

# Information and Women's Intentions: Experimental Evidence About Child Care

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**Abstract** We investigate the effect of providing information about the benefits to children of attending formal child care when women intend to use formal child care so they can work. We postulate that the reaction to the information differs across women according to their characteristics, specifically their level of education. We present a randomized experiment in which 700 Italian women of reproductive age with no children are exposed to positive information about formal child care through a text message or a video, while others are not. We find a positive effect on the intention to use formal child care and a negative effect on the intention to work. This average result hides important heterogeneities: the positive effect on formal child care use is driven by high-educated women, while the negative effect on work

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intention is found only among less-educated women. These findings may be explained by women's education reflecting their work–family orientation, and their ability to afford formal child care.

**Keywords** Female labor supply · Education · Gender roles

**JEL Classification** J2 · J16 · J13 · J18 · Z1 · C99

## 1 Introduction

The use of formal child care for young children differs significantly across families and across countries. But, how do women form their intentions to use formal child care? Does information about the effects of formal child care matter? Can specific policy measures influence these intentions?

Understanding women's intentions to use formal child care and how they may be influenced by positive information has important implications. As long as intentions translate into behaviors, informing women about the benefits of child care may increase the use of child care. The use of child care facilities, in turn, may have relevant effects on child development, particularly for disadvantaged families. Moreover, child care availability has been recognized to promote female labor supply and gender equality in the labor market. Hence, a policy of informing women about the benefits of formal child care also has the potential to change the gendered segregation of the labor force.

In this paper, we test the effect of providing information to women about the benefits of using formal child care on their intended labor market and child care behaviors. We present a survey experiment of a sample of 700 Italian women of reproductive age with no children. Our goal is to study whether a text or video message on the positive consequences of formal child care for children's outcomes, which increases their knowledge on this issue, has a causal impact on women's intentions to use formal child care, to participate in the labor market and on their intended child care arrangement within the family. We show that the communication we provide is convincing: knowing the beneficial effects of formal child care on children's outcomes increases women's intention to use formal child care. However, we also find that education acts as a moderating variable: the effect of the information differs across women according to their level of education. Highly educated women, who received positive information about child care, intend to send their children to formal care more than uninformed ones, and to continue to work, while low-educated, less-informed women strengthen their intention of having a crucial maternal role, thus reducing their labor supply.

The relevance of cultural beliefs and stereotypes about gender roles in explaining women's choices throughout their lives is well established (Ridgeway 2011). These beliefs are just as established among women as among men. Research has identified the consequences of these gender role attitudes on women's employment, careers prospects, division of labor within the couple, and even fertility (Pfau-Effinger

2000; Fernández 2007). Scholars have also underlined the persistence of these beliefs, as preferences tend to be transmitted from one generation to the next (Moen et al. 1997). Persistence of gender stereotypes may depend on women lacking information, for instance, about the consequences of their participation in the labor market for their children's psychological and educational outcomes. Thus, knowledge may alter this intergenerational transmission of gender stereotypes (Fogli and Veldkamp 2011): by observing nearby employed women of the previous generation, women may learn about the effects of maternal employment on children and realize that they can have both a job and a family at little (or no) cost to their children. As a result, they work more. One of the most pervasive beliefs about gender roles relates to maternal employment and child care. Women are regularly seen and see themselves as the best provider of care for their children, and thus refrain from delegating child care. They are often skeptical about the use of formal child care. Yet, formal child care may have benefits for children (Felfe and Lalive 2010; Havnes and Mogstad 2011; Brilli et al. 2016; Abner et al. 2013), particularly so for children of disadvantaged families (Carneiro and Heckman 2003).<sup>1</sup> In contrast, a beneficial effect is not necessarily seen by increasing maternal time: a recent study by Dustmann and Schonberg (2012) shows that the expansion in mothers' leave coverage did not improve their children's educational and labor market outcomes. Moreover, formal child care may help reconcile work and family time (Saraceno 2011). Several studies have indeed shown that public kindergartens have a positive impact on maternal employment (see Cascio 2009; Gelbach 2002; Lefebvre and Merrigan 2008; Del Boca and Vuri 2007).<sup>2</sup> Grandparents may also play a role in female labor supply and fertility decisions (see Arpino et al. 2014; Aassve et al. 2012).

Are women just unaware of these positive effects? This would explain their skepticism about the use of formal child care, and it would also suggest a very simple and relatively inexpensive form of intervention, based on the release of this apparently little-known information. Surprisingly, no research has been conducted on these ideas.

Although the role of providing information to influence beliefs related to gender roles, gender stereotypes, and the use of child care has not received attention so far, recent literature emphasizes the relevance of persuasion in many contexts (see Della Vigna and Gentzkow 2010). Previous studies have addressed the role of information and persuasive communication on individuals' opinions: Cochran and Chamlin

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<sup>1</sup> Early childhood is important for children's future outcomes (Heckman 2013). The relationship among maternal time, use of formal child care, and children's outcomes is still debated. An early review is provided by Waldfogel (2002). Previous contributions have shown that substituting maternal time with other child care providers may deliver negative results for children's skills, thus inducing a negative relationship between maternal employment and child development (Baker et al. 2008; Baum 2003; Ruhm 2004; Blau 1991). However, other studies have shown that maternal employment may even be beneficial to preschool children, although benefits may be offset by long hours of non-parental care and fewer positive mother-child interactions (Nomaguchi 2006). Formal child care mediates the relationship between maternal employment and children's outcomes: when maternal time is substituted with formal child care, the adverse effect of maternal employment on children's cognitive outcomes disappears (Bernal 2008; Bernal and Keane 2010, 2011). The quality of formal child care is crucial.

