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COVID-19's Impact on Cooking Practices and Social Representations from a food-related system resilience perspective

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Abstract

The COVID-19 pandemic may have shifted social representations, promoting waste-reducing food practices, such as cooking fresh food and leftovers. An online questionnaire was sent at the end of the first lockdown to ensure these new practices could be incorporated into an individual's daily routines. Using social representation theory and multinomial regression and clustering analyses, we identified these two cooking habits among adults under 25 years of age, living alone or in couples without children having adopted them. We discuss our results to determine whether their adoption is contextual rather than structural and reflects a change in central social representations that could be used from a managerial perspective. The pandemic was employed as a testing ground to explore the role of catastrophic crises in prompting changes and whether these changes can be used by institutions as a lever to decrease an individual's impact on the food system within the context of a climate crisis.

Keywords: food, food leftovers, social representations, food practices, food systems, COVID-19.

La Covid-19 a-t-elle favorisé l'émergence de pratiques culinaires et de représentations sociales alimentaires pouvant positivement influencer la résilience des systèmes alimentaires

Résumé

La pandémie de COVID-19 a modifié les représentations sociales des individus. Est-ce le cas pour celles des pratiques alimentaires réduisant le gaspillage, comme la cuisson d'aliments frais et des restes ? Un questionnaire en ligne a été envoyé à la fin du premier confinement pour s'assurer que ces nouvelles pratiques pouvaient avoir été intégrées aux routines individuelles. Les 409 réponses obtenues ont été analysées au prisme de la théorie de la représentation sociale. L'adoption des deux pratiques a été identifié chez les adultes âgés de moins de 25 ans et vivant seuls ou en couple sans enfants. Nous discutons ces résultats pour déterminer si ces adoptions sont contextuelles ou structurelle, traduisant un changement des représentations sociales centrales. La pandémie est utilisée comme terrain d'expérimentation pour explorer le rôle des crises catastrophiques dans l'incitation aux changements. Sont-ils mobilisables par les institutions pour diminuer l'impact des individus sur le système alimentaire dans le contexte de la crise climatique.

Mots-clés : alimentation, gaspillage alimentaire, représentations sociales, pratiques alimentaires, système alimentaire, COVID-19.

The impacts of food systems are well-documented in terms of biodiversity erosion, soil depletion, pollution, losses, and waste. Without change, they are expected to increase as the world population exceeds 10 billion by the end of the century. Decreasing food-related impacts may be difficult, particularly because residents of developed countries demand exotic and processed food products and ready-to-make meals. At the individual level, the Intergovernmental Panel on Climate Change (IPCC, 2022) has assessed that the most effective way to mitigate climate change is to reduce consumption levels. In this context, almost one-third of the household material footprint is explained by food consumption practices (Notarnicola et al., 2017) and more than half of the food waste is their responsibility (Principato et al., 2020). Consuming better and differently can involve homemade food, getting people involved in preparing meals, and using leftovers to avoid waste. The reduction of food waste is a key objective of international (FAO 2019) and national policy initiatives in Europe. They aim to develop sustainable food systems because food waste is largely embedded in food-related routines, from meal planning and shopping to eating and cleaning (Stancu et al., 2016). The consumption of fresh vegetables and fruits is also associated with the "healthy reference diet," as estimated by Willett et al. (2019), which is believed to contribute to the sustainability of the food system. It also helps reduce food waste (Schuster et al., 2022).

In the worldwide context of stressful uncertainties and the possibility of death, the first confinement period of the COVID-19 pandemic, with its severe restrictions, may have served as an incubator for a new relationship with food and encouraged the adoption of new behaviours and food consumption habits. This could be one of the expected triggers for the resilience of food-related social and ecological systems or SES at the individual level, where people seem to disconnect the way they eat daily from the challenges of a climate crisis. In France, during the first lockdown, supermarket shelves were emptied with brands not produced within the country's borders, the distance allowed for shopping was severely reduced, and it was impossible to eat out. The origin of COVID-19, associated with animal and local food markets, could also have a particularly strong impact in France, where the national imagination attaches great importance to farm and food traditions, whereas individuals under stress often seek comfort in cultural traditions (Lin, 2024).

