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Even with diet and exercise, Ozempic use reduces perceived effort and praiseworthiness of resulting weight loss

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ABSTRACT

The injectable medication Ozempic (semaglutide) has demonstrated unprecedented effectiveness in promoting significant weight loss. However, its use has sparked moral debates, with critics dismissing it as a mere "shortcut" compared to traditional methods like diet and exercise. This study investigates how weight loss method—Ozempic, diet/exercise, or a combination of both—impacts perceptions of effort, praiseworthiness, and identity/value change. We used a contrastive vignette technique in two experiments (combined $N = 1041$, demographically representative for age, sex, and ethnicity) to study the attitudes of US participants toward a fictional character who lost 50 pounds through one of the three described methods. Weight loss through diet/exercise alone was deemed most effortful and most praiseworthy, whereas Ozempic use, even when combined with diet/exercise, was rated as both less effortful and less praiseworthy than diet/exercise alone. Ozempic use with no mention of diet/exercise was rated as least effortful and least praiseworthy. Compared to diet and exercise alone, Ozempic use also decreased perceptions that the individual had really changed as a person, or experienced a change in their underlying values. We discuss potential implications, address study limitations, and provide suggestions for further work.

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1. Introduction

The injectable medication Ozempic has in recent years gained widespread use for weight loss. While Ozempic itself is only approved for treatment of type 2 diabetes, a higher-dose version called Wegovy (containing the same active ingredient semaglutide)[3] has been authorized by the U.S. Food and Drug Administration in 2021 for long-term weight management in "adults with obesity or overweight with at least one weight-related condition," such as high blood pressure or cholesterol (U.S. Food and Drug Administration, 2021; n.p., see Footnote 1 for details). In practice, factors such as medication availability, cost, and insurance coverage limitations have led to Ozempic often being used in place of Wegovy for weight loss, making it one of the most recognized and frequently discussed prescription medications for this purpose in both clinical and public contexts (Wehrwein, 2024; Wojtara et al., 2023).

The drug functions by mimicking the body's natural GLP-1 hormone to trigger insulin production, regulate blood sugar, slow stomach emptying, and reduce appetite by enhancing satiety (Wojtara, 2024). A meta-analysis of semaglutide's efficacy in non-diabetic individuals reported that over 20 weeks of medication use patients experienced a clinically significant reduction in mean body weight of 11.62 kg (25.62 lbs), a mean waist circumference reduction of 9.61 cm (3.78 in), and a mean Body Mass Index (BMI) reduction of 4.33 kg/m^2 (.89 lb/ft^2) across all included studies (Arastu et al., 2022). In real-world settings, Ozempic has proven to be one of the most effective options for achieving significant weight loss within relatively short time frames (Ladebo et al., 2024; Menzen et al., 2023), particularly for individuals who have not been successful with behavioral methods (Carmina and Longo, 2023).

Despite—or perhaps because of—its marked effectiveness, the drug also sparked a moral debate about medical weight loss solutions. While there are those who celebrate Ozempic as a "miracle drug" (Wallace-Wells, 2024), some critics perceive it as morally inferior compared to a traditional lifestyle approach of diet and exercise (Jones, 2023), while others see it as a possible impediment to systemic change toward a healthier and more inclusive society (Caplan, 2024; Davis, 2023; Kolata, 2024; see also discussion by Ryan and Savulescu, 2025). Prior vignette-based work has investigated public perceptions of physician prescribing practices of Ozempic (Callaghan et al., 2025); however, there are to our knowledge no controlled psychological studies to date (i.e., using a between-subjects experimental design) investigating moral attitudes toward those who use the drug and factors shaping these. Anecdotal evidence stemming from popular media outlets suggests that many people view it as an attempt to "cheat" at weight loss and take "the easy way out" (i.e., to avoid the mental and physical work of maintaining a healthy lifestyle) (Oswald, 2024; Rosenfield, 2024). For instance, many public figures, including politicians and actors, have been the target of online speculation over whether they have used Ozempic, with some such individuals expressing frustration that these claims undermine the value of their weight loss "achievements" (Mzezewa, 2023).

These moral reactions to Ozempic should be considered in light of broader societal patterns that moralize body weight. Despite evidence that body weight is shaped by a complex interaction of biological, behavioral, and environmental factors (e.g., Masood and Moorthy, 2023), there is a pervasive belief that obesity is primarily or even exclusively due to poor lifestyle choices and a lack of self-discipline (Puhl and Brownell, 2013). In the U.S. especially, ideologies of self-determination and individualism arguably underpin such moralistic assumptions. For instance, the so-called "Protestant work ethic," which is thought to have had a significant role in shaping American cultural norms and beliefs, emphasizes diligence and internal control. Accordingly, each person's life circumstances, including their weight, may more likely be attributed to internal, controllable causes (Carels et al., 2009). Similarly, neoliberalism (a set of political-economic ideas that favor free markets, privatization, minimal state intervention, and so on – likewise thought to influence and/or characterize American culture) frames the individual as primarily or even solely responsible for their own well-being through hard work and entrepreneurial effort (Harvey, 2023). This logic extends into what has been called "healthism" whereby overweightness is seen as a sign of personal failure to achieve a socially prescribed "healthy" body (Jiménez-Loaisa et al., 2020). Within these value systems, the moral standing of different weight loss methods such as Ozempic may depend heavily on how much effort each one is believed to require on the part of the individual.

Indeed, previous literature suggests that weight loss stemming from methods people perceive as involving insufficient effort is in fact deemed less praiseworthy. For instance, previously overweight individuals who lost weight through bariatric surgery (perceived to be "low effort") were viewed less positively (i.e., were perceived to be lazier and less competent) than individuals who lost weight through diet and exercise ("high effort") (Fardouly and Vartanian, 2012). Educating people about the effort required to lose weight following surgery dampened negative evaluations of patients (Vartanian and Fardouly, 2014). In this light, a relative lack of perceived effort—whether or not this corresponds to *actual* effort—may prove to be a key factor driving some people's negative judgments about Ozempic use in people trying to lose weight.

This prediction would be unsurprising given that similar attitudes have been documented within the literature on so-called bio-enhancement (for an overview, see Gordon, 2022): For instance, people tend to view individuals who use cognitive enhancement drugs as less deserving of praise for their academic success and related rewards compared to those who do not use such enhancements (Faber et al., 2016). Similarly, people tend to disapprove of drugs that enhance moral capacities (Lucas et al., 2024) or even romantic love (cf. Buyukbabani et al., 2024), partly due to a perceived lack of personal effort involved (for related findings, see Lantian et al., 2024).

Moreover, while weight loss achieved through lifestyle changes positively alters people's evaluations of an overweight individual's character, weight loss through bariatric surgery does not. A series of studies by Vartanian and Fardouly consistently demonstrated that individuals who lost weight through surgery were rated as being just as "lazy"—a trait commonly regarded as a vice or moral failing—after their weight loss as they were before (Fardouly and Vartanian, 2012; Vartanian and Fardouly, 2013, 2014).[4] This is consistent with a body of research showing that a person's weight-related attributes, such as body size, food choices, or weight management methods are often *moralized* in laypeople's social judgments (e.g., Hayran et al., 2013; Jackson et al., 2023; Ringel and Ditto, 2019; Sikorski et al., 2011). In other words, there is evidence that both being overweight and attempting to lose weight through means that are judged to be relatively "low effort" may result in negative judgments about a person's moral character.

[3] Beyond Ozempic and Wegovy, semaglutide is also available under the brand name Rybelsus (an oral version approved for type 2 diabetes but not yet for weight loss). We refer to Ozempic throughout to simplify, and to reflect the term employed in the study materials, which we anticipated would be most familiar to participants. Please note that both the concept and measurement (for example, using BMI, waist circumference, etc.) of "obesity" and "overweight" are contested by various researchers, as are the relationship(s) between these descriptions (or associated bodily states) and various health conditions (see, e.g., Manne, 2024). Since we are here studying public attitudes and/or stereotypes as they relate to categories and concepts that are widely used in popular and medical discourses, we will, for the purposes of this work, employ these and related terms as they are used in those discourses. We do not, however, thereby necessarily indicate substantive agreement or disagreement with them. For a related ethical discussion of these issues, see Ryan and Savulescu (2025).

[4] However, weight loss through surgery did lead to improved perceptions in traits related to appearance and social skills.

Moral character judgments, in turn, relate to how individuals are fundamentally perceived as persons. A well-documented phenomenon in moral psychology and experimental philosophy, known as the "moral self effect," suggests that moral attributes, much more so than other types of traits such as desires or preferences, are viewed as being central to a person's identity. Changes in moral traits may thus lead a person to be seen as "becoming a different person" (Dranseika et al., 2023; Prinz and Nichols, 2016; Strohminger and Nichols, 2014; Tobia, 2016). In this work, we connect the literature on the "moral self effect" with the previously described literature on lay attitudes toward biomedical enhancement to investigate the potential impact of Ozempic use on both moral judgments and perceptions of identity change following significant weight loss. Much like with bariatric surgery, we reasoned that Ozempic-assisted weight loss, compared to "traditional" methods of diet and exercise alone, may fail to improve people's judgments about a person's presumed moral qualities. As a result, individuals who lose weight through Ozempic, compared to those who are perceived to invest greater effort in losing weight through diet and exercise, may not be viewed as having "truly changed" as persons.

