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Time perspective and eating behaviour of young adults: how important is a healthy future compared to the present?

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Published in:

Nutrition and Food Science

DOI:

[10.1108/NFS-03-2024-0094/full/html](https://doi.org/10.1108/NFS-03-2024-0094/full/html)

First published: 26/06/2024

Document Version

Peer reviewed version

[Link to publication](#)

Citation for published version (APA):

Begho, T., & Liu, S. (2024). Time perspective and eating behaviour of young adults: how important is a healthy future compared to the present? *Nutrition and Food Science*, 1-19. Advance online publication. <https://doi.org/10.1108/NFS-03-2024-0094/full/html>

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Time perspective and eating behaviour of young adults: how important is a healthy future compared to the present?

Journal:	<i>Nutrition and Food Science</i>
Manuscript ID	NFS-03-2024-0094.R2
Manuscript Type:	Original Article
Keywords:	Dietary habits, Health perception, Time orientation

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Time perspective and eating behaviour of young adults: how important is a healthy future compared to the present?

Abstract

Purpose

Promoting healthy dietary habits is a concern for public health due to the association between unhealthy diets and nutrient related diseases. This paper examines the relationship between individuals' temporal dietary behaviour and perceptions of the effect of dietary habits on physical health, and how these perceptions influence two important aspects of eating behaviour, i.e., daily consumption of healthy food and self-reported extra payment for healthy food options.

Design/methodology/ approach

Cross-sectional data on 457 young Chinese adults within the age category of 18-30 years were collected through a survey. Two subscales (immediate and future) were obtained from the Consideration-of-Future-Consequences-12 scale (CFC) through a factor analysis. A Seemingly unrelated regression (SUR) was estimated to determine whether CFC impacts behaviour through an awareness of the consequences of one's dietary habits.

Findings

Individuals who are more focused on immediate gratification were more likely to perceive their current dietary habit have a negative effect on their physical health ($p < 0.001$). In contrast, those who prioritize the future benefits were less likely to perceive negative health effects from their dietary habits ($p < 0.001$). However, the perception of negative consequences of dietary habit on physical health did not motivate healthier eating daily ($p < 0.001$) nor allocating more money towards eating healthy ($p < 0.001$).

Originality

The paper uses insights from behavioural economics in identifying the behavioural triggers that lead to a healthier dietary habit.

Practical implications

Understanding the relationship between time perspective and dietary habits could help identify potential risk factors for poor dietary choices and promote healthier eating habits.

Keywords. Dietary habits, Health perception, Time orientation

Introduction

Time perspective and its relationship with dietary habits

Studies (Dassen et al., 2015; Daniel et al., 2013a; Daniel et al., 2013b) have shown that time perspective can significantly influence dietary habits. Time perspective refers to how individuals perceive and approach time in relation to their goals, values, and actions (Bénard et al., 2018). Time perspective encompasses an individual's orientation towards the past, present, or future (Stolarski et al., 2016; Stolarski et al. 2018).

Findings show that present-oriented individuals tend to have less healthy dietary habits (Piko and Brassai, 2009; Tuu et al., 2022). This category tends to show less dietary control (Piko and Brassai, 2009) and a greater impulse buying tendency towards unhealthy food (Tuu et al., 2022). Present-oriented people are more likely to consume foods that are high in energy, sugar, salt, and fat and less likely to consume fruits, vegetables, and whole grains (Daniel et al., 2013a; Daniel et al., 2013b, De Marchi et al., 2016; Byrd and Almanza, 2021).

Past studies also reported that time perspective influences discretionary consumption of specific food ingredients or nutrients with a warning on the packaging. For example, present-oriented individuals tend to pay less attention to warnings about the use or consumption of high sodium content in food (Rojas-Rivas et al., 2020; Antunez et al., 2022) or consume meals lower in calories (Byrd and Almanza, 2021). One can argue that the focus on immediate rewards and pleasure by present-oriented individuals may take precedence over health benefits.

In contrast, future-oriented individuals tend to prioritise long-term health benefits over immediate pleasure or gratification. Such habits may be reflected in a greater willingness to make sacrifices in the short-term to achieve their long-term food-related goals. Opting for healthy food may not offer the same level of instant pleasure even though it has long-term advantages (Best et al., 2012; Dassen et al., 2015). Thus, future-oriented individuals prioritise future consequences even if there are immediate costs (Dassen et al., 2015). Future-oriented individuals also tend to show a higher interest in food with related health and sustainability issues (De Marchi et al., 2016).

