

The Factorial Survey Experiment on “Normative Judgements of Work-Care Arrangements” in the German Family Panel

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I. Introduction

The German Family Panel (pairfam)¹ regularly includes factorial survey experiments. In Wave 12 of the panel study a factorial survey experiment focusing on normative judgements of work-care arrangements was implemented. The term “work-care arrangements” refers on the one hand to “work” in the form of paid and unpaid work within the family and on the other hand to “care” in the form of parental childcare as well as other forms of non-parental informal childcare or day care. Here, we focus on the combination of mothers’ and fathers’ employment and use of day care. Factorial surveys are an effective instrument to measure norms and attitudes as their experimental nature makes it possible to compare the effects of different influences on respondents’ decisions. Respondents are usually asked to evaluate an outcome variable based on different scenarios (vignettes) of hypothetical situations or individuals. The vignettes describe potentially relevant characteristics (dimensions) with different levels that vary randomly across vignettes. Due to this specific design, factorial surveys make it possible to disentangle underlying judgement principles and are less subject to social desirability bias than direct (single item) attitude questions. Moreover, they are able to include even rare combinations of characteristics for which subsamples in other surveys would be too small (Auspurg & Hinz, 2015; Jasso, 2006).

In the fully randomized factorial survey experiment described here, several vignettes depicting different fictitious couples and their familial and work situation were presented to the respondents, to examine the influence of various family characteristics and situational contexts on respondents’ normative judgements. The factorial survey module aims at answering the question of which individual and contextual factors influence social norms with respect to maternal and paternal employment (number of hours of paid work) and use of day care after a period of exclusive parental care.

II. Description of the Factorial Survey Experiment

¹ This report is based on data from the German Family Panel pairfam, coordinated by Josef Brüderl, Sonja Drobnič, Karsten Hank, Franz Neyer, and Sabine Walper. Pairfam has received long-term funding from the German Research Foundation (DFG). Analyses are based on data from the first twelve waves of the German Family Panel (pairfam), Release 12.0 (Brüderl et al. 2021). A detailed description of the study can be found in Huinink et al. (2011).

As the factorial survey experiment was implemented in the CASI (Computer-Assisted Self-Interview) section, respondents answered the module in a self-administered mode in the presence of an interviewer.² Three vignettes describing characteristics of a hypothetical two-parent family with a 15-month-old child were presented to each respondent. Respondents were asked to form judgments about fathers' and mothers' weekly working hours in paid work and about the scope of child's day care depending on different hypothetical situations. The variation in the hypothetical couples' individual-level and context-level characteristics makes it possible to study their influence on the respondents' ratings of the outcome variables. For example, the factorial survey experiment can answer the questions of whether day care quality has a differential impact on norms concerning parental work hours conditioned on the child's temperament or the family friendliness of the parents' jobs. Moreover, one can investigate whether day care quality matters less for outcome ratings in families where both parents need to work for pay to maintain their standard of living. Thus, the design of this factorial survey experiment makes it possible to assess which factors and their interaction terms influence ratings of maternal and paternal working hours and child's day care scope.

At the beginning of the vignette module, respondents were informed that the following questions would focus on their judgements about how couples with a young child should combine work and family. Then, they were told that they would receive descriptions of three hypothetical couples with a 15-month-old child.³ The introduction further included some basic information about the couple's characteristics (age, education, job characteristics, day care opportunities), which remained constant across the vignettes. Following the introduction, respondents were asked to indicate how many hours each parent should work for pay and how many hours the child should attend day care (see Figure 1).

Figure 1. Introductory text of the vignette module

We are interested in how you evaluate the compatibility of gainful employment and child-care for couples with a young child.
In the following, three example couples with their first child (15 months) will be introduced.

² Due to the Covid-19 pandemic, from the 24 April 2020 onwards, pairfam interviews could no longer be held in person at the respondents' place of residence, and the interviews were conducted via telephone (Computer-Assisted Telephone Interviewing, CATI). As a consequence, the remaining approximately 2,000 respondents did not receive the vignette questions and are coded with a missing value -3 "Does not apply".

³ In Germany the maximum time of paid parental leave is 14 months if both, mother and father, share the time at least 1:6. For this reason we chose to keep the child's age constant at 15 months.

For all couples, both parents are approximately 30 years old, similarly educated, and have permanent employment contracts. Both parents have a job which can only be worked during the day, does not require them to travel or commute, and both worked full time before the birth of their child.

