International Journal of Obesity www.nature.com/ijo

ARTICLE

Behavior, Psychology and Sociology

The weight of weight: the salience of body weight in the impression formation process

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BACKGROUND/OBJECTIVES: Western societies preach slimness. However, overweight and obesity are increasing. Individuals living with overweight often face weight discrimination. No studies have investigated the salience of body weight in the impression formation. This study aims to examine the salience of the overweight attribute in shaping first impressions.
SUBJECTS/METHODS: Sixty participants were recruited, among them eleven were excluded because they did not fully complete the study, and we included forty-nine participants (M_{age} = 25.82 years, SD = 13.44; 19 women). Participants were asked to describe fictitious characters who differed in age, gender, skin color, and weight. Targets with overweight (i.e., five characters with overweight) constituted the experimental condition and non-overweight targets formed the control condition (i.e., five characters without overweight). Targets were presented to participants in a pseudo-random order (participants could not see the same target more than once).
RESULTS: Multilevel analyses showed that weight-related words were used more frequently to describe the overweight target than the non-overweight target (25.41% vs 11.83%; OR = 1.56, 95% CI 1.24–1.96, p < 0.01). Moreover, the probability of using a weight-related word to describe overweighted targets was significantly higher for the earlier words, than for the later words – (OR = 3.82, 95% CI 2.36–6.20, p < 0.001 for the first, OR = 2.44, 95% CI 1.78–3.33 for the second, OR = 1.62, 95% CI 1.24–2.12, p < 0.001 for the third, and fourth OR = 1.08, 95% CI 0.73–1.60, p = 0.695 words used to describe the character).
CONCLUSION: These findings support that the overweight characteristics of individuals is salient are the impression formation process.

International Journal of Obesity; https://doi.org/10.1038/s41366-025-01921-3

INTRODUCTION

The physical characteristics of individuals are major elements in the impression formation process [1, 2]. Impression formation (i.e., how one perceives another person [3],) ranges from category-based impressions to individualized impressions, according to the dual-process approach [1, 4]. Within this approach, the continuum model regards the use of categorical information as an essential initial step in this process (e.g., [1]). Indeed, "people have a tendency to rely on "less effort" and categorical thinking when evaluating others" [5].

However, not all categorical attributes are equivalent in terms of salience cognitive accessibility [6, 7], in other words, in terms of immediate visibility to perceivers. Many studies point to the existence of primary categories that are automatically activated and prioritized in the impression formation process. These categories include gender and ethnicity, as well as age (e.g., [8]). The high salience of these categories is explained either by their "chronic" accessibility due to their immediate visibility and activation frequency (i.e., the applicability of the related concept) [6, 7], or by the widespread belief in Western societies that they are « natural », immutable, and imposed on the individual (e.g., [9]).

In addition, non-normative characteristics may be particularly salient (e.g., [8]). For example, Louvet and Rohmer [10] found that physical disability was by far the most salient characteristic when forming an impression of a character holding that characteristic. In their study, people with physical disabilities were described as "disabled" before they were identified by their gender or ethnicity. This salience was in no way diminished by other "non-normative" categorical affiliations: disability was equally salient regardless of gender, skin color or age. These results were interpreted as being due to the non-normative nature of physical disability, both numerically (i.e., physical disability is rare) and, more importantly, socially (i.e., physical disability is socially devalued). In sum, the literature suggests that characteristics are particularly salient when they are visible, perceived as rare, and socially devalued (e.g., [11]).

However, the extent to which this mechanism applies to overweight and obesity remains unknown. First, excess weight is visible, under-represented (in the country where the study was conducted, 30.3% of the adult population is living with overweight

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Received: 8 January 2024 Revised: 7 August 2025 Accepted: 23 September 2025
Published online: 04 October 2025

and 17% has obesity [12], and highly stigmatized (e.g., [13]), with many studies documenting weight stigma as one of the most common stigma among children, adolescents and adults [14, 15]. Indeed, in contemporary Western societies, having a body weight above the social norm is negatively judged [16, 17], and leads to verbal or physical harassment, unfair treatment, and active discrimination in many aspects of daily life [18]. Importantly, overweight and obesity are considered as being the individual's responsibility and due to a lack of willpower and self-control to stay thin and healthy, which are characteristics that are highly valued in Western societies [19]. As such, whether overweight operates as a primary category (i.e., is automatically activated and prioritized in the impression process) remains an open question: it is visible, relatively rare, and socially devalued, but it is not a category that is perceived as natural. Indeed, believing that body weight is controllable means considering that people can enter and exit this category depending on their willpower [20].