This study aimed to determine whether the COVID-19 pandemic triggered new French consumer practices that reduce food waste and food-related waste and consequently promote the resilience of food systems. The two identified practices as key practices for assessing the shift of individuals towards a new food routine conducive to food system resilience were cooking fresh food and leftovers.

1. Theoretical framework of the research

1.1. Food approach according to food-related SES

As in any crisis, the Covid-19 pandemic provides an opportunity for innovation to address the existing instability. Both the systems and individuals exhibit resilience. Resilience can be defined as the capacity of a system of entities

to cope with disturbances, absorb them, adapt to them, or reorganize themselves, regardless of the scientific field in which the concept is used (Folke, 2016). At the individual level, resilience is the ability to face adversity by mobilizing internal resources enriched by personal experience, while relying on the sociocultural environment to develop behavioral strategies that promote individual well-being and create new societal robustness (Keck and Sakdapolrak, 2013). Covid-19, with its high morbidity and the duration and uncertainty of its confinement, which forces individuals to rethink their entire daily routine, could trigger resilience. Among the everyday behaviours likely to be strongly affected by the pandemic and included in the food system are eating habits, which go beyond issues of practicality and convenience to encompass notions of comfort and health. For example, between the first two lockdowns in 2020, French households increased their spending on organic and natural products and fair-trade products by 41.2% and 43.6%, respectively, in May 2020 compared to that in May 2019 (Kantar, 2020).

A complex system is methodologically difficult to understand (Fallot et al., 2019). While the relationship between individuals and their environment through the notion of risk is considered in work documenting the resilience of SES (Botta and Bousquet, 2017), the risk considered is catastrophic type or presented as such. It takes the form of an event or a series of inextinguishable events whose tragic consequences are imprinted on collective memory, and whose memory and means of protection are passed down from one generation to the next (Bousquet et al., 2021). It can be reasonably anticipated that a similar anchoring process will be observed during the Covid-19 pandemic. Nevertheless, its relationship with food is secondary and is mainly a matter of daily life obligation: food preparation. It is also difficult to imagine the negative effects of a diet without intellectualising them, linking them to those of climate change, and managing them to synthesise them. Social psychology studies have shown that individuals tend to minimise this type of risk by banishing them in space and time (Lorenzoni et al., 2007). While some attitudes make it easier to understand this environmental risk (Sanchez-Sabate et al., 2019), for the majority, it is non-existent or remote because of the lack of mental and social representations that can act as a means of protection (Joffe and Haarnoff, 2002).

1.2. Food approach based on the Theories of Social Identity and Social Representations

Social identity theory (Tajfel and Turner, 2004) states that norms are the keystones of the groups that embody them. The more consistent an individual's attitude is with the group's norms, the more that attitude will influence their actions, and the more consistent their actions will be with the norms (Cruwys et al., 2020). For individuals to feel affected by and participate in group actions, they must first subjectively categorise themselves as group members. This social categorisation is considered to be the most important factor for participation in collective action (Reimer et al., 2022). Therefore, attitudes and norms were not independent. In other words, in our case, the individual must feel that they belong to a group whose norms establish that eating habits have an ecological impact that must be considered before any food is consumed. It is only when the negative or positive impacts of this consumption are considered in an injunctive manner that an individual's self-identity can contribute to the resilience of food-related

SES. Self-identity implies that individuals incorporate the meanings and expectations associated with food-related categorisations from their social group to build a set of identity standards that drive food-related behaviours (Monterrosa et al., 2020). For example, Brieger (2018) showed that individuals who perceive themselves as citizens of their community, nation, and world are more willing to make economic sacrifices to protect their environment. O'Neill et al. (2023) reported that sustainability-related eating behaviours, particularly those of women who avoid meat-based meals, also translate into a desire to minimize food waste and the cooking of leftovers.

