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RESEARCH ARTICLE



The politics and policies of sleep? Empirical findings and the policy context

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ABSTRACT

Public policies aim to promote the social good, but they do not always meet this goal. We argue that to improve policy and policy analysis, it is important to pay attention to the cumulative effect of policies on how people use their time. In this study, we looked at the effect of certain policies on sleep. Our exploratory study yielded intriguing findings on sleep in Israel in the specific policy context of a dual burden of work and caregiving. We surveyed 671 participants on the effect of work and care hours on sleep. The findings showed participants slept an average of 6.6 hours and expressed the desire to sleep one hour more. The desire to sleep more was higher than for all other uses of time and was evident in all employment categories. Part-time workers slept more than full-time workers and women, and younger people asked to sleep more than older ones. Long work hours and care hours led to lower sleep hours. Our findings suggest the need to be aware of possible 'side effects' in the policy design stage and are relevant to other countries with a care-work burden.

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KEYWORDS

Uses of time; policy analysis; policy design; care; work; sleep; Israel

Introduction

The study discussed in this article stemmed from our interest in the connection between policy and uses of time. Policies have unintended effects that often go unrecognized by policymakers. For example, there is a growing understanding that how we use our time affects our well-being (Lahat and Sened 2020; Gershuny 2011; Kahneman et al. 2010), but this has not attracted policymakers' attention (Ferrant, Pesando, and Nowacka 2014; Lahat and Sened 2020). Here, we focus on a specific use of time – the time people sleep – because of its significance to health. We suggest that more attention should be given to the side effects of policies on sleep.

Sleep is important to both individuals and the larger society. Those who have enough sleep reap benefits: students who sleep more have better achievements at school (Gariépy et al. 2017), and workers who sleep more are more productive at work (Hafner et al. 2017). However, people who sleep less have more health threats (Buxton and Marcelli 2010; Hillman and Lack 2013; Hafner et al. 2017; Mireku and Rodriguez 2021), and lack of sleep has been linked to car accidents (Rosenstein

2008), among other things. Even though the economic cost of sleep disorders is significant (Hillman and Lack 2013), policymakers pay little attention to the importance of sleep (Basner, Spaeth, and Dinges 2014; Chaput and Dutil 2016). We join other researchers in calling for an awareness of sleep as an important policy consideration (Williams 2011; Hsu 2014).

The article describes an exploratory study based on the Israeli case of a dual burden of work and care. We used a quantitative method. Specifically, we surveyed a representative sample of the Israeli population to explore the connection between care and work hours on sleep. The article proceeds as follows. The first section is a literature review of work on policy side effects, sleep, and policy; it also describes the Israeli policy context. The second section explains the survey we administered to a representative sample of the Israeli population. In the third section we present the results on the links between sleep, care, and work. Finally, we reflect on these findings in light of the broader policy context of the dual work-care burden in Israeli society. While diverse factors affect sleep, we suggest the need to take a macro perspective and pay attention to how policies can inadvertently contribute to sleep deficits. While Israel has unique features, the empirical findings are relevant to other societies with a work-care burden who are also reporting sleep deficits (e.g. Hafner et al. 2017; Mireku and Rodriguez 2021), especially among parents with young children.

Review of the literature

Public policies and their side effects

Policies generally aim to promote citizens' well-being, but unravelling complex policy processes to see if they do this is a challenging task (Colebatch 2006; Goyal and Howlett 2020). Complexity is a central characteristic in today's policy analysis (Hajer 2003; Li and Wagenaar 2019). Wagenaar defines complexity as "the density and dynamism of the interactions between the elements of a system" (2007, 17). We focus on the complexity created by the blank spots between policies and their accumulative effect on outcomes in another field. Meier and Hill (2005) use the metaphor of tectonic plates to refer to the holes created between policies that leave issues untreatable.

While many theories refer to the policy process, few consider the side effects of policies. One exception is welfare economics theory and its focus on externalities. An externality is any impact (positive or negative) resulting from any action (whether related to production or consumption) that affects someone who did not fully consent to it through participation in voluntary exchange (Weimer and Vining 2005, 91). While the literature on externality mostly refers to an action in the market that has unintended side effects on third parties, the concept is also relevant to government bureaucracies (Weimer and Vining 2005, 186). Health issues have been referred to in the context of externality (Steinacker 2006), and some studies refer to the indirect effects of policies on social outcomes (e.g. the effect of education on political participation) (Mettler and Soss 2004), but to the best of our knowledge, the cumulative influence of diverse policies on sleep has not been investigated. In what follows, we argue policy analysis should include policies' side effects, looking specifically at sleep.

Sleep, other uses of time, and policy

The 24/7 society, social acceleration, and the growing feelings of stress around time affect people's lives and their sleep (Wajcman 2015; Taylor 2014; Williams 2011; Hsu 2014; Sullivan and Gershuny 2018). Studies have mostly explored patterns of sleep based on individual socio-demographic characteristics, for example, gender and origin (Chatzitheochari and Arber 2009; Basner, Spaeth, and Dinges 2014; Organek et al. 2015; Mireku and Rodriguez 2021). Researchers have focused on specific countries, including the United Kingdom (Lamote de Grignon Pérez et al. 2018), Australia (Hillman and Lack 2013; Adams et al. 2017), the United States (Mireku and Rodriguez 2021), and Belgium (van Tienoven, Glorieux, and Minnen 2014).

Studies find various uses of time, such as work, childcare, and household work have an effect on sleep (Chatzitheochari and Arber 2009; Basner, Spaeth, and Dinges 2014; Pepin, Sayer, and Casper 2018; Ruppanner et al. 2021). For example, working parents report less sleep (Ruppanner et al. 2021). Those working in multiple jobs or working more than 10 h per day also tend to sleep less (Chatzitheochari and Arber 2009; Basner, Spaeth, and Dinges 2014). In fact, people who work more have a tendency to sleep less than recommended by the United States National Sleep foundation (Mireku and Rodriguez 2021).

There may be a gender effect as well; men in the workforce generally sleep less than women (Chatzitheochari and Arber 2009; Ruppanner et al. 2021). This may be due, at least in part, to the lower representation of women in full-time jobs. When both men and women who work full-time are studied, the findings are similar: both groups report less sleep (Chatzitheochari and Arber 2009). Pepin, Sayer, and Casper (2018) found married women spend more time on housework and sleep less than unmarried/divorced women. The researchers explained their results using a gender perspective; in their view, married women may practice more gendered behaviours such as spending more time on household chores (Pepin, Sayer, and Casper 2018).