In this work (one exploratory study; one pre-registered replication and extension study), we used the contrastive vignette technique (CVT; Burstin et al., 1980; Reiner, 2019) to examine these questions. In a between-subjects experimental design, participants were randomly assigned to read about a fictional overweight character losing weight in one of the following ways: through diet and exercise, Ozempic, or both. Then, they made judgments about perceived effort, praiseworthiness, and identity change (as well as "value change" in Study 2). We predicted that losing weight through diet and exercise would be perceived as more effortful, more praiseworthy, and more identity-changing than losing weight through Ozempic. We did not make a specific prediction in advance about the "combined" condition (Ozempic plus diet/exercise). Study 1, described next, was an exploratory study. Study 2 is a pre-registered replication and extension study with a larger sample size.

2. Study 1

2.1. Methods

2.1.1. Open science

The materials, anonymized data, and code to reproduce analyses for this study are available on the Open Science Framework at (OSF; https://osf.io/5z7dw/?view_only=e355141168464b48b8f4175ff9a8f597). This initial study was not pre-registered. To combat the "file-drawer" problem (Rosenthal, 1979) we hereby affirm that all data collected for the studies in this paper are reported either in the manuscript or the Supplemental Information file, and that there are no studies from our lab using this or a highly similar design (e.g. unreported pilot studies) that have not been included in this report.

2.1.2. Participants

312 U.S. participants[5] were recruited via Prolific using demographically representative sampling across age, sex, and race/ethnicity. Participants completed the study between May 19, 2024, and May 22, 2024. See Supplemental Information Section 2 for complete sample demographics, along with comparisons to nationally representative data from the U.S. Census. Data from participants who took less than 2 min to complete the survey, failed to complete the entire survey, or gave incorrect answers to an embedded attention check (n = 6) were excluded, resulting in a final sample of 306 participants (149 women; 150 men; 5 non-binary; 2 not declared; M_{age} = 38.14, SD = 13.85).

Table 1
1 × 3 design and vignettes, study 1.

Diet/Exercise	Ozempic	Both
For as long as she can remember, Susan[a] was significantly overweight. In early 2023, a big change happened in her life. **She started exercising regularly and eating a healthy diet.** As a result, she lost 50 pounds[b] over a one year period. For the first time in her life, Susan was now a healthy, average weight. Some of Susan's acquaintances who hadn't seen her for a while almost didn't recognize her.	For as long as she can remember, Susan was significantly overweight. In early 2023, a big change happened in her life. **She started using the injectable weight loss drug Ozempic which has been proven effective in scientific studies.** As a result, she lost 50 pounds over a one year period. For the first time in her life, Susan was now a healthy, average weight. Some of Susan's acquaintances who hadn't seen her for a while almost didn't recognize her.	For as long as she can remember, Susan was significantly overweight. In early 2023, a big change happened in her life. **She started using the injectable weight loss drug Ozempic which has been proven effective in scientific studies. She also started exercising regularly and eating a healthy diet.** As a result, she lost 50 pounds over a one year period. For the first time in her life, Susan was now a healthy, average weight. Some of Susan's acquaintances who hadn't seen her for a while almost didn't recognize her.

[a] "Susan" was randomly substituted for "Jim" and pronouns were adjusted to match. Vignettes were inspired by Vartanian and Fardouly (2014).
[b] about 23 kg. Weight was displayed in pounds due to the participants being sampled from the U.S.

2.1.3. Procedure

Participants read one of three vignettes about a person named Susan (or Jim, counterbalanced to account for potential gender effects)[6] who, after being significantly overweight throughout her life, had recently lost 50 pounds. Depending on the condition, we added a sentence in which Susan was described as having lost 50 pounds because she started pursuing a healthy lifestyle (*Diet/Exercise*), because she started using Ozempic (*Ozempic*), or because she did both (*Both*) (see Table 1 for exact wording). The *Both* condition was included to more clearly isolate the impact of each method, and for ecological validity, since it is recommended that Ozempic be taken in combination with healthy lifestyle changes (e.g., Wadden et al., 2021).

Next, participants provided ratings on perceived identity change, effort, and praiseworthiness, in that order. Identity change was fixed as the first rating scale shown to avoid demand effects (e.g., contemplating whether someone has changed as a person only after rating their praiseworthiness and effort). These variables were assessed within subjects, making it a 1 × 3 mixed factorial design, and each was measured using three items, presented in randomized order. As an exploratory measure, participants completed a scale assessing moral attitudes toward obesity (Ringel and Ditto, 2019); items and results for this measure are reported in the Supplemental Information Section 3. Lastly, they completed an attention check and answered demographic questions about age, gender, and political orientation. See Supplemental Information Section 4 for the exact wording of the attention check.

2.1.4. Measures

2.1.4.1. Effort. Participants responded to three items about the level of effort they believed to be involved in Susan's [Jim's] weight loss, presented in random order: (1) "How much effort was it for Susan to lose

[5] The data were collected in two waves (n = 82, collected on May 19, 2024; n = 230, collected on May 22, 2024), using identical methods and materials. The combined sample is reported here, but separate analyses yield similar results; see Supplemental Information Section 1. Sample size was determined based on available funding and previous experience with studies of this kind.

[6] Names were selected solely to convey gender and were not pretested for racialized or ethnic associations.

weight?" (0 = no effort at all, 100 = extreme effort), (2) "How difficult or easy was it for Susan to lose weight?" (0 = extremely difficult, 100 = very easy) (reverse-coded), (3) "How much of a sacrifice was Susan's weight loss?" (0 = no sacrifice at all, 100 = extreme sacrifice). Together these items formed a reliable measure of effort (α = .78) that served as the dependent variable.

2.1.4.2. Praiseworthiness. Participants answered three items assessing how much praise they would assign to Susan's [Jim's] weight loss, in random order: (1) "How praiseworthy was Susan's weight loss?" (0 = not at all praiseworthy, 100 = extremely praiseworthy), (2) "How proud should Susan be of losing the weight?" (0 = not at all proud, 100 = extremely proud), (3) "How morally objectionable was it for Susan to lose weight in the way that she did?" (0 = not at all objectionable, 100 = highly objectionable) (reverse-coded). Together these items formed a measure of praiseworthiness of borderline reliability[7] (α = .67) that served as the dependent variable.

2.1.4.3. Identity change. Participants responded to three items adapted from Earp et al.'s (2019) identity change measure to assess how much they felt that Susan [Jim] had changed as a person following the weight loss, in random order: (1) "In terms of changing or staying the same, how much would you say that Susan [Jim] is the same or a completely different person than before?" (0 = exactly the same person as before, 100 = completely different person than before), (2) "How much has Susan [Jim] changed as a person, if at all?" (0 = not at all, 100 = completely), (3) "There is a sense in which Susan [Jim] is not really the same person anymore." (0 = completely disagree, 100 = completely agree). Together these items formed a reliable measure of identity change (α = .85) that served as the dependent variable.

2.1.5. Analysis

We conducted three one-way ANOVAs to examine the effect of weight loss method on the dependent variables of effort, praiseworthiness, and identity change.

2.2. Results

2.2.1. Character gender

We found no significant effect of the target's gender (Susan vs Jim) on identity change (p = .931), effort (p = .565), or praiseworthiness scores (p = .257) and the following statistics do not account for this variable.

2.2.2. Effort ANOVA

There was a significant main effect of condition on perceived effort, $F(2, 303) = 88.17$, $p < .001$, $\eta^2 = .37$, 95 % CI [.30, 1.00], with significant differences across all conditions. Post hoc tests revealed that the most perceived effort was associated with weight loss via diet/exercise (M = 68.42, SD = 14.99), followed by the combined method (M = 59.42, SD = 17.94), followed by Ozempic (M = 35.69, SD = 21.10); see Fig. 1 and Table 2.

2.2.3. Praiseworthiness ANOVA

There was also a significant main effect of condition on praiseworthiness judgments, $F(2, 303) = 31.32$, $p < .001$, $\eta^2 = .17$, 95 % CI [.11, 1.00] with significant differences across all conditions. Weight loss via

[7] Exploratory analyses revealed that dropping item 3 improves Cronbach's alpha to α = .89. We therefore dropped this item prior to data collection in the replication Study 2. However, we chose to use the full 3-item measure for Study 1 for the sake of completeness in accordance with how the experiment was conducted. Reanalysing the data for Study 1 with the 2-item praiseworthiness measure does not appreciably change the main findings (see Supplemental Information Section 5).

