more in a state of discomfort. This was in hopes to find evidence towards the going towards the positive approach. However, there was no significant interaction between the images when comparing the room types. Likewise, when the option was unhealthy and neutral images, it was thought the neutral would be observed more, to show avoidance of the unhealthy images. A significant interaction was seen between the two, noting that there was some sort of difference between the pictures. It can be seen in both the means and the graphs that in the control room condition, neutral images were observed for more time than the unhealthy. In the experimental condition, unhealthy images were looked at for longer than neutral images. However, the sample size may need to be larger to be able to see what the effect was. An increase in sample size will help to narrow down the differences and variations of the data.

These findings are in no way conclusive for the exact reasoning behind cognitive dissonance. They just give some insight behind a possibility of what is occurring subconsciously within the brain. With these results, further studies can continue to explore the idea of

cognitive dissonance with body image problems. With a stronger understanding, more knowledge behind not only how body image works but also how to help those with body image issues can be found. This idea can also be extended into other mental health areas that may relate to internal combat.

Further studies should beware of certain areas of issues that may have occurred within this study. First, the way of creating internal discomfort was by having participants sit in a room with four posters of models for two minutes. There is prior research using this method, however, other ways, stronger ways, of creating internal discomfort may want to be looked into. Whether the time in the room needs to be changed, the type of picture, or just a completely new way to create discomfort, a different measure would be good to explore. Another variable that this study did not control for was asking about sexual orientation. This may be an underlying factor of what images they looked at and for how long. A third component that could be better improved in the next study would be to change the images they looked at. For simplicity, this study chose very obvious healthy and unhealthy images and very simple neutral images. Seeing a cake versus a red hammer may be too distinct from each other, making the participant not have enough to look at, or becoming bored with the neutral picture in a short amount of time. Since some of the images were much more colorful and exciting than others, making all pictures black and white may also change the results. At the end of the experiment, having the participants rate the images may be useful to control for this. They also had a specified amount of time to look at each image pairing, however, if this study was repeated where they could decide how long they wanted to look at each image (such as scrolling to mimic social media), results would also change. Controlling for the time of day may

also help remove confounds because the time of day may impact and tarnish their self-standard and mood. An issue that arose during the analysis was not having a large enough sample size to be able to interpret some of the data. Our sample of 25 control and 25 experimental at some points had too much spread and variation to be able to conclude analyses. The combination of these alterations may lead to more data and insight on the idea of cognitive dissonance and would help expand our scientific knowledge behind this concept.

The results showed that the participants in the experimental group were more likely to look at healthy images than unhealthy images. However, the control group looked at both the healthy images and the unhealthy images for roughly the same amount of time. This may be due to cognitive dissonance trying to resolve itself and have the behavior (looking at the healthy images) be in line with the thought (want to have a healthier body type). This may assist further with those that struggle with social comparison and body image issues and disorders. By knowing that a discomforting environment can cause enough internal conflict to change an attentive behavior allows researchers to begin to think of ways to teach people how to cope with that emotion. This study is done on a small scale of looking at images, however if an intervention can come from this, it may help those who struggle with body image issues. It could be the first step to learning how to sit with the feeling of discomfort but not automatically changing a behavior from it, especially if it would be changed in an unhealthy manor. This study can help cause awareness and assist with therapy tools and treatments, with hopes to increase a sense of positive body image throughout society.

