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PAPER

Implicit anti-fat bias among health professionals: is anyone immune?

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OBJECTIVE: To investigate whether negative implicit attitudes and beliefs toward overweight persons exist among health professionals who specialize in obesity treatment, and to compare these findings to the implicit anti-fat bias evident in the general population.
DESIGN: Health care professionals completed a series of implicit and explicit attitude and belief measures. Results were compared to measures obtained from a general population sample.
SUBJECTS: A total of 84 health professionals who treat obesity (71% male, mean age 48 y, mean body mass index (BMI) 25.39).
MEASUREMENTS: Participants completed an attitude- and a belief-based Implicit Association Test. This reaction time measure of automatic memory-based associations asked participants to classify words into the following target category pair. 'fat people' *vs* 'thin people'. Simultaneously, the tasks required categorization of words into one of the following descriptor category pairs: good *vs* bad (attitude measure) or motivated *vs* lazy (stereotype measure). Participants also reported explicit attitudes and beliefs about fat and thin persons.
RESULTS: Clear evidence for implicit anti-fat bias was found for both the attitude and stereotype measures. As expected, this bias was strong but was lower than bias in the general population. Also as predicted, only minimal evidence for an explicit anti-fat bias was found. Implicit and explicit measures of the lazy stereotype were positively related although the attitude measures were not.
CONCLUSION: Even health care specialists have strong negative associations toward obese persons, indicating the pervasiveness of the stigma toward obesity. Notwithstanding, there appears to be a buffering factor, perhaps related to their experience in caring for obese patients, which reduces the bias.
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Keywords: implicit attitudes; bias; anti-fat; obesity

Introduction

The large medical costs associated with obesity are well known,[1] but less is understood about the serious social and psychological costs. Discrimination against obese persons is clear across many domains of living, including hiring prejudice in employment,[2] inequities in wage and promotions,[3] and rejection at school.[4] Stigma (negative attitudes that color interpersonal interactions[5]) is also pervasive and may have insidious consequences. For example, as early as 9-y-old, clinically overweight children report significantly lower self-esteem than their non-overweight peers, and believe weight is the reason they are teased, have fewer friends, and are excluded from games and sports.[6]

It is not unexpected that weight stigma occurs in the general population, given the near-constant messages that thin people are beautiful and in control while overweight people are lazy and lack willpower (R Puhl and KD Brownell, unpublished manuscript). It may come as more of a surprise when stigma occurs in health professionals. Health care workers are exposed to the same social messages about obese persons as is the general population, and are even more aware of the negative health consequences of obesity. Yet, the evidence suggests that negative attitudes expressed by medical professionals are directed not just toward obesity as a health condition, but also against *people* who are obese. For instance, Klein and colleagues found that physicians associated obese patients with poor hygiene, non-compliance, hostility and even dishonesty.[7] Nurses believe that

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obese persons are overindulgent, lazy, experience unresolved anger and are less successful than their average-weight counterparts.[8] The consequences of these negative attitudes may include poor obesity management practices[9] and problems with health insurance coverage.[10]

There is much documentation of explicit negative attitudes and beliefs about obese persons, but researchers now recognize that attitudes exist in multiple forms. The studies cited above on explicit attitudes are limited because they assess only consciously held evaluations, which are subject to social desirability and rely on self-report (which requires conscious awareness of the negative attitude). People may not accurately report negative attitudes toward a group if they feel it is not appropriate to do so. Hence, scientists are increasingly interested in implicit attitudes to help gain a less biased and more comprehensive assessment of stigma. Implicit attitudes lie outside conscious awareness and occur automatically.[11] Implicit and explicit attitudes can be similar when conscious and automatic attitudes coincide, but at other times are unrelated.

There are important reasons to suspect that explicit attitudes may not reveal why discrimination is so rampant. While it is still partially acceptable to derogate obese people,[12] social desirability may prevent some people from reporting anti-fat attitudes. This may become increasingly true as 'fat acceptance' advocates gain strength through greater social and legal rights. In addition, people who wish to be unbiased may still be affected by societal messages, and may not realize that they hold negative attitudes. Further, there is mounting evidence that implicit attitudes may predict prejudiced behaviors more effectively than self-report, particularly in the domain of racial prejudice when the behaviors are unconscious or spontaneous (such as decreased smiling and eye contact, and increased spatial distance).[13,14] Recently, Bessenoff and Sherman[15] have demonstrated that automatic anti-fat evaluations (as demonstrated by a lexical decision task) predicted how far participants chose to sit from an overweight woman, whereas explicit anti-fat attitudes did not. Thus, understanding implicit negative attitudes toward obese persons may be critical to discern why discrimination and stigma continue to be so insidious despite people's good intentions.