The theory of social representation suggests that social representations are similar to common sense. The anchoring of these representations produces systems of interpretation that govern relationships with the world and guide practices and actions. After selecting and prioritising information from an individual's social environment, the representation is consolidated and naturalised at the group level through objectification (Moscovici, 1984). This process provides representation coherence and legitimacy, reinforced by the results of the actions it gives rise to. Beliefs, knowledge, and attitudes are established as legitimate social representations. There are two types of social representations: central and peripheral. Central social representations form the core socio-cognitive system that enables individuals or groups to attribute meaning to reality through knowledge, opinions, or beliefs. Identifying the social representations of the central core is crucial because only those that organise them hold significant power over behavioural intentionality and are involved in decision-making and choice processes (Moliner and Abric, 2015). Social representations of food thus make it possible to identify the constituent elements of collective identities and distinguish those that have injunctive power over behaviour. Eating practices are routines based on trivial, and therefore, largely unthinking skills. An individual's commitment to practice is contingent upon the social characteristics that define it, including gender (Southerton, 2020). Consequently, individuals' practices are inextricably linked to social prescriptions (Plessz et al., 2014). As with other practices, food success depends on one's degree of mastery of the skills involved. Bisoani et al. (2005) distinguish between two cases: standard and circumstance. The standard represents what is considered appropriate by the individual, regardless of the coherence between their norms and food consumption. In other words, for a practice to change, social representations must define norms to create a new standard. The evolution of standards encourages the acceptance of new norms, which leads to the introduction of new practices. Conversely, engagement in practice modifies the structure of social representation. Therefore, the more these practices are publicly displayed and shared, the more they reinforce social representation (Rochira et al., 2020). In other words, for a social representation to have injunctive power, it must belong to a core group and take the form of identifiable practices. However, cooking requires that individuals possess a specific set of skills in addition to their initial motivation and opportunity to practice. Those who are unable to master these skills may experience negative outcomes (van Geffen et al., 2020). Thus, the implementation of the new individual approach of cooking fresh food and leftovers, combined with the strengthening of prosocial representation, can be seen as an effective indicator of individuals engaged in positive behaviour regarding the transition towards a more sustainable food system. This attitude relates to questioning the responsibility of consumers and their ability to drive systemic transition. As highlighted above,

the COVID-19 pandemic triggered a change in social representation, positively impacting the resilience process of the food-related socio-ecological system in the Anthropocene era. However, in the case of a change in social representations leading to a change in dietary practices, will the observed adaptation be permanent based on a change in individuals' core beliefs or will it be the result of a contextual adaptation where only peripheral beliefs have been modified?

Our quantitative study aimed to test whether the COVID-19 health crisis has triggered a change in individuals' relationships with food in an identified cohort of individuals who have adopted the two new food practices described above, which are known to have positive impacts on the food system. We hypothesized that this shift is part of a broader resilience narrative surrounding food-related social and ecological status (SES). We postulate three hypotheses. Hypothesis 1: The Covid-19 health crisis triggered a change in the way people cook with the adoption of new culinary practices (cooking with fresh food and leftovers). Hypothesis 2: The adoption of new culinary practices is positively associated with a particular cohort of individuals. Hypothesis 3: These novel food practices are associated with social representations of food-related SES linked to sustainable food. All procedures conducted in this study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The funders had no role in the study design, data collection and analysis, decision to publish, or manuscript preparation.

2. Method

To determine if the two selected food preparation practices allowed us to assess a change in the way of cooking among a specific demographic group during the pandemic, we administered an online questionnaire between May 2nd and 11th of May 2020. This period corresponded to the end of the first lockdown, which lasted for a total of three months and 17 days in France. This ensures that any changes in attitudes towards food and dietary habits are rooted in everyday life. The questionnaire was published in the Wanted Community Facebook groups of eight major French cities: Paris, Lyon, Rennes, Bordeaux, Toulouse, Marseilles, Nantes, and Strasbourg. The Wanted Community groups are primarily comprised of individuals aged between 18 and 45 who look for help in everyday life (buying second-hand goods, finding a good restaurant, finding or giving away a pet, etc.). The responses were anonymous.