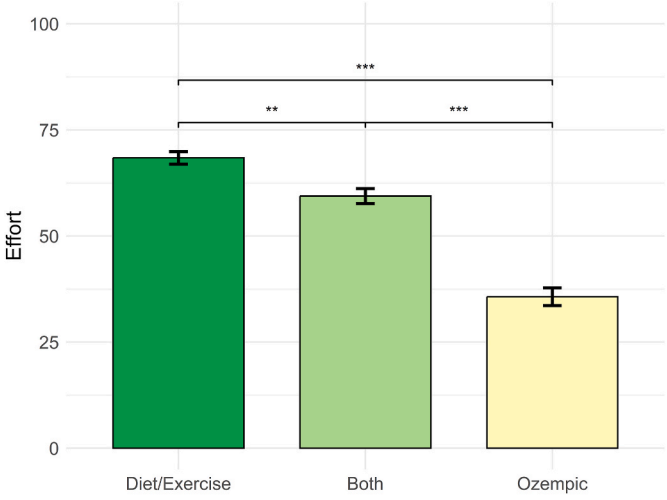

Fig. 1. Mean Scores of Perceived Effort Across Conditions, Study 1. Note: *p < .05, **p < .01, ***p < .001. Error bars represent ±1 standard error (SE).

Table 2
Pairwise comparisons of effort across all conditions, study 1.

	M_{diff}	95 % CI_{tukey}	SE	t (303)	p_{tukey}
Both vs. Diet/Exercise	−9.00	[-15.00, −3.00]	2.55	−3.53	.001**
Both vs. Ozempic	23.70	[17.70, 29.70]	2.55	9.32	<.001***
Diet/Exercise vs. Ozempic	32.70	[26.70, 38.70]	2.55	12.85	<.001***

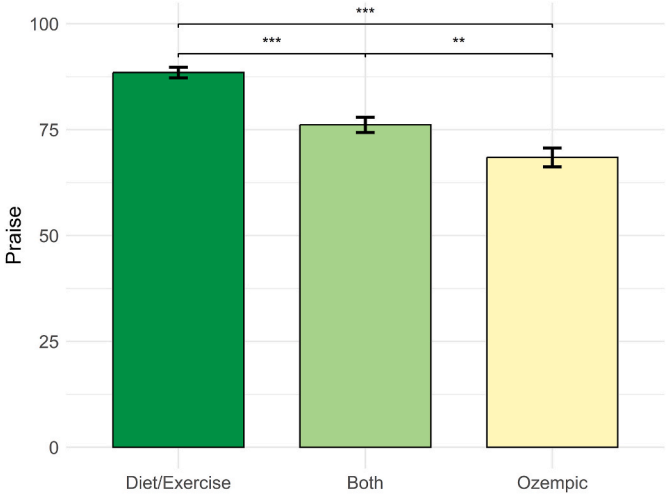

Fig. 2. Mean Scores of Perceived Praiseworthiness Across Conditions, Study 1. Note: *p < .05, **p < .01, ***p < .001. Error bars represent ±1 standard error (SE).

Table 3
Pairwise comparisons of praiseworthiness across all conditions, study 1.

	M_{diff}	95 % CI	SE	t (303)	p_{tukey}
Both vs. Diet/Exercise	−12.35	[-18.37, −6.33]	2.55	−4.83	<.001***
Both vs. Ozempic	−7.69	[1.67, 13.7]	2.55	3.01	.008**
Diet/Exercise vs. Ozempic	20.04	[14.02, 26.06]	2.55	7.84	<.001***

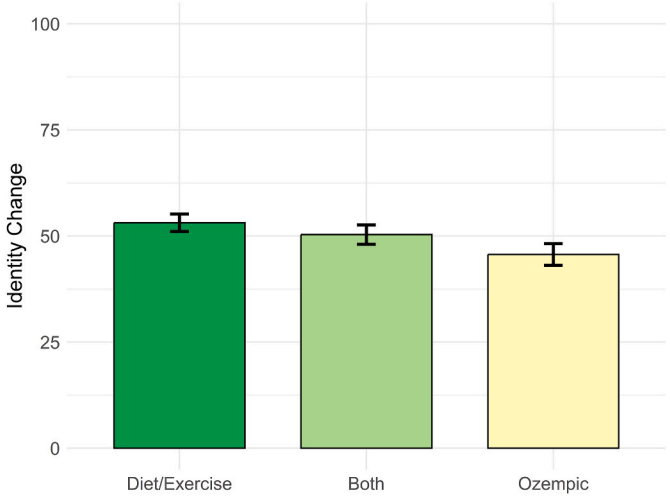

Fig. 3. Mean Scores of Perceived Identity Change Across Conditions, Study 1. Note: *$p < .05$, **$p < .01$, ***$p < .001$. Error bars represent ±1 standard error (SE).

diet and exercise was rated as most praiseworthy ($M = 88.49$, $SD = 12.72$), followed by the combined method ($M = 76.14$, $SD = 18.14$), followed by Ozempic only ($M = 68.45$, $SD = 22.53$); see Fig. 2 and Table 3.

2.2.4. Identity change ANOVA

A 1 × 3 ANOVA did not yield a significant main effect of condition on perceived identity change, $F(2, 303) = 2.66$, $\eta^2 = .02$, 95 % CI [.00, 1.00] $p = .071$. Weight loss via diet and exercise ($M = 53.12$, $SD = 20.75$) was perceived as more identity-changing than Ozempic ($M = 45.67$, $SD = 25.8$), but this was not statistically significant according to the .05 alpha criterion adopted by convention for this study ($p = .060$). There was no difference between *Diet/Exercise* and *Both* ($M = 50.33$, $SD = 23.10$), $p = .670$, nor between *Ozempic* and *Both*, $p = .327$; see Fig. 3 and Table 4.

2.3. Discussion

In this exploratory study, weight loss via Ozempic use was rated as less effortful and less praiseworthy than diet and exercise, even when the outcome (i.e., losing 50 pounds) was held constant. In fact, even when Ozempic use was explicitly combined with diet and exercise, as recommended, it was still seen as less effortful and less praiseworthy than diet and exercise (i.e., "lifestyle change") alone.

These results are in line with previous work showing that weight loss methods perceived to be "low effort" such as bariatric surgery are viewed less positively than "high effort" lifestyle interventions (Fardouly and Vartanian, 2012). They are also consistent with some theories of effort, according to which well-directed expenditure of effort, beyond being a mere cost, can be a source of personal meaning (Campbell et al., 2025), a potential signal of self-discipline in a prospective cooperation partner (Baumeister and Exline, 1999; Baurneister and Stillman, 2008), and one important determinant of an achievement's perceived value (Kriegstein, 2017; see also Danaher and Nyholm, 2020). Thus, people may often view the same outcomes as being more valuable if more, not less, effort was used to attain them, holding all else equal (Inzlicht et al., 2018), i.e., assuming that the effort is rational/reasonable, proportionate to the intended outcome, oriented toward an appropriate goal, and so on (for a theoretical discussion with caveats, see Gordon, 2022; see also Khan et al., 2025) for potentially conflicting findings in the domain of art production).

Table 4
Pairwise comparisons of effort across all conditions, study 1.

	M_{diff}	95 % CI_{tukey}	SE	$t(303)$	p_{tukey}
Both vs. Diet/Exercise	−2.78	[-10.47, 4.90]	3.26	−.85	.670
Both vs. Ozempic	4.67	[-3.02, 12.41]	3.26	3.01	.327
Diet/Exercise vs. Ozempic	7.45	[-.23, 15.10]	3.26	7.84	.060

With respect to perceived identity change, although the method of weight loss resulted in response patterns consistent with theoretical expectations based on the "moral self effect," such that any Ozempic use (either on its own, or combined with diet and exercise) was associated with less perceived identity change, these differences were not statistically significant at the .05 level. A post-hoc power analysis showed that we had only 59 % power to detect the observed effect size of $\eta^2 = .02$, suggesting that a larger sample would be required to establish statistical significance. To explore this issue further, we conducted a larger, preregistered replication and extension study, described next.

3. Study 2

In Study 2, we had two primary aims: first, to test whether the statistically significant effects on the dependent variables of effort and praiseworthiness in Study 1 replicated with a larger sample; and second, to take a further and higher-powered look at the question of whether and how people perceive others' identity changing as a result of their chosen weight loss method.

Although we did not find a statistically significant effect of condition on identity change in Study 1, possibly due to an insufficient sample size, the numerical differences were consistent with the previously described attitude among some (Rosenfield, 2024) that Ozempic is a kind of "cheat code" or shortcut to having a slimmer body (widely, if controversially, regarded as desirable in certain cultures; see Swami, 2015), on cultural variance in body size ideals), potentially eliciting negative attitudes. This would be similar to lay attitudes observed in Western samples toward the use of other biomedical technologies to achieve what are seen as morally positive outcomes (e.g., Lucas et al., 2024). According to this view, Ozempic enables users to bypass the virtues of effort and willpower required to become truly healthy (as discussed by Ryan and Savulescu, 2025)—a state that, we emphasize, is often conflated with thinness, just as fatness is often inappropriately conflated with unhealthiness and laziness (see Manne, 2024).