Relationship between Consideration of Future Consequences (CFC) and time perspective and its relevance to understanding dietary habits

CFC (Strathman et al., 1994) is a psychological construct that describes a person's tendency to consider the potential outcomes of their actions and decisions in the future. Individuals who have a low level of future consideration are predicted to prioritize their immediate needs and concerns. In contrast, those with a high level of future consideration are predicted to consider the future

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3 implication of their behaviour and use their long-term goals to frame their present actions (Bénard
4 et al., 2018). Thus, the CFC can be a valuable tool in understanding **time perspective**.

7 The CFC scale has been extensively tested in non-food-related studies (e.g., work behaviour,
8 health-related behaviour, and ethical and environmental decision-making (Joireman and King,
9 2016; Murphy and Dockray, 2018). Regarding dietary habits, this construct can be relevant in
10 understanding how individuals choose what they eat and drink and how these choices may impact
11 their health and well-being in the long term (Van Beek et al., 2013; Bénard et al., 2024).

16 *Summary of the gap in the existing literature that the current paper aims to address*

18 While several studies have brought renewed attention to the importance of considering time
19 orientation in food choices and decisions, prior investigations have largely focused on **time**
20 **perspective** and dietary habits with implications for long-term health behaviours (Tortora and
21 Ares, 2018; Rojas-Rivas et al., 2020; Tuu et al., 2022). In addition, few studies have examined the
22 influence of time orientation on overall dietary habits. These findings cannot be generalised as
23 studies show distinctions in the effect time perspective has on intentions compared to habits. For
24 example, it is shown that while individuals that are present-oriented are more likely to follow
25 habits, future-oriented individuals, in contrast, are more likely to follow intentions (Onwezen et
26 al., 2016).

34 On this premise, the paper contends that more research is needed to better understand this
35 relationship and to identify effective interventions that can help individuals improve their dietary
36 habits in the long term. Studying the association between **time perspective** and dietary habits can
37 inform future research aimed at understanding the relationship between behaviour, cognition, and
38 health outcomes. From the health dimension, understanding the relationship between **time**
39 **perspective** and dietary habits could help identify potential risk factors for poor dietary choices
40 and promote healthier eating habits. For example, if a correlation is established between **time**
41 **perspective** and decisions that prioritise long-term health over short-term indulgences, then
42 interventions could be tailored to individuals who account for levels of **time perspective**, with a
43 focus on highlighting the long-term health consequences of poor dietary choices for those with
44 lower levels of **time perspective**.

53 This paper thus examines the relationship between individuals' temporal dietary behaviour and
54 perceptions of the effect of dietary habits on physical health, and how these perceptions influence
55 two important aspects of eating behaviour.

59 *Hypotheses*

This paper is based on the awareness of consequences (as mediator) in CFC model (Joireman et al., 2010; Joireman and King, 2016). In the CFC context, the awareness model posits that a person needs to be aware of the potential future consequences of one's behaviour in order to engage in future-oriented thinking. In other words, the extent to which CFC affects behaviour depends on the degree of awareness that an individual has about the potential consequences of their actions. As such, a high future orientation may create awareness in an individual that consuming healthy food can result in long-term benefits, thereby encouraging them to maintain a healthy diet. Thus, the pathway conjectured is that:

CFC → perceived consequences → dietary preference/habits

Based on these premises, the following hypotheses are tested in this paper.

H1: CFC-Immediate oriented individuals are more likely to perceive negative effects on their physical health due to their current dietary habits.

H2: CFC-Future oriented individuals are less likely to perceive negative health effects from their current dietary habits.

H3: The stronger an individual perceived there could be a negative effect on their physical health due to their dietary habits, the greater the likelihood that they would eat healthy daily

H4: The stronger an individual perceived there could be a negative effect on their physical health due to their dietary habits, more likely they will pay extra to eat healthy.