The time people spend on sleep, despite its importance to health, is generally regarded as a private matter and, as such, is seldom featured on the policy agenda (Wylie 2005; Basner, Spaeth, and Dinges 2014; Chaput and Dutil 2016). This is also partly because of the normative connection between sleep deprivation and hard work, whereby sleeping less is perceived as a symbol of hardworking people and is appreciated by society (Mitler, Dement, and Dinges 2000). Nevertheless, some policy steps have been taken in the direction of promoting, if not sleep, at least leisure hours, for example, regulating the length of the workday, work shift hours, or the hours drivers spend on the road. Other policies include the starting hours of school days, giving children and parents more time to sleep. Organizations such as the US military are paying more attention to the importance of sleep, as well, while government agencies are investing research funds in studying sleep, and programmes that educate people on the importance of sleep are being implemented (Mitler et al. 1988, 2000; Wylie 2005; Barnes and Drake 2015; Gariépy et al. 2017). These efforts are laudable, but they do not go far enough.

Studies that specifically connect sleep and policy are scarce (Williams 2011; Hafner et al. 2017). However, some studies have connected policies and uses of time more generally (e.g. Lewis, Campbell, and Huerta 2008; Gershuny and Sullivan 2003; Craig, Mullan, and Blaxland 2010; Craig and Mullan 2011; Lahat and Sened 2020). Studies

have also found that the type of welfare regime¹ influences uses of time. For example, a liberal welfare regime offers less social coverage than a social-democrat regime, and people in the former tend to work more (Gershuny and Sullivan 2003). Goodin et al. (2008) found childcare subsidies and taxation influenced the time mothers work. For example, single mothers in the USA work more than their comparators in Sweden. In the context of care time, some research (Lahat and Sened 2020) has found people in liberal regimes spend more hours caring, on average, than people in five other welfare regime types.² The authors explained these findings by the relatively lower government support for care services alongside the growing normative demands for “being a good mom” (Lahat and Sened 2020). However, other research has not found differences between liberal and social-democrat regimes (Gershuny and Sullivan 2003). Craig, Mullan, and Blaxland (2010) found policies influenced the time people in Australia spent on paid and unpaid work. They compared the period of the Labour government with that of the Coalition government between 1992 and 2006 and discovered that during the years of the more conservative Coalition government, women spent more time on unpaid work. This trend reversed a gender convergence in time uses dedicated to unpaid work during the period of the Labour government.

Overall, a body of literature connects policy context to uses of time. We extend previous work by looking specifically at sleep time and policy in the Israeli context.

The Israeli context: policies affecting uses of time

Established in 1948, Israel is a small country with a population of nine million (ICBS n.d.). Since its post-Holocaust establishment as the homeland for the Jewish people, many Jews worldwide have immigrated to Israel. Israelis are exposed to relatively stressful life circumstances, partly because of the history of the Holocaust and partly because of ongoing war and terrorism (Mizrahi, Mehrez, and Naor 2001; Besser, Neria, and Haynes 2009; Fund et al. 2020). One of the country’s main features is its heterogeneous population, with Jewish immigrants from Asia, Africa, Europe, North America, and the former Soviet Union (a million immigrants arrived from the former Soviet Union in the 1990s). Arabs constitute around 20 percent of the Israeli population (ICBS n.d.).

As we argued in the previous section, policies can affect uses of time. Here, we focus on Israeli policy fields with a profound effect on uses of time: work and care. Workforce policies in Israel are influenced by the imperative of the value of work. At its establishment, Israel was led by the Labour party, Mapai. The first three decades were inspired by the theme of building the nation, manual labour on the land, and the work ethic of the Zionist movement. The Labour party dominated the political landscape (Oz 1997; Aharoni 1998). From a welfare perspective, the country understood the way to help the needy was to supply productive work, not aid (Doron 2018). Israel later developed a universal welfare state model (Gal and Bargal 2002). After the mid-1980s, the welfare state changed, adopting an in-between model with more individualistic, neo-liberal trends, such as those reflected in the American model (Doron 2001), but the importance of work remained salient.

The main law regulating work hours in Israel is the Hours of Work and Rest Law (1951). It stipulates a 45-hour work week. The weekly work hours dropped to 42 in

2018 with the introduction of a new regulation. However, various occupations are excluded from this regulation, including members of the air force, care practitioners, and prison employees (Labor Ministry website [N.D.](#)). The number of work hours per week is high in comparison to other countries (Man 2020). For example, while drivers of heavy trucks work an average of 56 h in the European Union, in Israel, they work 68, more like North American countries (National Road Safety Authority [N.D.](#)). Israel embraces activation programmes (like many other countries) that aim at incorporating into the workforce people with difficulties finding jobs (Benish 2014). In recent years, there has been an emphasis on incorporating populations with specific cultural features, such as Ultra-orthodox Jews and Arab women.

In other words, while the welfare state ideology has changed, the importance of work has not. Israel has an average 72 percent of potential workers participating in the workforce, close to the 72.04 percent average for OECD countries and is located seventh from the top out of 38 countries in its high number of weekly work hours (OECD 2019a, 2019b). Women in Israel have a high participation rate, with 74 percent working, but Arab women lag behind, at 40 percent (Fuchs and Weiss 2018; Taub 2019a). Full-time work is common for Israeli women; only a third of working Jewish women are in part-time jobs (Ekert-Jaffe and Stier 2009; Taub 2019b). The combination of high work hours and relatively large families creates pressure on women and parents (Taub 2020; Man 2020).

Family size is another important aspect in the Israeli context, driven both by culture and at least in part by policy. Out of 52 OECD countries, Israel has the biggest family size, with 3.1 children per woman. The OECD average is 1.7; it is 1.3 in Spain, 2.1 in Mexico, and 1.9 in France (OECD 2019c). Israel is a family-oriented society, and the norm dictates having several children, not just among the religious, but also among the secular working population. While culture and norms are part of the explanation of the high number of children in Israel, policy has an important role as well (Birenbaum-Carmeli 2003, 2009). Birenbaum-Carmeli (2009) notes that Israel's public funding of fertility treatments is unparalleled worldwide. Treatment is offered for a modest user contribution of roughly 100 USD to practically any Israeli woman, irrespective of family status, sexual orientation, education, financial situation, or mental well-being, to a woman aged 44–51 if she uses a donor egg, until she has two children with her present partner (where applicable).