One way to evaluate implicit attitudes is to examine automatic associations a person has toward a social group. This approach has become increasingly popular in social cognition and stigma research. In an earlier study designed to assess implicit bias toward obesity in the general population, we used a paper/pencil version of the Implicit Association Test (IAT[16]), a reaction time measure of automatic memory-based associations that taps implicit attitudes without requiring conscious introspection. We found striking evidence of implicit anti-fat evaluations of obese persons as bad people and beliefs that they were lazy.[17] Further, implicit bias was strong even when participants did not explicitly report negative attitudes, demonstrating the incremental validity of assessing attitudes that lie outside awareness. Implicit weight bias focused not only on the behavior of obese persons (being lazy), but also on core characteristics (being 'bad').

It is possible that contact with a stigmatized group reduces bias, perhaps because members of the group are then seen as real people. Examining implicit attitudes in health care professionals who specialize in treating obesity would be one test of this hope; hence the present study. A demonstration of bias among health care professionals would underscore the pervasiveness of weight bias and the power of social messages. We hypothesized that implicit bias would exist in this group, but given their experience with obese persons and their commitment to their care, it would be weaker than in the general population.

Method

Participants

Subjects were health care specialists ($n=84$) attending a continuing education meeting on obesity sponsored by a pharmaceutical company. Attendance at the meeting was by invitation of the company. Participants were chosen as being current or likely prescribers of obesity medications in practices where many obese patients are seen. Most participants were physicians (72%), but a variety of nutritionists, pharmacists and other health care specialists were also invited to attend the meeting if they work in the obesity treatment field. The sample was chiefly male (71% male), had a mean age of 48 (s.d. 9.81; range 26–70 y) and was predominantly Caucasian (89.9%). Body mass index (BMI) was 25.81 (s.d. 2.90) for males and 24.40 (s.d. = 3.14) for females.

Materials

Implicit Association Test. The IAT is a widely used measure to reflect automatic attitudes, primarily related to social prejudice, including gender stereotypes[18] and racial evaluations.[19] It shows expected differences across groups[20] and relates to other forms of implicit and explicit bias. The IAT has participants classify words or pictures into superordinate categories. For example, in the practice task for the current study, participants chose whether words such as daisies, tulips, bugs and mosquitoes belonged to the superordinate category 'flowers' or 'insects'. The categories of 'flowers' and 'insects' were simultaneously paired with the descriptive categories 'good' and 'bad'. Participants generally classify the stimuli faster when the paired categories match their automatic attitudes toward the category (ie 'flowers' paired with 'good' and 'insects' paired with 'bad'), than when they are mismatched. For the paper and pencil version of the IAT used in the present study, the dependent variable is the difference in the number of items correctly categorized when the paired categories are matched *vs* when they are mismatched.

This paper and pencil version is based on the original computerized version of the IAT, which uses reaction time to

classify stimuli as the dependent variable. The underlying logic of these two IAT versions is identical, since both are premised on the idea that classification is facilitated when categories are paired so that they match a person's automatic associations in memory, and both dependent variables index strength of association. Further, both the computer and the paper/pencil versions of the IAT are now being widely used, and when the two versions have been directly compared, results indicate that the strength of effects is equivalent (eg Lane and Banaji, unpublished manuscript).

The present study focused on weight attitudes. Given the pervasiveness of stigma towards obesity, for most people, stimuli were expected to be classified more easily when the target and descriptor category pairings matched the individual's automatic anti-fat associations (eg 'fat people' with 'bad' or with 'lazy'), than when they were mismatched (eg 'fat people' with 'good' or with 'motivated'). In each case, the person's implicit associations to one target category were assessed relative to his or her associations to the other target category. Specifically, automatic associations with 'fat people' were measured relative to automatic associations with 'thin people'. To test both automatic attitudes and automatic stereotypes toward overweight individuals, participants completed two different IAT tasks, one to measure attitudes (associations of 'fat people' and 'thin people' with 'good' and 'bad'), and the other to measure a stereotype (associations of 'fat people' and 'thin people' with 'motivated' and 'lazy'). The stimuli were approximately matched for length and the ease of categorization was evaluated during pre-testing; see Table 1.