The paper is grounded in the Time Perspective Theory (Zimbardo and Boyd, 2014) which explains how individuals perceive time and how this perception affects their thinking and decision-making. The theory suggests that the way a person mentally partition the flow of their personal experience into distinct time frames i.e., past, present, and future influences behaviour and decisions. Individuals who adopt a past-oriented perspective often dwell on their memories and past experiences. In contrast, individuals with a present-oriented perspective focus on living in the moment and base decisions on what feels good at the current time. Individuals who are future-oriented think about the long-term effects of their actions, are proactive in planning and setting objectives, and their decisions are influenced by the anticipated benefits in the future.

Methodology

Data

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3 The data used in this paper was obtained from an online survey from a sample of 457 young adults
4 in China who responded to the online survey distributed through the platform - WenJuanXing.
5 The inclusion criteria were that participants are between 18 and 30 years of age, reside in China
6 and are solely or jointly responsible for their food shopping. Young adults in China were chosen
7 as they are an important cohort for studying diet habits considering their exposure to rapid changes
8 and food diversity, level of education and prevalence in overweight and obesity (Zhou et al, 2022;
9 Guo et al., 2023).

10
11 The paper employed a quantitative approach to collect data on participants on the extent to which
12 individuals consider the potential future outcomes of their current dietary habits, health perception
13 related to dietary habits, and their self-reported dietary behaviours. The survey passed the research
14 ethics and integrity assessment of [REMOVED FOR REVIEW] before the research began. The
15 food version of the CFC (Joireman et al., 2012) was used to measure the future time orientation.
16 Participants were categorised into CFC-Future oriented individuals if they mostly consider the
17 future consequences of their actions when making current dietary decisions. The CFC-immediate
18 oriented individuals prioritize immediate gratification and consequences of their actions over long-
19 term outcomes. The CFC scale is a reliable and valid instrument for assessing individuals'
20 consideration of future consequences and tested in several diet choice and eating habit studies
21 (Dassen et al., 2015; Bénard et al., 2024). Further, participants' perceived consequence was
22 measured through a Yes/No self-reported response asking if the participant thought there could
23 be any negative effects on their physical health as a result of their current dietary habits. Two
24 complimentary questions were asked on the priority participants place on eating healthy food daily
25 and whether they would pay extra for healthy food.

26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 *Data Analysis*

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44 The Seemingly unrelated regression (SUR) model (Zellner and Huang, 1962) was estimated to
45 determine whether CFC is a factor that can explain perceived consequences and to examine the
46 effect of perceived consequences on dietary habits, i.e., two separate regressions are estimated but
47 allowing the errors to be correlated. Thus, the preference for the SUR model was to estimate the
48 coefficients for each equation and the covariance matrix of the error terms simultaneously. The
49 estimation process in SUR takes into account the cross-equation correlation to improve efficiency
50 and accuracy in parameter estimation compared to estimating each equation separately. The model
51 permit for a test of $\beta = \gamma = 0$.

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58 The SUR models are specified by:
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$$\text{Perceived consequences (PC)} = \beta_0 + \beta_1\text{CFC} + \beta_2\text{gender} + \beta_3\text{age} + \beta_4\text{location} + u_1 \quad (1)$$

$$\text{Dietary habits} = \gamma_0 + \gamma_1\text{PC} + \gamma_2\text{gender} + \gamma_3\text{age} + \gamma_4\text{Food_expenditure} + u_2 \quad (2)$$

Where PC is perceived consequences, β and γ represents the vector of coefficients, and u is the error term. SUR is chosen as the preferred modelling approach given that when the error terms of different equations are correlated, SUR can provide more efficient and unbiased parameter estimates compared to estimating each equation separately using ordinary least squares (OLS), can handle simultaneous equations models where endogenous variables appear on both sides of the equations and provides consistent estimates in such cases. The choice of the control variables included in the regression models was informed from previous studies which have shown that age gender and geographical location can affect individuals' dietary habits and choices (Artegoitia et al., 2021; Patel et al., 2023; Lombardo et al., 2024). The data was analysed using Stata 16. A p -value < 0.05 was used to designate statistical significance.

Results

Among the sample, 69% identified as female. Participants within the age category of 18-20 years constituted 47% of the sample, while the age group of 22-25 years accounted for 46%, while 26-30 years was 7%. Among the participants, 64% were students, while 35% were employed and 1% unemployed. In terms of expenditure on food, approximately 40% of the participants spent less than one third or less of their total household monthly income on food, while 60% of the participants spent more than one third of their total household monthly income on food. Geographically, 10% of the participants were from Central China, 46% were from Northern China, and 44% were from Southern China.