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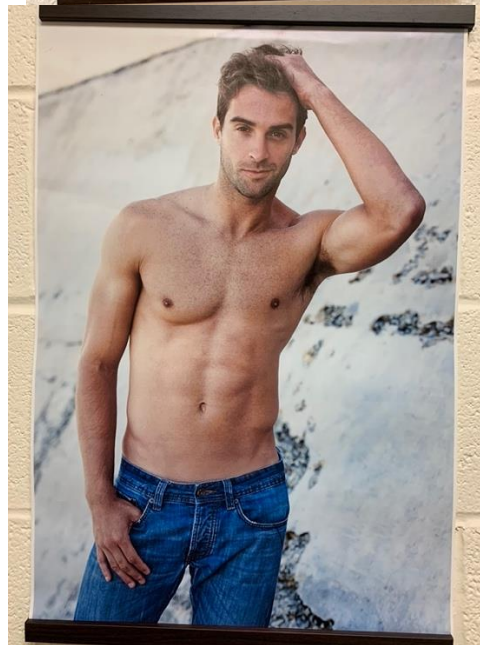
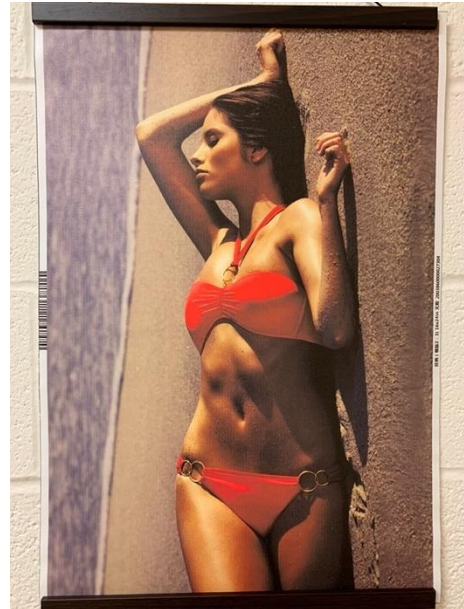
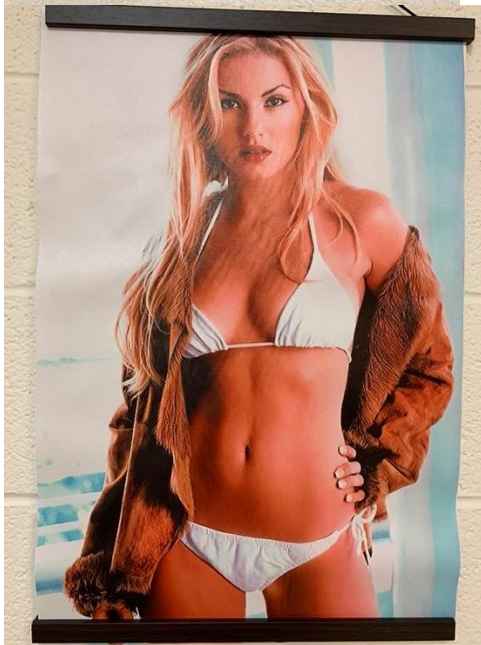
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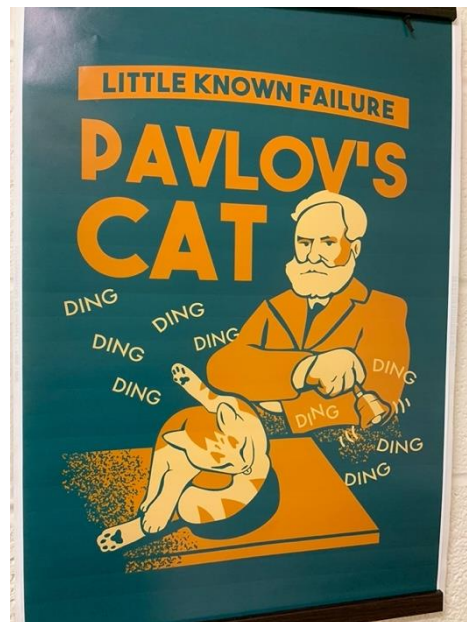
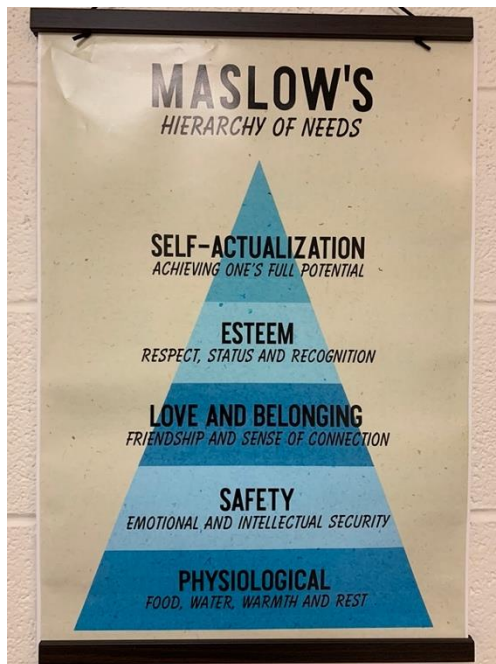
Supplemental material:

A

Experimental:



Control:



RESTORATIVE QUESTIONS
TO RESPOND TO CHALLENGING BEHAVIOR

WHAT HAPPENED?

WHAT WERE YOU THINKING OF AT THE TIME?

WHO HAVE YOU THOUGHT ABOUT SINCE?

WHO HAS BEEN AFFECTED BY YOUR ACTIONS? IN WHAT WAY?

HOW COULD THINGS HAVE BEEN DONE DIFFERENTLY?

WHAT DO YOU THINK YOU NEED TO DO TO MAKE THINGS RIGHT?

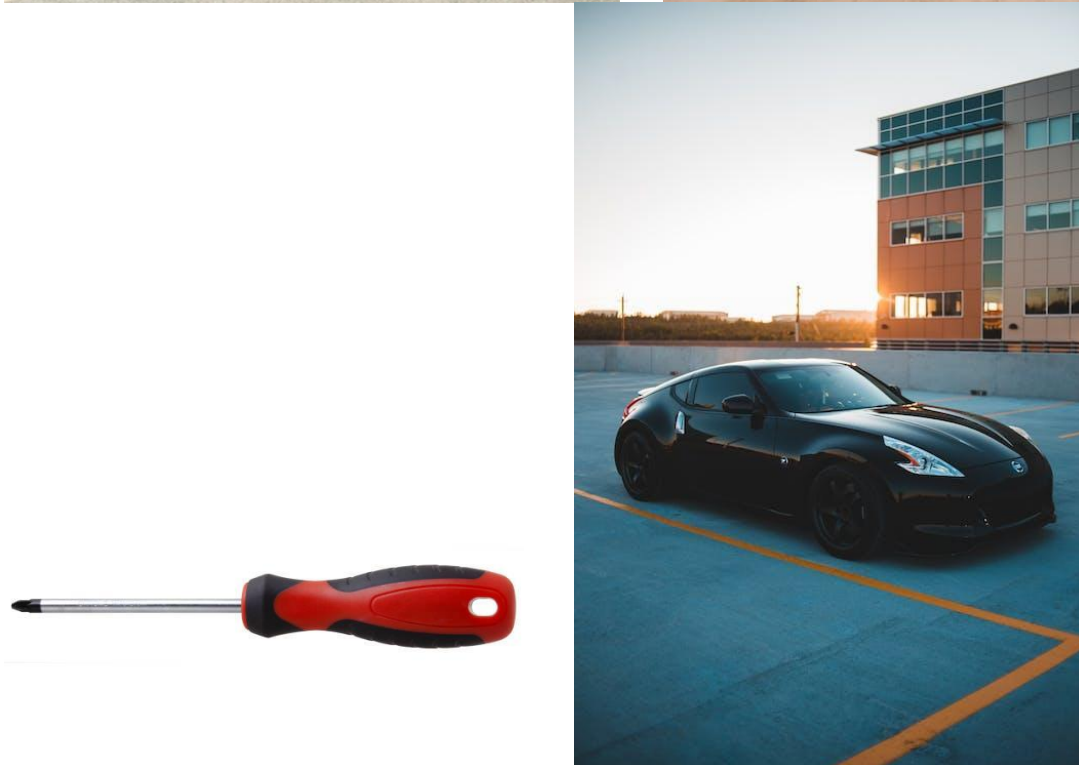
A poster with six horizontal bars, each containing a question. The questions are: WHAT HAPPENED?, WHAT WERE YOU THINKING OF AT THE TIME?, WHO HAVE YOU THOUGHT ABOUT SINCE?, WHO HAS BEEN AFFECTED BY YOUR ACTIONS? IN WHAT WAY?, HOW COULD THINGS HAVE BEEN DONE DIFFERENTLY?, and WHAT DO YOU THINK YOU NEED TO DO TO MAKE THINGS RIGHT?.

