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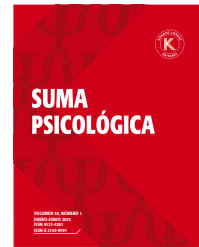
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## Changes in food habits and food-related satisfaction before and during the COVID-19 pandemic in dual-earner families with adolescents

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### KEYWORDS

Life satisfaction,  
diet quality,  
dual-earner couples,  
adolescents,  
COVID-19

**Abstract Introduction:** Food habits have been associated with positive outcomes during the COVID-19 pandemic. Family members may share protective factors, but each member may also respond differently to the pandemic. **Aim:** To examine food habits in different-sex dual-earner parents with adolescents, comparing reports from late 2019 before the pandemic (T1) and mid-2020 during the pandemic (T2) in Temuco, Chile. **Method:** A sample of 193 families composed of mother, father, and one adolescent aged 10 to 15 responded to a questionnaire at T1 and T2. Non-parametric tests were used to compare family food-related habits and the satisfaction with food-related life of each family member at T1 and T2. An Actor-Partner Interdependence Model was conducted to explore relations between T1 and T2 variables and between family members. **Results:** Frequency of family meals increased during the pandemic, and mothers increased their cooking hours. All family members improved their diet quality during the pandemic. Perceived family meal atmosphere and satisfaction with food-related life did not change. T1 food habits were not associated with T2 satisfaction with food-related life. **Conclusion:** These families changed their food-related habits during the pandemic, but their food-related life assessment was similar before and during the pandemic.

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### PALABRAS CLAVE

Satisfacción vital,  
calidad de la dieta,  
parejas de doble ingreso,  
adolescentes,  
COVID-19

### Cambios en hábitos alimentarios y satisfacción con la alimentación antes y durante la pandemia por COVID-19 en familias de doble ingreso con hijos adolescentes

**Resumen Introducción:** Las prácticas alimentarias se han asociado con mayor bienestar durante la pandemia por COVID-19. Aunque en una familia se comparten condiciones de vida, cada miembro puede responder de modo diferente a la pandemia. **Objetivo:** Examinar las prácticas alimentarias en parejas con doble ingreso e hijos adolescentes, comparando reportes antes de

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la pandemia (finales de 2019, T1) y durante la pandemia (mediados de 2020, T2) en Temuco, Chile. **Método:** 193 familias compuestas por madre, padre y un hijo adolescente de 10 a 15 años respondieron un cuestionario en T1 y T2. Se utilizaron pruebas no-paramétricas para comparar hábitos alimentarios y satisfacción con la alimentación para cada miembro de la familia en T1 y T2. Se exploraron las relaciones entre variables en T1 y T2, y entre miembros de la familia usando el modelo de interdependencia de actor-compañero. **Resultados:** La frecuencia de las comidas familiares y las horas que la madre dedicó diariamente a cocinar aumentaron durante la pandemia. Los tres miembros de la familia mejoraron la calidad de su dieta durante la pandemia. La atmósfera percibida de comidas familiares y la satisfacción con la alimentación no cambiaron. Los hábitos alimentarios del T1 no incidieron en la satisfacción con la alimentación en T2. **Conclusión:** Los hábitos alimenticios de estas familias cambiaron durante la pandemia, pero la evaluación de su vida alimentaria fue similar antes y durante la pandemia.

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The food domain is one of the many life spheres that have been severely affected by the COVID-19 pandemic (González-Monroy et al., 2021; Lamy et al., 2022). Measures to contain the outbreak of this coronavirus disease (World Health Organisation [WHO], 2020) have resulted in the disruption of daily life worldwide. In the food domain, this disruption is observed in changes in eating habits (González-Monroy et al., 2021), food availability and choice (Snuggs & McGregor, 2020), and food preparation and consumption patterns (Eftimov et al., 2020; Grunert et al., 2021; Lamy et al., 2022), among others. Parents who have kept their paid job during the pandemic have faced these challenges in addition to others in their work-family interface, altering food purchase, preparation and consumption patterns for themselves and their families (Schnettler, Miranda-Zapata, Orellana, Saracostti et al., 2022). Nevertheless, parents in these families, particularly dual-earner parents, may also count on resources (e.g., double income, family support) that might serve as protective factors of their food-related life and well-being, before, during, and even after the pandemic.

This study compared food habits and food-related life satisfaction from a pre-pandemic (last quarter of 2019) to a mid-pandemic period (mid-2020) in Chilean dual-earner parents with adolescents. In Chile, the first case of COVID-19 was reported in March 2020, and the Ministry of Health decreed quarantines across the country (Reyes-Olavarria et al., 2020). By then, a social and economic crisis was unfolding in the country due to inequality. Civil unrest had erupted in October 2019 (Caroca et al., 2020), and Chilean authorities declared a state of emergency and imposed military curfews across the country. The consequences of both crises put a strain on households nationwide. Most studies that have examined well-being in the food domain during the pandemic, including those with Chilean samples (Reyes-Olavarria, 2020; Ruiz-Roso et al., 2020), have focused on nutrition and behaviour, showing that food behaviours and dietary intake have changed over the course of the pandemic (González-Monroy et al., 2021; Wang et al., 2021). However, food habits include social components (Prime et al., 2020; Snuggs & McGregor, 2020). The alterations of these components due to a social or health crisis, and therefore their consequences for subjective well-being, have been less explored.