If this interpretation of Ozempic use as bypassing morally valuable effort is correct, it would be consistent with both the "moral self effect" (Strohminger and Nichols, 2014) and the moralization of fatness/thinness (Ringel and Ditto, 2019) discussed previously. In other words, a relative lack of perceived identity change in the case of weight loss involving Ozempic use could be driven by an associated moral belief: namely, that Ozempic users have failed to acquire relevant moral traits through their pharmacologically-supported process of weight loss (e.g., they have not increased their level of self-discipline, which is regarded as a moral trait in many cultures; see Baumeister and Exline, 1999). Since their underlying values haven't changed, this lay theory would hold, they haven't really changed in terms of "who they are, deep down inside" (i.e., their true self; see Strohminger et al., 2017), despite outwardly inhabiting a slimmer figure.

To assess this possibility while also addressing the problem of insufficient power from Study 1, we added an additional measure: a "value change" measure in which we directly assess participants' beliefs that the character's underlying values have or have not changed through the process of weight loss. Otherwise, apart from a small change to the wording of vignettes and the measure of praiseworthiness, described below, the materials and procedure for Study 2 are identical to those of Study 1.

3.1. Methods

3.1.1. Open science

The hypotheses, sampling and analysis plan, sample size, and exclusion criteria were pre-registered at aspredicted.com (#207869). As with Study 1, the materials, anonymized data, and code to reproduce analyses are available on the Open Science Framework at (OSF; https://osf.io/5z7dw/?view_only=e355141168464b48b8f4175ff9a8f597).

3.1.2. Participants

Sample size was determined via an a priori power analysis using the *pwr.f2.test* function in the *pwr* R package. We established 90 % power to detect an effect of $f^2 = .02$ with an alpha level of .05, and 2 numerator degrees of freedom. This approach revealed a target sample size of 669 participants, assuming a 5 % drop-out rate. Ultimately, 729 U.S. participants (demographically representative across age, sex, and race/ethnicity) were recruited via Prolific and completed the survey on January 14, 2025. Participants who took part in Study 1 were not invited to participate in Study 2. Data from participants who took less than 1 min[8] to complete the survey, failed to complete the entire survey, or gave incorrect answers to at least one of the two embedded attention checks ($n = 50$) were excluded, resulting in a final sample of 679 participants (352 women; 316 men; 5 non-binary; 3 self-described, 3 not declared; $M_{age} = 46.15$, $SD = 15.76$).

3.1.3. Procedure

The design and stimuli for Study 2 were the same as in Study 1, except that "In early 2023, a big change happened in her [his] life" was changed to "About a year ago, a big change happened in her [his] life." The identity change measure was presented first, followed by the new *value change* measure, described below. Perceived effort and praiseworthiness measures were subsequently presented in a randomized order, as these yielded robust results in Study 1.

3.1.4. Measures

3.1.4.1. Effort and identity change. We employed the same set of effort and identity change items as in Study 1. Reliability was acceptable for both measures (α = .77 and .87, respectively).

3.1.4.2. Praiseworthiness. The praiseworthiness items were the same as in Study 1, except that item 3 ("How morally objectionable was it for Susan to lose weight in the way that she did?") was dropped to improve reliability as explained in Footnote 5. Thus, a modified 2-item praiseworthiness measure was used for Study 2, with very good reliability (α = .89). The corresponding correlation coefficient (*r*) between the two items was equal to .82.

3.1.4.3. Value change. To assess perceived value change, we initially developed seven items which assessed how much participants felt Susan's [Jim's] values had changed over the course of the story. A reliability analysis for the full set of seven items revealed high internal consistency (α = .93), indicating possible redundancy. We conducted an exploratory factor analysis (EFA), which confirmed that all items loaded onto a single factor with no low loadings (<.40) or high uniqueness values (>.47). Using iterative item elimination, we systematically removed items while monitoring changes in Cronbach's alpha. The final three-item subset maintained high reliability (α = .90) while reducing redundancy: (1) "How much have Susan's [Jim's] core values changed, if at all?" (0 = no change, 100 = complete change) (2) "Susan [Jim] now approaches life with a different set of guiding principles." (0 = completely disagree, 100 = completely agree) (3) "Susan [Jim] has undergone a significant shift in her moral character." (0 = completely disagree, 100 = completely agree). Together these items formed a measure of value change that served as the dependent variable. The items were presented in random order.

3.1.5. Analysis

As pre-registered, we conducted four one-way confirmatory ANOVAs to examine the effect of weight loss method on the dependent variables of effort, praiseworthiness, identity change, and value change. As a confirmatory hypothesis, we predicted that losing weight through Ozempic would be seen as less effortful and less praiseworthy compared to weight loss through diet/exercise, or both. We also predicted that diet/exercise would be seen as more identity changing than Ozempic use, at least when the latter is used on its own. As an exploratory hypothesis, we tested whether the same pattern as just described would hold for "value change" (i.e., the extent to which the person's underlying values have truly changed). We also conducted an exploratory analysis testing whether participants' "value change" judgments would account for any observed differences in perceived identity change across conditions. To do this, we asked whether inclusion of the value change measure as an additional predictor in the model of identity change judgments attenuates (or eliminates) the predicted effect of condition on identity change. The results of this last analysis are reported in the Supplemental Information Section 6.

3.2. Results

3.2.1. Character gender and demographics

Similar to Study 1, we found no significant effect of the target's gender (Susan vs Jim) on effort ($p = .081$), praiseworthiness ($p = .430$), identity change ($p = .913$), or value change ($p = .878$) scores. Target gender is therefore not reflected in the following analyses. Please note that the following ANOVA results remain robust after controlling for participant demographic factors; see Supplemental Information Section 7.

3.2.2. Effort ANOVA

Consistent with our pre-registered confirmatory hypothesis, and replicating the results from Study 1, a 1 × 3 ANOVA yielded a significant main effect of condition on perceived effort, $F(2, 676) = 148.1$, $p < .001$,

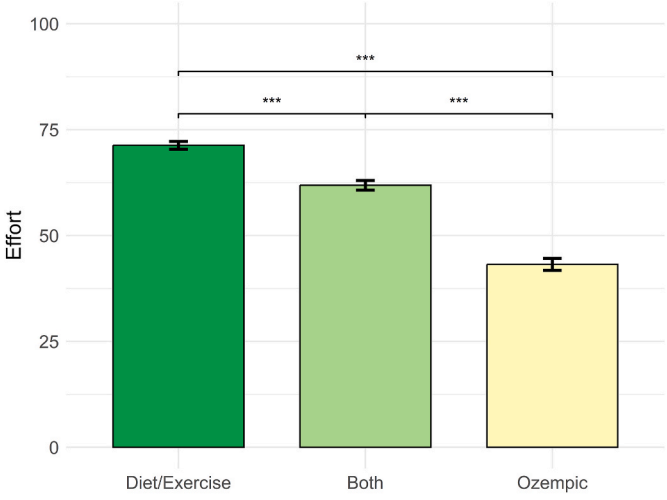

Fig. 4. Mean Scores of Perceived Effort Across Conditions, Study 2. Note: *$p <$ .05, **$p < .01$, ***$p < .001$. Error bars represent ±1 standard error (SE).

[8] In Study 1, we estimated that a minimum of 2 min would be required for participants to adequately process the information. However, the observed median response time was 2 min and 20 s, suggesting that participants needed less time than anticipated. As a result, we lowered the minimum time threshold to 1 min.

Table 5
Pairwise comparisons of effort across all conditions, study 2.

	M_{diff}	95 % CI_{tukey}	*SE*	*t*(303)	p_{tukey}
Both vs. Diet/Exercise	−9.42	[-13.3, −5.6]	1.64	−5.72	<.001***
Both vs. Ozempic	18.68	[14.8, 22.6]	1.66	11.26	<.001***
Diet/Exercise vs. Ozempic	28.10	[24.2, 32.0]	2.66	16.94	<.001***

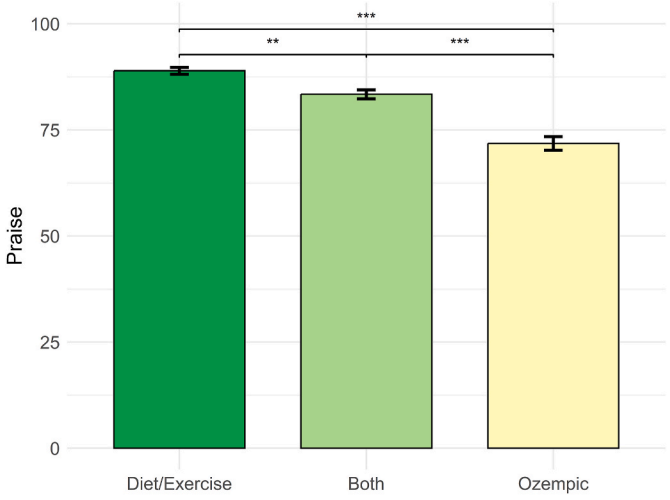

Fig. 5. Mean Scores of Perceived Praiseworthiness Across Conditions, Study 2. Note: *$p < .05$, **$p < .01$, ***$p < .001$. Error bars represent ±1 standard error (SE).