Each IAT task consisted of two pages. On one page, the target and attribute categories were paired on either side of a column in a way expected to match negative automatic associations with overweight (eg 'fat people' with 'bad' or with 'lazy' heading up one side of the column and 'thin people' with 'good' or with 'motivated' heading up the other side; see Appendix). On the other page, the target and attribute categories were paired so as to contradict expected associations (eg 'thin people' were paired with 'bad' or with 'lazy' on one side and 'fat people' were paired with 'good' or with 'motivated' on the other side). Participants were given 20 s to classify as many words as possible on each page.

Table 1 Categories and associated subordinate stimuli for IAT tasks

	Stimuli to be classified		
Target category labels			
Fat people	Fat	Obese	Large
Thin people	Slim	Thin	Skinny
Flowers (practice task)	Daffodil	Daisy	Tulip
Insects (practice task)	Bugs	Mosquito	Roach
Attribute category labels			
Bad	Terrible	Nasty	Horrible
Good	Wonderful	Joyful	Excellent
Lazy	Slow	Lazy	Sluggish
Motivated	Determined	Motivated	Eager

Participants were then asked to take a moment to note the new category pairings on the second page before repeating the classification task. Thus, participants completed the classification exercise both when the category pairings matched and mismatched expected associations. The variable of interest was the difference in the number of correctly classified items under the two different category pairings.

Explicit fat/thin bias. To assess explicit attitudes, participants were asked to rate their feelings about 'fat people' and their feelings about 'thin people' as bad *vs* good on seven-point semantic differential scales with one representing a bad/negative rating and seven representing a good/positive rating. A difference score between these two items was then calculated to evaluate attitudes toward fat people relative to thin people. Comparable items were used to assess beliefs about fat and thin people as lazy *vs* motivated (again, two separate questions on seven-point semantic differential scales). A score above the neutral point on the scale (ie greater than four) indicates anti-fat bias, while a score less than four indicates pro-thin bias. These explicit items were designed to parallel the relative nature of the IAT, allowing comparison of explicit and implicit measures.

Demographics questionnaire. Participants completed a general demographics questionnaire, which included items about age, gender, ethnicity, height, weight and medical specialization.

Procedure

The completion of the IAT tasks occurred as part of a larger workshop on understanding stigma of obesity, so the IAT was administered to groups of approximately 25 people each. Participants were told that attitudes can exist in multiple forms, and were invited to take part in a study to learn how implicit attitudes toward overweight people can be measured. In addition to the workshop leader who provided the instructions and timing of the IAT tasks (the first author), an assistant was also available to answer questions and to monitor adherence to the instructions (eg to insure that all participants started and stopped the classification tasks at the appropriate times). Essentially all workshop participants completed the tasks, with fewer than five people choosing not to take part.

Participants completed an unrelated practice IAT task (classifying insects and flowers as good or bad) to familiarize them with the procedure before completing the two 'fat people'/'thin people' IAT tasks. The order of the implicit anti-fat attitude (bad/good) and stereotype (lazy/motivated) tasks was counterbalanced, and within each IAT task, the order in which the matched *vs* mismatched category pairings appeared was counterbalanced. In providing instructions for the IAT tasks, participants were asked to work as quickly and accurately as possible, to try to avoid making mistakes (ie misclassifying a word) but to continue without stopping

should this occur, and to not skip any items but to work their way down the column of words, indicating (with a check in a bubble) which side of the column the word belonged. Finally, participants completed the demographic and explicit bias questions.

Results

Implicit attitudes and beliefs

Prior to the planned analyses, distributions of the IAT data were examined to check for outliers. Individuals who completed fewer than four items on any page were excluded from further analyses, since unusually slow responding on the task may indicate inattention or lack of understanding. Pages with high error rates (ie $\geq 35\%$ incorrectly classified items) were omitted due to unreliability. High error rates may also indicate distraction or lack of understanding. These corrections resulted in deleting 14 bad/good and 15 lazy/motimotivated IAT scores. (Five participants had scores deleted from both IAT tasks, whereas the remaining deletions removed only one score for a participant based on a high error rate for a particular task.) Although this is a high number of deletions, this stringent criterion was considered necessary to insure the quality of the data in a group administration. However, it should be noted that when analyses were checked using a more relaxed inclusion criterion, the pattern of results did not change, so we report the more rigorous test here.