The initial questionnaire comprised 126 items. The present study included 35. They corresponded to the 5 first sections (the dimension of food, the two cooking practices, the buying food families, the attention towards food attributes, the food talks) and the last two (the conception of the world after the pandemic, the sociodemographic profile of the respondents). The non-selected sections concerned meals, the delivery/distribution channel used,

and the use of cooking apps. The modalities of response for the two food practices were as follows: "I have begun to", "I used to cook", "I only cook ready-to-eat" and "no concern". These last two modalities were combined for analysis purposes, as the sample size of those with "no concern" was too small for quantitative assessment. The dimensions of food proposed are pleasure, health, survival function, economics, conviviality, easy cooking, and ethics as prosocial motivations (Likert scale with 5 points). Food attention encompasses the composition of food, origin of food, presence of packaging, price of food, and buying food families. The modalities of response were as follows: less, more than before the pandemic of Covid-19, not concerned. Food talks concerned their increases within families and social webs (Likert scale with 5 points). The propositions of the world after the pandemic of Covid-19 include a world with less useless consumption, a world where the origin or composition of food is known, a world where food is consumed locally, a world without waste or with energy economy, and a world as before (binary answers). To ascertain whether the questionnaire was easy to understand and coherent, we tested it on 30 individuals recruited through convenience sampling. The questionnaire was validated for convergent validity using cross-referencing variables.

After cleaning, we conducted quantitative analyses with sufficient sample sizes for each modality to aggregate the variable modalities with small sample sizes (less than 30 responses, including vegans with vegetarian respondents and those aged 40 years and above). After using descriptive statistics, we conducted multinomial regressions to determine the positive or negative effect of the odds ratio of the modalities of variables included in each category for each of the two food practices. This allowed us to detect potential shifts in food practices according to the explanatory variables. The Variance Inflation Factor was used to detect the absence of multicollinearity between variables. Subsequently, multiple correspondences analysis and a final clustering analysis were conducted to ascertain whether respondents who had begun cooking fresh food and/or leftovers during the pandemic were grouped in a distinctive cluster. We used the v-test (value test) as an index to determine the centrality of the variable's modalities in each cluster. The v-test described by Escofier and Pagès (2023) was used to estimate for a factorial axis the difference between the center of gravity of a class and that of a variable. This indicator can be used to facilitate comparisons between different variables and modalities, as it represents a reduced, centered value that takes into account the sample size. The greater the strength of this indicator, the more central and representative is the modality of the cluster. A value exceeding 2 was regarded as a significant outcome at the 5% level of statistical significance. Data analyses were conducted using R statistical software (v4.3.3, 2024-02-29 ucrt), specifically the packages "FactoMineR" (v.2.10), "factoextra" (v.1.0.7), "cluster" (v.2.1.6) and "nnet" (v.7.3-19).

A total of 409 responses were received. Data cleaning excluded no participants (30 were considered statistical artifacts when processing the factor analysis). The sample was not representative of the French population, with a majority of female respondents; almost half of the respondents were below 25 years of age (Table 1). Half of the participants lived in medium or large cities. Furthermore, approximately 40% of respondents were couples with or without children.

Table.1 : Sociodemographic sample profile

Variables	Levels				
sexe	female 82.9 %	male 17.1 %			
age	18-24 yo 45.5 %	25-29 yo 19.1% %	30-39 yo 15.4%	> 40 yo 20 %	
income (mo)	<1,200 euros 47.4 %	1,200-2,300 euros 38.1 %	> 2,300 euros 14.4 %		
size of home town	< 10,000 res. 22.7 %	10 to 29,999 res. 26.9 %	30 to 100,000 res. 21.8 %	> 100,000 res. 28.6 %	
Socio-prof. categories	student 47.2 %	employee 17.6 %	manager 15.2 %	without activity 7.1 %	
family	parent's home 32.8 %	in couple without child 23.2 %	alone 18.1 %	in couple with child 16.4 %	flat sharing 9.5%

3. Results

3.1. Culinary practices and food dimension and attributes

Regarding culinary practices, 37.7% and 62.6% of the respondents reported cooking fresh food and leftovers, respectively, while 44.3% and 22.7% began cooking them during the pandemic Covid-19. Those who said they had started cooking fresh food were also the most likely to report having started cooking leftovers (chi²=120.210, *p* <0.001; chi² *residuals*=3.400). They were 3.4 times more likely to report having started cooking leftovers than those who had already cooked fresh food (OR=3.413; *p* <0.001). In contrast, those who had already prepared meals with fresh food and those who had continued to use already-prepared food did not (chi² *residuals*=-2.200 and chi² *residuals*=-2.150, respectively). Thus, 68% of new fresh food cooks started to cook leftovers, whereas only 24% usually cooked fresh food.