Despite a large number of studies documenting the negative effects of weight stigma in many areas of daily life, such as employment [21] or health and health behaviors (e.g., [22, 23]), to our knowledge, no studies have examined the salience of the weight attribute in the impression formation process. In the present study, we examined the visibility of the overweight attribute, in a society where both men and women models are almost exclusively endorsed by thin and slim public figures. In this context, is weight noticed when meeting or seeing someone for the first time? More specifically, are people more likely to notice a weight that conforms to the norm or, on the contrary, more likely to notice a weight that deviates from this norm, especially if the person has overweight or obesity?

Present study

This study aimed to determine the extent to which weight is a salient attribute in a Western European country. Due to the negative stereotypes surrounding overweight and obesity (see [16]), we hypothesized that the weight attribute would be more salient in overweight targets than in non-overweight targets, i.e., that the overweight attribute would be more salient than the non-overweight attribute.

To this end, our methodology was based on the experimental paradigm used in Louvet and Rohmer [10], which focused on the salience of physical disability. In their study, 272 participants were invited to complete a study about 'interpersonal communication". Participants were instructed to describe a character providing only one descriptive element at a time. The targets differed in terms of three categorical characteristics: physical otherness (wheelchair-bound or not), gender (male or female) and ethnicity (black or white). Participants were given only three words to describe the target. The authors then calculated a salience index, indicating the order of appearance of the target categories.

Because the attribute of physical disability and overweight share a common and visible "out of the ordinary" dimension [10], we used a similar design adapted to our research question about weight salience.

METHOD

All procedures adhered to the ethical principles of the APA. Informed consent was obtained from all participants before the study began. They were informed that the study was anonymous and confidential, with a self-generated code replacing their identity. Given that our resources were limited due to time constraints [24], we recruited 60 participants at Nantes University and Grenoble Alpes University, via university classes, posters, and at the university libraries over the course of one month. Participants were not compensated for their participation.

The entire study was conducted online on Inquisit Web [25]. Participants were first invited to read and sign an informed consent form before performing the task of interest. To compensate for our limited sample size, each participant was asked to describe 10 out of 16 possible characters (instead of one per participant in Louvet and Rohmer [10]), with four words (open-ended question format). Particularly, they had to describe five overweight characters (i.e., the experimental condition), and five non-overweight characters (i.e., the control condition). The 10 characters were picked up and presented to the participants in a pseudo-random order (i.e., participants can see only once a character). Finally, they completed a short questionnaire assessing their sex (Women; Men; Don't want to answer), age, height, weight, skin color [26], and perceived weight [13].

Experimental procedure

Characters. The characters were created using the Electronic Arts[1] video game "The SIMS 4" based on a combination of four characteristics: gender (women, men), age (young, old), skin color (light, dark), and weight (overweight, non-overweight), resulting in a total of 16 characters. Moreover, all of the characters' clothes were standardized to avoid any effects from what they wore (see Supplementary Materials for characters examples). The perceived weight of the characters was pre-tested in a validation study conducted on a sample that was independent from the sample of the main study. Specifically, we recruited 28 students (M_{age} = 21.89, SD = 3.49, 9 women) during university classes and asked them to evaluate the 16 targets used in the main study. On each page of an online study, the picture of one target was presented, followed by the question: "How do you perceive the weight of the character"? with answers ranging from 0 "underweight" to 10 "overweight". A repeated measures ANOVA with target's weight status (overweight or normal-weight) and measurement occasion (from 1 to 8) as within-subject factors was conducted. Results showed a main effect of target's weight status, $F(1,27) = 195.60$, $p < 0.001$, $\eta^2_p = 0.88$, with the overweight targets being perceived as more overweight (M = 8.27, SD = 1.15) than the normal-weight targets (M = 4.42, SD = 0.90). The effect of measurement occasion was non-significant, $F(7,189) = 1.31$, $p = 0.25$, $\eta^2_p = 0.05$, as well as the interaction between weight status and measurement occasion, $F(7,189) = 0.95$, $p = 0.47$, $\eta^2_p = 0.03$. In addition, we assessed how participants perceived the credibility of each character with the following question: "How realistic (i.e., close to reality) is the image presented?" with answers ranging from 0 "not at all realistic" to 10 "completely realistic". Results showed that the perceived credibility of the stimuli was 5.75 on average (SD = 1.90), and was significantly higher than the middle of the scale (i.e., 5), $t(27) = 2.09$, $p = 0.02$, suggesting that the stimuli were perceived as somewhat realistic.