Despite the encouragement of large families and although Israeli policies promote participation in the workforce, care services are mostly inadequate (Hasson and Dagan-Buzaglo 2019). Israel recently added full funding for childcare from the age of three, but the childcare services for children aged 0–3 do not suffice for working parents (Hasson and Dagan-Buzaglo 2019). In addition, childcare services are subsidized, but their cost is still high compared to other countries. Supply does not meet demand (Holler and Gal 2011; Hasson and Dagan-Buzaglo 2019; Man 2020), services are not adequately supervised (Holler and Gal 2011; Moshel 2014), and there is a clear need to improve their quality (Koren-Karie, Sagi-Schwartz, and Egoz-Mizrachi 2005). About 40 percent of children are cared for by their mothers, other family members, or nannies, and 28 percent are in private day-care facilities (Hasson and Dagan-Buzaglo 2019, 21). Schools are complemented by partly subsidized, informal education programmes (Hasson and Dagan-Buzaglo 2019). Finally, maternity leave in Israel is

relatively short: only 15 weeks are fully paid (National Insurance Institute of Israel 2020; Perez 2011).

Another challenge in the context of family care is caring for older people. A pillar of Israeli long-term services is care for the elderly (Ajzenstadt and Rosenhek 2000). Yet in 2017, a special report of the Israeli Comptroller highlighted regulatory deficits, the problematic quality of care services, and the burden on families (State Comptroller 2017).

Government or compulsory insurance schemes that include health and social care components in Israel represent 0.7 percent of GDP, compared to the OECD average of 1.7 percent (OECD 2019d). Thus, while Israeli policies encourage both work and large families, care coverage does not meet the needs. Consequently, family members supplement inadequate services by putting a lot of their own time into care work.

There are few studies on sleep in Israel, and the findings are inconclusive. Some previous work reports lower levels of sleep among Israelis. For example, one study found Israeli youngsters slept less than their peers in 11 European countries (Tynjälä, Kannas, and Välimaa 1993). In a more recent study, Israeli adults reported having a relatively short sleep time, an average of 6.59 h, and the researchers pointed to the common use of digital media in the evening as a possible explanation (Green, Dagan, and Haim 2018). However, in a study of sleep disorders in Israel, Fund et al. (2020) found that despite the stressful life circumstances – the Holocaust trauma, geopolitical and security problems – the persistence of these disorders is like other Western countries.

In fact, data on uses of time (not just sleep) in Israel are scarce (Kaplan and Karkabi-Sabah 2017). A time budget survey based on dairies was conducted 30 years ago (CBS 1995, 1996), making the findings less relevant today. Findings from the 2007 International Social Survey Programme (ISSP) on leisure time and sports shed more light on leisure time activities in the current context. The findings show Israeli have the highest individual-level mean of informal social contact with family and relatives among 22 countries explored (Akaeda 2018). This supports our previous contention that Israeli is a family-oriented culture. That said, the growing burden of work and care on parents is relevant not just in the Israel but in many countries (e.g. Hochschild ([1997] 2007); Goodin et al. 2008, 2010; Wajcman 2015), making our study of interest elsewhere.

Method

The article presents an exploratory case study (Yin 2003) of Israeli society. The study was qualitative, and we used a telephone survey to gather data.

Data collection

Between March and May 2018, we conducted a telephone survey on time uses and policy perceptions. The survey, conducted by B. I. and Lucille Cohen Institute for Public Opinion Research at Tel Aviv University, included a representative sample of the general Israeli population above age 18. The return rate of the sample was 52 percent. Six hundred and seventy-one people, 558 Jews and 113 Arabs were interviewed. The questionnaire was pre-approved by the ethics committee of Tel Aviv University.

Research tool

This study was part of a larger research project on uses of time and policy alternatives.³ The survey included questions on socio-demographic characteristics, uses of time, perceptions about uses of time, preferred uses of time, and policy perceptions. In this article, we explore the questions that included the socio-demographic variables and uses of time. Since it is challenging for people to be accurate, the survey referred to the broad categories of sleep, work, and care. Note that the participants gave uses of time in hours or half hours.⁴

Variables

Dependent Variables: Dependent variables were amount of sleep, desired amount of sleep, and the gap between the two. Note that we measured uses of time based on similar questions from other surveys.⁵ For *amount of sleep*, we asked participants to respond to the following: “On a regular day, during mid-week, out of 24 h, try to estimate how many hours you spend on sleep”. For *desired sleep*, we asked, “If you had an opportunity to spend your time on a regular day in mid-week the way you wanted, how much time would you like to spend on sleep?” For the *sleep gap*, we calculated the gap between the two uses of time as a function of current sleep time minus the desired uses as an absolute value.

Independent Variables: Independent variables were time spent on work and care. For *work time*, we asked, “On a regular day, during mid-week, out of 24 h, try to estimate how many hours you spend on paid work, including commuting to work and/or looking for work.” Based on two pilots that helped us identify participants’ challenges when calculating their hours, we used the following question to help participants better determine their uses of time. To estimate *care time* we asked, “After summing the time you spend on sleep and work and out of the *_X_* left hours, how much time do you dedicate to household chores (such as: shopping, cooking, laundering, and tacking care of children or adults as well as volunteering for others etc.?)”

Control variables. The literature identifies certain variables as affecting the way people use time. In the logistic regression, we controlled for the most central ones (see Ruppanner et al. 2021): gender (dummy: Men = 0/Women = 1), age (continuous), education (three categories: without a matriculation certificate; full matriculation and post-secondary education; academic education),⁶ income (measured based on the question: “The average net income for a family in Israel is around 15,000 shekel. Is your family income 1 = well below average, 2 = below average, 3 = average, 4 = above average, 5 = well above average?”), ethnic group (Arab or Jewish: Arab = 1, Jewish = 0), number of children (continuous), and health status (5 categories: 1 = poor, 2 = not so good, 3 = good, 4 = very good, 5 = excellent).⁷

The sample

Table 1 shows the socio-demographic characteristics of the sample. The average age was 46.9, with a higher representation of those 65+ than in the general population (17.1% versus 11.5%). In addition, 11.5 percent were retirees, 17 percent were Arabs (vs. 20%

Table 1. Main characteristics of the sample and their representation in the logistic regression.