<sup>2</sup> Note, however, that no effect was found in Fitzpatrick (2012).

(2005) in the context of capital punishment, and Avitabile (2012), Dupas (2011), and Avery et al. (2007) for health-related issues. Text messaging has been proved to influence behavior, such as paying taxes (Haynes et al. 2013), changing personal savings (Karlan et al. 2010), increasing electoral turnout (Dale and Strauss 2009), and stopping smoking (Free et al. 2011), in addition to improving health behaviors (Fjeldsoe et al. 2009). Thus, delivering information, through the use of text or videos, has proved to be an effective policy measure for influencing intentions and, eventually, behaviors.

The above-mentioned studies also point out that individuals do not react to the same message in the same way, as individual characteristics may play a significant role in explaining the influence that information has on beliefs. Recent research has focused on the crucial role of individual “identity” (see Akerlof and Kranton 2000; Ridgeway 2011) in making decisions. Education may be an important determinant of “identity” when beliefs about gender roles are formed, which influences intentions about the use of child care and about maternal employment. In fact, the existing literature (Carneiro et al. 2013; Monstad et al. 2008; Guryan et al. 2008) shows that women’s intentions and decisions on such topics as labor supply, child care, timing of fertility, and even breast-feeding, differ by educational attainment. More-educated women are also more likely to choose center-based child care (Del Boca and Vuri 2007; Suarez 2013). In this paper, we test the role of education as a key variable moderating the impact that information has on individual intentions: are women with different educational attainment reacting differently to the same message related to the benefits of child care for children’s development? If so, this may be due to education being related to factors such as work–family orientation and ability to pay. Work–family orientation may in turn, to some extent, depend on cultural factors. Women with different work–family orientations are indeed known to respond differently to broader policy, economic, and ideological environments (Janus 2013). It is recognized that more highly educated women are more likely to earn a higher wage and to be more career-oriented than low-educated women. This may translate into their higher preference or need for external child care versus maternal care, which is then reinforced by the information provided.

Our experiment is conducted in Italy, a suitable place for a study on the impact of information on gender stereotypes, due to the existence of strong gender gaps in employment (a female employment rate below 50 %, among the lowest in Europe, and scarce participation in the labor force by low-income women; see Casarico and Profeta 2010), low child care attendance for children below the age of 3 (around 12 %), with limited supply and limited incentives to use child care, and a conservative gender culture somewhat hostile to mothers’ participation in the labor market (see Campa et al. 2011). We consider a sample of 700 Italian women between 20 and 40 years with no children randomly assigned to three groups. The first group was treated with a set of text messages, i.e., women in this group saw on-screen text messages that stated the benefits of day-care attendance. The second group was treated with a video message, i.e., women were shown a video featuring children 6 months to 3 years doing activities at a day-care center, while a background voice read the same messages on the benefits of day-care attendance as read by the first group. The third—control—group was not treated and hence did not

receive any information. Before the treatment, background individual characteristics, such as age, marital status, nationality, education, and work activity, were gathered. After the treatment, women were asked several questions, including their intention: (1) to use formal child care, and their willingness to pay for it; (2) to participate in the labor market, both on the extensive and on the intensive margin; and (3) to arrange child care within the family, e.g., using grandparents. The whole survey is conducted in one sitting.

Our experimental results suggest that information on the educational advantages obtained by children who attended child care increases women's intention to use formal child care and reduces their intention to use care by grandparents.<sup>3</sup> Surprisingly, it also reduces women's intended labor supply. This surprising result hides strong heterogeneous effects<sup>4</sup> according to educational attainment. High-educated women respond to the informational treatment by increasing their intended use of formal child care and are also willing to pay more for it. Low-educated women instead do not modify their formal child care decision, but reduce their intended labor supply. We interpret this result as education being associated with women's work-family orientation and their ability to afford formal child care.

Our experiment focuses on short-term intentions and not on actual behavior. Perceptions and intentions are per se interesting to analyze, because they are important drivers of social changes. Moreover, to the extent that intentions translate into behaviors, we have identified a channel (i.e., information) which affects families' decisions in terms of maternal work and use of formal child care, which represent the ultimate policy goal. The link between intentions and behaviors is, however, not obvious. Some previous studies have assessed how, in the context of labor supply and fertility decisions, declared intentions translate into actual behaviors. Using a Danish longitudinal time-use study, Bonke and Schultz-Nielsen (2014) show that there is accordance between the number of hours that individuals declare they want to work (less or more than the actual ones) and the number of working hours later implemented. Yerkes (2013) finds that working preferences have a causal (though not very large) impact on actual weekly working hours of women. Ruitenbergh and de Beer (2012) find that work preferences influence actual labor participation much more than other characteristics. Böheim and Taylor (2004) consider subjective data on hours worked by individuals in the British Household Panel Study and associate them with actual labor market behavior: they show that men and women are able to adjust their work hours in line with their preferences. Career intentions are also a good predictor of future career behavior (Vincent et al. 1998). Returns to work after childbirth are in line with college women's intentions expressed ten years before (Skromme Granrose and Kaplan 1994). Finally, we conduct our own elaboration: using a sample of 3446 mothers of children aged 4–6 months in the UK Infant feeding survey 2005 (NHS 2007), we find that 34.8 %

<sup>3</sup> We interpret as causal changes/modifications the differences found with respect to the behavior of non-treated women.