The construct of satisfaction with food-related life (SWFoL) entails food-related well-being. SWFoL is the person's assessment of their eating habits and overall food-related life. This assessment covers food purchasing, preparation, consumption, and disposal practices (Grunert et al., 2007), but also the social environment in which these practices occur (Schnettler, Miranda-Zapata, et al., 2021). Pre-pandemic research has associated SWFoL with higher life satisfaction and healthier eating habits in adults and adolescents (Schnettler, Rojas, et al., 2021). Studies with dual-earner families with adolescents have also associated SWFoL with food variables such as perceived family meal atmosphere (Schnettler, Miranda Zapata, et al., 2021; Schnettler, Miranda-Zapata, Orellana, Grunert, et al., 2022), food and meal preparation (Schnettler, Rojas, et al., 2021; Schnettler, Miranda-Zapata, Orellana, Grunert, et al., 2022) and diet quality (Schnettler, Miranda-Zapata, Orellana, Saracostti et al., 2022). Given that the lockdown has allowed specific populations to focus on and improve their food-related habits (Grunert et al., 2021; Wang et al., 2021), Hypothesis 1 states that satisfaction with food-related life during the pandemic is higher than before for mothers, fathers, and adolescents.

The social aspects of SWFoL suggest interindividual influences in food habits (Schnettler, Miranda-Zapata, et al., 2021), particularly in family environments (Robson et al., 2020). However, not all family members have the same impact on one another in the food domain. Studies show that mothers have more influence than fathers in their children's eating habits and diet quality (Hebestreit et al., 2017), and that mothers' food habits influence their children's SWFoL and their male partner/spouse's SWFoL and diet quality (Schnettler, Miranda-Zapata, Orellana, Saracostti et al., 2022). It thus becomes relevant to examine food habits among different family members. The pandemic has been particularly challenging for youth (Orellana & Orellana, 2020), as it has disrupted developmental tasks related to an increasing independence from their parents. Adolescents' search for autonomy extends to the food domain, where they increasingly choose what and when to eat, and eat outside the home more often (Schnettler, Miranda-Zapata, Orellana, Saracostti et al., 2022). In contrast, pandemic confinement measures have demanded that adolescents stay at home with their parents and physically distance from their peers (Magson et al., 2021).

These stay-at-home measures have also been linked to a significant increase in family meal frequency during the pandemic (Berge et al., 2021; Grunert et al., 2021). For many families in this crisis context, getting together for meals became a regular event with emotional significance (Prime et al., 2020). During the pandemic, family meals have gained value for parents (Snuggs & McGregor, 2020), and have been associated with dietary and emotional well-being (Berge et al., 2021). Hence, Hypothesis 2 proposes that family meal frequency during the pandemic is higher than before the pandemic for mothers, fathers, and adolescents.

Family meal frequency should be considered along with family meal atmosphere. The latter is defined as the degree of enjoyment and communication opportunities that meal-times afford to all family members (Neumark-Sztainer et al., 2004; Schnettler, Miranda-Zapata, Orellana, Grunert, et al., 2022). Besides dietary intake, family meals can help a family to bond and to exchange affective resources (Berge et al., 2021; Schnettler et al., 2020). Hypothesis 3 states that perceived family meal atmosphere during the pandemic is more positive than before the pandemic for mothers, fathers, and adolescents (H3).

Pandemic lockdown measures have also been linked to increased cooking at home and a change in diet quality (Grunert et al., 2021; Reyes-Olavarria et al., 2020; Wang et al., 2021). Diet quality is a representation of overall dietary patterns (Robson et al., 2020), and studies in European, Asian, and South American countries report that an improvement in diet quality is linked to increased cooking at home (Grunert et al., 2021; Scarmozzino & Visoli, 2020; Ruiz-Roso et al., 2020; Wang et al., 2021). On this basis, Hypothesis 4 posed that diet quality during the pandemic is higher than before for mothers, fathers, and adolescents.

However, cooking can also be a taxing activity. In Chile, Schnettler, Rojas et al. (2021) found that women spent more hours per week cooking than their male partners, under the socially shared assumption that cooking is women's responsibility. Men have reportedly increased their share of domestic work during the pandemic, but women have continued investing more hours per week to chores, and they are still held responsible for tasks such as laundry and cooking (Frank et al., 2021; Lyttelton et al., 2020; Sevilla & Smith, 2020). In this regard, Hypothesis 5 proposes that the hours dedicated to cooking by mothers, their partners and other caretakers during the pandemic is higher than before the pandemic (H5).

In addition to the five hypotheses posed, this study explored longitudinal interrelations between these variables and between mothers, fathers, and adolescents. Two exploratory research questions (ERQ) were also proposed to examine the effects of food habits (perceived family meal atmosphere and diet quality, and parents' cooking hours) measured at T1 on SWFoL measured at T2. The first ERQ probed intra-individual effects from the three family members' food habits at T1 to their own SWFoL at T2. The second ERQ tested these same relations between family members (inter-individual effects).

Comparing pre- and mid-pandemic SWFoL and food habits, and testing interrelations between these variables among family members, can help detect protective factors in the food domain for families' well-being. This knowledge can inform decision-making in researchers and practitioners

in this field. Therefore, the aim of this study was to compare food habits (perceived family meal atmosphere, cooking hours, diet quality) and SWFoL before (T1) and during (T2) the COVID-19 pandemic, in different-sex dual-earner parents with adolescent children in Temuco, Chile.

## Method

### Participants

A non-probabilistic sample of 193 families composed of mother, father and at least one adolescent child, was recruited in Temuco, Chile. Inclusion criteria were that both parents had a paid job before and during the pandemic, and that adolescents were between 10 and 15 years old. Participants responded a questionnaire before the pandemic (T1) and during the pandemic (T2; see Procedure). This study is part of a wider research on eating habits and subjective well-being in dual-earner families in Chile. The design of this study precedes the pandemic and thus infection status was not assessed.

The average age was, for mothers, 38.94 years ( $SD = 7.05$ ), for fathers, 42.12 years ( $SD = 8.83$ ), and for adolescents 12.54 years ( $SD = 1.80$ ). Regarding the adolescents' gender, 56% were boys, and 44% girls. For the parents' type of employment, 73.6% of mothers and 75.1% of fathers reported being employees, while the remaining 26.4% and 24.9%, respectively, reported being independent workers. The average number of family members was four. Most families were of a middle socioeconomical level (83.4%), followed by families of lower (15.5%) and higher (1.0%) socioeconomical levels.