Outcomes and data analysis

Participants had to describe the characters using four words, as if they were trying to get a partner to guess the character in question in the famous board game[2] "Guess who?". Specifically, participants were asked to "make an imaginary partner guess" the identity of a character drawn on a card, providing only one descriptive element at a time. In the original game, the partner is given a board containing the drawings of all the characters, and is instructed to "discover" the identity of the individual described by the participant after four clues have been given. Each participant had to describe 10 out of the 16 possible targets on a computer and did not know all of the possible targets. They were asked to not describe the characters by their clothes.

Data preparation. The final sample included 49 participants (M_{age} = 25.82 years, SD = 13.44; 19 women), and 483 observations. Indeed, 11 participants were excluded because they did not fully describe at least one target. While mixed effects models are robust to some missing data, we excluded participants with missing target data. Indeed, we estimated that given the short duration (only a few minutes) and the ease of the task, missing data may indicate that the participant was not sufficiently concentrated or involved in the task. We therefore chose not to keep the answers of these participants in order to ensure the validity of the results. Answers were coded as 1 if the participant used a word related to weight, in the 'categorization order' column 1, 2, 3, or 4, depending on the order in which the participants used the word. For all other answers, the code was 0. For example, if a participant described the presented character as a "man", "overweight", "tall", and "blond", the code turned to: (category 1; 0), (category 2; 1), (category 3; 0) and (category 4; 0). However, if a character was first described by its weight, word 1 was coded 1 (see Supplementary Material for examples).

[1]Electronic Arts. (2023). The SIMS 4 [Video game]
[2]Hasbro. (2023). Guess who? [Board game]

Table 1. Descriptive analyses for experimental and control conditions.

a.Descriptive analyses for experimental and control conditions—by word

Attribute type	Condition	In percentage of times by word	
		Don't used to describe the characters	Used to describe the characters
Sex	Experimental	80.89%	19.11%
	Control	80.81%	19.19%
Age	Experimental	91.74%	8.26%
	Control	89.83%	10.17%
Skin color	Experimental	80.62%	13.69%
	Control	78.94%	21.06%
Weight	Experimental	74.59%	25.41%
	Control	88.17%	11.83%

b. Descriptive analyses for experimental and control conditions—by character

Attribute type	Condition	In percentage of times by character			
		First attribute used to describe the characters	Second attribute used to describe the characters	Third attribute used to describe the characters	Fourth attribute used to describe the characters
Sex	Experimental	66.94%	3.72%	2.48%	3.31%
	Control	68.87%	4.15%	1.25%	2.49%
Age	Experimental	2.07%	4.96%	11.16%	14.88%
	Control	3.73%	8.71%	17.43%	10.79%
Skin color	Experimental	9.91%	42.56%	12.40%	12.40%
	Control	13.69%	43.98%	15.37%	11.20%
Weight	Experimental	11.98%	30.17%	38.01%	21.90%
	Control	5.39%	18.67%	20.75%	12.49%

There are 4 words used by characters. In total 968 words in experimental condition and 964 words in control condition (Ntotal = 1932). In total 242 characters in experimental condition and 241 characters in control condition (Ntotal = 483).

Statistical models. To test our hypotheses, we conducted multilevel binomial logistic regressions using the *lme4* package in R Studio [27]. First, we created a model to test the overall effect of the condition (i.e., overweight vs. non-overweight) on the probabilities of using a weight-related word to describe the character. Then, in a second model, we included an interaction term between the condition and the word number (i.e., first, second, third and fourth word used) to examine whether the probabilities of using a weight-related word to describe the character were more likely in the earlier words than in the later words. In the first model, we defined as random factor the condition at the participant level. In the second model, the interaction between condition and word order at the participant level and the word order at the characters level were included as random factors.