<sup>4</sup> Interestingly, previous studies have concluded that different individuals may react to identical messages in quite different ways (Bostrom 1983) and thus individual characteristics turn out to be crucial when assessing the persuading impact of communication on targeted groups.

of these women say they would like to start working within a year.<sup>5</sup> When their actual behavior is observed after only four months, 35.7 % of them is already working, while only 3.4 % has changed her mind and now say they do not want to work.

## 2 Experiment Design

Our experiment is based on an on-line survey conducted on a sample of 696 Italian women between 20 and 40 years with no children. A survey agency, Carlo Erminero & Co., was contacted to run the online survey. The agency used an existing panel of 20,000 people with internet access from home, who had previously agreed to participate in online surveys on social issues (environment, labor, and politics) and marketing (products and brands). The agency randomly sampled 3300 women 20–40 years old who were then invited by e-mail to answer a survey on child care. Those who initially agreed to be interviewed were immediately selected and randomly assigned to the different groups. Among the 2066 women who agreed to fill out the questionnaire, 221 people did not finish the interview, while 342 were automatically dropped by the survey company, as the required sample size for each group of different age classes had been reached. Thus, the survey was completed by 1,503 women. For the current analysis, mothers were dropped from the sample (807 observations). This is because mothers have already largely faced—and perhaps solved—their child care and labor market trade-offs. The survey took place in November 2011.

In our final sample of 696 Italian women non-mothers, the average age was 29 years, 36 % of those interviewed were in a stable relationship with a partner (married or cohabiting, self-assessed status), almost 45 % had tertiary education (university degree), and 57 % were employed. More importantly, 91 % of women in our sample expected to have a baby in the future, and 68 % in the next 3 years. A summary of their characteristics is provided in Table 1, where we also report the descriptive statistics for the two subsamples of low- and high-educated women, corresponding to non-college and college-graduated women, which we will use in the analysis.

To check the external validity of the analysis, consider that, according to ISTAT (2013),<sup>6</sup> 93 % of the Italian population has or has used internet, and 42 % has Internet at home and use it at least once per week. For the age group 20–40, the percentage is much higher, equal to 85 %.

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<sup>5</sup> The main aim of the Infant Feeding Survey (2005) is to provide estimates on the incidence, prevalence, and duration of breastfeeding and other feeding practices adopted by UK mothers. Data are collected in three points in time: when babies are four to ten weeks old, when they are four to six months old, when they are eight to ten months old. Apart from providing information on breastfeeding, feeding practices, child and mother's health, the survey also gives information on mother's education, preference for returning to work, and actual work.

<sup>6</sup> Authors' elaboration from the dataset "Aspetti della vita quotidiana" ("Characteristics of daily life"), 2013, released by Istat.

**Table 1** Descriptive statistics

Variable	All women	Low-educated women	High-educated women
Tertiary education (%)	44.8	0.0	100.0
Age	29.2	28.7	29.7
Employed (%)	57.3	50.3	66.0
In a couple (%)	36.1	33.9	38.8
Watches news (%)	57.3	57.8	56.7
Reads news (%)	63.6	59.1	69.2
Religious (%)	30.5	26.0	35.9
Political ideology: left (%)	49.7	42.7	58.3
Political ideology: right (%)	44.5	50.5	37.2
Political ideology: missing (%)	5.7	6.8	4.5
Home owner (%)	77.7	76.8	78.8
South (%)	36.1	37.0	34.9
Observations	696	384	312

Women in our sample were randomly assigned to three groups. The first and the second group were treated with information, via text or video, respectively, while the third—control—group was not treated and hence did not receive any information. After the treatment, the women were asked several questions, including their intention to use formal child care and their willingness to pay for it, their intention to participate in the labor market, both on the extensive and on the intensive margin, and their intention for how to arrange child care within the family, e.g., their use of grandparents.

The informational content of the treatment comes from recent studies that show that day-care attendance has positive effects on children's educational outcomes (Felfe and Lalive 2010; Havnes and Mogstad 2011; Brilli et al. 2016). Women in the treatment groups received the following three pieces of information,<sup>7</sup> as a text or via a background voice in a video:

- Information I A study conducted on 10-year-old Germans shows that children who attended formal child care are more independent, socialize more with other children, and use more appropriate language when compared to children who stayed at home.
- Information II Research on 30-year-old Norwegians shows that those who attended formal child care have a higher probability of going to college, earn more and have a lower probability of being on welfare.
- Information III Also in Italy, according to data collected by the National Institute for the Evaluation of the Educational System, a positive effect of attending formal child care emerges. In second grade, children who attended formal child care have better results on Italian tests than others.