Table 6
Pairwise comparisons of praiseworthiness across all conditions, study 2.

	M_{diff}	95 % CI_{tukey}	*SE*	*t*(303)	p_{tukey}
Both vs. Diet/Exercise	−5.54	[-9.5, −1.6]	1.68	−3.30	.003**
Both vs. Ozempic	11.58	[7.6, 15.6]	1.69	6.83	<.001***
Diet/Exercise vs. Ozempic	17.12	[13.1, 21.1]	2.69	10.10	<.001***

$\eta^2 = .30$, 95 % CI [.26, 1.00]. Weight loss via diet and exercise ($M = 71.30$, $SD = 14.04$) was perceived as the most effortful, followed by the combined method ($M = 61.88$, $SD = 17.17$), with weight loss via Ozempic with no mention of diet or exercise rated as the least effortful ($M = 43.20$, $SD = 21.02$); see Fig. 4 and Table 5.

3.2.3. Praiseworthiness ANOVA

Consistent with our pre-registered confirmatory hypothesis, and replicating the results from Study 1, there was also a significant main effect of condition on praiseworthiness judgments, $F(2, 676) = 53.0$, $p < .001$, $\eta^2 = .14$, 95 % CI [.10, 1.00]. Perceived praiseworthiness differed significantly across all conditions, with diet and exercise rated as the most praiseworthy ($M = 88.94$, $SD = 12.45$), followed by the combined method ($M = 71.82$, $SD = 23.92$), and Ozempic only as the least praiseworthy ($M = 83.40$, $SD = 15.82$); see Fig. 5 and Table 6.

3.2.4. Identity change ANOVA

Consistent with our pre-registered confirmatory hypothesis, and replicating the pattern of data observed in Study 1 (albeit, now with statistically significant results), there was a significant main effect of

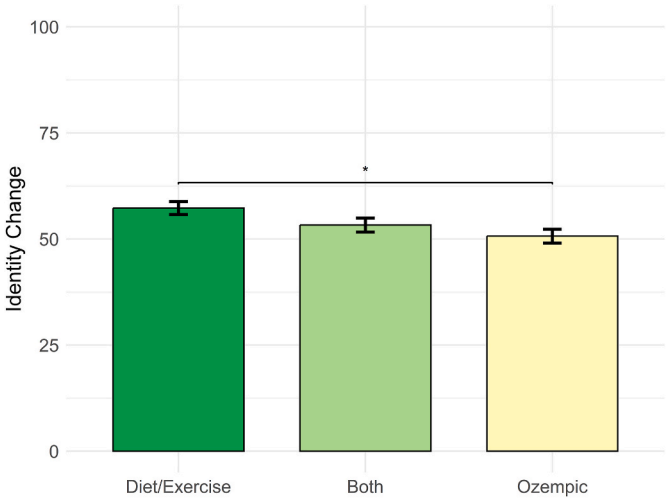

Fig. 6. Mean Scores of Perceived Identity Change Across Conditions, Study 2. Note: *$p < .05$, **$p < .01$, ***$p < .001$. Error bars represent ±1 standard error (SE).

Table 7
Pairwise comparisons of identity change across all conditions, study 2.

	M_{diff}	95 % CI_{tukey}	*SE*	*t*(303)	p_{tukey}
Both vs. Diet/Exercise	−3.99	[-9.3, −1.3]	2.25	−1.77	.181
Both vs. Ozempic	2.63	[-2.7, 8.0]	2.27	1.16	.479
Diet/Exercise vs. Ozempic	6.61	[1.3, 12.0]	2.27	2.91	.010*

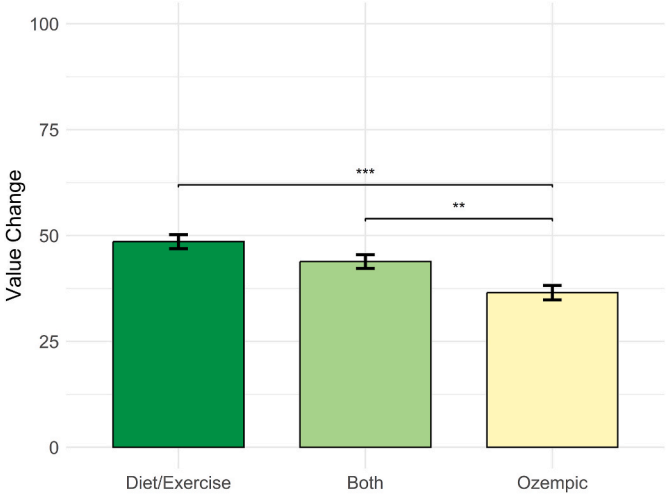

Fig. 7. Mean Scores of Perceived Value Change Across Conditions, Study 2. Note: *$p < .05$, **$p < .01$, ***$p < .001$. Error bars represent ±1 standard error (SE).

Table 8
Pairwise comparisons of value change across all conditions, study 2.

	M_{diff}	95 % CI_{tukey}	*SE*	*t*(303)	p_{tukey}
Both vs. Diet/Exercise	−4.70	[-10.2, .7]	2.32	−2.02	.107
Both vs. Ozempic	7.34	[1.8, 12.9]	2.34	3.13	.005**
Diet/Exercise vs. Ozempic	12.05	[6.5, 17.6]	2.34	5.14	<.001***

weight loss method on perceived identity change, $F(2, 676) = 4.31$, $p = .014$, $\eta^2 = .01$, 95 % CI [.00, 1.00]. Weight loss through diet and exercise ($M = 57.29$, $SD = 22.99$) was perceived as more identity-changing than weight loss through Ozempic ($M = 50.68$, $SD = 24.38$). However, there were no significant differences between *Diet/Exercise* and *Both* ($M = 53.31$, $SD = 24.88$), $p = .181$, or between *Ozempic* and *Both*, $p = .479$; see Fig. 6 and Table 7.

3.2.5. Value change ANOVA

Consistent with our pre-registered exploratory hypothesis, we found a significant main effect of condition on perceived value change, $F(2, 676) = 13.38$, $p < .001$, $\eta^2 = .04$, 95 % CI [.02, 1.00]. A person who lost weight through diet and exercise ($M = 48.57$, $SD = 24.75$) was perceived to experience a bigger value change than a person losing weight through Ozempic ($M = 36.52$, $SD = 25.26$). Additionally, the combined weight loss method was perceived as more value-changing than Ozempic alone. However, there was no significant difference between *Diet/Exercise* and *Both* ($M = 43.86$, $SD = 24.58$), $p = .107$; see Fig. 7 and Table 8.

3.3. Discussion

Study 2 was designed as a replication of Study 1, with a measure of perceived value change added as an exploratory variable. Consistent with Study 1, weight loss through diet and exercise was perceived as the most effortful and most praiseworthy method, followed by the combined approach, while weight loss via Ozempic only was seen as the least effortful and least praiseworthy. Additionally, Ozempic use was perceived as less identity-changing than diet and exercise. A person taking Ozempic was also seen as less changed in their underlying values compared to a person using diet and exercise only or the combined method. Moreover, the effect of condition on perceived identity change was largely accounted for by perceptions of value change, suggesting a possible mediating role for the latter. However, the effects of condition on identity change ($\eta^2 = .01$) and value change ($\eta^2 = .04$) appear less robust than those on effort ($\eta^2 = .30$) and praiseworthiness ($\eta^2 = .14$), as indicated by smaller effect sizes.

4. General discussion

Across both Study 1 and Study 2, we consistently found that weight loss through diet and exercise, without medication, was perceived as more effortful and more praiseworthy than weight loss through the use of Ozempic, even when the latter was described as being used alongside diet and exercise. These findings align with previous research showing that bariatric surgery, another technologically-mediated weight loss method, is rated less positively than weight loss via traditional lifestyle change, and that this is due to perceptions of diminished effort (Fardouly and Vartanian, 2012; Vartanian and Fardouly, 2013, 2014). Thus, when it is explained to participants that substantial personal effort is still required to lose weight following such surgery, negative perceptions are decreased (Vartanian and Fardouly, 2014). Within the biomedical enhancement literature, studies have likewise documented negative attitudes toward the use of certain drugs to achieve a valued outcome (e.g., Ritalin use without a prescription during exam season). Such use is often seen as morally problematic and is sometimes characterized as resulting in undeserved or "hollow" achievements; see also Mihailov et al. (2021).

Strikingly, in both of our studies, a character described as using Ozempic while *also* engaging in regular exercise and eating more healthily (*Both*) was rated as investing less effort and as deserving less praise than a character who relied solely on diet and exercise (*Diet/Exercise)*. Since the same phrase, stating that the character had started "exercising regularly and eating a healthy diet," was used in both conditions, it might initially seem puzzling why ratings of effort and praiseworthiness would be lower when, *on top of* making such so-called lifestyle changes, Ozempic was described as also being used.