		% (Mean)	N
Gender	Dummy variable		
Women	Women = 1	48.6	326
Men	Men = 0	51.4	345
Age	Continuous	(46.9)	
18–29		17.6	118
30–39		16.9	113
40–54		29.7	199
55–64		18.7	125
65+		17.1	115
Education	Three categories:		
Without a matriculation certificate		22.9	153
Full matriculation, post-secondary education		38.4	257
Academic education	Comparison group	38.7	259
Income	1-low below average – 5 well above average		
Well below average		23.2	143
Below average		19.7	122
Average		20.7	128
Above average		20.7	128
Well above average		15.7	97
Employment Status			
Employed, full time	Comparison group	44.4	296
Employed, part time		14.4	96
Independent worker		15.9	106
Unemployed, searching for a job		2.7	18
Retired/pensioner		11.5	77
Primarily responsible for childcare and household chores		4.2	28
National service		0.3	2
Student ¹		2.4	16
Other ¹		4.2	28
Origin²			
Asia, Africa		29.8	200
Europe, America		21.0	140
Former Soviet Union		9.7	65
Israel	Comparison group	39.5	264
Ethnic group			
Jewish		83.2	558
Arabs		16.8	113
Religious Orientation³			
Religious ultra-orthodox		25.9	173
Religious traditionalist		30.7	205
Secular		43.4	289
Family and Marital Status			
Married, no children		3.4	23
Married, with children		68.3	458
Unmarried, no children		16.1	108
Unmarried, with children		12.2	82
Number of children at home	Continuous	(1.6)	
Health Status⁴	Continuous 1-poor, 5-excellent		
Poor		1.8	12
Not so good		6.4	43
Good		26.2	175
Very good		30.5	204
Excellent		35.1	235

¹We did not include the last three groups, National service, student and other, in the analysis. They were small, and there were too many categories for analysis. Moreover, they could be mostly controlled by the age variable.

²Category includes people born in Asian or African countries or whose father was born in these countries; same for other categories.

³We referred to different levels of religiosity: 1 = very religious-ultra-orthodox; 2 = religious; 3 = religious-traditionalist; 4 = traditionalist – not so religious; 5 = not religious-secular. The five categories were combined to create three categories.

⁴The health categories were measured based on the F-36 questionnaire, from 1 = excellent to 5 = poor. We reversed this variable.

in the general population), and women were slightly underrepresented. Seventy percent of the sample had children, reflecting Israel's high fertility rate of 3.1 children per family (OECD 2019c), a characteristic of Israeli society (Israel Central Bureau of Statistics).

Data analysis

Using the means of the actual time slept and the amount of sleep desired, we calculated the gap between the two. A negative result indicates the desire to have more of a specific kind of time use. In the larger project, we used MANOVA analysis to understand the differences between different groups in the population in terms of their current and desired uses of time. In this article, we refer only to sleep. Post-hoc Tukey tests indicated significance between the groups based on their socio-demographic characteristics at the 5 percent level.

To explore the effect of time uses on care and work, controlling for socio-demographic variables, we implemented a logistic regression for current sleep ($0 < 7$ h and $1 = > 7$), desired sleep ($0 < 7$ h and $1 = > 7$), and the sleep gap ($0 < 1$ h and $1 = > 1$).

In the next step, we explored the effect of care and work time on more nuanced categories of sleep, while controlling for socio-demographic variables. To this end, we used an ordinal regression with three categories of sleep: category 1, short sleep (≤ 5 h); category 2, medium sleep (5.01–6.99 h); category 3, long sleep (≥ 7 h). These categories have been used in other studies (e.g. Hsieh et al. 2011; van Schrojenstein Lantman et al. 2017). The findings are reported in Table A1 in the appendix. Figures 2 and 3 present the statistically significant main effect of two variables, work hours and care hours, on sleep hours.

Findings

Survey results: uses of time and sleep

We started by looking at the descriptive data and found participants devoted relatively little time to sleep. Sleeping less than seven hours was evident in all employment categories, including unemployed and self-employed. The one exception was for retirees ($M = 7.05$, $SD = 1.60$). Figure 1 depicts the current time uses versus the desired time uses by employment status. Participants of all employment statuses wanted more time to sleep. While preferences for time use varied across groups, all groups wanted more sleep. The participants who sought the most extra time for sleep were primarily responsible for childcare and household chores; they asked for 8.9 h, on average. Retirees had the smallest number of desired hours of sleep, with an average of 7.4.

As for the gap between the current amount of sleep and the desired amount of sleep, t (g), our participants asked for an average of 1.07 ($SD = 1.9$) more hours. Slightly more than half, 51 percent, wanted more time to sleep, and 93 percent asked for more or the same amount of time. Of the four categories of time uses (work, care, personal, sleep), desire for more sleep was the most mentioned, followed by a desire for more personal time, with an average of -0.53 h ($SD = 2.78$). Participants also expressed a desire to work less ($M = 0.9$ h, $SD = 3.3$) and wanted to devote less time to caring for others ($M = 0.63$, $SD = 3.09$).

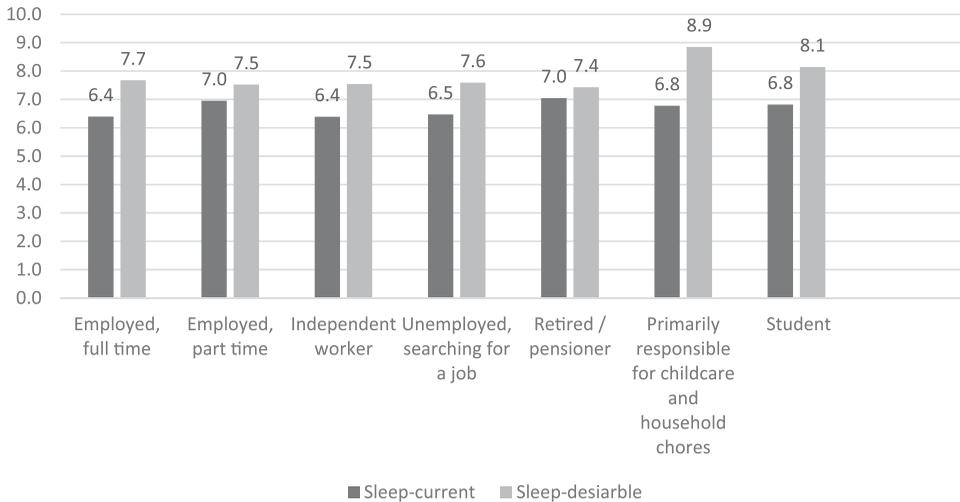


Figure 1. Differences between current and desired sleep time by employment status (hours).