Concerning the dimensions describing these two practices, two-thirds of those who were already cooking leftovers (67%) and those who had started cooking them since the start of the pandemic (65%) said they associated this culinary activity with an ethical approach or health (73% and 67%, respectively). A minority of respondents associated this approach with an economical approach (29% and 18%) or with the practicality of this type of culinary preparation (31% and 39%). The new leftover cook was approximately twice as likely to express disagreement with the economic dimension of this practice than those who had already cooked them. They are even more numerous when ease of preparation is considered. They were also 2.4 times more chance to declare focusing more attention on food composition than those already cooking leftovers, and more than three times more likely to declare buying

more vegetables, rice, and potatoes (Table 2). New fresh food cooks were around third as likely to express disagreement with the ethical dimension of this practice as those who are already fresh food cooks. As the new leftovers cook, they declare paying more attention to food composition and, in addition, to food origin. They also said that they bought more vegetables, cereals, and potatoes than before the pandemic, and they spoke more about food on social networks than those who had already cooked fresh food before the pandemic. Finally, the new fresh food cook and the new leftover cook were significantly less likely to report that they were vegetarian/vegan or flexitarian, living in a couple with a child, or not, than the fresh food cook (Table 2).

Table.2 : Multinomial regression results

	"new leftovers cook"				"new fresh food cook"			
Dimension	OR	2.5%	97.5%	*p*	OR	2.5%	97.5%	*p*
economic - disagreement	1.974	1.011	3.851	0.046				
easy cooking - disagreement					0.380	0.218	0.665	<0.001
ethic - disagreement					2.954	1.250	6.982	0.014
Attention	OR	2.5%	97.5%	*p*	OR	2.5%	97.5%	*p*
Food composition - more att.	2.410	1.354	4.289	0.003	2.526	1.318	4.839	0.005
Food origin - more att.					1.753	1.018	3.019	0.043
Food family	OR	2.5%	97.5%	*p*	OR	2.5%	97.5%	*p*
Vegetables - more	3.516	2.089	5.917	0.001	2.821	1.642	4.848	<0.001
Rice/Potatoes - more	3.198	0.098	0.703	<0.001	1.972	1.067	3.645	0.030
Food talk	OR	2.5%	97.5%	*p*	OR	2.5%	97.5%	*p*
Social network - more					2.885	1.400	5.950	0.004
Sociodemographic	OR	2.5%	97.5%	*p*	OR	2.5%	97.5%	*p*
Vegetarian/vegetalian diet	0.152	0.039	0.587	0.006	0.219	0.063	0.765	0.017
Flexitarian diet	0.263	0.098	0.703	0.008				
Couple with child	0.374	0.174	0.802	0.011	0.439	0.222	0.869	0.018
Couple without child					0.475	0.257	0.878	0.017

3.2. Culinary practices and clustering

Multiple correspondence analysis and final clustering analysis enabled us to identify three distinct cohorts of individuals: the already fresh food/leftovers cook (39.6%), new fresh food/leftovers cook (42.3%), and easy food cooks (18.1%). The first cluster is characterised by an over-representation of individuals aged over 30 living in couples with children, as well as individuals living in small towns (Table 3). Their relationship with food is positively associated with its ethical and health dimensions but not with its economic dimension. They exhibited no change in their attention to food attributes or the amount of food bought for vegetables and/or cereals since the start of the pandemic (Table 4). They are over-represented among sample individuals who project themselves in a world where food is local and healthy and useless consumption and waste are avoided (Table 5).