<sup>7</sup> Information I is from Felfe and Lalive (2010); Information II from Havnes and Mogstad (2011); and Information III from Brilli et al. (2016).

These messages provide clear, direct information on the role played by formal child care on the future educational attainment of children, suggesting a causal link between early investments and later benefits. Moreover, they contribute to making educational attainment a more salient quality of children for our potential mothers (see Bordalo et al. 2013). For the first treated group, these three messages are released in an on-screen text format, which helps to single out their informative content, over three subsequent pages of our online survey. For the second treated group, the messages are contained in a 60-s (on-line) video that showed a group of children doing various activities, such as playing, painting, dancing, and having lunch, at a child care facility, while a (professional) background voice read the three pieces of information reported above.<sup>8</sup> In this latter case, the informational content is thus accompanied by images and sounds, which are also likely to solicit an emotional response. Although the content is the same, seeing the research statements in written form may be perceived as more scientific. We believe that understanding the different reaction to the text or video message is itself an interesting result. We return to these different treatments in the discussion of the results.

As shown in Table 2, the three groups are balanced in their observable characteristics (employment status was different at a 10 % level for women exposed to the video treatment; we control for this variable in the analysis). Nothing more than the treatment varies across groups. This guarantees the validity of the randomization.

In an initial part of the survey, women were asked questions about their individual characteristics (age, location, education, marital status, occupation, watching and reading news, religiosity, political ideology, home ownership).

The second part of the survey is only for women of the first and second group, who were treated. Women were asked whether they already knew the information released, whether they found it credible, and how much they liked it. These questions may be considered the conclusive part of the treatment, since they induce women to pause once more on the information received and to evaluate it. We made sure that women see the video or the text, because otherwise they cannot move to the third part of the survey, and they are thus out of our final sample.

In the last part of the survey (the third one for treated women and the second one for non-treated ones), all women were asked questions about their intended future use of formal child care and their labor supply intentions. We also ask questions about their willingness to pay for formal child care and their preferences for different family arrangements. More precisely, the five outcome variables are the following:

- Willingness to send the child to formal child care (yes or no)
- Willingness to pay for formal child care (yes or no on different brackets; amount in euros)
- Desired work status (yes or no)
- Desired hours of work (number of hours of work per week)

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<sup>8</sup> The video is available upon request, but cannot be made freely available on-line for ethical issues, since it involves images of children.



**Table 2** Randomization of the treatments

	Text	Video	No treatment
Tertiary education (%)	42.8	43.7	48.0
Age	28.9	29.1	29.6
Employed (%)	59.7	51.9*	60.3
In a couple (%)	35.6	36.4	36.2
Watches news (%)	58.5	55.8	57.6
Reads news (%)	64.8	63.6	62.4
Religious (%)	30.9	29.0	31.4
Political ideology: left (%)	46.2	50.2	52.8
Political ideology: right (%)	47.9	43.7	41.9
Political ideology: missing (%)	5.9	6.1	5.2
Home owner (%)	81.4	76.2	75.5
South (%)	33.9	39.0	35.4
Observations	236	231	229

Average characteristics of women treated by the text, treated by the video, and untreated

Significant differences of "text" and "video" with respect to "no treatment": \*\*\* at 1 % level, \*\* at 5 % level, \* at 10 % level

- Grandparents should look after grandchildren (yes or no)

In Table 8 ("Appendix"), we summarize all variables. Note that responses come in different forms: the question on the desired working status allows for a binary response (1 = Work or 0 = No work), while continuous measures are instead used for "How much did you like the text/video?", from 1 to 9, and for the desired weekly hours of work, from 0 to 99. Responses that allow for categories are rearranged to be binary (see Table 8), while binary responses or continuous measures are not transformed.

For the external validity of the experiment, it is of interest to compare the average characteristics of the women in our sample with the average characteristics of non-mothers, aged from 20 to 40 years, in the Italian section of the European Survey on Living and Income conditions, a representative Italian household survey.<sup>9</sup> Women in the two samples are of similar ages, but have different average levels of education: 44.8 % of women in our sample have tertiary education versus only 28.8 % in the Italian representative data. Along these lines, women in our sample tend to work slightly more (57 vs 52 %). Differences in education and age could also, at least in part, account for differences in the representativeness of couples, together with the fact that our sample contains a smaller share of students.<sup>10</sup> These differences are largely explained by the online nature of our sample, as online panels typically feature more highly educated respondents. To account for this difference, we control for these characteristics in our regression models.

<sup>9</sup> Table AO1 (in the Appendix) provides a comparison of our sample with the corresponding European Survey on Living and Income conditions for the year 2010.

<sup>10</sup> Although household monthly income is difficult to compare, being measured as gross labor income in the European Survey on Living and Income conditions, and as total net income in our sample, a rough comparison, based on a 30 % average tax rate, suggests that women have a slightly higher net income in our sample.