The child can be cared for by the parents or in a day care facility (day care, crèche, or nanny), other options (e.g., grandparents or au pair) are not available.

Please indicate for each couple how much each parent should work and how long the child should be cared for by the day care facility.

There are no right or wrong answers. We are simply interested in your personal opinion.

Note: Important parts were also underlined in the interview the respondent filled out.

The outcome variables were measured on two scales. Respondents were asked to select their preference for mothers' and fathers' number of working hours on a seven-point scale including "0 hours per week", "1-8 hours per week", "9-17 hours per week", "18-25 hours per week", "26-32 hours per week", "33-40 hours per week", and "more than 40 hours per week". Whether respondents first had to select the mother's or the father's employment was randomly varied. The extent to which the child should attend day care was measured with the four categories "no day care", "a few hours on some days", "attending for a half-day every day", and "attending for a full-day every day".

Each respondent received three randomly selected vignettes. Figure 2 shows an example vignette including the description of the hypothetical couple and the different outcome measures.

Figure 2. Example vignette (varied dimensions underlined)

Case Study 1

Before the birth of the child, the mother earned more than the father.

Until now, the child was cared for primarily by the mother and quickly adapts to new environments and people.

The family has now been offered a place for their child in a reputable day care facility.

The income from one full-time or two part-time jobs would not be sufficient to maintain the family's desired standard of living.

The mother has good career advancement opportunities at her job, but the father doesn't. The mother's employer supports absence periods or part-time work for parents, the father's employer does not.

In your opinion, what is the best way for this family to arrange gainful employment and childcare in the upcoming years?

How many hours should the mother spend working at her job per week? (vig11_)

(vig11a and vig11b: random mechanism built in - Random_Mother_Father, once when the mother's question comes before the father's vig11a and once after the father's vig11b. Corresponding to vig14a and vig14b for vignette 2 and vig17a and vig17b for vignette 3)

Not at all (0 hours)	1 to 8 hours	9 to 17 hours	18 to 25 hours	26 to 32 hours	33 to 40 hours	Over 40 hours
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How many hours should the father spend working at his job per week? (vig12)

(Corresponding to vig15 for vignette 2 and vig18 for vignette 3)

Not at all (0 hours)	1 to 8 hours	9 to 17 hours	18 to 25 hours	26 to 32 hours	33 to 40 hours	Over 40 hours
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The child should ... (vig13)

(Corresponding to vig16 for vignette 2 and vig19 for vignette 3)

Not at- tend day care.	Only attend day care for a few hours on se- lected days.	Attend day care every day, half-day.	Attend day care every day, full-time.
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

As recommended by the factorial survey literature and cognitive sciences research (Auspurg & Hinz, 2015; Miller, 1994), the experiment included seven dimensions with two to four levels each. The seven dimensions and their respective levels addressed: 1) the relative income of the mother compared to the father – this refers to income from paid work, 2) the division of parental childcare to date, 3) the child's temperament, 4) day care quality, 5) consequences of employment interruptions for the household's standard of living, 6) career prospects of the mother and father, and 7) family-friendliness of each parent's employer (see Table 1 for a summary). All dimensions relate to frequently discussed mechanisms potentially explaining the division of paid work and family work among parents. Women's relative earnings play a role in economic theory and bargaining approaches (Becker, 1991; Lundberg & Pollack, 1996). Mothers' childcare choices and subsequent employment behaviour might also depend on their child's temperament (Coley et al., 2014; Hondralis & Kleinert, 2018). In addition, contextual factors like employer support and day care quality are assumed to influence work-care

arrangements among couples with young children (Bernhardt et al., 2016; Kelly et al., 2014; Pettit & Hook, 2005; Schober & Spiess, 2015; Stahl & Schober, 2020; Twamley & Schober, 2018; Zoch & Hondralis, 2017). All vignettes included information on all seven dimensions.

Additionally, a randomly drawn subgroup of respondents (approximately 50%) received an information treatment before answering the vignettes. The information experiment was designed to increase the salience of parents' legal entitlement to a day care spot for their child from age one onwards and aims to raise awareness that mothers are significantly more often affected by lower lifetime incomes and old-age poverty than fathers, partly due to mothers' longer employment interruptions (see Figure A1 in the appendix).