### Measures

All questions were presented at T1 and in T2. Only mothers answered the two following questions.

**Frequency of family meals.** The number of days per week in which family members have breakfast, lunch, supper (in Spanish "once", a traditional Chilean evening meal), and dinner together.

**Cooking hours.** The number of hours per day dedicated to cooking for the household, by the mother, the father, and another adult during the week, and on weekends.

Mothers, fathers, and adolescents answered the following scales.

**Satisfaction with Food-related Life (SWFoL, Grunert et al., 2007).** The five-item SWFoL scale covers a single dimension to register individuals' overall assessment of their food and eating habits (e.g., *Food and meals are positive elements in my life*). The Spanish version of the SWFoL was used (Schnettler et al., 2013). Respondents indicated their degree of agreement with each statement using a 6-point Likert scale (from 1: *Completely disagree*, to 6: *Completely agree*). SWFoL scores were obtained from the sum of the scores of the five items. Cronbach's Alpha values for T1 were mother's  $\alpha = .834$ , father's  $\alpha = .864$ , adolescent's  $\alpha = .784$ . For T2, values were mother's  $\alpha = .824$ , father's  $\alpha = .842$ , adolescent's  $\alpha = .851$ .

**Adapted Healthy Eating Index (AHEI).** This index is a measure of diet quality, adapted from the US-HEI (Kennedy et al., 1995) and developed in Spanish by Norte and Ortiz (2011). The AHEI registers consumption frequency of nine food groups (e.g., vegetables, sugary drinks). For each group, this frequency is converted to a 0-10 score according to the degree of compliance with dietary guidelines (see Norte & Ortiz, 2011). The scores for each food group are totalled to obtain the AHEI score. From a theoretical maximum of 100 points, scores below 50 represent “unhealthy” diets; between 51 and 80, “diets that require changes”; and scores above 80 represent a “healthy” diet (Kennedy et al., 1995).

**The Project-EAT Atmosphere of family meals (AFM, Neumark-Sztainer et al., 2004).** Four AFM items were used to assess mealtime atmosphere. Two items refer to the person’s enjoyment of family mealtimes (e.g., *I enjoy eating meals with my family*), and the other two refer to family communication during mealtimes (e.g., *In my family, mealtime is a time for talking with other family members*). The Spanish version of the AFM scale was used (Schnettler, Miranda-Zapata et al., 2021). The Chilean evening meal “once”, equivalent to supper, was included besides dinner, as said meal routinely replaces dinner. Respondents indicated their degree of agreement with each statement using a 6-point Likert scale (from 1: *Completely disagree*, to 6: *Completely agree*). Mean scores were calculated with higher scores representing a more positive mealtime atmosphere. Cronbach’s Alpha values for T1 were mother’s  $\alpha = .863$ , father’s  $\alpha = .911$ , adolescent’s  $\alpha = .851$ . For T2, values were mother’s  $\alpha = .909$ , father’s  $\alpha = .856$ , adolescent’s  $\alpha = .889$ .

## Procedure

Families were contacted via seven schools from diverse socioeconomical backgrounds in the city. The invitation to participate informed of the study’s objectives and inclusion criteria, the longitudinal nature of this research, and the confidentiality and anonymity of the responses. Families who agreed to participate were contacted by trained interviewers between September and November 2019 (T1), and between July and September 2020 (T2). For data collection during T1, interviewers visited the families in their homes and administered the questionnaires face-to-face. During T2, data collection was conducted online as national and international public health guidelines reinforced lockdown measures.

In T1 and T2, adolescents signed informed assent forms, parents signed informed consent forms as well as the authorisation form for their child to participate in the study. Each family member responded to their own questionnaire, hosted on the QuestionPro platform. Each family received a gift card worth approximately USD \$15 after completing the three questionnaires. The Ethics Committee of Universidad de La Frontera approved the study protocol for T1, and modifications for online data collection during T2 (Protocol Number 007/19).

Prior to T1 data collection, a pilot test was conducted with 20 families. Results were deemed satisfactory, and neither the procedure nor the questionnaire required changes.

## Data analysis

Analysis was conducted using SPSS v.25. Databases from T1 and T2 were merged. Descriptive analyses were conducted to explore sociodemographic variables and the means and standard deviations of all measures. Correlations are presented as supplementary material. To compare within-subject effects between T1 and T2, the non-parametric Friedman test was conducted to compare the medians for family meal frequency, cooking hours, perceived family meal atmosphere, diet quality, and variety of the diet based on the AHEI and SWFoL. To compare within-subject effects between T1 and T2 in the frequency of consumption of each of the food groups of the AHEI, the McNemar-Bowker Chi2 test was used. Moreover, the interrelations between these variables at T1 and T2 were explored based on the evidence of reciprocal influences between parents’ and children’s eating habits (Robson et al., 2020; Schnettler, Miranda-Zapata, Orellana, Saracostti et al., 2022). An extended version of the actor-partner interdependence model (APIM, Kenny et al., 2006) was thus conducted, using structural equation modelling (SEM) with distinguishable triads. This is a triadic APIM approach, called multimembers multigroup APIM, to assess reciprocal influences between family members (Lederman et al., 2017).

In the APIM, actor effects are the individual’s outcomes (e.g., SWFoL) derived from their own characteristics (e.g., diet quality). Partner effects refer to cross-triadic associations and are observed when the characteristics of one family member influence another member’s outcomes. In this study, actor effects are the intra-individual associations between T1 cooking hours, diet quality, and family meal atmosphere perception and T2 SWFoL. Partner effects are the inter-individual associations between one family member’s T1 cooking hours, diet quality, family meal atmosphere perception, and another family member’s T2 SWFoL.

The APIM controls for the associations between the same variable in different family members by establishing a correlation between independent variables (T1 variables) for each dyad member. The APIM also includes correlations between the residual errors of the dependent variable of each family member at T2 (i.e., father’s, mother’s and adolescent’s SWFoL), which controls for other sources of interdependence between actors and partners (Kenny et al., 2006).