Table.3 : Detailed cluster profiles based on food practices and sociodemographic.

variables / clusters	already fresh food/leftovers cook	new fresh food/leftovers cook	easy food cook
	culinary practices		
leftovers cooking	already, 80.9% v.test=8.345	new, 61.3% v.test=5.930	
fresh food cooking	already, 47.1% v.test=6.227	new, 36.4% v.test=5.606	
garbage - leftovers			39.4% v.test=5.513
already prepared food			40.9% v.test=4.800
	Sociodemographic profile		
family	couple with children, 47.1% v.test=11.862	parent's home, 46.9% v.test=5.874 couple without children, 26.5% v.test=3.852	parent's home, 50.7% v.test=3.601 single, 23.5% v.test=1.971
age	30-39 years old, 50.7% v.test=10.731 > 40 year old, 37.5% v.test=8.472	18-24 years old, 70.4% v.test=9.862 25-29 years old, 26.5% v.test=3.674	18-24 years old, 57.1% v.test=2.261
Income	2,300-5,000 euros, 33.1% v.test=7.310 1,200-2,300 euros, 45.1% v.test=2.316	<1,200 euros, 64.8% v.test=6.774	
home town (size)	< 10,000 res., 30.9% v.test=3.129	30-100,000 res., 31.6% v.test=4.647	10-29,999 res., 42.9% v.test=3.366
sexe	female, 87.7% v.test=2.082		

The second cluster was characterised by individuals living with their parents or couples without children. Most of these individuals are under the age of 25 and reside in medium to large-sized towns. Their relationship with food is associated with pleasure and conviviality, and they reported paying greater attention to the composition and origin of food, buying more vegetables, and talking more about food on social networks since the start of the pandemic. Only those who project a "waste-free" world are over-represented in this group. This cluster is opposed to the first in multiple correspondence analysis.

Table.4 : Detailed cluster profiles based on food dimensions, attention paid to food attributes

variables / clusters	already fresh food/leftovers cook	new fresh food/leftovers cook	easy food cook
Dimensions			
Ethical	agreement, 88.9% v.test=7.853	nor nor, 32.7% v.test=2.968	desagreement, 42.9% v.test=9.010
			nor nor, 37.7% v.test=2.522
Health	agreement, 88.2% v.test=6.017		desagreement, 33.8% v.test=6.449
			nor nor, 31.2% v.test=2.648
Pleasure	nor nor, 25.0% v.test=2.401	agreement, 77.0% v.test=4.994	desagreement, 32.5% v.test=3.774
friendly		agreement, 88.3% v.test=2.993	desagreement, 22.1% v.test=4.923
economical	desagreement, 50.0% v.test=2.209		
easy			agreement, 47.8% v.test=2.410
Function			agreement ,45.5% v.test=2.154
Pay attention to			
Food composition	as much as before, 85.3% v.test=6.079	more than before, 29.1% v.test=4.815	no concerned, 57.1% v.test=10.178
Food packaging	as much as before, 72.1% v.test=3.563		no concerned, 62.3% v.test=9.099
Food origin	as much as before, 66.2% v.test=2.379	more than before, 34.2% v.test=2.717	no concerned, 63.6% v.test=12.156
Food buying			
Vegetables	as much as before, 71.6% v.test= 8.241	more than before, 66.5% v.test= 7.690	
Rice/potatoes	as much as before, 82.1% v.test= 5.824	less than before, 17.9% v.test= 2.516	more than before, 33.3% v.test= 2.724
Food talk			
Social network		more than before 12.7% v.test= 3.299	

In the final cluster, individuals aged between 18 and 24 years old and living with their parents or on their own are over-represented. They perceive food in terms of its ease of preparation and its vital function. They hold opposing food-related views to those expressed by individuals in the other two clusters. Furthermore, food attributes are not

a cause for concern, even from an economic perspective. However, there is an over-representation of individuals who express a desire to revert to the "previous world".