The comprehensibility of the vignettes and the information treatment was tested in fifteen cognitive interviews with a diverse set of persons in terms of gender, age, educational level, and parenthood status. Subsequently, an online pre-test was conducted among scholars at the Department of Sociology at the University of Munich and among students and staff at the University of Tübingen as well as the German Institute for Economic Research. As a result of this pre-test, the order in which respondents had to rate mothers' and fathers' paid work hours was randomly varied.

Table 1. Overview of dimensions and levels that varied within vignettes

Dimension	Levels			
Income	3	Before the birth of the child, the mother earned more than the father. (1)	Before the birth of the child, the father earned more than the mother. (2)	Before the birth of the child, both parents earned equivalent salaries. (3)
Division of childcare/parental care	3	Until now, the child was cared for primarily by the mother and ... (1)	Until now, the child was cared for primarily by the father and ... (2)	Until now, the child was cared for primarily by both parents equally and ... (3)
Child temperament	2	... has difficulties adapting to new environments and people. (0)	... quickly adapts to new environments and people. (1)	

Day care centre quality	2	The family has now been offered a place for their child in an average day care facility. (0)	The family has now been offered a place for their child in a reputable day-care facility. (1)		
Standard of living	2	Income from only one full-time or two part-time jobs would not be sufficient to maintain the family's desired standard of living. (0)	Income from only one full-time or two part-time jobs would be sufficient to maintain the family's desired standard of living. (1)		
Career prospects	4	The mother has good career advancement opportunities at her job, but the father doesn't. (1)	The father has good career advancement opportunities at her job, but the mother doesn't. (2)	Both parents have good career advancement opportunities at their jobs. (3)	Neither parent has good career advancement opportunities at their job. (4)
Family-friendliness of job	4	The mother's employer supports absence periods or part-time work for parents, the father's employer does not. (1)	The father's employer supports absence periods or part-time work for parents, the mother's employer does not. (2)	Both parents' employers support absence periods or part-time work for parents. (3)	Both parents' employers do not support absence periods or part-time work for parents. (4)

III. Experimental Design to Generate Vignettes

To keep the burden for individual respondents and interview duration low, each respondent received three randomly selected vignettes from the full universe of 1,152 different vignettes ($2^3 \times 3^2 \times 4^2 = 1,152$). The experiment was implemented as a full factorial (rather than a D-efficient) design, which means that all possible combinations of dimensions and levels were presented to the respondents, and no implausible combinations of dimensions existed. In this design all possible interaction terms can be estimated. Respondents were allocated to a ran-

dom subsample of three vignettes. 6,285 anchor respondents completed the vignette questionnaire in Wave 12. Based on a universe of 1,152 vignettes and three vignettes per respondent, each vignette should have been assessed about 16 times.

Based on the estimated sample size and universe of vignettes, on average, each vignette in combination with the information treatment should have been presented to about eight respondents, while eight persons should have received each vignette without the information stimulus. In practice, on average, each vignette was assessed about 16 times and was presented to about nine respondents in the information treatment and about nine respondents in the control group. The large sample of pairfam respondents provides sufficient statistical power to test for heterogeneous effects of the vignette dimensions and the information stimulus across social groups.

IV. Realized Sample, First Descriptive Results, and Data Quality

As presented in Table 2, 8,197 respondents participated in Wave 12 of the pairfam study. 1,912 respondents did not receive the vignette module as the interview mode was changed due to the Covid-19 pandemic in spring 2020. Of the 6,285 remaining respondents, 6,050 (96.26%) respondents evaluated at least one of the three assigned vignettes, resulting in 17,800 realized vignette evaluations and an item nonresponse rate of 5.60%. On average, each vignette was presented 16.35 times.

Table 2. Number of possible/realized respondents/vignette evaluations

	Respondents	Vignette evaluations
N Respondents in pairfam wave 12	8,197	24,591
N Did not receive the vignette module (missing -3)	1,912	5,736
N Received the vignette module	6,285	18,855
N Nonresponse (missing -1, -2)	235	1,055
N Realized number	6,050	17,800

Source: pairfam wave 12, number of respondents (wide format) and vignette evaluations (long format).