IAT effects. IAT effects reflect a preference for one category pairing over another as indicated by latency of categorization. Difference scores were obtained by subtracting the number of items correctly classified in the mismatched category pairing condition (eg fat people + motivated or good) from the matched condition (eg fat people + lazy or bad). This resulted in a positive score for most participants, but a negative score for individuals who classified more items when 'fat people' was paired with positive attributes. To better control for individual differences in the number of items completed, the difference score was inserted into the following algorithm where max and min respectively represent the category pairings where the highest *vs* lowest number of items was correctly classified: (max/min -1)$\times$square root of (max$-$min). This composite scoring of the IAT is based on simulations run by Nosek and Lane (BA Nosek and K Lane, unpublished data), indicating that this calculation maximizes the reliability of correlations with IAT data. For these analyses, positive IAT effects indicate anti-fat or pro-thin bias while negative IAT effects indicate anti-thin or pro-fat bias.

t-Tests were conducted to demonstrate that the IAT effects were significantly different from zero, indicating that more items were correctly classified when 'fat people' was paired with negative attributes than with positive attributes. As expected, there was evidence of strong implicit anti-fat bias among the health professionals on both the implicit attitude (bad/good IAT; $t_{(63)} = 7.78$, $P < 0.0001$, $d^* = 1.96$) and implicit belief (lazy/motivated IAT; $t_{(63)} = 6.15$, $P < 0.0001$, $d = 1.55$) measures. These IAT tasks were combined to form a composite of implicit bias, confirming the robustness of the bias ($t_{(72)} = 7.12$, $P < 0.0001$, $d = 1.68$). The average numbers of items correctly classified and standard error bars for each category pairing are shown in Figure 1.

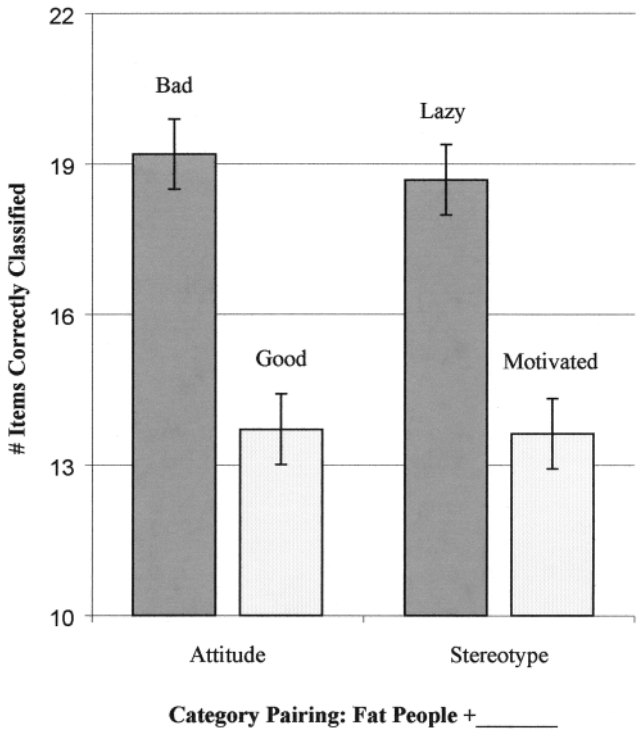

Figure 1 Implicit anti-fat attitude and stereotype.