One possible solution to this puzzle is that participants in *Both* might have inferred that if Ozempic is used, relatively *less* exercise and/or effortful dieting would be required to lose 50 pounds (i.e., compared to the magnitude or difficulty of the changes presumed to be required to lose the same amount of weight without medication). From a medical perspective, Ozempic is thought to work, at least in part, by increasing satiety and thus reducing the desire to (over-) eat (Mowbray, 2024). Even holding exercise constant, therefore, the *specific* effort that is required to change one's eating behavior if taking Ozempic (i.e., in a way that can be expected to result in weight loss) may indeed be somewhat reduced, all else being equal. From this perspective, participants could be making a broadly reasonable inference about the relative effort that would be required for a given person to lose weight with, versus without, the use of Ozempic. However, this is only if one focuses solely on the effort required to resist certain appetitive desires.

In reality, things are not so simple. For example, there may be an increase in the effort or sacrifice required to deal with the potential side effects of Ozempic (which can be significant; see Hannemann, 2025); to strictly adhere to a new medication regimen; or even to weather potential social costs, such as gossip or speculation about one's method of weight loss. Doing these things in pursuit of a personally valued goal could thus be seen as evidence of a "costly commitment," which some philosophers have argued is deserving of praise in its own right, that is, independently of the specific amount of effort that is expended along a given dimension (Maslen et al., 2020).

Similar to the bariatric surgery studies cited above, therefore, it may turn out that educating participants, or the public more generally, about the challenges or difficulties that can be associated with Ozempic use would increase perceptions of praiseworthiness and/or effort. We are currently engaged in some work to test this hypothesis. Whether promoting weight loss through Ozempic is itself a desirable goal is a separate question, shaped by distinct ethical considerations such as the risk of reinforcing prejudiced attitudes toward overweight people – an issue we will revisit in the concluding paragraphs.

Moreover, it should be remembered that *sheer* expenditure of effort is not necessarily valuable. Making something "harder than it needs to be"—that is, expending effort needlessly or without sufficient justification—may also be seen as undesirable. A promising avenue for future work, therefore, might be to systematically manipulate the *reasons* or *justifications* for using Ozempic in addition to, or even in lieu of, significantly increased exercise or dietary changes (e.g., due to an urgent health condition, to be able to spend more time on other valued pursuits, and so on). Clarifying that Ozempic may be medically necessary for some users, and therefore taken for very good reasons, may similarly increase perceptions of praiseworthiness.

These observations point to an aspect of our current studies that can be seen as both a strength and a limitation: namely, our choice to employ a minimal description both of Ozempic use and of any changes in diet and exercise. For example, we do not describe the reason for taking Ozempic in the relevant conditions; nor do we explain the drug's theorized mechanism of action; nor do we detail the nature or magnitude of any "lifestyle changes" apart from the generic description given. This is because we wanted to capture the realistic situation in which a third party learns about another's Ozempic use, but without necessarily knowing their reasons for doing so (e.g., medical versus non-medical use), how the drug works on a mechanistic level, or the precise dietary or exercise habits of the individual.

In other words, we wanted to capture laypeople's *stereotype* of Ozempic users, given the large role that stereotypes—however accurate or inaccurate—are known to play in shaping public attitudes about certain group members, including those who are marginalized on the basis of their body size or weight (e.g., De Caroli et al., 2017; O'Brien et al., 2013; see also Manne, 2024). To be able to address potential harms of any stereotyped attitudes toward overweight Ozempic users, it is necessary first to understand the nature and content of these stereotypes, and to identify the factors that inform them.

One aspect of the stereotype regarding overweight people in general, as noted, is that they are lazy or otherwise lack self-discipline or self-control (De Caroli et al., 2017). This stereotype, in turn, may shape attitudes toward overweight users of Ozempic, specifically. After all, if Ozempic use is interpreted as a "shortcut" to losing weight, as anecdotal evidence suggests it often is, its use by overweight persons might then be interpreted as "yet more" evidence that the stereotype about laziness is true. Consistent with this possibility, in our studies, a character described as losing weight solely through Ozempic (with no mention of diet or exercise) was perceived as having undergone less change in their underlying values compared to someone who incorporated diet and exercise into their weight loss regimen. This could explain why the character was likewise seen as less of a "different person" (i.e., given the "moral self effect" as previously described). Future work could test this hypothesis by manipulating evidence of weight loss-associated values change independently of Ozempic use and measuring the effects on perceived identity change.

4.1. Limitations

Our studies have several important limitations. First, all participants were based in the U.S. where attitudes toward Ozempic, body size ideals, or other relevant variables may differ from those in other populations (e.g., due to factors such as the accessibility and cost of the drug, prevailing norms around body image and health, and varying levels of trust in pharmaceutical solutions). Moreover, as discussed in the introduction, values particularly prominent in the U.S. (e.g., the Protestant work ethic, neoliberalism, healthism) are closely linked to anti-fat attitudes and the moralization of obesity (Jiménez-Loaisa et al., 2020; Ringel and Ditto, 2019). Future research should explicitly assess the moderating effects of these ideological attitudes on perceptions of Ozempic use and extend replication efforts across diverse cultural contexts. In addition, as our current studies did not measure participant characteristics such as body size, weight loss history, and experience with Ozempic, later studies should investigate how these factors influence perceptions of different weight loss methods or behaviors.

Another key limitation concerns the design of our studies. As discussed, the scenarios included minimal details so that people would respond according to what they intuitively assumed to be the case (e.g., based on stereotypes, as is often the case in real life). However, this makes it harder to isolate the relative contribution of different factors that could be driving the observed results, such as potentially differing inferences about lifestyle changes versus a more general bias against "unnatural" weight loss methods (see, e.g., Gaskell et al., 2000, on public attitudes toward supposedly "unnatural" biotechnological interventions, focused on the example of genetically modified foods).

Another variable that should be manipulated in future work is the starting weight of the individual. The societal moralization of obesity (Ringel and Ditto, 2019) suggests that while overweight individuals may often face criticism for their chosen weight loss methods, already slim individuals trying to maintain their weight, or even to lose weight, by similar methods might be praised for their "dedication." If this extends to Ozempic use, such that overweight characters are praised less for using Ozempic compared to non-overweight characters, this might suggest that relatively negative attitudes toward Ozempic use, such as those observed in the present studies, are not just about "too easy" weight loss. Rather, they might reflect negative assumptions and stereotypes about overweight individuals more broadly (as has been extensively documented; see preceding references). However, the reverse may also be true—people might feel more positively toward overweight individuals who use Ozempic, especially if they are described as having a related health condition, than toward those who are not considered overweight or who are using Ozempic for so-called cosmetic reasons. (This, in turn, might explain why the media uproar thus far has focused so much on celebrities.)

4.2. Ethical and social implications

In our studies, we have focused on public attitudes around Ozempic, finding that U.S. participants make *relatively* negative (though still positive overall) praiseworthiness judgments toward Ozempic users compared to those who rely on diet and exercise alone. But this does not address the substantive ethical or social-policy question about whether it would be better, all things considered, if Ozempic use was, in fact, seen as deserving of greater praise relative to "lifestyle" changes than is currently the case. Is large-scale weight loss through Ozempic something societies should try to promote, perhaps by finding ways to improve attitudes toward Ozempic users and/or destigmatize Ozempic use?

Scholars have begun to evaluate this question, arguing that the adoption of Ozempic as a common weight loss method could have a diversity of effects, both good and bad. On the positive side, it could help many people who are experiencing genuine health difficulties associated with their diet or weight to ameliorate some of those difficulties, thereby boosting their health and well-being in that respect. On the negative side, some authors suggest that the promotion of Ozempic as a desirable weight loss solution could contribute to *fatphobia*, a concept that has recently been (re)theorized by the philosopher Kate Manne (2024) as a structural form of oppression in which society unjustly ranks bodies—especially larger ones—as inferior in domains such as health, morality, sexuality, and intellect.

For example, Ryan and Savulescu (2025) suggest that the drug's widespread accessibility may reinforce the view of obesity as a personal choice. Thus, overweight individuals may be seen as lacking a justifiable "excuse" for remaining overweight. From this perspective, even if diet and exercise fail, Ozempic presents as a low-effort "cure" such that choosing not to take it could be construed as a deliberate refusal to change in the way that society demands. Consequently, the existence of overweight bodies in society may be further delegitimized, leading to fewer accommodations or otherwise resulting in fat or overweight people becoming even more marginalized.

Moreover, anti-fat attitudes are deeply intertwined with class ideology. Even if Ozempic becomes increasingly accessible, it is unlikely that everyone will be able to afford the drug – especially in countries like the U.S., where almost 8 % of Americans are uninsured (Tsai, 2023). Consequently, only individuals with sufficient economic status will realistically be able to "escape the anti-fat gaze" (Oswald, 2024, p. 131). This pattern has already been observed with bariatric surgery, a procedure that is significantly more likely to be undertaken by individuals with private insurance and those identifying as Caucasian (Hecht et al., 2020). As Oswald notes, the belief that one must work hard to overcome fatness may shift into the belief that those who remain overweight will need to work harder to earn enough money to access "fat-loss" (Oswald, 2024).