table.5 : Detailed cluster profiles based on post-world attributes

variables / clusters	already fresh food/leftovers cook	new fresh food/leftovers cook	easy food cook
	Post-world		
Local food	Yes, 93.4% v.test=8.045		No, 75.3% v.test=9.016
No food waste	Yes, 91.9% v.test=5.476	Yes, 82.6% v.test=2.801	No, 66.2% v.test=9.091
Sober consumption	Yes, 80.9% v.test=4.092		No, 59.7% v.test=5.513
Food composition checking	Yes, 67.7% v.test=3.566	Yes, 61.3% v.test=2.088	No, 70.1% v.test=4.954
As before	No, 53.7% v.test=3.118		Yes, 68.8% v.test=2.292
Energy saving			No, 26.0% v.test=2.053

4. Discussion

Our results show that a novel cohort of individuals developed new food practices by starting to cook fresh food and leftovers during the COVID-19 health crisis. Our first and second hypotheses were thus confirmed. However, the lack of centrality (moderate statistical test values) of these new cooking practices suggests that initiated commitment is not entirely objectified or anchored in the social representations of this cohort of individuals. Therefore, Hypothesis 3 was not fully supported. O'Neill et al. (2023) observed that a cohort of young individuals who were aspirational in their approach to sustainability-related behaviour demonstrated a lower level of engagement than their older counterparts. They hypothesised that this is associated with a low level of responsibility for food within the family unit and a tendency to follow sustainable food trends without linking them to environmental concerns. Indeed, the cohort of "new cooks" is more likely to comprise young adults who are less involved in married or family life than those who already cooked fresh food and leftovers before the start of the pandemic. This may explain why, in contrast to those who consume sustainable food, they do not consider ethical issues such as concern for carbon emissions or biodiversity loss (Luchs et al., 2015), nor do they project themselves into a post-pandemic world that is more respectful of others and themselves, except in a world with less food waste. This low representational projection of "new cooks" is at odds with the evolution of social representations, which integrate the ecological field of the challenges of global warming among French people under the age of 25 reported before the pandemic. Tavoularis *et al.* (2015) observed that the social representation of food among French individuals

under 25 years of age involved an increase in the prioritization of health considerations. Mathé et al. (2014) highlighted the convivial aspect of food as in the present study. This aspect echoes the development of food sharing experiences on social media (Poyoi et al., 2024). Nevertheless, the pandemic seems to have triggered "new cooks". The adoption of these two new cooking practices is associated with greater interest in the composition and origin of food than before. In several European countries, shifts in dietary patterns have been observed, particularly with respect to the manner in which food is prepared (Ben Hassen et al., 2021). France has been undergoing a process of intensifying its engagement with short-distribution channels (Darrot et al., 2020). The more sustainable eating habits of the French also include increased consumption of organic and seasonal produce, and food preparation that avoids food waste (François-Lecompte et al., 2020). However, sociodemographic profiles were not specified. Di Renzo et *al.* (2020) reported the 18-30 age group in Italy demonstrated a higher interest in the Mediterranean diet. Italian households, such as French households, were also more likely to engage in the preparation of fresh food and avoid food waste (Fanelli, 2021; O'Neill et al., 2023). It has also been shown that, during the pandemic, people aged 18 to 24 who were living with a partner and no children declared that they enjoyed preparing meals together (Tarnaud, 2022)

4.1. A contextual adaptation rather than a true social innovation helping the food-related SES resilience

The emergence of novel food preparation practices within a specific cohort, which are only tenuously or moderately linked to social representations of food perceived to have a positive influence on the resilience of the food system, does not appear to signal a key shift in social representations towards sustainable food-related SES. In a meta-analysis of 43 countries, Andrighetto et al. (2024) showed that individual adaptations during the first months of the Covid-19 pandemic did not lead to changes in social norms, except for handwashing, which was directly related to collective threat. For a new practice to participate in the emergence of a social representation, it is necessary for novelty to be associated with existing categorisations and transformed into a familiar object (Brondi et al., 2021). Without this transformation, novelty cannot be associated with new meanings, and can be incorporated into the central representational core. This integration process also provides the object of social representation with a symbolic dimension. It can then be shared and identified in the practices and discourses of individuals within the same social group (Rochira et al., 2020). The objectification of social representation is also possible, because individuals who bear it share similar social experiences and a similar reading of the world, particularly in food (Lo Monaco and Bonetto, 2019). Social representations and identities are, therefore, linked and influence behaviour according to in-group norms (Salazar et al., 2024). Brick and Lai (2018) showed that social identity, supported by environmental commitment, predicts pro-environmental behaviour while Udall *et al.* (2020) found that identification with nature is strongly associated with pro-environmental behaviour. Social identification with organic consumers predicts willingness to purchase organic products (Bartels and Onwezen, 2014). Our results show a disconnection between food and the environmental issues involved in the transition of food systems, suggesting that the two new