Explicit attitudes and beliefs

Recall that a score greater than four indicates anti-fat bias, while a score less than four indicates pro-thin bias. As evident by the means, all explicit ratings were close to the neutral point (bad/good attitude toward fat people $M = 4.17$, s.d. $= 0.94$; bad/good attitude toward thin people $M = 4.29$, s.d. $= 0.79$; lazy/motivated stereotype toward fat people $M = 3.93$, s.d. $= 0.99$; lazy/motivated stereotype toward thin people $M = 4.51$, s.d. $= 0.81$). *t*-Tests comparing the difference scores to zero indicated that health professionals did

*The effect size *d* is described in Rosenthal and Rosnow,[21] and is commonly used for *t*-tests to index the magnitude of an effect independent of sample size. As recommended by Cohen,[22] a magnitude of *d* between 0.2 and 0.5 reflects a small effect, 0.5 – 0.8 reflects a medium effect, and above 0.8 reflects a large effect.

not endorse evaluations of overweight persons as bad, but did endorse the belief that thin people are more motivated than fat people are ($t_{(78)}=3.46$, $P=0.001$, $d=0.78$). This effect was statistically significant, though the mean difference score was only 0.58 (s.d. = 1.48), indicating less than a one-point difference from the neutral point on the seven-point scale.

Relation among implicit and explicit measures. The bad/good and lazy/motivated explicit measures were positively correlated ($r=0.67$, $P<0.0001$), as were the bad/good and lazy/motivated IAT tasks ($r=0.47$, $P\leq 0.0001$). This result is not surprising given their shared method variance. Of more interest is the relation among the implicit and explicit measures. The bad/good explicit questions were not significantly related to the bad/good IAT ($r=0.06$, $P>0.10$), but there was a significant correlation between the lazy/motivated explicit questions and the lazy/moti-motivated IAT ($r=0.25$, $P<0.05$). This relationship may be partially due to the greater variance in the lazy/motivated implicit and explicit measures (compared to the bad/good measures), and participants' willingness to rate thin persons as motivated but not obese persons as bad.

Individual differences

We did not find sex or age differences on either the implicit or explicit measures. In addition, we used a crude measure of the percentage of the physicians' patients who were obese to consider how degree of contact was related to anti-fat bias, but no significant relationship was observed. We did find that participants' BMI was negatively related to the explicit measures (bad/good $r=-0.30$, $P=0.007$; lazy/motivated $r=-0.39$, $P<0.0001$), and there were marginally significant negative relations on the bad/good IAT ($r=-0.23$, $P=0.06$) and the lazy/motivated IAT ($r=-0.21$, $P=0.09$). Thus, being heavier is moderately related to lower self-reported anti-fat bias, and weakly related to lower implicit bias.

Obesity treatment specialists *vs* general population

Based on our hypothesis that the obesity treatment specialists would have lower bias than in the general population, we ran one-tailed *t*-tests comparing the IAT anti-fat bias across samples using data from Teachman and colleagues.[17] The sample used for the general population data ($n=96$) came from a beach area in Connecticut, and had similar demographic characteristics except that they were more equal for gender (51% female) and slightly younger (mean age = 35, s.d. = 14.63) than the health professionals' sample. This group was drawn from a larger sample that completed the IAT tasks as part of another study. Results confirmed our hypothesis. The composite of implicit bias was significantly higher in the general population ($t_{(155)}=1.70$, $P<0.05$, $d=0.25$) as was the bad/good IAT ($t_{(133)}=2.52$, $P<0.01$, $d=0.44$). The lazy/motivated IAT was also higher in the general population, but this finding did not reach significance ($t_{(137)}=0.27$, $P>0.05$, $d=0.05$).

Comparison of these samples is included to provide a standard from which to contrast the health professionals' results, although these findings should be interpreted with caution, given the differences between the two samples' demographic characteristics and differences in data collection. Nonetheless, the IAT tasks are identical across samples and both groups were assessed in environments where weight and shape were salient, increasing the comparability of their results (ie the general population was evaluated at the beach, and the health specialists were evaluated at a meeting for prescribers of obesity medications).

Discussion

This study confirmed the pervasiveness of automatic negative associations toward persons who are overweight. Even among health professionals who specialize in obesity treatment, strong implicit anti-fat bias was evident in evaluations of overweight persons as bad and beliefs that overweight persons are lazy. Implicit measures are relative, so these results could be interpreted both as evidence for anti-fat bias and as support for pro-thin bias. Given that our society derogates obese individuals but also glorifies thinness, both forces may be active. What is striking is the finding that these attitudes seem to be directed toward obese persons rather than being limited to the concept of obesity, and are evident in a population committed to the care and treatment of obese persons. It is important to note the robustness of these implicit biases in contrast to the self-reported bias (which was non-existent for evaluations of overweight persons as bad, although evidence for the belief that thin people are motivated was found). These results suggest that relying on explicit measures alone is inadequate because individuals may not be aware of their own bias, and for people who wish to appear equitable, social desirability may influence reporting. The clear evidence for implicit anti-fat associations implies that wishing to be unprejudiced and consciously feeling no bias does not make us immune to negative social messages.