SEM was conducted using Mplus 8.4. The structural model parameters were estimated using the robust unweighted least squares (ULSMV). Considering the ordinal scale of the items, the SEM analysis was done via the polychoric correlation matrix. The Tucker-Lewis index (TLI), the comparative fit index (CFI) and the root mean square error of approximation (RMSEA) determined the model fit of the data. A good model fit is found when the model  $\chi^2$  is non-significant. The TLI and CFI showed a good fit with a value above .95. A good fit is defined as the value of the RMSEA being below 0.06. (Hu & Bentler, 1999).

## Results

### Changes in food-related habits during the pandemic

A non-parametric Friedman test of differences was conducted to test Hypotheses 1 to 5. Table 1 shows the results for Hypotheses 2 and 5, based on mothers' frequency reports. Hypothesis 2 stated that family meal frequency increased during the pandemic. The mean rank of number of days per week in which family meals occurred showed a significant increase mid-pandemic for breakfast, lunch, and supper ( $p < .001$ ). Hypothesis 2 was therefore supported. On the other hand, hypothesis 5 posited that cooking hours per day during the week increased during the pandemic for mothers, fathers, and other adults in the household. Cooking hours increased for mothers ( $p < .001$ ), but not for fathers ( $p = .070$ ). Therefore, Hypothesis 5 was supported for mothers only.

Table 2 displays the results for Hypotheses 1, 3 and 4, related to measures responded by mothers, fathers, and adolescents at T1 and T2. These hypotheses state that SWFoL, family meal atmosphere, diet quality would increase during the pandemic. Neither SWFoL nor family meal atmosphere levels showed significant changes for the three family members ( $p > .1$ ). Hence, Hypotheses 1 and 3 were not supported. On the other hand, Hypothesis 4 was supported, as diet quality increased significantly between T1 and T2 for the three family members ( $p < .001$ ).

To better understand changes in diet quality, a McNemar-Bowker Chi2 test was conducted for each food group.

For mothers, consumption frequency did not significantly change from T1 to T2 for cereals and derivatives ( $p = .063$ ), vegetables ( $p = .145$ ), fruits ( $p = .370$ ), milk and dairy products ( $p = .168$ ), meat ( $p = .256$ ), legumes ( $p = .135$ ), sausages and cold meats ( $p = .168$ ) and sweets ( $p = .058$ ). By contrast, the proportion of mothers with daily consumption of soft drinks decreased from T1 to T2, while the proportion of mothers who never or almost never consumed soft drinks increased from T1 to T2 ( $p = .037$ ).

For fathers, the frequency of consumption did not significantly change from T1 to T2 for cereals and derivatives ( $p = .083$ ), vegetables ( $p = .370$ ), fruits ( $p = .708$ ), milk and dairy products ( $p = .155$ ), meat ( $p = .108$ ), and sweets ( $p = .066$ ). By contrast, the proportion of fathers who never or almost never consume legumes decreased and the proportion of fathers who consume once or twice a week increased from T1 to T2 ( $p = .025$ ). The proportion of fathers who reported daily consumption of sausages and cold meats ( $p = .025$ ) and soft drinks ( $p = .003$ ) decreased, and the proportion of fathers who never or almost never consumed these foods increased from T1 to T2.

In adolescents, the frequency of consumption did not significantly change from T1 to T2 for cereals and derivatives ( $p = .052$ ), vegetables ( $p = .335$ ), fruits ( $p = .309$ ), milk and dairy products ( $p = .142$ ), meat ( $p = .335$ ), and legumes ( $p = .055$ ). By contrast, the proportion of adolescents who daily consumed sausages and cold meats ( $p = .017$ ), sweets ( $p < .001$ ) and soft drinks with sugar ( $p < .001$ ) decreased, while the proportion of adolescents who never or almost never consume these foods increased from T1 to T2.

**Table 1.** Family meals per week and hours per day dedicated to cooking for the household as reported by mothers before and during the COVID-19 pandemic

Measure		Time 1			Time 2			$\chi^2$	<i>p</i>
		<i>M</i>	<i>SD</i>	Mean rank	<i>M</i>	<i>SD</i>	Mean rank		
Days per week of family meals	Breakfast	2.72	2.12	1.36	4.16	2.68	1.64	20.86	< .001
	Lunch	3.19	2.20	1.29	5.29	2.35	1.71	47.20	< .001
	Supper	5.25	2.44	1.39	6.23	1.68	1.61	18.07	< .001
Hours per day dedicated to cooking	Mother	2.26	1.40	1.29	4.67	6.01	1.71	44.73	< .001
	Father	1.00	1.30	1.46	1.45	2.80	1.54	1.88	.070
	Another adult	0.95	1.54	1.51	0.84	1.77	1.49	.163	.686

**Table 2.** Satisfaction with food-related life, family meal atmosphere, and diet quality for mothers, fathers, and adolescents before and during the COVID-19 pandemic

Variables		Time 1			Time 2			$\chi^2$	<i>p</i>
		<i>M</i>	<i>SD</i>	Mean rank	<i>M</i>	<i>SD</i>	Mean rank		
Satisfaction with food-related life	Mother	21.24	4.54	1.46	22.09	4.44	1.54	1.66	.201
	Father	22.69	4.86	1.48	22.97	4.33	1.52	.381	.537
	Adolescent	23.74	4.36	1.46	22.09	4.44	1.54	1.52	.271
Family meal atmosphere	Mother	21.80	2.91	1.54	21.35	3.68	1.46	1.44	.230
	Father	21.52	3.58	1.49	21.70	2.84	1.51	.136	.713
	Adolescent	21.18	3.28	1.54	20.59	3.95	1.46	2.17	.140
Diet quality	Mother	61.11	12.92	1.34	65.93	12.53	1.66	21.68	< .001
	Father	55.36	13.84	1.33	61.30	12.74	1.67	23.50	< .001
	Adolescent	61.31	13.41	1.34	65.84	12.65	1.66	20.02	< .001

These findings show that family members improved their compliance with dietary guidelines (Norte & Ortiz, 2011) during the pandemic, regarding reduced consumption of unhealthy foods (sausages and cold meats, sweets and soft drinks), and foods recommended for consumption once or twice a week (legumes).