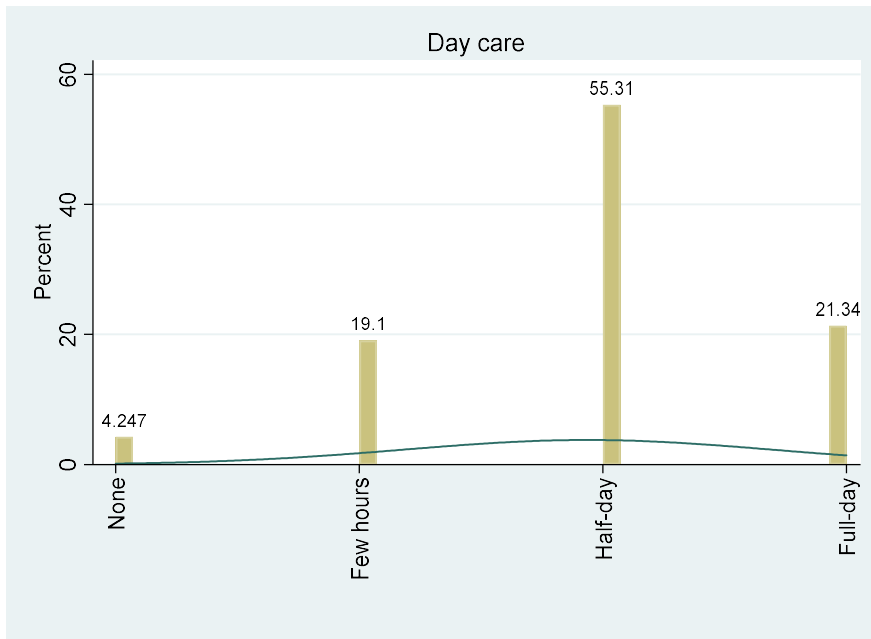
The following descriptive analyses are based on the number of realized vignette evaluations. Figures 3-5 graphically show the distribution of evaluations by outcome for mothers’ number of working hours per week, fathers’ number of working hours per week, and extent of day care. The figures reveal that the respondents used the full rating scale. With regard to mothers’ number of working hours, the middle category of “18 to 25 hours” was chosen most frequently (about 31%). For fathers, the category “33 to 40 hours”, close to full-time work, was

selected most often (about 46%). Half-day day care was mostly recommended for the 15-month-old child (about 55%).⁴

Figure 3-5. Distribution of the realized vignette evaluations by outcome



⁴ The distributions of the outcome variables do not change when excluding speeders, i.e., respondents who required a relatively short amount of time to answer the vignette items.



In terms of data quality, first descriptive results indicate that the factorial survey experiment worked well. Table A1 in the appendix shows the frequency with which each level of each dimension occurred; the frequencies are quite balanced across the realized sample. Furthermore, the experimental design should ensure no correlations between the vignette dimensions and respondents' characteristics. Table A2 in the appendix presents the Spearman correlations between all vignette dimensions. Overall, the correlations are very small ($r_s < 0.02$), indicating that the randomization process of the vignettes worked well.

V. Description of the Vignette Data Set

The vignette data sets "anchor12_vig.dta" (Stata) and "anchor12_vig.sav" (SPSS), respectively, include all vignettes in wide format, meaning that all three vignettes per respondent are presented in a single row (see Table 3 for the data structure). Missing values are coded like in the main pairfam data set: "-1 Don't know" and "-2 No answer" for respondents who could not or did not want to answer, respectively. Value "-3 Does not apply" is applied if a respondent was not asked the corresponding question, which was the case for the 1,912 respondents who did not receive the vignette questions due to a change in survey mode from face-to-face to telephone interview.

Table 3. Structure of the vignette data set (wide format)

id	VigID_1	TVingIndex_1	vigtr	Random_Mutter_Vater	vig11a	vig11b	vig12	vig13
860316000	2300011	0417	2	2	-3	6	6	4
945000	3211013	0931	2	1	5	-3	3	2

Source: pairfam wave 12. This table shows the first two respondents and their vignettes in wide format for illustrative purposes.

The first column of the vignette data set contains the respondent id, which should be used to merge the vignette data set with the anchor data set “anchor12.dta” (Stata) or “anchor12.sav” (SPSS). The variables “TVingIndex_1”, “TVingIndex_2”, and “TVingIndex_3”, each ranging from 0001 to 1152, represent the id number for each unique vignette. Additionally, the 7-digit variables “VigID_1”, “VigID_2”, and “VigID_3” stand for the specific combination of levels on each dimension a respondent received. Based on this information, the user can build separate variables for the seven vignette dimensions and their respective levels, which can be used for further analysis of individual-level and contextual-level effects on social norms.