Source: Authors' 2018 survey of Israeli population, 18+.

Next, we applied MANOVA analysis to the findings for sleep and desired sleep⁸ to explore differences between groups based on their socio-demographic characteristics. Table 2 shows the findings for sleep; it demonstrates that gender, origin, education, income, religious orientation, and state of health had no significant effect on the current time devoted to sleep. A main effect ($F = 4.028$ [$df = 6;613$] $p < 0.001$, partial $\eta^2 = .038$) was employment status. Post-hoc Tukey tests exploring the difference between group categories showed part-time workers slept more than full-time workers (Table 2, employment status, comment a). Retirees slept more than full-time workers and the self-employed (Table 2, employment status, comment dm). People without children slept more than others (Table 2, marital status, comment ac). Finally, Arabs (Table 2, ethnic group, comment a) and Druze (Table 2, religion, comment c) slept more than Jews.

When we turned to the amount of time people wanted to spend on sleeping, we found most of the socio-demographic variables, with the exception of education, income, and health status, had an effect on the dependent variable. After gender and ethnic group, the three most influential were: age ($F = 7.679$, [$df = 4;641$] $p < 0.001$, partial $\eta^2 = .046$), origin ($F = 7.245$, [$df = 3;641$] $p < 0.001$, partial $\eta^2 = .033$), and religion ($F = 6.702$, [$df = 3;635$] $p < 0.001$, partial $\eta^2 = .031$). There were differences inside categories as well. For example, people aged 18–29 wanted to sleep more than people of other ages (Table 2, age, comment abcd). Israelis born in Israel asked for more sleep than those born elsewhere (Table 2, origin, comment ch). Arabs (mainly Muslims) wanted more sleep than Jews (Table 2, ethnic group comment a; religion, comment a) and women wanted more sleep than men (Table 2, gender, comment a).

We explored the effect on sleep of a possible connection between care and work hours by controlling for other variables. To this end, we implemented a logistic regression on three outcome variables: current time spent on sleep, desired sleep time, and the gap between the two. As shown in Table 3, the probability of sleeping less was correlated

Table 2. Current and desired amounts of sleep by socio-demographic characteristics.

Demographics	Current			Desired				
	Sleep		F df	Partial Eta ²	Sleep		F df	Partial Eta ²
	Mean	SD			Mean	SD		
Age			2.889* (df = 4;644)	.018			7.679** (df = 4;641)	.046
18–29	6.95^b	1.35			8.50^{abcd}	2.54		
30–39	6.54	1.21			7.64	1.45		
40–54	6.44	1.39			7.56	1.96		
55–64	6.50	1.31			7.53	1.42		
65+	6.72	1.63			7.23	1.46		
Note: ^b Statistically significant between the first and third group.			Note: ^a Statistically significant between the first and second group; ^b between the first and third group; ^c between the first and fourth group; ^d between the first and fifth group.					
Gender			2.407 (df = 1;648)	.004			10.145* (df = 1;645)	.015
Men	6.52	1.41			7.44	2.05		
Women	6.69	1.36			7.90^a	1.65		
			Note: ^a Statistically significant between the first and second group.					
Ethnic group			5.806* (df = 1;648)	.009			19.518** (df = 1;645)	.029
Jews	6.54	1.32			7.53	1.67		
Arabs	6.89^a	1.68			8.38^a	2.55		
Note: ^a Statistically significant between the first and second group.			Note: ^a Statistically significant between the first and second group.					
Origin			2.628* (df = 3;644)	.012			7.245** (df = 3;641)	.033
Asia, Africa	6.44	1.39			7.43	1.57		
Europe, America	6.46	1.29			7.27	1.23		
Former Soviet Union	6.71	1.08			7.63	1.26		
Israel	6.76	1.47			8.07^{ch}	2.36		
			Note: ^c Statistically significant between the first and fourth group; ^h between the second and fourth group.					

(Continued)

Table 2. Continued.

Demographics	Current				Desired			
	Sleep		F df	Partial Eta ²	Sleep		F df	Partial Eta ²
	Mean	SD			Mean	SD		
Education			.800 (df = 2,645)	.002			1.993 (df = 2,642)	.006
Without a matriculation certificate	6.63	1.60			7.86	2.55		
Full matriculation, post-secondary education	6.67	1.40			7.74	1.74		
Academic education	6.52	1.24			7.50	1.50		
Income			2.053 (df = 4;599)	.014			1.134 (df = 4;596)	.008
Well below average	6.58	1.62			7.87	2.62		
Below average	6.82	1.38			7.60	1.51		
Average	6.55	1.17			7.78	1.88		
Above average	6.52	1.25			7.57	1.27		
Well above average	6.29	1.30			7.38	1.86		
Employment Status			4.028** (df = 6;613)	.038			2.071* (df = 6;636)	.022
Employed, full time	6.40	1.28			7.67	1.95		
Employed, part time	6.95^a	1.27			7.52	1.61		
Independent worker	6.39	1.42			7.55	1.49		
Unemployed, searching for a job	6.47	1.18			7.59	2.65		
Retired / pensioner	7.05^{dm}	1.60			7.43	1.46		
Primarily responsible for childcare and household chores	6.78	1.83			8.85^{ejns}	1.75		
Student	6.82	0.95			8.14	1.56		
Note: ^a Statistically significant between the first and second group; ^d between the first and fifth group; ^m between the third and fifth group.				Note: ^e Statistically significant between the first and sixth group; ^j between the second and sixth group; ⁿ between the third and sixth group; ^s between the fifth and sixth group.				
Family and Marital Status			3.274* (df = 3;646)	.015			4.725* (df = 3;643)	.022
Unmarried, no children	6.99^{ac}	1.49			8.30^{ac}	2.31		
Unmarried, with children	6.43	1.33			7.51	1.79		
Married, no children	6.67	1.02			7.87	1.91		
Married, with children	6.54	1.38			7.55	1.75		
Note: ^a Statistically significant between the first and second group; ^c between the first and fourth group.				Note: ^a Statistically significant between the first and second group; ^c between the first and fourth group.				

(Continued)

Table 2. Continued.