For the Consideration of future consequences-12 scale, the method of extraction employed was the principal axis factoring with an oblique rotation. The results suggest a high Kaiser–Meyer–Olkin measure (KMO = 0.89) with the determinant of the correlation matrix of 0.003, which was greater than the .00001, below which multicollinearity would have been a concern. Thus, Factor Analysis was considered as an appropriate technique to further analyse the data. The Bartlett's test of sphericity was also significant, $\chi^2(91) = 2942, p < 0.001$, indicating sufficiently large correlations. Two eigenvalues were greater than 1 (4.6, 2.2), suggesting the possibility of two factors and supporting previous studies (Toepoel, 2010; Joireman et al., 2012). The CFC immediate subscale consisted of seven items, while the CFC future subscale had four items (Table 1). The scale reliability coefficient (Cronbach's alpha) $\alpha = 0.85$, indicating a value above the commonly accepted threshold for good reliability.

The regression analysis to examine the influence of time orientation (measured using the CFC) on health perception and the latter on individuals' dietary habits is presented in Tables 2 and 3. The results in Table 2 show that individuals who were concerned with satisfying their immediate needs with their food choices were more likely to perceive there could be a negative effect on their physical health due to their dietary habits ($\beta = 0.66$, standard error (SE)= 0.07, $p < 0.001$). In contrast, those concerned with the future consequences of their dietary behaviour were less likely to perceive there could be negative effects on their physical health due to their dietary habits ($\beta = -0.39$, SE = 0.06, $p < 0.001$). Against *a priori* expectation, the perception of negative consequences of dietary habit on physical health did not motivate healthier eating daily ($\beta = -1.60$, SE = 0.14, $p < 0.001$) (Table 2) nor allocating more money towards eating healthy ($\beta = -1.38$, SE = 0.13, $p < 0.001$) (Table 3). These results indicate that the hypotheses H1, H2 cannot be rejected while H3, H4 are rejected.

Discussion

The findings in this paper support previous studies that have shown the CFC scale can provide valuable insights into understanding the decision-making behaviours of individuals concerning their dietary habits (Van Beek et al., 2013; Mullan et al., 2014; Dassen et al., 2015). Our results are also in accord with previous studies that have found opposite effects of the CFC subscales (Joireman et al., 2012; Dassen et al., 2015; Olsen and Tuu, 2017). Further, it aligns with studies that find empirical support for a two-factor structure (Van Beek et al., 2013; Chng et al., 2022) and supports the time perspective theory (Zimbardo and Boyd, 2014).

The association between CFC and perceived consequences suggests that the group of young adults who were more concerned about immediate gratification, perceived a greater negative effect on their physical health due to their dietary habits. This finding is as expected as individuals who only choose food to satisfy their immediate needs, aim to take care of future dietary problems that may occur at a later date or place a greater priority on specific consequences of day-to-day eating behaviour over distant consequence are more likely to be in the position where their dietary habits could have a negative effect on their physical health. Conversely, the finding that individuals who prioritize future consequences are less likely to perceive negative effects on their physical health from their dietary habits is justified. This justification is from the perspective that an individual that considers how their health might be in the future, tries to influence their health with day-to-day eating behaviour while taking warnings about negative consequences of their eating behaviour seriously, would rationally take necessary steps to reduce negative effects on their physical health. This manifest in the decision to follow a healthier dietary habit.

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3 Young adults who recognize their diets as unhealthy often exhibit a low willingness to prioritize
4 healthy eating or pay for healthier options. This contradicts the postulation of awareness of
5 consequences as mediator in CFC and adds new information to the field. This low willingness to
6 prioritize healthy eating could be due to several interrelated factors. Financial constraints may play
7 a role as many young adults may find the higher cost of healthy foods impractical. Convenience
8 could also influence young adults' dietary choices, with fast and processed foods often being more
9 accessible and quicker to prepare than healthier alternatives. Also established preferences and
10 habits can make transitioning to different foods challenging while the scepticism about the efficacy
11 of 'healthy' foods, the influence of social circles, and a lack of detailed nutritional knowledge can
12 further reduce the appeal of spending extra on healthier food options. Additionally, young adults
13 might not yet experience the immediate health impacts of an unhealthy diet, which can delay their
14 motivation to change eating habits. The long-term effects of a poor dietary habit might seem too
15 distant to be of immediate concern (Munt et al., 2017; Royall, 2018).