### 3 The Empirical Analysis

We first present average effects for the five outcome variables for the three groups: text-treated, video-treated, and untreated women. This analysis will show in a simple way the key results of the experiment. Then, we will move to the regression analysis. Finally, we will present a robustness analysis to better investigate the crucial role of education.

#### 3.1 Average Effects

Table 3 shows that the average informational treatment, which includes both text and video treatments, induces an increase in the intended use of child care. The text treatment is most effective, as it raises the share of women willing to use formal child care facilities from 44.1 to 58.5 %, while the video treatment has no significant impact. This amounts to a persuasion rate of about 25.8 %, which is in the upper tail of the empirical distribution according to Della Vigna and Gentzkow (2010). Consistently, the text treatment also increases the willingness to pay for formal child care, from Euro 328 per month to Euro 361.

The typical criticism, that it is not surprising that information has an immediate impact on intentions in the expected direction, applies. However, note that a surprising result emerges: despite the appreciation of formal child care, women are strongly induced by both treatments to reduce their labor supply—both on the extensive margin (from 89.1 % of women willing to work to around 81 %) and on the intensive margin (from 23 h per week to 20.1 in the text treatment and 19.1 in the video treatment). Furthermore, treated women intend to use grandparenting for child care less than the untreated ones (from almost 20 % of favorable women to only 12.6 %).

While the result on the reduction in the use of grandparents can be easily interpreted as an increased trust in formal child care after the treatment, and a comparatively reduced trust in the quality of child care provided by grandparents, the results on labor supply seem puzzling: why are women willing to use more (and pay more for) formal child care, if they then intend to work less, and thus to stay at home more—possibly with their children? To better investigate this question, and the possible role of education as a moderating variable for the influence of information on the intention to use formal child care and the intention to work, we consider the individual educational level and the two subsamples of low- and high-educated women. Table 4 shows a stark difference in the response to our treatments between low- and high-educated women. The low-educated treated women are less willing to work than the untreated, both on the intensive (from 88.2 % of women willing to work to around 76 %) and on the extensive margin (from 21.8 h per week to around 17 h), but they do not differ in their formal child care decision. Since they are also (slightly) less intentioned than the untreated to use grandparents' care, this evidence seems to suggest a desire by low-educated women to take more child care upon themselves. In contrast, high-educated treated women are strongly more willing to use formal child care facilities than the untreated (from 50 % of potential

**Table 3** Average treatment effects

Treatment	Would send the child to formal child care (%)	Willingness to pay for formal child care (€)	Desired work status (%)	Desired hours of work	Grandparents should look after grandchildren (%)
<i>Information</i>					
Information	52.9**	349	81.6**	19.6***	12.6**
No treatment	44.1	328	89.1	23.0	19.7
Observations			696		
<i>Text/video</i>					
Text	58.5***	361*	81.4**	20.1**	11.0**
Video	47.2	337	81.8**	19.1***	14.3
No treatment	44.1	328	89.1	23.0	19.7
Observations	696	696	696	696	696

The top part of the table shows the average outcomes of women treated by the information. Significant difference between “information” and “no treatment”: \*\*\* at 1 % level, \*\* at 5 % level, \* at 10 % level. The bottom part of the table shows the average outcomes of women treated, separately, by the text or the video, and the untreated. Significant differences of “text” and “video” with respect to “no treatment”: \*\*\* at 1 % level, \*\* at 5 % level, \* at 10 % level.

**Table 4** Average treatment effects by level of education

	Would send the child to formal child care (%)	Willingness to pay for formal child care (€)	Desired work status (%)	Desired hours of work	Grandparents should look after grandchildren (%)
<i>High-educated women (312 observations)</i>					
Text	72.3***	395*	89.1	23.4	5.9**
Video	61.4*	359	88.1	21.5	10.9
No treatment	50.0	345	90.0	24.3	16.4
<i>Low-educated women (384 observations)</i>					
Text	48.1	336	75.6**	17.6**	14.8
Video	36.2	319	76.9**	17.3***	16.9
No treatment	38.7	313	88.2	21.8	22.7

Average outcomes of women treated by the text, treated by the video, and untreated. Significant differences of “text” and “video” treatment with respect to “no treatment”: \*\*\* at 1 % level, \*\* at 5 % level, \* at 10 % level.

users to 72.3 % with the text treatment and 61.4 % with the video), and they have a higher willingness to pay (by euro 50). No significant effect emerges on the intended labor supply, while the preferred amount of care by grandparents drops substantially. Hence, high-educated women do not intend to modify their role in the

labor market, but seem willing to substitute other people's care—such as grandparents—with formal child care. Note also that non-treated high-educated women have on average a stronger preference for using formal child care (50 %) than non-treated low-educated women (38.8 %).<sup>11</sup>

Note also that Tables 3 and 4 show that the text is in general more effective than the video in inducing a reaction by high-educated women, and it is the only significant treatment when we consider their willingness to pay for formal child care, and their intention to reduce their use of grandparents for care. For low-educated women instead, the video is as effective as the text in reducing their intention to work. This is probably because the text is perceived as more scientific, a fact which may provoke a larger impact on high-educated women. In other words, while the text is perceived to be more objective and scientific, the video contains images and sounds, which may attract the attention to children and distract from the main “scientific” message. We will come back to the difference between text and treatment when we consider the appreciation of the information.