Demographics	Current			Desired				
	Sleep		F df	Partial Eta ²	Sleep		F df	Partial Eta ²
	Mean	SD			Mean	SD		
Religion			3.000* (df = 3; 638)	.014			6.702** (df = 3;635)	.031
Jewish	6.54	1.30			7.52	1.68		
Muslim	6.75	1.71			8.45^a	2.75		
Christian	6.89	0.92			8.25	1.42		
Druze	7.64^c	1.86			7.73	1.85		
Note: ^c Statistically significant between the first and fourth group;					Note: ^a Statistically significant between the first and second group;			
Religious Orientation			.874 (df = 4;641)	.005			4.760** (df = 4;638)	.029
Ultra-orthodox	6.46	0.99			7.12	1.65		
Religious	6.76	1.64			7.90^b	1.99		
Religious, traditionalist	6.66	1.42			8.10^m	2.62		
Traditionalist	6.61	1.40			7.91	2.11		
Secular	6.51	1.29			7.41	1.28		
Note: ^b Statistically significant between the first and third group; ^m between the third and fifth group;								
Health Status			1.799 (df = 4;643)	.011			1.007 (df = 4:640)	.006
Excellent	6.69	1.34			7.51	1.67		
Very good	6.42	1.24			7.66	2.13		
Good	6.74	1.26			7.89	1.79		
Not so good	6.49	2.13			7.71	2.02		
Poor	6.25	2.20			7.70	1.57		

$p < 0.001^{**}$ $p < 0.05^*$.

Source: Authors' 2018 survey of Israeli population, 18+.

¹The categories National service and other were not included in the analysis due to their small size.

²We referred to different levels of religiosity: 1 = very religious-ultra-orthodox; 2 = religious; 3 = religious-traditionalist; 4 = traditionalist - not much religious; 5 = not religious-secular.

³Statistically significant Wilks' Lambda $p < 0.05$; difference between groups is based on post-hoc Tukey tests at .05 level of significance.

Table 3. Logistic regression for the effect of uses of time and socioeconomic variables on current sleep, desired sleep hours and the sleep gap.

Variables	Current sleep		Desired sleep		Sleep gap	
	B (S.E)	OR(95% C.I.)	B (S.E)	OR(95% C.I.)	B (S.E)	OR(95% C.I.)
Age	-.016** (.007)	.985 (.972 .997)	-.022** (0.008)	0.979 (0.964 0.993)	-.024*** (0.006)	0.976 (0.964 0.988)
Education	.034 (.048)	1.035 (.941 1.138)	0.006 (0.056)	1.006 (0.902 1.121)	-0.038 (0.048)	0.963 (0.877 1.057)
Gender	.111 (.187)	1.117 (.775 1.611)	0.701** (0.219)	2.017 (1.313 3.096)	0.118 (0.183)	1.126 (0.786 1.612)
Income	-.016 (.074)	.984 (.852 1.137)	0.055 (0.085)	1.056 (0.893 1.249)	-0.09 (0.073)	0.914 (0.793 1.054)
Health ^a	.155 (.096)	1.167 (.967 1.409)	-.0109 (0.110)	0.897 (0.723 1.113)	-.0238* (0.095)	0.788 (0.654 0.950)
Number of children	-.021 (.049)	.979 (.889 1.079)	-.0092 (0.055)	0.912 (0.820 1.015)	-.0002 (0.049)	0.998 (0.907 1.098)
Arab-Jew	.454 (.243)	1.575 (.979 2.535)	0.071 (0.283)	1.074 (0.617 1.869)	-.0246 (0.235)	0.782 (0.493 1.240)
Work hours	-.206*** (.030)	.814 (.766 .864)	-.0051 (0.032)	0.950 (0.893 1.011)	0.089** (0.027)	1.093 (1.036 1.153)
Care hours	-.160*** (.032)	.852 (.800 .908)	-.0048 (0.036)	0.953 (0.889 1.023)	0.099** (0.031)	1.104 (1.039 1.173)
Constant	2.200** (.714)	9.027	2.927*** (0.837)	18.671	1.631* (0.683)	5.108
Nagelkerke R Square	.146		.065		.090	
Model chi square	68.604***		25.761**		41.444***	
Hosmer and Lemeshow test	17.239 ^{ab}		9.395		4.086	
N	593		593		593	

* $p < .05$, ** $p < .01$; *** $p < .001$.

Source: Authors' 2018 survey of Israeli population, 18+.

Note: Current sleep (0 < 7 h and 1 = > 7), desired sleep (0 < 7 h and 1 = > 7), sleep gap (0 < 1 h and 1 = > 1).

^aHealth is included as a continuous variable from 1 = poor to 5 = excellent.

^bHosmer and Lemeshow test is significant ($p = 0.028$), but it is not supposed to be significant (with values higher than $p = 0.05$). Therefore, the researchers suggest the test might be problematic (Bertolini et al. 2000); a χ^2 test might be a better fit (Harrell 2015) for this model and it is significant.

with spending more time at work and on care. Both variables significantly affected sleep, $p < .001$. The only other variable with a significant effect on sleep was age; older people slept less. The variables affecting the probability of wanting to sleep more were age and gender. Younger people wanted more sleep, and women wanted more than men. The work and care time influenced the gaps. People who worked more hours and spent more time on care had a higher probability of bigger gaps between current and desired sleep. The other significant variables were age and health; older and healthier people had less probability of large gaps.

A more nuanced exploration of different categories of sleep revealed an even more interesting picture. We used an ordinal regression with three categories of time spent on sleep (less than 5 h, between 5–7, and 7 h and more) to explore the effect of the different variables (see Table 1 in the appendix). We focus here on the findings for care and work time.