food practices identified in the 'new fresh food/leftovers cooks' social group were not translated into the social representation of this group at the end of the first Covid-19 confinement. Additionally, the lack of development of routines based on routine skills (almost half of them live with their parents), which is shaped by social influences and, therefore, social representations, may also be a contributing factor. It can be argued that food practices, like others, are based on skills that facilitate anchoring (Bisoani et al., 2005). It is not known whether the two new practices are shared as salient values, even if young respondents discuss more about food on social networks, and thus, might contribute to the development and acceptability of a new norm. It is also possible that this change in representation and identity will never occur as food appears to be disconnected from issues involved in the transition of the food system. The perception of environmental damage caused by food consumption styles is significantly diminished when urbanized eaters are geographically distant from production areas and temporally isolated from the effects of consumption on the environment and health. Consequently, when only peripheral beliefs are called into question, the adaptations put in place by individuals are contextual (Bonetto et al., 2020).

4.2. Research limitations and perspectives

However, the managerial implications of the emergence of new culinary preparation practices, whether they objectify a change in the social representation of individuals, could be used in the context of national and international policies to promote ecological transition and food system resilience. They could be employed by companies committed through their CSR policy to the transition linked to the challenges of global warming, and therefore, are convinced of the need for resilience in food-related SES. While social representations determine the engagement procedures of individuals (Bonetto et al., 2018), they are based on elements of discourse that can be used to communicate with individuals who use them. A discourse that includes these linguistic elements and comes from a source with a recognised social status could modify them (Sammut, 2015). Inviting individuals to participate in an action can also participate to structure the formation of new social representations (Monterrosa et al., 2020).
Our study has several limitations. The sample is not representative of the French population and only French people were considered. It is also based on declarative data, which can be significantly different from *in situ* behaviour, particularly when food is concerned. We cannot exclude the bias of social desirability in self-reported behaviours, as well. However, this bias was minimized by asking questions about actual behaviour rather than intention. Our approach to social representation does not allow us to ascertain the central/peripheral status of social representations directly, as is possible using the central core method. We derive the level of centrality indirectly by using the test value, which provides information on the level of exclusivity of a modality within a cluster (its centrality). Further research is necessary to confirm these findings. A qualitative study of the relationship between culinary practices and the environment in the context of natural disasters could provide insights into the impact of these disasters on changes in people's social representations. An investigation into the correlation between the utilization of social networks and endorsement of novel dietary practices would also be a valuable contribution to the field. It

is also important to identify the main obstacles to the emergence and integration of social representations related to the environment and food.

This study identifies social innovation in a particular group of individuals. The objectification and embedding of this innovation could be a powerful lever for communicating with individuals in this group and promoting a change in eating routines that resonates with the resilience of food-related SES. The search for a relationship between social representation and practice has enabled us to identify a statistical cohort of individuals, going beyond sociodemographic variables alone as a leverage indicator. It would be necessary to collect the linguistic elements explaining culinary preparation practices to integrate them into a communication aimed at reinforcing the emergence of these representations, using personalities recognised by the members of this group. The new culinary preparation practices thus highlighted may not be motivated solely by behavioural adaptation to the context of the Covid-19 pandemic, where food has become a central topic of discussion. They could be the prelude to the objectification of new social representations favourable to the resilience of food systems, as they appeared in individuals belonging to a generation known for their sensitivity to the challenges of global warming.

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