## APIM results

For the two exploratory research questions (ERQ), an actor-partner interdependence model (APIM, Figure 1) assessed the effects of the three family members' pre-pandemic (T1) perceived family meal atmosphere and diet quality, and both parents' cooking hours, on the three family members' mid-pandemic (T2) SWFoL. Chi-square value was  $\chi^2(528) = 1749.933$ ,  $p < .001$ . This model had a good fit with the data (CFI = .981; TLI = .976; RMSEA = .017). The explained variance of SWFoL for each family member was as follows: For mothers, 9.7% (0.097); for fathers, 16% (0.160), and for adolescents, 14% (0.140).

A significant correlation (covariance) was found between the cooking hours of both parents ( $r = .154$ ,  $p = .005$ ). Significant correlations were also found in family meal atmosphere perception between mother and father ( $r = .569$ ,  $p < .001$ ), between mother and adolescent ( $r = .439$ ,  $p < .001$ ), and between father and adolescent ( $r = .363$ ,  $p = .004$ ). Diet quality also had significant correlations between mother and father ( $r = .186$ ,  $p = .012$ ), between mother and adolescent ( $r = .130$ ,  $p = .048$ ), and between father and adolescent ( $r = .333$ ,  $p = .002$ ). Lastly, significant correlations were found between the residual errors for SWFoL between mother and father ( $r = .358$ ,  $p < .001$ ), between mother and adolescent ( $r = .310$ ,  $p = .006$ ), and between father and adolescent ( $r = .277$ ,  $p = .008$ ).

ERQ1 referred to actor effects (i.e., intra-individual effects). Path coefficients (standardised) of the structural model showed only one significant actor effect. The father's T1 family meal atmosphere perception had a positive effect on his own T2 SWFoL ( $\gamma = .220$ ,  $p = .041$ ). ERQ2 referred to partner effects (i.e., inter-individual effects). No partner effects were found.

## Discussion

This study compared four food habits (family meal frequency, family meal atmosphere, diet quality, cooking hours) and satisfaction with food-related life (SWFoL) before and during the COVID-19 pandemic, in different-sex dual-earner parents with adolescent children. Several findings aligned with previous studies showing that, for some populations, the pandemic has improved conditions in the food domain (i.e., diet quality). However, other findings showed no changes in food-related experiences (i.e., family meal atmosphere, SWFoL). Furthermore, pre-pandemic food habits did not show a longitudinal influence on mid-pandemic SWFoL for the three family members, at an individual or inter-individual level.

It was expected that SWFoL would improve during the pandemic (Hypothesis 1), but it showed similar levels at T1 and T2. At both times, SWFoL positively correlated with both parents' family meal atmosphere, and with the mo-

thers' diet quality; and with the fathers' diet quality at T2. For adolescents, SWFoL correlated both times with diet quality. This latter finding expands on a qualitative study in Chile that found that adolescents associated SWFoL with both unhealthy (i.e., hedonic) and healthy foods (Schnettler et al., 2020), underscoring the actuality that healthy foods are included in adolescents' food-related life evaluation. The atmosphere of these meals was also of interest here (Hypothesis 3). Pre-pandemic studies in Chilean families (Schnettler et al., 2020) suggest that SWFoL depends not only on individual factors, but also on interindividual ones related to family relationships. Contrary to expectations, however, the three family members maintained similar -and positive- perceptions of this atmosphere during the pandemic. Overall, these two variables related to subjective experiences in the food domain (SWFoL, perceived family meal atmosphere) showed no changes during the pandemic for these families.

On the other hand, variables related to food-related routines showed significant change from T1 to T2. Namely, an increase was observed in family meal frequency, diet quality (i.e., frequency of consumption of food groups), and cooking hours, the latter only for mothers. The increase in family meal frequency for breakfast, lunch, and supper was expected (Hypothesis 2) as families spent more time at home. Families in this sample also showed increased diet quality during the pandemic (Hypothesis 4). Findings are mixed in this regard, as some studies report that diet quality has improved during the pandemic (Grunert et al., 2021; Scarmozzino & Visioli, 2020; Ruiz-Roso et al., 2020; Wang et al., 2021), while others report that it has decreased (González-Monroy et al., 2021). This study shows that dual-earner families with adolescent children can be counted among those for whom diet quality has improved during the pandemic.

Lastly, the mothers in this sample reported cooking for more hours during the pandemic than before, and cooked for more hours than the fathers (consistent with pre-pandemic findings, see Schnettler, Rojas et al., 2021), whereas the fathers and the other adults did not show a significant change (Hypothesis 5 supported for mothers). The mothers' increased cooking hours align with evidence that domestic work has increased for women during the pandemic (Frank et al., 2021; Lyttelton et al., 2020; Sevilla & Smith, 2020). Yet neither the mothers' nor the fathers' cooking hours were linked to their own nor to their adolescents' diet quality, at either T1 or T2. Mothers in this sample have spent more time cooking during the pandemic than before, but they have not necessarily cooked healthier food. In this sense, the analysis of advised consumption frequency of nine foods (Norte & Ortiz, 2011) showed that families did not consume more healthy food (i.e., fruits and vegetables), but rather they reduced their consumption of unhealthy foods (sugar, meat). This finding stands in contrast with evidence that unhealthy food consumption has increased during the pandemic (González-Monroy et al., 2021).