RESULTS

Descriptive analyses

Descriptive analyses revealed that, on average, twice as many weight-related words were used to describe the characters in the experimental condition than in the control condition (25.41% vs 11.83% respectively, see Table 1a). Moreover, in the experimental condition, weight was used as the first attribute to describe the character 11.98% of the time, as the second attribute 30.17% of the time, as the third attribute 38.01% of the time, and as the fourth attribute 21.90% of the time. In the control condition, weight was used 5.39% as the first attribute to describe the character, 18.67% as the second attribute, 20.75% as the third attribute, and 12.49% as the fourth attribute (see Table 1b). It may be interesting to note that participants could use several words related to a same attribute to describe a target (e.g., several words related to weight).

Main effect of the condition

This first analysis showed that the condition was positively associated with the predicted probabilities of using a weight-related word to describe the character (OR = 1.56, 95% CI 1.24–1.96, p = 0.000175, see Table 2). More specifically, participants were more likely to describe characters by their weight when these characters were overweight (i.e., experimental condition) than when they were not overweight (i.e., control condition).

Effect of the condition depending on the word order

The second model showed that the effect of condition significantly depended on the word order as indicated by a significant condition x time interaction (OR = 1.98, 95% CI 1.45–2.71, p < = 1.81e-05, see Table 3)—the higher probabilities of using a weight-related word to describe the character in the experimental condition relative to the control condition significantly decreased as the number of words used to describe the target increased. Specifically, the interaction decomposition revealed a significant effect of the condition for the first word used to describe the character (OR = 3.82, 95% CI 2.36–6.20, p = 5.47e-08; the probability of using a weight-related word to describe the character under the control condition is 5% (CI

0.02–0.08) against 16% (CI 0.10–0.23) in the experimental condition), the second word (OR = 2.44, 95% CI 1.78–3.33, p = 2.40e-08; 9% (CI 0.06–0.13) vs. 20% (CI 0.16–0.24) for control and experimental conditions) and the third word (OR = 1.62, 95% CI 1.24–2.12, p < 0.000425; 17% (CI 0.14–0.20) vs. 25% (CI 0.22–0.28) for control and experimental conditions), but the effect of the condition was not significative for the fourth word (OR = 1.08, 95% CI 0.73–1.60, p = 0.695353; 29% (CI 0.22–0.38) vs. 31% (CI 0.24–0.39) for control and experimental conditions) (See supplementary for more details). Thus, participants were more likely to use a word related to weight to describe a character in the experimental condition (i.e., overweight) than in the control condition, but this effect was significantly stronger the earlier rather than later words used (see Fig. 1).

Table 2. Predicted probabilities of using a weight-related word to describe the character, main effect of the condition.

	Probabilities of using a weight-related word to describe the character		
IVs	**Odds ratios**	**95% CIs**	**P-Value**
Intercept	**0.22*****	**0.18–0.27**	**<0.001**
Condition [1]	**1.56*****	**1.24–1.96**	**<0.001**
Random effects			
σ^2	3.29		
$\tau_{00\ ID}$	0.15		
$\tau_{11\ ID.condition1}$	0.07		
$\rho_{01\ ID}$	−1.00		
$N_{\ ID}$	49		
Observations	1932		
Marginal R^2/Conditional R^2	0.015/NA		

Bold values indicate significant results.***$p < 0.001$.

Table 3. Predicted probabilities of using a weight-related word to describe the character, depending of the word order.

	Probabilities of using a weight-related word to describe the character		
IVs	**Odds ratios**	**95% CIs**	**P-Value**
Intercept	0.05***	0.03–0.10	<0.001
Condition [1]	3.73***	2.29–6.09	<0.001
Condition [1] x Centered order [1]	1.98***	1.45–2.71	<0.001
Centered order [1]	0.66***	0.53–0.84	0.001
Random effects			
σ^2	3.29		
$\tau_{00\ ID}$	3.55		
$\tau_{00\ stimulusitem1}$	0.00		
$\tau_{11\ ID.condition1}$	0.36		
$\tau_{11\ ID.order\_cent1}$	0.85		
$\tau_{11\ ID.condition1:order\_cent1}$	0.07		
$\tau_{11\ stimulusitem1.order\_cent1}$	0.00		
$\rho_{01\ ID.condition1}$	−0.93		
$\rho_{01\ ID.order\_cent1}$	−0.97		
$\rho_{01\ ID.condition1:order\_cent1}$	0.54		
ICC	0.26		
$N_{\ ID}$	49		
$N_{\ stimulusitem1}$	16		
Observations	1932		
Marginal R^2/Conditional R^2	0.095/0.326		