Figure 2 presents the effect of hours spent on work ($p = 0.000$) on the probability of short, medium, and long sleep duration. The findings showed that people who worked more had a higher probability of sleeping less than five hours and a lower probability

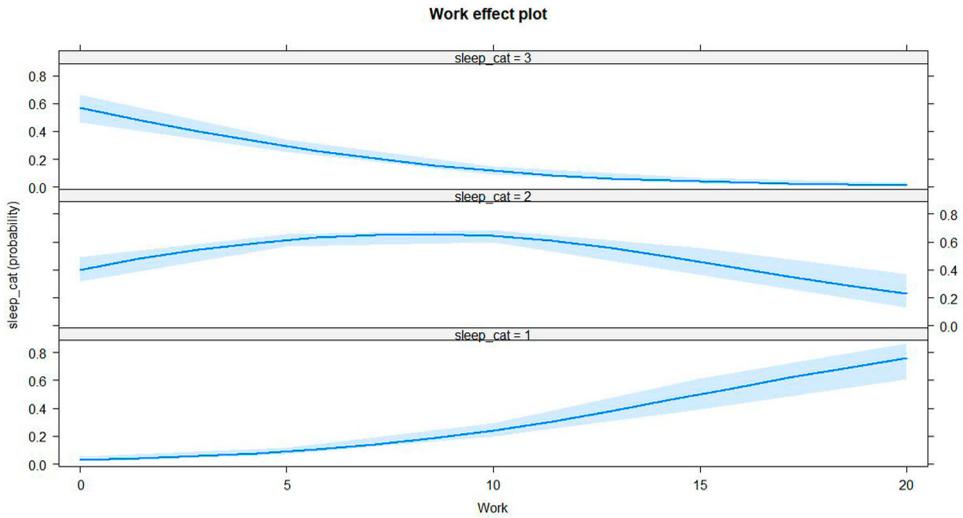


Figure 2. Main effect of hours spent on work on the probability for short, medium, and long duration of sleep.

Source: Authors' 2018 survey of Israeli population, 18+.

Note: Category 1, short sleep (≤ 5 hours); category 2, medium sleep (5.01–6.99 hours); category 3, long sleep (≥ 7 hours).

of sleeping more than seven hours. In the 5–7 h of sleep category, the effect of work hours was less salient than in the previous categories.

Figure 3 shows the main effect of hours spent on care ($p = 0.000$) on the probability of short, medium, and long sleep duration. The same trends appeared. People who spent

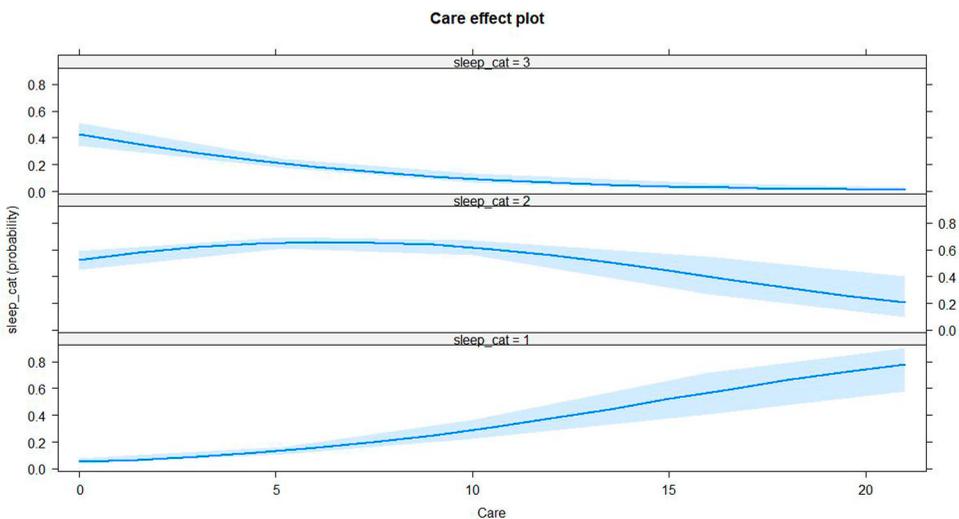


Figure 3. Main effect of hours spent on care on the probability for short, medium, and long duration of sleep.

Source: Authors' 2018 survey of Israeli population, 18+.

Note: Category 1, short sleep (≤ 5 hours); category 2, medium sleep (5.01–6.99 hours); category 3, long sleep (≥ 7 hours).

more time on care had a higher probability of sleeping less than five hours and a lower probability of sleeping more than seven hours, with less effect on category 2 (5–7 h of sleep).

Discussion and conclusions

While many different factors affect sleep, we argue that paying more attention to the macro perspective and probing the possible side effects of policy can contribute to our understanding of sleep deficits. The Israeli case is a fascinating example of a sleep-deprived society. We found the average number of sleep hours for Israeli adults is less than seven (mean 6.6), a finding supported by another study of sleep among Israeli adults (Green, Dagan, and Haim 2018). While health organizations, such as the United States National Sleep Foundation and the CDC, suggest a range between seven and nine hours of sleep is appropriate for adults (see Mireku and Rodriguez 2021, 2; CDC N.D.). And although the duration of appropriate sleep is changing by age group and by country⁹ (e.g. Hafner et al. 2017; Mireku and Rodriguez 2021), the Israeli mean is low, and people seem eager to sleep more. We also found increased work and care hours had a significant effect on sleeping less than five hours, controlling for other socio-demographic variables, thus supporting other studies (Chatzitheochari and Arber 2009; Basner, Spaeth, and Dinges 2014; Pepin, Sayer, and Casper 2018; Ruppanner et al. 2021).

Looking at these findings in light of the policy context yields some interesting insights. As mentioned, the Israeli context includes policies and norms that encourage long hours of work, involvement in the work force, and large families but offer only partial coverage of care services. Long work hours while also caring for children and the elderly understandably places a burden on parents (OECD 2019a; OECD 2019c; Israel Central Bureau of Statistics; Hasson and Dagan-Buzaglo 2019; Man 2020; Herbst-Debby, Endeweld, and Kaplan 2021). While this is not the only explanation of Israeli sleep deprivation, we suggest the cumulative effect of policies may be one of the factors creating a work-care burden that hinders sleep. This exacerbates the work-sleep conflict suggested by Lamote de Grignon Pérez et al. (2018) and leads to a conflict between work, care, and sleep.

An interesting question is why Israelis do not use their leisure time to get more sleep. One answer might be the importance of family and work. For Israelis, family is more important than leisure, community, work, or religion, and family is more important in Israel than in the USA, Germany, or Japan (Sharabi and Harpaz 2007). So, Israelis may be less likely to give up leisure time if it includes time spent with family and friends (see Akaeda 2018). Future studies should investigate different uses of time and leisure time in a comparative context to shed more light on this issue.

Another intriguing finding is that although work and care hours affected the actual sleep and the sleep gap, they did not affect participants' desire to sleep more. The socio-demographic variables stood out as better explanatory factors. Young people and women wanted to sleep more. Work is a central value in Israeli society and can be considered a cultural norm (Aharoni 1998; Doron 2018). Therefore, stating a desire to sleep more might be perceived as going against the cultural code of working hard (Mitler, Dement, and Dinges 2000). The young may be less affected by this norm. Meanwhile,

women perform more than their fair share of childcare, housework, and eldercare, and this could add to their desire for more sleep. In our view, the desire for sleep has not received enough attention (for an exception, see Baker et al. 2003). Future research could follow up these possibilities. Another interesting approach would be to look for a possible effect of culture.