16
17 This examination of the association between CFC and dietary habits provides empirical evidence
18 into the factors that influence individuals' food choices and inform strategies for promoting
19 healthier eating habits. These findings could inform future policies or interventions aimed at
20 promoting healthy eating habits and influencing dietary attitudes related to public health, as
21 highlighted in past studies (Tórtora and Ares, 2018; Chang et al., 2020). For example, the results
22 highlight a critical aspect that while awareness of negative health consequences is high, it alone is
23 insufficient to motivate change in dietary behaviours. This gap suggests that public health
24 initiatives need to include more than just information about the adverse effects of poor dietary
25 habits. Strategies that engage motivational elements, offer rewards for healthy choices, or reduce
26 barriers to healthy eating might be more effective in promoting changes in behaviour. For
27 individuals who are not concerned with future impact of their current dietary habits, making the
28 short-term health benefits of healthy eating more salient rather than the future risks, might be a
29 more effective strategy. It is equally crucial to address the underlying perceptions and attitudes
30 individuals hold about the impact of their diet on their health.

31
32 In line with De Marchi et al. (2016), this paper acknowledges that there is no single most efficient
33 way to influence a person's tendency to consider the potential outcomes of their dietary actions
34 and decisions, particularly as other external factors such as the price of healthy food may be the
35 barrier for dietary change.

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37 *Limitations and future research*

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3 There are aspects of this paper that can be improved upon in future studies. The data used in this
4 paper is cross-sectional, hence there is no scope to measure CFC and dietary habits beyond a single
5 point in time. As a result, the paper cannot establish whether changes in CFC may be related to
6 changes in dietary habits over time. Thus, longitudinal studies which examine the causal
7 relationships between time perspectives and dietary habits over time is needed. There are also
8 limitations of the estimated model such as the assumption of linear relationships among the
9 variables. Also, the paper used data obtained from self-reported measures, which may introduce
10 response biases. Future research could incorporate objective measures or observational data to
11 enhance the validity of the findings. Although CFC is one of the important factors determining
12 food choices and dietary habits, this paper acknowledges that food choices are influenced by
13 various factors, including food availability and norms not examined in this paper. Future research
14 can also be more specific on the relationship between CFC and specific dietary behaviours, such
15 as the consumption of processed foods or healthy foods such as vegetables.
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28 **Conclusion**

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30 This paper reveals that immediate and future time perspectives are related to perceptions of the
31 effects of dietary habits on physical health. The findings demonstrate that individuals who
32 prioritize immediate consequences are more likely to perceive negative health effects. Conversely,
33 individuals who prioritize future consequences are less likely to perceive negative health effects.
34 The awareness of the adverse effects of dietary habits on physical health did not lead to daily
35 improvements in eating behaviour nor to increased spending on healthier food options. These
36 findings are relevant and have practical implications for other populations globally. Understanding
37 the relationship between time perspective and dietary habits could help identify potential risk
38 factors for poor dietary choices and promote healthier eating habits. These findings highlight a
39 role for targeted messaging and behavioural interventions tailored to an individuals' temporal
40 orientations and presents an opportunity for developing more evidence-driven campaigns and
41 interventions that are psychologically and contextually tailored to young adults.
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3 **Acknowledgements:** None
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5 **Role of each author**

6
7 Author 1: Conceptualization, methodology, formal analysis, writing - original draft, writing -
8 review & editing, visualization, supervision.

9
10 Author 2: Conceptualization, data curation, visualization, writing - original draft.