B

USED:







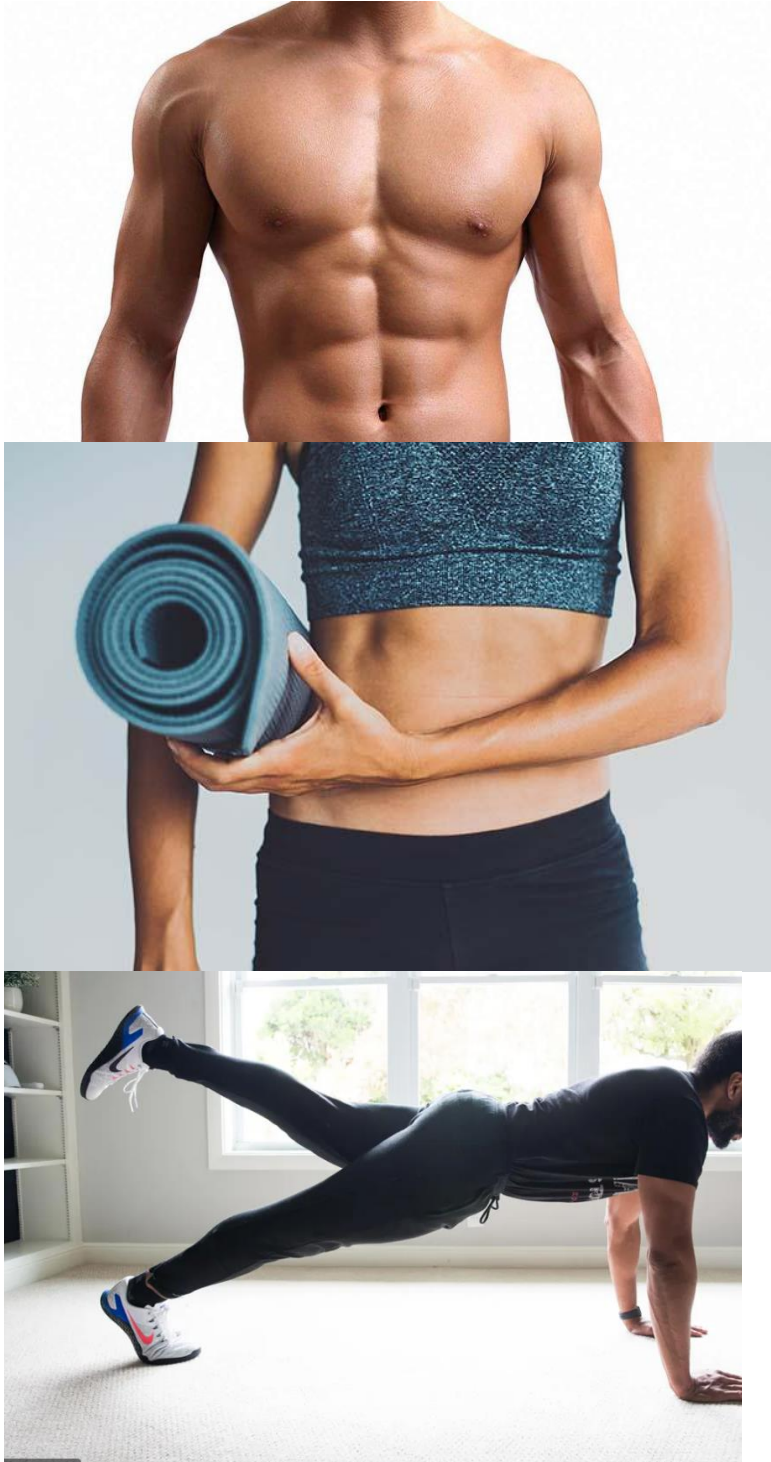








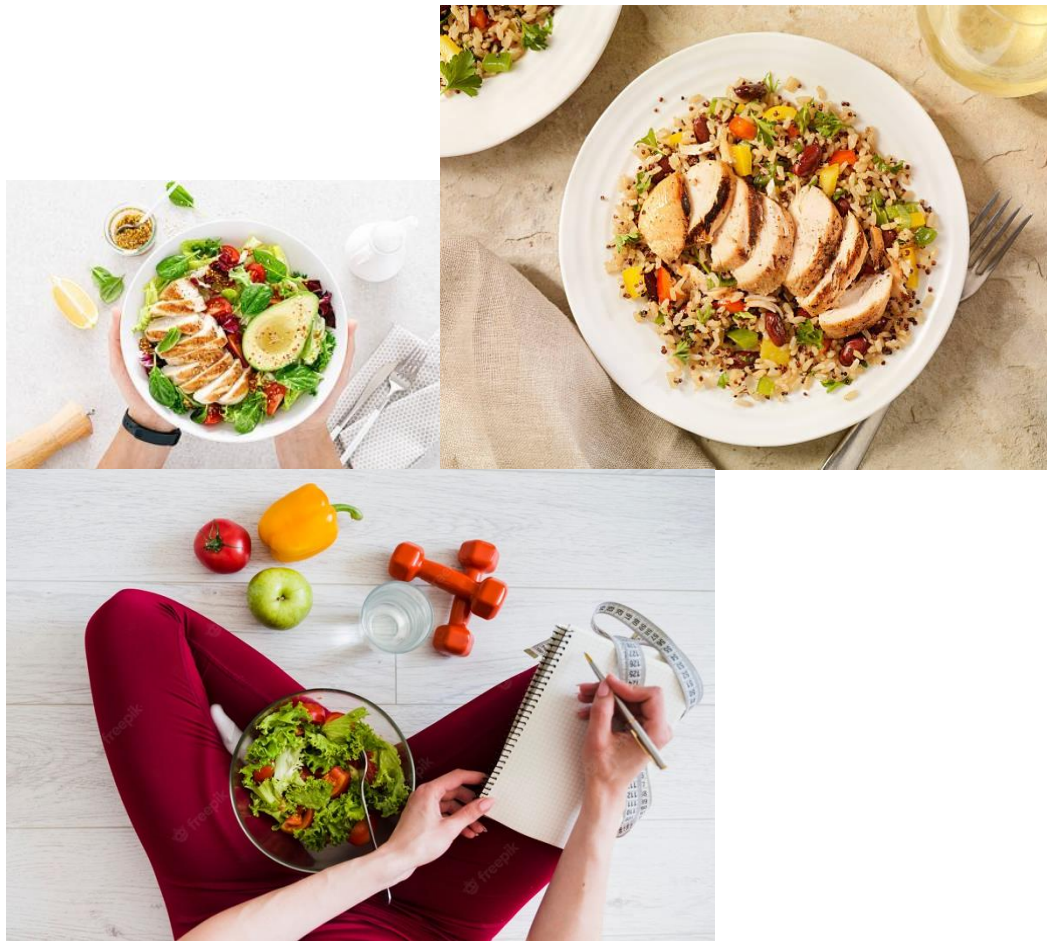






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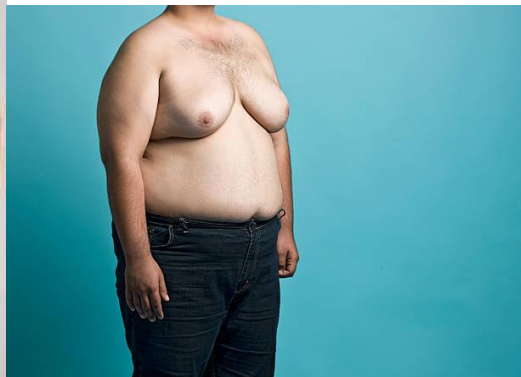




Appendix C. Photos not used in study.

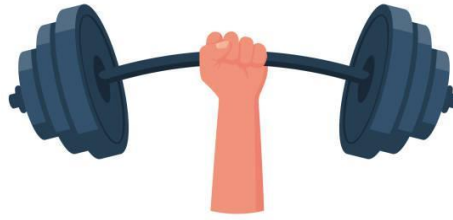


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D

BIQD:

1. Are you concerned about the appearance of some part(s) of your body, which you consider especially unattractive? (Circle the best answer)

1	2	3	4	5
Not at all concerned	Somewhat concerned	Moderately concerned	Very concerned	Extremely concerned

2. If you are at least somewhat concerned, do these concerns preoccupy you? That is, you think about them a lot and they're hard to stop thinking about? (Circle the best answer)

1	2	3	4	5
Not at all preoccupied	Somewhat preoccupied	Moderately preoccupied	Very preoccupied	Extremely preoccupied

3. Has your physical "defect" often caused you a lot of distress, torment, or pain? How much? (Circle the best answer)

1	2	3	4	5