Moreover, diet quality was not linked to family meal frequency nor cooking hours, the other two variables that showed significant changes from T1 to T2. This result was unexpected because better diet quality during the pandemic has been associated with more frequent family meals (Berge et al., 2021; Grunert et al., 2021), and with more

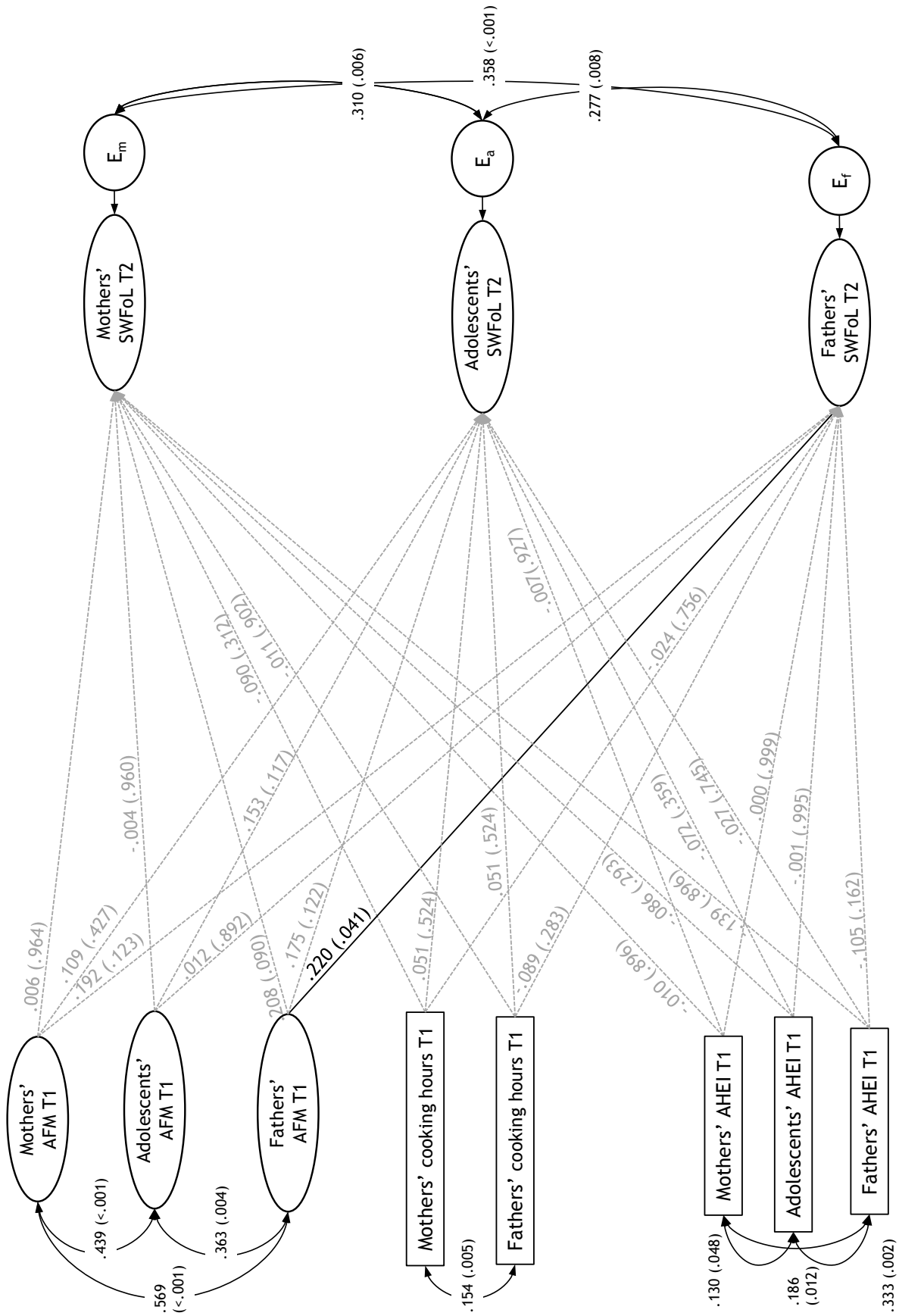


Figure 1. The actor-partner interdependence model of the effects of the three family members' Perception of the Atmosphere of Family Meals (AFM) and diet quality (measured by the Adapted Healthy Eating Index, AHEI) and both parent's food and meal preparation (hours cooking) pre-pandemic (T1) on the three family members' Satisfaction with Food-related Life (SWFoL) during the pandemic (T2) in dual-earner parents with adolescent children. Em, Ea and Ef: residual errors on SWFoL for the fathers, mothers and their adolescent children.



cooking at home (Grunert et al., 2021; Reyes-Olavarria et al., 2020; Ruiz-Roso et al., 2020; Wang et al., 2021). Taken together, these findings indicate a two-fold perspective in the food domain for dual-earner families with adolescent children. Their food-related routines (family meal frequency, diet quality, cooking hours) have changed during the pandemic, but their assessment of their food-related life and conditions (family meal atmosphere, SWFoL) remained at similar levels.

To complement these hypotheses, an actor-partner interdependence model (APIM) was applied. The APIM showed that mid-pandemic SWFoL was not influenced by pre-pandemic family meal atmosphere, diet quality or cooking hours, neither intra- nor inter-individually. This null finding applies to the three family members, except for the fathers' influence of T1 family meal atmosphere on their T2 SWFoL. The fathers' SWFoL did not change from T1 to T2, but a pre-pandemic positive family meal atmosphere may have provided protective factors, whether in terms of dietary intake or affective resources (Berge et al., 2021), to help maintain their SWFoL at both times. In mothers and adolescents, pre-pandemic food habits were not related to mid-pandemic SWFoL. Resources in these families, such as double income and having older children who require less parental supervision, can help explain why their food-related assessments have not changed alongside their food-related patterns during the pandemic. These findings suggest the need to explore more focused SWFoL aspects that may result from alterations in food-related patterns due to the pandemic.