Of course, there are additional ethical considerations. For example, overprescription of semaglutide could lead doctors to overlook underlying health issues in patients (Tolentino, 2023), while governments may use it as an excuse to avoid making difficult policy decisions (Davis, 2023). Yet, the conversation does not end with medical ethics or the treatment of overweight individuals. As reflected in numerous opinion pieces (e.g., Friedman, 2025; Mhloyi, 2023; Tolentino, 2023), many commentators anticipate that weight loss drugs could reshape the way people think about health and beauty more generally. The prevailing worry is that widespread use (especially among those who fall below clinical obesity levels and use the drugs for off-label aesthetic purposes; Han et al., 2024) could reignite a societal fixation on thinness, raise beauty standards for everyone, and undermine progress in promoting acceptance of body diversity and reducing unjust weight-based discrimination.

In light of these concerns, we do not necessarily advocate for increasing the perceived praiseworthiness of Ozempic use relative to current perceptions. Instead, we call for systematic research into the factors shaping public attitudes and stereotypes about Ozempic, using

tools from experimental psychology and experimental bioethics (Earp et al., 2021; Reiner, 2019). Understanding how this powerful technology can be integrated into society without exacerbating prejudice or unjust inequalities will be essential for fostering productive public discourse.

CRediT authorship contribution statement

Maria Bachmakova: Writing – review & editing, Writing – original draft, Visualization, Validation, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Mey Bahar Buyukbabani:** Methodology, Investigation, Formal analysis, Data curation. **Vilius Dranseika:** Writing – review & editing, Methodology. **Rebecca C.H. Brown:** Writing – review & editing, Methodology. **Katrien Devolder:** Writing – review & editing, Conceptualization. **Nanette Ryan:** Writing – review & editing. **Julian Savulescu:** Writing – review & editing, Supervision. **Jim A.C. Everett:** Writing – review & editing, Methodology, Funding acquisition. **Ivar Hannikainen:** Writing – review & editing, Supervision, Methodology, Conceptualization. **Brian D. Earp:** Writing – review & editing, Supervision, Project administration, Methodology, Conceptualization.

Ethics approval statement

This study received ethical approval from the University of Oxford Central University Research Ethics Committee (CUREC), reference number [R80692/RE006].

Declaration of competing interest

JS is an advisor of AminoChain, Inc., a Bioethics Committee consultant for Bayer and a Bioethics Advisor to the Hevolution Foundation. The other authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.socscimed.2025.118657.

Data availability

The materials, anonymized data, and code to reproduce analyses for this study are available on the Open Science Framework at (OSF; https://osf.io/5z7dw/?view_only = e355141168464b48b8f4175ff9a8f597).

References

Arastu, N., Cummins, O., Uribe, W., Nemec, E.C., 2022. Efficacy of subcutaneous semaglutide compared to placebo for weight loss in obese, non-diabetic adults: a systematic review & meta-analysis. Int. J. Clin. Pharm. 44 (4), 852–859. https://doi.org/10.1007/s11096-022-01428-1.

Baumeister, R.F., Exline, J.J., 1999. Virtue, personality, and social relations: self-control as the moral muscle. J. Pers. 67 (6), 1165–1194. https://doi.org/10.1111/1467-6494.00086.

Baurneister, R.F., Stillman, T.F., 2008. Self-regulation and close relationships. In: The Self and Social Relationships. Psychology Press, pp. 139–158.

Burstin, K., Doughtie, E.B., Raphaeli, A., 1980. Contrastive vignette technique: an indirect methodology designed to address reactive social attitude measurement. J. Appl. Soc. Psychol. 10 (2), 147–165. https://doi.org/10.1111/j.1559-1816.1980.tb00699.x.

Buyukbabani, M., Earp, B.D., Hannikainen, I., Barba, T., Mihailov, E., David B, Y., Savulescu, J., 2024. Moral attitudes toward pharmacologically assisted couples therapy: an experimental bioethics study of real-world 'love drugs.'. AJOB Neurosci. 15 (4), 239–243. https://doi.org/10.1080/21507740.2024.2402221.

Caplan, A., 2024. Larger issues accompany weight-loss drugs. BostonGlobe.Com. https://www.bostonglobe.com/2024/09/19/opinion/larger-issues-accompany-weight-loss-drugs/.

Carels, R.A., Young, K.M., Wott, C.B., Harper, J., Gumble, A., Hobbs, M.W., Clayton, A. M., 2009. Internalized weight stigma and its ideological correlates among weight loss treatment seeking adults. Eat. Weight Disorder Stud. Anorexia Bulima Obesity 14 (2), e92–e97. https://doi.org/10.1007/BF03327805.

Carmina, E., Longo, R.A., 2023. Semaglutide treatment of excessive body weight in obese PCOS patients unresponsive to lifestyle programs. J. Clin. Med. 12 (18), 5921.

Davis, N., 2023. New diabetes drugs do not tackle root causes of obesity, experts warn. Guardian. https://www.theguardian.com/society/2023/feb/05/new-diabetes-drugs-do-not-tackle-root-causes-of-obesity-experts-warn.

De Caroli, M.E., Sagone, E., Licciardello, O., Hichy, Z., 2017. Prejudicial and stereotypical attitudes about the issue of obesity: an action Project. Psychology 8 (13), 2174–2186. https://doi.org/10.4236/psych.2017.813138.

Dranseika, V., Nichols, S., Strohminger, N., 2023. Which kind of sameness? Disambiguating two senses of identity with a novel linguistic task. Cognition 238, 105545. https://doi.org/10.1016/j.cognition.2023.105545.

Earp, B.D., Lewis, J., Dranseika, V., Hannikainen, I.R., 2021. Experimental philosophical bioethics and normative inference. Theor. Med. Bioeth. 42 (3–4), 91–111. https://doi.org/10.1007/s11017-021-09546-z.

Earp, B.D., Skorburg, J.A., Everett, J.A.C., Savulescu, J., 2019. Addiction, identity, morality. AJOB Empirical Bioethics 10 (2), 136–153. https://doi.org/10.1080/23294515.2019.1590480.

Faber, N.S., Savulescu, J., Douglas, T., 2016. Why is cognitive enhancement deemed unacceptable? The role of fairness, deservingness, and hollow achievements. Front. Psychol. 7. https://doi.org/10.3389/fpsyg.2016.00232.

Fardouly, J., Vartanian, L.R., 2012. Changes in weight bias following weight loss: the impact of weight-loss method. Int. J. Obes. 36 (2), 314–319. https://doi.org/10.1038/ijo.2011.26.

Friedman, V., 2025. Why ultrathin is in. N. Y. Times. https://www.nytimes.com/2025/03/20/style/ultra-thin-models.html.

Gaskell, G., Allum, N., Bauer, M., Durant, J., Allansdottir, A., Bonfadelli, H., Boy, D., de Cheveigné, S., Fjaestad, B., Gutteling, J.M., Hampel, J., Jelsøe, E., Jesuino, J.C., Kohring, M., Kronberger, N., Midden, C., Nielsen, T.H., Przestalski, A., Rusanen, T., et al., 2000. Biotechnology and the European public. Nat. Biotechnol. 18 (9), 935–938. https://doi.org/10.1038/79403.

Gordon, E.C., 2022. Human Enhancement and Well-Being: a Case for Optimism. Routledge. https://doi.org/10.4324/9781003147992.

Han, S.H., Safeek, R., Ockerman, K., Trieu, N., Mars, P., Klenke, A., Furnas, H., Sorice-Virk, S., 2024. Public interest in the off-label use of glucagon-like peptide 1 agonists (Ozempic) for cosmetic weight loss: a google trends analysis. Aesthetic Surg. J. 44 (1), 60–67. https://doi.org/10.1093/asj/sjad211.

Hannemann, K., 2025. Ozempic side effects: common, severe, long term. https://www.drugs.com/sfx/ozempic-side-effects.html.

Harvey, M., 2023. Neoliberal narratives and internalized weight stigma: obstacles to fat equality. Aletheia 3 (1). https://doi.org/10.15173/a.v3i1.3395.

Hayran, O., Akan, H., Özkan, A.D., Kocaoglu, B., 2013. Fat Phobia of University students: attitudes toward obesity. J. Allied Health 42 (3), 147–150A.

Hecht, L.M., Pester, B., Braciszewski, J.M., Graham, A.E., Mayer, K., Martens, K., et al., 2020. Socioeconomic and racial disparities in bariatric surgery. Obes. Surg. 30 (6), 2445–2449. https://doi.org/10.1007/s11695-020-04394-7.

Inzlicht, M., Shenhav, A., Olivola, C.Y., 2018. The effort paradox: effort is both costly and valued. Trends Cognit. Sci. 22 (4), 337–349. https://doi.org/10.1016/j.tics.2018.01.007.

Jackson, A.M., Iniguez, A., Min, H.J., Strickland, M., Lanigan, J., 2023. "I enjoy the good foods, all of which are not good for me." the categorization and moralization of food. Appetite 191, 107071. https://doi.org/10.1016/j.appet.2023.107071.