### 3.2 Regression Analysis

In the next step of the analyses we perform linear regressions for continuous outcomes and logistic regressions for binary outcomes. Our basic equation, which we estimate separately for the low- and high-educated groups, is the following:

$$y_q = T'\eta_q + X'\kappa_q + \varepsilon_q \quad (1)$$

where  $y_q$  is the outcome of interest, and  $q$  defines the specific outcome in our group of five: use of formal child care, willingness to pay, desired work status, desired hours of work, and whether grandparents should look after grandchildren;  $T$  is a vector of dummy variables that indicates the treatment (text, video, versus no information);  $X$  is a vector of personal characteristics (age, work, being in a couple, reading/watching news, religiosity, political ideology, home ownership, South);  $\varepsilon$  is a random error that follows a normal distribution for continuous outcomes (willingness to pay, desired hours of work) and a logistic cumulative distribution for binary outcomes (use of formal child care, desired work status, grandparents should look after grandchildren);  $\eta$  and  $\kappa$  are the parameters to be estimated.

The estimates reported in Table 5 confirm our previous results. Our treatments are significantly associated with the intention to use child care by high-educated women, and the difference across educational groups is strongly significant. However, the treatments are associated with a reduction in the intention to work of low—but not high—educated women—on both margins, and this difference across educational groups is again significant (for the text treatment). Using the additional

<sup>11</sup> The use of grandparents in Italy in the general population differs according to the number of hours and the education levels of the mothers. Grandparents take care of children between 1 or 2 years old at least 1 h per week for 28.7 % of the all sample of women, ranging from 37.3 % of the high-educated to 26.2 % among the low-educated ones; at least 10 h per week for 22.8 % of women, ranging from 31.8 % of the high-educated to 19.5 % of the low-educated and at least 20 h per week for 17.7 % of all women, ranging from 25.5 % of the high-educated to 14.9 % of the low-educated (source: European Survey on Income and Living Conditions 2010, our elaboration).

**Table 5** Treatment effects by level of education (*t*-ratios)

	Would send the child to formal child care (%)	Willingness to pay for formal child care (€)	Desired work status (%)	Desired hours of work	Grandparents should look after grandchildren (%)
<i>Effects for high-educated women</i>					
Text	1.13*** (3.64)	58** (2.15)	-0.06 (0.13)	-0.4 (0.20)	-1.40*** (2.69)
Video	0.68** (2.28)	29 (1.09)	-0.01 (0.01)	-2.4 (1.32)	-0.67 (1.49)
<i>Effects for low-educated women</i>					
Text	0.35 (1.32)	15 (0.62)	-1.13*** (3.05)	-4.8*** (2.95)	-0.57* (1.67)
Video	-0.22 (0.81)	4 (0.18)	-0.97*** (2.59)	-4.9*** (2.97)	-0.37 (1.10)
<i>Testing different effects by level of education (t-ratios)</i>					
Text	1.92**	1.19	1.77*	1.82*	1.34
Video	2.23**	0.68	1.61	1.02	0.54
Observations	696	696	696	696	696

The top part of the table reports the effects (and the *t*-ratios in brackets) of text and video treatment on the outcome variables, estimated separately for high and low-educated women, through linear regressions for continuous outcomes and logistic regressions for binary outcomes; controlling for age, work, being in a couple, reading/watching news, religiosity, political ideology, home ownership, South; significant effects of “video” and “text” with respect to “no treatment”: \*\*\* at 1 % level, \*\* at 5 % level, \* at 10 % level. The bottom part of the table reports the *t*-ratios related to the differential effect of the “text” and “video” treatment between “high-educated” and “low-educated” women, significant differences: \*\*\* at 1 % level, \*\* at 5 % level, \* at 10 % level

controls, the effect of the treatments on the preferred use of grandparenting becomes more significant for both educational groups.

Our results are confirmed if we exclude from the analysis women who declare they don't want to have a baby in the future (see Table AO2 in the online appendix, where we replicate the main results of Table 5, considering only childless women who declare they want to have a baby in their life). Note also that if we exclude women who don't want to have a baby in the future, the share of high- and low-educated women does not significantly change (the share of high-educated women moves from 44.8 to 46 %).

Finally, note that we have considered only childless women, because for them it is appropriate to measure intentions. However, we check that the treatments (video or text) do not have effects on fertility intentions (see Table AO3 in the on-line appendix).