Limitations of this study must be acknowledged. First, the sample was non-probabilistic and self-selected. These families counted on a double income at both times, and thus, they possibly had sufficient resources to cope with the most immediate concerns raised during this emergency, maintaining their overall food-related conditions. Hence, these findings cannot be applied to populations that have been affected more severely by the pandemic (e.g., people who lost their job, single-earner households). Second, the study design precedes both the pandemic and the civil unrest in Chile, hence specific material and psychological conditions related to this twofold crisis were not accounted for. Further studies are needed to explore food-related life and needs amidst the pandemic and other crisis contexts, in populations with diverse sociodemographic characteristics. The consequences of COVID-19 infection on experiences in the food domain must also be addressed by future research.

Despite these limitations, this study contributes to the literature by showing pandemic-related changes for families in the food domain. This sample of dual-earner parents and their adolescents showed increased family meal frequency and improved diet quality, which could help maintain or enhance their well-being over time. However, mothers increased their cooking hours, which was not associated with higher diet quality nor SWFoL for the family members. Moreover, subjective food-related experiences (i.e., family meal atmosphere, SWFoL) remained the same pre- and mid-pandemic. These results raise research questions about the diverse contributors to SWFoL and protective factors from the food and family domains that may explain its consistent levels at both times. This study also has implications for public health campaigns and policies, regarding

the promotion of frequent and pleasant family meals, and distinguishing increased healthful food consumption from decreased unhealthful food consumption. Overall, these results highlight the need to include the social and psychological aspects of food habits into mid- and post-pandemic research and interventions.

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## References

- Berge, J. M., Hazzard, V. M., Larson, N., Hahn, S. L., Emery, R. L., & Neumark-Sztainer, D. (2021). Are there protective associations between family/shared meal routines during COVID-19 and dietary health and emotional well-being in diverse young adults? *Preventive Medicine Reports*, 24, 101575. <https://doi.org/10.1016/j.pmedr.2021.101575>
- Caroca, P., Cartes, C., Davies, T., Olivari, J., Rica, S., & Vogt-Geisse, K. (2020). The anatomy of the 2019 Chilean social unrest. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 30(7), 073129. <https://doi.org/10.1063/5.0006307>
- Eftimov, T., Popovski, G., Petković, M., Seljak, B. K., & Kocev, D. (2020). COVID-19 pandemic changes the food consumption patterns. *Trends in Food Science and Technology*, 104, 268-272. <https://doi.org/10.1016/j.tifs.2020.08.017>
- Frank, E., Zhao, Z., Yang, Y., Rotenstein, L., Sen, S., & Guille, C. (2021). Experiences of work-family conflict and mental health symptoms by gender among physician parents during the COVID-19 pandemic. *JAMA Network Open*, 4(11), e2134315. <https://doi.org/10.1001/jamanetworkopen.2021.34315>
- González-Monroy, C., Gómez-Gómez, I., Olarte-Sánchez, C. M., & Motrico, E. (2021). Eating behaviour changes during the COVID-19 Pandemic: A systematic review of longitudinal studies. *International Journal of Environmental Research and Public Health*, 18(21), 11130. <https://doi.org/10.3390/ijerph182111130>
- Grunert, K. G., Dean, M., Raats, M. M., Nielsen, N. A., Lumbers, M., & Food in Later Life Team (2007). A measure of satisfaction with food-related life. *Appetite*, 49(2), 486-493. <https://doi.org/10.1016/j.appet.2007.03.010>
- Grunert, K., De Bauw, M., Dean, M., Lähteenmäki, L., Maison, D., Pennanen, K., Sandell, M., Stasiuk, K., ... Vranken, L. (2021). No lockdown in the kitchen: How the COVID-19 pandemic has affected food-related behaviours. *Food Research International*, 150, 110752. <https://doi.org/10.1016/j.foodres.2021.110752>
- Hebestreit, A., Intemann, T., Siani, A., De Henauw, S., Eiben, G., Kourides, Y.A., ... Pigeot, I. (2017). Dietary patterns of European children and their parents in association with family food environment: Results from the I.family study. *Nutrients*, 9(2), 126. <https://doi.org/10.3390/nu9020126>
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1-55. <https://doi.org/10.1080/10705519909540118>
- Kennedy, E. T., Ohls, J., Carlson, S., & Fleming, K. (1995). The Healthy Eating Index: design and applications. *Journal of the American Dietetic Association*, 95(10), 1103-1108. [https://doi.org/10.1016/S0002-8223\(95\)00300-2](https://doi.org/10.1016/S0002-8223(95)00300-2)
- Kenny, D. A., Kashy, D. A., & Cook, W. L. (2006). *Dyadic data analysis*. Guilford press.