From a theoretical perspective, the study calls attention to the cumulative influence of the (unintended) effects of policies and suggests the need to widen the scope of policy analysis when exploring social outcomes, including an interdisciplinary view and diverse policy fields (Dery 1998). The study also extends the literature on policy side effects to include their effect on sleep. While some work has considered the side effects of policy on health (Weimer and Vining 2005; Steinacker 2006), until now, the specific context of sleep has not been explored. Moreover, work on sleep has mostly considered the individual level. Our findings suggest the need to examine connections between policy and sleep by taking a macro perspective. While the Israeli case is arguably unique, the empirical findings can be relevant to other countries where families also deal with the dual burden of work and care. Future studies need to continue to explore this connection.

The study has several limitations. First, the data reflect only one time point and a single case study; findings therefore have limited generalizability (Yin 2003). Longitudinal data showing the changing nature of uses of time in the Israeli context, along with an exploration of different contexts, could strengthen our findings. Findings on uses of time and changes in policies could further reinforce our claims. Unfortunately, longitudinal data covering the last two decades are not available in Israel. Second, the data are based on self-reports, and this method requires respondents to recall the use of time (Williams 2014), possibly leading to a recall bias. Moreover, the survey questions focused on the duration but not the quality of sleep, another important but difficult aspect to explore (van Tienoven, Glorieux, and Minnen 2014). Self-reports may lead to other respondent errors, including social desirability bias (e.g. sleep perceived as laziness) and confirmation bias (where uses of time are seen as representing values, e.g. work, caring). The conceptualization and interpretation of sleep could be problematic as well (time spent sleeping vs time spent in bed, the question of naps etc.). To deal with some of these challenges, we did two rounds of pilots and adjusted the questions by including some that helped us interpret the findings. As mentioned, other studies support our findings for average sleep hours (Green, Dagan, and Haim 2018).

Despite the limitations, the study has important policy implications. Given the established impact of the lack of sleep on health and the economic ramifications to societies (Hafner et al. 2017), we believe it is necessary to raise awareness of certain policies' side effects on sleep. Sleeping impacts health, productivity, and economic vitality (Chatzitheochari and Arber 2009; Buxton and Marcelli 2010; Hillman and Lack 2013; Hafner et al. 2017), and it is perceived as a human right (Williams 2011). While the Israeli public is not known to participate in policy processes (Vigoda-Gadot, Cohen, and Zalmanovitch 2014), future studies that reveal more details about policy effects and their link to the lack of sleep may inspire deliberation between policymakers and the public. A holistic perspective that includes policies' side effects on the time people spend sleeping may contribute to better policy design and a healthier society.

Notes

1. Welfare regimes reflect different levels of commodification based on the relations between the state, markets, and the family (Esping-Andersen 1990).
2. They refer to the following regimes: liberal, social-democratic, conservative, Mediterranean, Eastern European regime, and other. “Other” includes mostly former USSR countries (Lahat and Sened 2020).
3. The findings were presented in a research report on the uses of time submitted to the National Insurance Institute of Israel (in Hebrew). The findings were approved for publication by the National Insurance Institute of Israel.
4. A few participants referred to a quarter of an hour and were included in the data.
5. See, for example, European Quality of Life Survey (EQLS).
6. Comparison group.
7. Based on verified questions from such surveys as European Social Survey (ESS), International Social Survey Programme (ISSP) and SF-36.
8. In the study, we explored all four categories of uses of time (work, care, personal, sleep). In the article, we present the findings for sleep only.
9. Because of differences in measurement methods, it is hard to compare Israel to other countries. However, the mean hours of sleep are clearly higher elsewhere. For example, in the United States, the mean is 8.5 h (Mireku and Rodriguez 2021); in the United Kingdom, it is 8.06 (Lamote de Grignon Pérez et al. 2018); in Australia, it is 7 h (Hillman and Lack 2013; Adams et al. 2017); in Belgium, it is around 8 h on weekdays (van Tienoven, Glorieux, and Minnen 2014). A study exploring hours of sleep in Israel refers to the average of 6.59 h (Green, Dagan, and Haim 2018).

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Appendix

Table A1. Ordinal regression for the effect of uses of time and socioeconomic variables on sleep categories

	B (S.E)	OR (95% C.I.)
Variables		
Age	–0.018** (0.006)	0.982 (–0.03 –0.005)
Education		
No matriculation	–0.280 (0.244)	0.756 (–0.759 0.198)
Matriculation and above high school education	0.049 (0.198)	1.05 (–0.339 0.436)
Academic degree	0a	
Gender	–0.140 (0.177)	0.869 (–0.487 0.207)
Income		
Below average	–0.027 (0.303)	0.973 (–0.620 .567)
Slightly below average	0.422 (0.292)	1.524 (–0.151 0.994)
Average	0.251 (0.28)	1.285 (–0.298 0.800)
Slightly above average	0.221 (0.266)	1.247 (–0.301 0.742)
Above average	0a	
Health		
Poor	–1.822** (0.677)	0.162 (–3.149 –0.496)
Not so good	–1.153** (0.369)	0.316 (–1.876 –0.429)
Good	0.118 (0.227)	1.125 (–0.327 0.562)
Very good	–0.221 (0.207)	0.802 (–0.626 0.185)
Excellent	0a	
Number of children	–0.005 (0.047)	0.995 (–0.098 0.088)

(Continued)

Table A1. Continued.

	B (S.E)	OR (95% C.I.)
Arab-Jews	-0.404 (0.236)	0.667 (-0.866 0.057)
Work hours	-0.257*** (0.031)	0.773 (-0.318 -0.196)
Care hours	-0.209*** (0.033)	0.812 (-0.273 -0.145)
Level 1 vs 3	-6.025*** (0.636)	
Level 2 vs 3	-4.182*** (0.610)	
Nagelkerke R Square		.189
Cox and Snell R Square		.164
Model chi square (df)		106.214*** (16)
N		593

* $p < .05$, ** $p < .01$, *** $p < .001$.

Source: Authors' 2018 survey of Israeli population, 18+.