### 3.3 Robustness Analysis: The Role of Education

Despite the differential response across educational groups, the perceptions about the message received in the treatments are similar. Table 6 shows that an overwhelming majority of both low- and high-educated women find text and video

**Table 6** Appreciation of the information on child care received by treated women

	Aware of the information provided (%)	The message was credible (%)	How much she liked the text/video (from 1 to 10)	Observations
<i>High-educated women</i>				
Text	31.7	77.2	7.3	101
Video	28.7	84.2	7.8	101
<i>Low-educated women</i>				
Text	20.7	71.1	7.2	135
Video	24.6	78.5	7.6	130
Total observations				467
<i>Testing differences by level of education (t-ratios)</i>				
Text	1.90*	1.05	0.16	
Video	0.70	1.09	1.08	

Appreciation of the information by women treated by the text and treated by the video. The bottom part of the table reports the *t*-ratios related to the difference between “high-educated” and “low-educated” women, significant differences: \*\*\* at 1 % level, \*\* at 5 % level, \* at 10 % level

messages to be credible. The only significant difference (at a 10 % level) emerges in their awareness of the information provided. More high-educated (31.7 %) than low-educated (20.7 %) women stated that they were aware of the information released in the text treatment. This statistical difference does not emerge in the video treatment. Among the high-educated women, the video is more appreciated than the text, while among the low-educated ones, text and video are perceived as equally credible and women like them equally.

If low- and high-educated women share the same perceptions about our treatments, what explains the different response in terms of labor supply intentions? We want to rule out the possibility that education is systematically associated with other dimensions, such as political ideology, age, or working status, which might explain the different reactions to the message among women with different levels of education. Table AO4 in the online appendix provides the results of the empirical specification which, besides the regressors at Eq. 1, includes a full set of interactions of all observable characteristics (see Table 8 in the appendix) with the treatment indicators (i.e., text and video). Despite being statistically more demanding, this specification confirms our previous results in Table 5. Women’s responses to our treatments differ along educational groups: high-educated treated women have a higher willingness to use formal child care than the untreated ones, whereas the low-educated treated ones have a lower intention of supplying labor than the untreated.

Finally, to justify why education is the main source of heterogeneity in our context, we run other empirical models in which women are partitioned into two groups along all observable characteristics in the same way we have done with the education variable. As an example, we run regressions using samples of women

**Table 7** Other heterogeneities

	Would send the child to formal child care (%)	Willingness to pay for formal child care (€)	Desired work status (%)	Desired hours of work	Grandparents should look after grandchildren (%)
<i>Younger than 31</i>					
Text	0.45	0.14	0.11	0.24	0.26
Video	0.99	0.39	0.17	0.13	0.16
<i>Work</i>					
Text	0.39	1.41	0.37	1.03	0.02
Video	0.31	0.27	0.44	1.05	0.92
<i>In a couple</i>					
Text	0.08	0.11	0.44	0.22	1.21
Video	0.84	0.03	0.23	0.88	0.73
<i>Watches news</i>					
Text	0.64	0.26	0.32	0.01	2.01**
Video	1.06	0.44	0.34	0.35	0.91
<i>Reads news</i>					
Text	1.68*	0.88	0.32	1.48	0.94
Video	0.73	0.43	1.49	1.47	0.79
<i>Religious</i>					
Text	0.78	0.91	0.36	0.75	0.12
Video	0.20	1.53	2.91***	0.63	1.10
<i>Leftist</i>					
Text	1.16	0.11	0.35	0.14	1.25
Video	0.71	1.03	0.29	0.32	1.15
<i>Home owner</i>					
Text	0.14	0.23	0.15	0.00	0.83
Video	0.37	0.67	0.29	0.52	0.50
<i>South of Italy</i>					
Text	0.80	0.27	0.85	1.34	1.68*
Video	0.88	1.38	0.78	0.65	0.04

The table reports the *t*-ratios related to the differential effect of the “text” and “video” treatment between opposite categories: “younger than 31” and “older than 31”; “work” and “not work” etc.; significant differences: \*\*\* at 1 % level, \*\* at 5 % level, \* at 10 % level. For the description of variables see Table 8

divided by age (younger/older than 31), controlling for all other variables. As shown in the first two rows of Table 7, there are no different reactions to the message among younger/older women. In general, some significant results emerge in Table 7 (for example the video significantly increases the intention to work more among the religious than non-religious people), but the only case in which women respond to our treatment in a systematically different way is when education is considered.

## 4 Discussion and Conclusions

We provide experimental evidence of the effects of persuasive information. In the context of women and child care, our experiment is the first rigorous analysis that shows that information on the beneficial effects of formal child care increases women's intentions to use it. We also find that women's intentions differ according to the level of education: high-educated treated women intend to send their children to formal care and to continue to work more than untreated ones, while treated low-educated women intend to work less than untreated ones.

While the positive effect of information on the use of formal child care may simply be the expected immediate response of rational individuals to a positive advertisement, our results on the intentions to work, and the difference in intended behavior between high- and low-educated women, are quite surprising, and difficult to interpret. They are not driven by a different appreciation of the messages received in the treatment. Most low- and high-educated women perceive both messages to be credible, and like them, although only a few low-educated women had prior knowledge of the information provided. Our empirical analysis also rules out other confounding effects, such as political ideology, age, religiosity, or marital status, which could have driven this difference.