Despite observing implicit bias among the health care professionals, the finding that they showed less bias than was evident in the general population is reason for hope. (This finding needs to be replicated though given differences in the samples and data collection procedures.) A limitation of the current study is that the health care sample was predominantly male and middle-aged, making it difficult to generalize these results to health care professionals more broadly. Also, this study was not designed to test the mechanisms that led to the attenuated bias. Experience with a stigmatized group may play a role in minimizing the impact of living in a biased culture. In addition, however, it may be that health professionals who started with more positive attitudes selected to work with obese persons. Health care professionals may also feel increased empathy

toward obese persons due to personal attachments with patients. Alternatively, professionals may have more comprehensive knowledge of the complex causes of obesity as a consequence of their training, leading to less blame. Reduced bias may be related to more general differences associated with those who enter the medical field (eg greater tolerance or empathy toward others). Further, variance in education levels may contribute to decreased negative attitudes. It will be important for future studies to test these possibilities.

This knowledge may be important for training health care professionals to reduce bias and prevent discrimination. Weise and colleagues[23] conducted an intensive intervention program designed to reduce weight stigma in medical students, and found that students demonstrated significantly improved explicit attitudes and beliefs about obesity in comparison to a control group. The effectiveness of the intervention was still supported at 1 y follow-up. Although the mechanisms of change have yet to be determined, the program was notable for its emphasis on both education and promoting empathy.

The long-term goals of this work are to reduce discrimination and stigmatization of obese persons among health care professionals and the general population. A number of steps will need to occur to make this goal possible. Future research is needed to clarify the relationship among different measures of attitudes and stereotypes. The different results for the implicit and explicit bias measures speaks to the value of assessing multiple components of attitudes and beliefs, rather than relying on a single measure, particularly one vulnerable to social desirability. Evidence from the present study suggests that implicit and explicit measures are variably related to one another. The good/bad evaluative measures showed no relationship while the measures of the lazy stereotype were weakly related. We suspect that conscious and automatic beliefs about overweight people as lazy and thin people as motivated are related because it is more socially acceptable to report this belief than it would be to report a direct negative evaluation of obese persons. There is a pervasive misconception that obesity is simply the result of laziness and a lack of will power, so reduction of these negative stereotypes may be assisted by education. The general public may benefit from learning about the important role played by genetics in predisposing an individual toward obesity, and by the impact of the food environment in promoting weight gain.

An additional step required to determine the most effective ways to reduce anti-fat bias will be to clarify how implicit attitudes and beliefs predict specific discriminatory behaviors. The evidence of strong implicit bias, even among people who specialize in the treatment of obesity and who do not consciously report negative feelings toward obese persons, is reason for concern. The challenge now will be to determine how to change conscious and automatic biases at both the individual and societal levels.

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Appendix

Sample portion of an IAT task measuring implicit associations among fat and thin people with lazy and motivated descriptors. This page would be compatible for people who have implicit anti-fat bias, since the pairings match negative automatic associations with overweight. The opposite pairing (fat people with motivated and thin people with lazy) would be incompatible or a mismatch for people who have implicit anti-fat bias.

Thin people	**Fat people**	**Thin people**	**Fat people**
slim	fat	slim	fat
thin	obese	thin	obese
skinny	large	skinny	large
Motivated	**Lazy**	**Motivated**	**Lazy**
determined	slow	determined	slow
motivated	lazy	motivated	lazy
eager	sluggish	eager	sluggish

Thin people Motivated		**Fat people Lazy**	**Thin people Motivated**		**Fat people Lazy**
○	obese	○	○	slow	○
○	sluggish	○	○	thin	○
○	slim	○	○	determined	○
○	eager	○	○	fat	○
○	large	○	○	lazy	○
○	lazy	○	○	slim	○
○	fat	○	○	eager	○
○	motivated	○	○	large	○
○	thin	○	○	sluggish	○
○	determined	○	○	obese	○
○	skinny	○	○	motivated	○