Regarding the outcome ratings on parents’ number of working hours, the variable “Random_Mutter_Vater” indicates the order in which respondents evaluated mothers’ and fathers’ extent of employment – either mother-father (1) or father-mother (2) – which was randomly assigned to each respondent during the survey experiment. For respondents who answered the questions regarding mothers’ number of working hours first and afterwards the questions about fathers’ number of working hours, information about mothers’ number of working hours is stored in the variables “vig11b”, “vig14b”, and “vig17b”. By contrast, for respondents who answered the questions about mothers’ number of working hours in the second position, the respective information about mothers’ number of working hours is stored in variables “vig11a”, “vig14a”, “vig17a”. Thus, in order to analyse respondents’ preferences regarding mothers’ number of working hours, “vig11a” and “vig11b”, “vig14a” and “vig14b”, “vig17a” and “vig17b” must be combined accordingly. The variables “vig12”, “vig15”, and “vig18” refer to respondents’ judgements about fathers’ number of working hours. Variables “vig13”, “vig16”, and “vig19” refer to respondents’ evaluations of day care hours. Finally, “vigtr” indicates whether the respondent was part of the treatment group (1) or control group (2).

For analyses at the respondent level, the data can be left in wide format. For analyses at the vignette level, it is recommended to transform the vignette data set from wide into a vignette based long format. This reshaping ensures that each vignette is displayed in its own row and the three vignettes per respondent are labelled 1, 2, and 3 with a newly built variable. For more detailed information on data management and the analysis of vignette data, see Auspurg and Hinz (2015).

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VII. Appendix

Table A1. Check of experimental design: Frequency of dimension levels in the realized sample

Dimension	Level	Realized evaluations	Share (%)
Income	Mother more	5,936	33.35
	Father more	5,914	33.22
	About equal	5,950	33.43
Division of childcare/parental leave so far	Mainly mother	5,987	33.63
	Mainly father	5,955	33.46
	Equal	5,858	32.91
Child temperament	Difficulties adapting	8,974	50.42
	Adapts easily	8,826	49.58
Day care centre quality	Mediocre quality	9,025	50.70
	Very high quality	8,775	49.30
Standard of living	Income not sufficient	8,818	49.54
	Income sufficient	8,982	50.46
Career prospects	Only mother	4,542	25.52
	Only father	4,358	24.48
	Both	4,510	25.34
	None	4,390	24.66
Family-friendliness of job	Only mother	4,516	25.37
	Only father	4,357	24.48
	Both	4,506	25.31
	None	4,421	24.84

Source: pairfam wave 12, N=17,800 vignette evaluations.

Table A2. Experimental design check: Spearman correlations

Dimensions	1	2	3	4	5	6	7
1 Income	1.0000						
2 Division of childcare/parental leave so far	0.0002 (0.9757)	1.0000					
3 Child temperament	0.0014 (0.8535)	0.0039 (0.6043)	1.0000				
4 Day care quality	0.0026 (0.7263)	0.0081 (0.2799)	0.0045 (0.5491)	1.0000			
5 Standard of living	-0.0083 (0.2706)	0.0103 (0.1684)	0.0104 (0.1647)	-0.0078 (0.2950)	1.0000		
6 Career prospects	0.0024 (0.7489)	0.0192 (0.0106)	0.0016 (0.8270)	-0.0124 (0.0980)	-0.0061 (0.4189)	1.0000	
7 Family-friendliness of job	-0.0080 (0.9138)	-0.0051 (0.5004)	-0.0048 (0.5198)	-0.0062 (0.4077)	-0.0083 (0.2677)	0.0061 (0.4142)	1.0000

Source: pairfam Wave 12, N=17,800 vignette evaluations. Spearman correlations measure linear dependence between two variables. Numbers close to 0 indicate independence between two variables (vignette dimensions). p-values in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Figure A.1 Information treatment

Before you start, here is some important information:

“Since 2013, every child has a right to a spot in a day care centre or family day care beginning at age 1. This allows both parents - if they wish - to pursue employment. For mothers, in particular, earning an income of their own can improve their financial situation in the long term. Academic studies show that shorter employment interruptions tend to result in higher wages for mothers in the longer term, which can reduce the risk of poverty in old age.”

Notes: Half of respondents received an information treatment on old-age poverty at the beginning of the vignette module (vigtr = 1).