No distress	Mild, and not too disturbing	Moderate and disturbing but still manageable	Severe, and very disturbing	Extreme, and disabling

4. Has your physical "defect" caused you impairment in social, occupational or other important areas of functioning? How much? (Circle the best answer)

1	2	3	4	5
No limitation	Mild interference but overall performance not impaired	Moderate, definite interference, but still manageable	Severe, causes substantial impairment	Extreme, incapacitating

5. Has your physical “defect” significantly interfered with your social life? How much? (Circle the best answer)

1 2 3 4 5

Never Occasionally Moderately often Often Very often

6. Has your physical “defect” significantly interfered with your schoolwork, your job, or your ability to function in your role? How much? (Circle the best answer)

1 2 3 4 5

Never Occasionally Moderately often Often Very often

7. Do you ever avoid things because of your physical “defect”? How often? (Circle the best answer)

1 2 3 4 5

Never Occasionally Moderately often Often Very often

Appendix E. Self Esteem Questionnaire

1. On the whole, I am satisfied with myself.

Strongly Agree Agree Disagree Strongly Disagree

2. At times I think I am no good at all.

Strongly Agree Agree Disagree Strongly Disagree

3. I feel that I have a number of good qualities.

Strongly Agree Agree Disagree Strongly Disagree

4. I am able to do things as well as most other people.

Strongly Agree Agree Disagree Strongly Disagree

5. I feel I do not have much to be proud of.

Strongly Agree Agree Disagree Strongly Disagree

6. I certainly feel useless at times

Strongly Agree Agree Disagree Strongly Disagree

7. I feel that I'm a person of worth, at least on an equal plane with others.

Strongly Agree Agree Disagree Strongly Disagree

8. I wish I could have more respect for myself.

Strongly Agree Agree Disagree Strongly Disagree

9. All in all, I am inclined to feel that I am a failure.

Strongly Agree Agree Disagree Strongly Disagree

10. I take a positive attitude toward myself.

Strongly Agree Agree Disagree Strongly Disagree