***p < 0.001.

DISCUSSION

The present study examined the salience of weight when forming an impression about overweight and non-overweight characters. The results showed that participants were more likely to describe the characters by their weight when the targets were overweight (i.e., experimental condition) than when the targets were not overweight (i.e., control condition). Besides, results showed a primacy effect of weight-related words, with a decrease in attribute salience from the fourth word used to describe the targets, illustrated by a significant interaction effect between the word order (i.e., first, second, third or fourth word) and the condition. These results support our hypothesis that a weight that differs from the norm (both numerically and socially) is more salient, when one has to describe a target, than a weight that corresponds to the norm in participants from a Western European country. The descriptive analyses are also in line with these primary analyses, showing that overweight characters were more than twice as often described by their weight than non-overweight characters.

These results provide insights into the accessibility of the overweight category against the non-overweight one, the former being more salient than the latter. The difference in salience between overweight and those with a normal weight can be explained by its "non-normative" nature, both numerically and socially. Indeed, while a significant proportion of the world's population is living with overweight or obesity (25%, [28]), this does not represent the majority of the population. In addition, overweight and obesity have very negative connotations and are associated with negative stereotypes (e.g., lazy, lack of willpower, incompetent [16]). We can therefore suggest that this pejorative attribute is more visible because it does not correspond to what is positively valued by the society. As it was suggested by Rohmer and Louvet [11] for physical disability, the salience of overweight may be explained mainly by its significant deviation from the dominant norm in Western societies, which value body perfection on the one hand, and performance and competitiveness on the other hand (e.g., [16]). Interestingly, the overweight category was salient although it is not perceived as 'natural', but instead as being the individual's responsibility (e.g., [19]). This suggests that such criterion is not a necessary condition for a category to be salient.

Nevertheless, even if the accessibility of an attribute or concept is important, this does not necessarily mean that it will be used, as concepts may come to mind without us using them [7]. This is what happens, for example, when the concept in question is linked to negative stereotypes and we feel that using it to judge a person is not socially acceptable [29]. This could explain why, in the case of overweight in this study, despite a greater relative difference in the first words used, the absolute probability of using a weight-related word is greater in the last words used, that may illustrate a certain social desirability bias.

Strengths and weaknesses

Three limitations should be acknowledged. First, it is possible that social desirability impacted the order in which participants described the weight status of the overweight targets, given the negative value of overweight in Western societies. It is difficult to estimate such impact, but if it occurred, this would mean that