The following interpretation of our findings may apply. Education may reflect both the ability to pay and a specific work–family orientation. More-educated individuals earn on average higher wages and can thus afford formal child care more than low-educated ones. Moreover, education may reflect a different personal identity, and be associated, on average, with career-oriented types of women, *vis-à-vis* maternal-oriented ones. Low-educated women may perceive themselves predominantly as a provider of maternal care, whereas more-educated women may identify themselves as career-oriented. This may in turn depend on their culture with respect to gender roles.<sup>12</sup> The impact of our informational treatment is thus moderated by the level of education: for high-educated women, it reinforces the intention to send their children to formal care and to continue to work. For low-educated women, new knowledge about the benefits of formal care and about the salience of early childhood investments strengthens the decision to have a crucial maternal role—given also that they may not be able to afford the relatively high price of formal child care for children under the age of three (see Lehrer 1989 on the role of economic constraints in the use of child care by working mothers). Both low- and high-educated treated women reduce their intention to use informal care (grandparents). Hence, both market-based (wages) and preference-based (identity) transmission channels are consistent with our hypothesis on the role of education as a moderating variable and with our experimental results. To investigate more deeply into these two channels, in the appendix we provide additional results which try to capture the role of these two transmission channels: first, in Table AO5 (on-line appendix) we see that both high- and low-educated women who have been treated

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<sup>12</sup> Obviously these are average concepts and should be considered with caution. Variability exists also within education groups concerning wages and work preferences. Not all college-graduated women are high earners and not all educated women can be considered “not maternal types”. In fact, some educated women prefer to work for their own income and others do not.



with the text or the video reduce their agreement with the statement “If jobs are scarce, men have more rights than women to work”. This statement captures the role of gender culture, which may contribute to shape women’s identity. Thus, our result seems to suggest that culture does not differently impact high- and low-educated treated women. Second, Table AO6 (on-line appendix) tries to capture the role of market-based variables by looking at the level of satisfaction of women with respect to prices of the public and private day-care centers in their area. Low-educated text-treated women reduce their level of satisfaction with prices with respect to the non-treated ones, while no effect is found for high-educated women. The difference between high- and low-educated is, however, not significant. Although being certainly not conclusive, this result seems to suggest that the market-based transmission channel is dominant in explaining differences across education.

Several limitations affect our study. First, we have not assessed knowledge and intentions of a given woman prior to treatment, and thus, we can only measure the outcomes after the treatment and not their actual changes. Second, we have analyzed the effect of information on intentions, and not on behaviors. Would high-educated women increase their actual use of formal child care, as they state in the survey, once they have a child? We expect the information would have a lower impact on behavior, which may occur later on, than on immediate intentions. However, this argument may even reinforce the role of barriers (prices or identity) that keep low-educated women from outsourcing the care of their children. Moreover, as already mentioned, several studies have shown that intentions tend to translate into actual behaviors. Third, we have focused only on women and not considered men. However, we know that fathers may also play an important role in child care decisions and paternal care matters for children’s outcomes (see Averett et al. 2005). Fourth, we have assessed the crucial role of education, but we are not able to identify the precise channel through which education influences intentions after the treatment. Are less-educated women not willing to increase their intention to use formal child care because it is too expensive, or due to their strong maternal identity? If the first channel prevails, as it seems to be suggested by Table A6, policy-makers should consider lowering formal child care prices, motivated as well by the literature that shows that children from less-advantaged backgrounds are the ones who benefit more from this experience. However, if maternal identity also matters, potential interventions should be implemented much earlier in women’s lives, possibly at the time of their education. Finally, as in all experimental analysis, the external validity of our findings remains an open issue. However, notice that our control for several types of heterogeneities (as we do not restrict the analysis to a comparison between average effects) may limit the issue of external validity.

The existence of a possible double transmission channel has important policy implications. Public policies about child care use (see Ermisch 2002, on the role of child care policies) should acknowledge that child care decisions by mothers may depend on budgetary restrictions—as in the case of low-wage mothers—and probably also on maternal identity. Some (low-educated) mothers may choose to keep the role of main care provider for their children, even when family-friendly institutions are available. However, as cognitive skills mediate the impact of policies and of the welfare state on individuals’ intentions, simple policies such as

information release through text messages, which are relatively cheap, may have powerful results and substantial social consequences.

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## Appendix

See Table 8.

**Table 8** Variables description

Would send the child to formal child care	1: Yes; 0: No, doesn't know
Willingness to pay for formal child care	Different brackets proposed (amount in euro): 100, 200, 300, 400, 500, 600
Desired work status	1: Work; 0: No work
Desired hours of work	From 0 to 99
Grandparents should look after grandchildren	1: Strongly agree; 0: Agree, nor agree nor disagree, disagree, strongly disagree
Age	From 20 to 40
Education	2 dummy variables: high (tertiary education) and low (secondary education or less)
Employed	Yes/no
In a couple	Yes: you are married or you cohabit with a partner, No: otherwise
Watches news	1: always; 0: very often, seldom, never
Reads news	1: always, very often; 0: seldom, never
Religious	She goes to church: 1 often, quite often; 0: occasionally, never
Political ideology	From 0 to 9 (from left to right), 3 dummy variables: 0–4 left, 5–9 right, missing
Home owner	Residing in an owned house
South	1: Living in the South; 0: Living in the Centre or in the North of Italy
Aware of the information provided	1: Yes, I knew everything, most of the things; 0: I knew little or nothing
The message was credible	1: Agree, strongly agree; 0: Nor agree nor disagree, disagree, strongly disagree
How much she liked the text/video	From 1 to 10

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