- Lamy, E., Viegas, C., Rocha, A., Raquel Lucas, M., Tavares, S., Capela E Silva, F., Guedes, D., ... & Consortium for Changes in Food Behavior - COVID-19 (2022). Changes in food behavior during the first lockdown of COVID-19 pandemic: A multi-country study about changes in eating habits, motivations, and food-related behaviors. *Food Quality and Preference*, 99, 104559. <https://doi.org/10.1016/j.foodqual.2022.104559>
- Ledermann, T., Rudaz, M., & Grob, A. (2017). Analysis of group composition in multimember multigroup data. *Personal Relationships*, 24(2), 242-264. <https://doi.org/10.1111/per.12176>
- Lyttelton, T., Zang, E., & Musick, K. (2020). Before and during COVID-19: Telecommuting, work-family conflict, and gender equality. *Council on Contemporary Families*.
- Magson, N., Freeman, J., Rapee, R., Richardson, C., Oar, E., & Fardouly, J. (2021). Risk and protective factors for prospective changes in adolescent mental health during the COVID-19 pandemic. *Journal of Youth and Adolescence*, 50, 44-57. <https://doi.org/10.1007/s10964-020-01332-9>
- Neumark-Sztainer, D., Wall, M., Story, M., & Fulkerson, J. A. (2004). Are family meal patterns associated with disordered eating behaviours among adolescents? *Journal of Adolescent Health* 35, 350-359. <https://doi.org/10.1016/j.jadohealth.2004.01.004>
- Norte, A., & Ortiz, R. (2011). Calidad de la dieta española según el índice de alimentación saludable. *Nutrición Hospitalaria*, 26(2), 330-336.
- Orellana, C., & Orellana, L. (2020). Predictores de síntomas emocionales durante la cuarentena domiciliar por pandemia de COVID-19 en El Salvador. *Actualidades en Psicología*, 34(128), 103-120. <https://doi.org/10.15517/ap.v34i128.41431>
- Prime, H., Wade, M., & Browne, D. T. (2020). Risk and resilience in family well-being during the COVID-19 pandemic. *American Psychologist*, 75(5), 631-643. <https://doi.org/10.1037/amp0000660>
- Reyes-Olavarría, D., Latorre-Román, P. Á., Guzmán-Guzmán, I. P., Jerez-Mayorga, D., Caamaño-Navarrete, F., & Delgado-Floody, P. (2020). Positive and negative changes in food habits, physical activity patterns, and weight status during COVID-19 confinement: Associated factors in the Chilean population. *International Journal of Environmental Research and Public Health*, 17(15), 5431. <https://doi.org/10.3390/ijerph17155431>
- Robson, S. M., McCullough, M. B., Rex, S., Munafò, M. R., & Taylor, G. (2020). Family meal frequency, diet, and family functioning: A systematic review with meta-analyses. *Journal of Nutrition Education and Behavior*, 52(5), 553-564. <https://doi.org/10.1016/j.jneb.2019.12.012>
- Ruiz-Roso, M.B., de Carvalho Padilha, P., Mantilla-Escalante, D.C., Ulloa, N., Brun, P., Acevedo-Correa, D., ... Dávalos, A. (2020). Covid-19 confinement and changes of adolescent's dietary trends in Italy, Spain, Chile, Colombia and Brazil. *Nutrients*, 12, 1807. <https://doi.org/10.3390/nu12061807>
- Scarmozzino, F., & Visioli, F. (2020). Covid-19 and the subsequent lockdown modified dietary habits of almost half the population in an Italian sample. *Foods*, 9, 675. <https://doi.org/10.3390/foods9050675>
- Schnettler, B., Hueche, C., Andrades, J., Ares, G., Miranda, H., Orellana, L., & Grunert, K. (2020). How is satisfaction with food-related life conceptualized? A comparison between parents and their adolescent children in dual-headed households. *Food Quality and Preference*, 86, 104021. <https://doi.org/10.1016/j.foodqual.2020.104021>
- Schnettler, B., Miranda, H., Sepúlveda, J., Denegri, M., Mora, M., Lobos, G., & Grunert, K. G. (2013). Psychometric properties of the Satisfaction with Food-Related Life Scale: Application in southern Chile. *Journal of Nutrition Education and Behavior*, 45(5), 443-449. <https://doi.org/10.1016/j.jneb.2012.08.003>
- Schnettler, B., Miranda-Zapata, E., Orellana, L., Grunert, K. G., Poblete, H., Lobos, G., ... Lapo, M. (2022). Work-to-family enrichment and atmosphere of family meals influence satisfaction with food-related life: An actor-partner interdependence approach in dual-earner parents with adolescent children. *Food Quality and Preference*, 97, 104471. <https://doi.org/10.1016/j.foodqual.2021.104471>
- Schnettler, B., Miranda-Zapata, E., Orellana, L., Poblete, H., Lobos, G., Adasme-Berrios, C., ... Beroiza, K. (2021). Relationships between work-to-family conflict and the food domain for dual-earner parents with adolescent children. *Frontiers in Psychology*, 12, 752209. <https://doi.org/10.3389/fpsyg.2021.752209>
- Schnettler, B., Miranda-Zapata, E., Orellana, L., Saracostti, M., Poblete, H., Lobos, G., ... Grunert, K. G. (2022). Parents' modeling during the COVID-19 pandemic: Influences on family members' diet quality and satisfaction with food-related life in dual-earner parents with adolescent children. *Frontiers in Nutrition*, 9, 902103. <https://doi.org/10.3389/fnut.2022.902103>
- Schnettler, B., Rojas, J., Grunert, K. G., Lobos, G., Miranda-Zapata, E., Lapo, M., & Hueche, C. (2021). Family and food variables that influence life satisfaction of mother-father-adolescent triads in a South American country. *Current Psychology*, 40, 3747-3764. <https://doi.org/10.1007/s12144-019-00328-4>
- Sevilla, A., & Smith, S. (2020). *Baby steps: The gender division of childcare during the COVID-19 pandemic* (IZA Discussion Papers 13302). Institute of Labor Economics. <https://www.iza.org/publications/dp/13302/baby-steps-the-gender-division-of-childcare-during-the-covid-19-pandemic>
- Snuggs, S., & McGregor, S. (2021). Food & meal decision making in lockdown: How and who has Covid-19 affected? *Food Quality and Preference*, 89, 104145. <https://doi.org/10.1016/j.foodqual.2020.104145>
- Wang, J., Yeoh, E-K., Yung, T-K-C., Wong, M-C-S., Dong, D., Chen, X., Chan, M-K-Y., E-L-Y., Yushan, W., ... Chong, K-C. (2021). Change in eating habits and physical activities before and during the COVID-19 pandemic in Hong Kong: A cross-sectional study via random telephone survey. *Journal of the International Society of Sports Nutrition*, 18(1), 33. <https://doi.org/10.1186/s12970-021-00431-7>
- World Health Organization [WHO] (2020). Mental health and psychosocial considerations during the COVID-19 outbreak. *World Health Organization*. <https://www.who.int/publications-detail/mental-health-and-psychosocial-considerations-during-the-covid-19-outbreak>