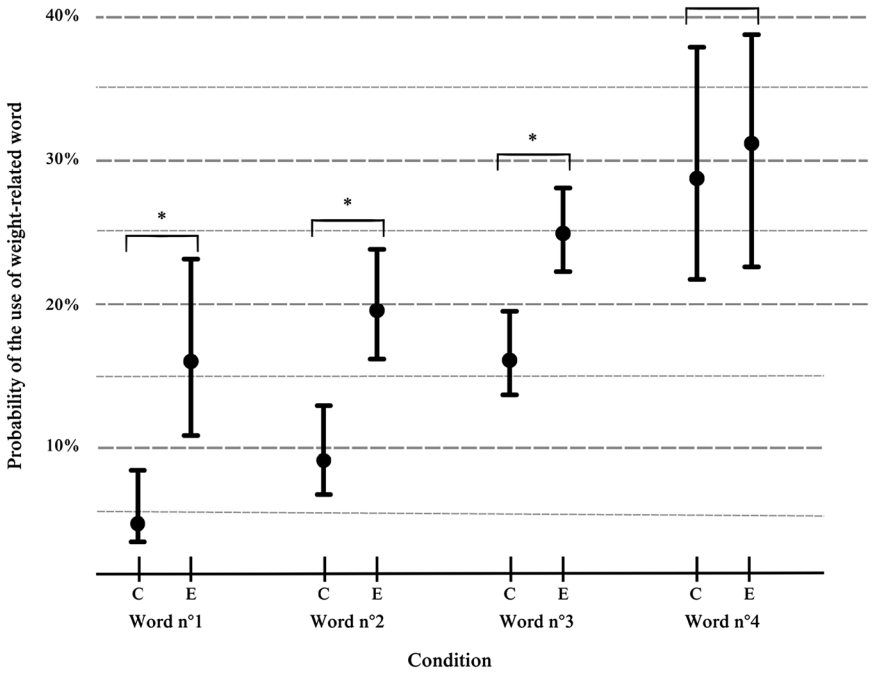

Fig. 1 Predicted probabilities for the use of weight-related word depending of the word order. ● = mean; *p < 0.001; C control condition, E experimental condition.

weight salience was underestimated in this study. Second, as the sample size (N = 49) was determined by resource limitations and the complexity of the model made it difficult to estimate the smallest detectable effect size with logistic regressions, we recommend that future researchers investigating this phenomenon and calculating sample sizes based on our observed effect size should use the lower bound of the effect size's confidence interval for their estimates rather than the effect size itself (thus use OR = 1.24 rather than OR = 1.56). Third, the pilot study indicated that our fictitious characters were perceived as somewhat realistic. This suggests that using a more ecological methodology would be interesting to ascertain the external validity of our results, for example by using photos in an environment such as social media. In addition, one could consider that because only a few characters' features varied from one target to another (weight, skin color, gender, age), these features may have become salient because of the study design. However, we were not interested in the absolute salience of weight, but instead in the variability of its salience (depending on target's weight status) within the same individuals.

Nevertheless, this study has at least two main strengths. First, the within-subject design provides a high power, and a certain robustness of results thanks to the 483 trials included in the analyses [24]. Moreover, converting our effect size to Cohen's D allowed us to compare it (d = 0.73 for the more complex model) with the effect size found in Louvet and Rohmer's [10] study (d = 0.92), Rohmer and Louvet (study 1, 11) study (d = 0.66) on physical disability, and with the effect size in Ruchaud et al. [30] which investigated the salience of gender (d = 0.70) in sport. Even though there are differences in our design, we can already observe that our results tend in the same direction. Second, our study partially replicates the results from Rohmer and Louvet [10, 11] and extends them to another population, in overweight situation.

CONCLUSION

To sum up, our results showed that perceivers are more likely to describe overweight people by their weight than non-overweight people. These findings suggest that the overweight is more salient than non-overweight and suggest that people with overweight are quickly categorized on the basis of this attribute. This salience of overweight may be a source of the considerable stigmatization of overweight people in Western societies. Thus, this study could enable future research to take a closer look at this determinant, and to continue explore weight salience. Notably, future studies could vary the weight range of the overweight stimuli to determine at which level overweight becomes salient in impression formation, and whether this level corresponds more to the definition given by international health agencies or to standards of beauty [31].

DATA AVAILABILITY

The datasets generated during and/or analyzed during the current study are available in the OSF repository, https://osf.io/x9tmd/?view_only=998dd39bb89445e9ad15c14ad90307b2.

CODE AVAILABILITY

Data, code and Supplementary Materials are fully available on the Open Science Framework (https://osf.io/x9tmd/?view_only=998dd39bb89445e9ad15c14ad90307b2).

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ACKNOWLEDGEMENTS

We are thankful to Cyril Forestier for his contribution to the analyses presented and for his feedback on the first version of the manuscript.

AUTHOR CONTRIBUTIONS

MdC, AC, and HD designed the study protocol. MdC and BC designed the analyses. MdC collected the data and analyzed them. MdC drafted the manuscript. MdC, AC, BC, and HD critically appraised the manuscript and significantly contributed to its content and structure. All authors approved the final version of the manuscript.

FUNDING

MdC was supported by a PhD grant from Université Grenoble Alpes.

COMPETING INTERESTS

The authors declare no competing interests.

CONSENT FOR PUBLICATION

All the authors listed in the by-line have agreed to the by-line order and to the submission of the manuscript in this form.

ADDITIONAL INFORMATION

Supplementary information The online version contains supplementary material available at https://doi.org/10.1038/s41366-025-01921-3.

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