11 **Financial Support:** There was no financial support for this paper
12

13 **Declarations of interest:** None
14

15 **Ethical Standards Disclosure:** This paper was conducted according to the guidelines laid down
16 in the Declaration of Helsinki and all procedures involving research paper participants were
17 approved by the Research Ethics and Integrity procedure of [REMOVED FOR REVIEW].
18 Written informed consent was obtained from all subjects.
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Table 1. Consideration of future consequences-12 scale (factor loadings)

	Subscale		Communalities
	CFI- <i>immediate</i>	CFI- <i>future</i>	
1. I consider how my health might be in the future, and try to influence my health with my day to day eating behaviour		0.68	0.47
2. Often, I engage in a particular eating behaviour in order to achieve outcomes that may not result for many years.		0.67	0.47
3. I only choose my food to satisfy immediate needs, figuring the future will take care of itself.	0.76		0.67
4. My eating behaviour is only influenced by the immediate (i.e., a matter of days or weeks) consequences of my actions.	0.69		0.61
5. My convenience is a big factor in the food I choose or my eating behaviour.	0.65		0.62
6. I am willing to sacrifice the immediate happiness or well-being I derive from my eating behaviour in order to achieve future outcomes.	0.47		0.47
7. I think it is important to take warnings about negative consequences of my eating behaviour seriously even if the negative consequence will not occur for many years.		0.70	0.50
8. I think it is more important to perform eating behaviour with favourable distant consequences than eating behaviour with less favourable immediate consequences.		0.67	0.48
9. I generally ignore warnings about possible future consequences of my eating behaviour because I think they will be resolved before they reach crisis level.	0.84		0.71

10. I think that sacrificing particular food now is usually unnecessary because future outcomes can be dealt with at a later time.	0.78	0.62
11. I only choose my food to satisfy immediate needs, figuring that I will take care of future problems that may occur at a later date.	0.83	0.69
12. Because my day to day eating behaviour has specific consequences, it is more important to me than behaviour that has distant consequence	0.73	0.59

Statistical method: Factor analysis

Table 2. Seemingly unrelated regression (SUR) regression estimating the determinants of (i) perceived consequences of dietary habit and (ii) habit of daily eating healthy

	Perceived consequences (of negative effects of dietary habit on physical health)		Dietary habits (eating healthy daily)	
	Coefficients \pm Standard errors	p- value	Coefficients \pm Standard errors	p- value
CFC-immediate	0.66 \pm 0.07***	<0.01		
CFC-future	-0.39 \pm 0.06***	<0.01		
Gender	0.14 \pm 0.14	0.32	0.13 \pm 0.14	0.34
Age	-0.02 \pm 0.1	0.86	-0.08 \pm 0.1	0.43
Location (Southern China)	-0.06 \pm 0.1	0.57	-0.03 \pm 0.1	0.72
Food expenditure			0.17 \pm 0.06**	0.01
Perceived consequences			-1.60 \pm 0.14***	<0.01
Constant	0.1 \pm 0.34	0.78	1.35 \pm 0.36	<0.01

*** indicates significance at 1%, ** indicates significance at 5%,

Note: CFC-immediate refers to individuals that mostly prioritize immediate gratification and consequences of their actions over long-term outcomes

CFC-Future refers to individuals that mostly consider the future consequences of their actions when making current dietary decisions

Age are in categories of 18-20, 22-25 and 26-30 years. Food expenditure refers to the percentage of total household monthly income spent on food. Location is Southern China vs. Northern and Central China

Table 3. Seemingly unrelated regression (SUR) regression estimating the determinants of (i) perceived consequences of dietary habit and (ii) whether one pays more for healthy eating

	Perceived consequences (of negative effects of dietary habit on physical health)		Dietary preference (pay extra for eating healthy)	
	Coefficients \pm Standard errors	p- value	Coefficients \pm Standard errors	p- value
CFC-immediate	0.66 \pm 0.08***	<0.01		
CFC-future	0.37 \pm 0.06***	<0.01		
Gender	0.11 \pm 0.14	0.44	-0.04 \pm 0.13	0.77
Age	0.0 \pm 0.1	1	-0.15 \pm 0.09	0.12
Location (Southern China)	-0.04 \pm 0.1	0.65	0.08 \pm 0.09	0.41
Food expenditure			0.08 \pm 0.05	0.11
Perceived consequences			-1.38 \pm 0.13***	<0.01
Constant	0.06 \pm 0.34	0.86	1.12 \pm 0.34	<0.01

*** indicates significance at 1%, ** indicates significance at 5%

Note: CFC-immediate refers to individuals that mostly prioritize immediate gratification and consequences of their actions over long-term outcomes

CFC-Future refers to individuals that mostly consider the future consequences of their actions when making current dietary decisions

Age are in categories of 18-20, 22-25 and 26-30 years. Food expenditure refers to the percentage of total household monthly income spent on food. Location is Southern China vs. Northern and Central China