Jiménez-Loaisa, A., Beltrán-Carrillo, V.J., González-Cutre, D., Jennings, G., 2020. Healthism and the experiences of social, healthcare and self-stigma of women with higher-weight. Soc. Theor. Health 18 (4), 410–424. https://doi.org/10.1057/s41285-019-00118-9.

Jones, C.T., 2023. Ozempic can help users. Why does the internet shame them? Roll. Stone. https://www.rollingstone.com/culture/culture-commentary/ozempic-shame-semaglutide-shortage-1234932411/.

Khan, M., Mikalonytė, E., Mann, S., Liu, P., Chu, Y., Attie-Picker, M., Bahar Buyukbabani, M., Savulescu, J., Hannikainen, I., Earp, B., 2025. Personalizing AI art boosts credit, not beauty. OSF Preprints. https://doi.org/10.31234/osf.io/xzvmq_v3 [Preprint].

Kolata, G., 2024. In: World, Trump, RFK Jr., (Eds.), And Elon Musk Highlight Debate over Obesity Treatment—The New York Times. https://www.nytimes.com/2024/12/18/health/ozempic-food-rfk-elon-musk.html.

Ladebo, L., Ernst, M.T., Mailhac, A., Dirksen, C., Bojsen-Møller, K.N., Pottegård, A., 2024. Real-World use of semaglutide for weight management: patient characteristics and dose titration—A Danish cohort study. Diabetes Care 47 (10), 1834–1837. https://doi.org/10.2337/dc24-1082.

Lantian, A., Boudesseul, J., Cova, F., 2024. Prescription for love: an experimental investigation of laypeople's relative moral disapproval of love drugs. AJOB Neurosci. 15 (4), 218–233. https://doi.org/10.1080/21507740.2024.2326923.

Lucas, S., Douglas, T., Faber, N.S., 2024. How moral bioenhancement affects perceived praiseworthiness. Bioethics 38 (2), 129–137. https://doi.org/10.1111/bioe.13237.

Manne, K., 2024. Unshrinking: How to Face Fatphobia. Crown.

Maslen, H., Savulescu, J., Hunt, C., 2020. Praiseworthiness and motivational enhancement: 'No Pain, No Praise'? Australas. J. Philos 98 (2), 304–318. https://doi.org/10.1080/00048402.2019.1618883.

Masood, B., Moorthy, M., 2023. Causes of obesity: a review. Clin. Med. 23 (4), 284–291. https://doi.org/10.7861/clinmed.2023-0168.

Menzen, M., Berentzen, T.L., Catarig, A.-M., Pieperhoff, S., Simon, J., Jacob, S., 2023. Real-world use of once-weekly semaglutide in type 2 diabetes: results from SemaglUtide real-world evidence (SURE) Germany. Exp. Clin. Endocrinol. Diabetes 131 (4), 205–215. https://doi.org/10.1055/a-2007-2061.

Mhloyi, C., 2023. Ozempic Exposed the Cracks in the Body Positivity Movement. TIME. https://time.com/6263689/ozempic-cracks-body-positivity/.

Mihailov, E., Rodríguez López, B., Cova, F., Hannikainen, I.R., 2021. How pills undermine skills: moralization of cognitive enhancement and causal selection. Conscious. Cognit. 91, 103120. https://doi.org/10.1016/j.concog.2021.103120.

Mowbray, S., 2024. Here's how ozempic actually works for weight loss. Discov. Mag. https://www.discovermagazine.com/the-sciences/heres-how-ozempic-actually-works-for-weight-loss.

Mzezewa, T., 2023. Celebrities keep distancing themselves from Ozempic. The cut. https://www.thecut.com/2023/02/celebrities-ozempic-kyle-richards-khloe-kardashian.html.

O'Brien, K.S., Latner, J.D., Ebneter, D., Hunter, J.A., 2013. Obesity discrimination: the role of physical appearance, personal ideology, and anti-fat prejudice. Int. J. Obes. 37 (3), 455–460. https://doi.org/10.1038/ijo.2012.52.

Oswald, F., 2024. Anti-fatness in the Ozempic era: State of the landscape and considerations for future research. Fat Stud. 13 (2), 128–134. https://doi.org/10.1080/21604851.2024.2307674.

Prinz, J., Nichols, S., 2016. Diachronic identity and the moral self. In: Kiverstein, J. (Ed.), The Routledge Handbook of Philosophy of the Social Mind. Routledge, pp. 449–464.

Puhl, R., Brownell, K.D., 2013. Bias, discrimination and obesity. Health Human Right Changing World 581–606.

Reiner, P.B., 2019. Experimental neuroethics. In: Nagel, S.K. (Ed.), Shaping Children: Ethical and Social Questions that Arise when Enhancing the Young. Springer Verlag, pp. 75–83.

Ringel, M.M., Ditto, P.H., 2019. The moralization of obesity. Soc. Sci. Med. 237, 112399. https://doi.org/10.1016/j.socscimed.2019.112399.

Rosenfield, K., 2024. Why Ozempic is Cheating. UnHerd. https://unherd.com/2024/02/why-ozempic-is-cheating/.

Rosenthal, R., 1979. The file drawer problem and tolerance for null results. Psychol. Bull. 86 (3), 638–641. https://doi.org/10.1037/0033-2909.86.3.638.

Ryan, N., Savulescu, J., 2025. The ethics of ozempic and wegovy. J. Med. Ethics. https://doi.org/10.1136/jme-2024-110374 jme-2024-110374.

Sikorski, C., Luppa, M., Kaiser, M., Glaesmer, H., Schomerus, G., König, H.-H., Riedel-Heller, S.G., 2011. The stigma of obesity in the general public and its implications for public health—A systematic review. BMC Public Health 11, 661. https://doi.org/10.1186/1471-2458-11-661.

Strohminger, N., Knobe, J., Newman, G., 2017. The true self: A psychological concept distinct from the self*n*. Perspect. Psychol. Sci. 12 (4), 551–560. https://doi.org/10.1177/1745691616689495.

Strohminger, N., Nichols, S., 2014. The essential moral self. Cognition 131 (1), 159–171. https://doi.org/10.1016/j.cognition.2013.12.005.

Swami, V., 2015. Cultural influences on body size ideals: unpacking the impact of Westernization and modernization. Eur. Psychol. 20 (1), 44–51. https://doi.org/10.1027/1016-9040/a000150.

Tobia, K.P., 2016. Personal identity, direction of change, and neuroethics. Neuroethics 9 (1), 37–43. https://doi.org/10.1007/s12152-016-9248-9.

Tolentino, J., 2023. Will the Ozempic era change how we think about being fat and being thin? New Yorker. https://www.newyorker.com/magazine/2023/03/27/will-the-ozempic-era-change-how-we-think-about-being-fat-and-being-thin.

Tsai, B., 2023. *U.S. uninsured rate hits record low in first quarter of 2023* [Blog post]. *NCHS Blog.* Centers for Disease Control and Prevention. https://blogs.cdc.gov/nchs/2023/08/03/7434/.

U.S. Food and Drug Administration, 2021. FDA Approves New Drug Treatment for Chronic Weight Management, First Since 2014. U.S. Food and Drug Administration [Press release]. https://content.govdelivery.com/accounts/USFDA/bulletins/2e2adc7.

Vartanian, L.R., Fardouly, J., 2013. The stigma of obesity surgery: negative evaluations based on weight loss history. Obes. Surg. 23 (10), 1545–1550. https://doi.org/10.1007/s11695-013-0918-y.

Vartanian, L.R., Fardouly, J., 2014. Reducing the stigma of bariatric surgery: benefits of providing information about necessary lifestyle changes. Obesity 22 (5), 1233–1237. https://doi.org/10.1002/oby.20721.

Wadden, T.A., Bailey, T.S., Billings, L.K., Davies, M., Frias, J.P., Koroleva, A., Lingvay, I., O'Neil, P.M., Rubino, D.M., Skovgaard, D., Wallenstein, S.O.R., Garvey, W.T., STEP 3 Investigators, 2021. Effect of subcutaneous semaglutide vs placebo as an adjunct to intensive behavioral therapy on body weight in adults with overweight or obesity: the STEP 3 randomized clinical trial. JAMA 325 (14), 1403–1413. https://doi.org/10.1001/jama.2021.1831.

Wallace-Wells, D., 2024. This is what a miracle drug looks like, and it costs only $5 to make. N. Y. Times. https://www.nytimes.com/2024/04/24/opinion/ozempic-wegovy-weight-glp1.html.

Wehrwein, P., 2024. Weathering the GLP-1 storm: how health plans and self-insured employers are coping with all the prescriptions for Ozempic and the other GLP-1 drugs. Manag. Healthc. Exec. 34 (2), 22+. https://link.gale.com/apps/doc/A783429403/AONE?u=anon41080b3c&sid=googleScholar&xid=c12e2f0f.

Wojtara, M., Mazumder, A., Syeda, Y., Mozgała, N., 2023. Glucagon-like Peptide-1 receptor agonists for chronic weight management. Adv. Med. 2023 (1), 9946924. https://doi.org/10.1155/2023/9946924.