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Original Article

Shifting partnership ideals with online technologies among unmarried women in India

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This study complements existing scholarship in family sociology and digital demography by investigating the role of digital technologies in shaping partnership ideals among unmarried women in India. We build on the premise that, by means of faster communication, effective information dissemination, and reciprocal exchange of norms and ideals, recurrent exposure to globalized cultural scripts through the Internet may shape family-related outcomes such as views and opinions regarding different aspects of family life. Leveraging new data from a primary survey of unmarried, partnered women living in cities across twenty states, we find that daily Internet use is positively and significantly associated with modern partnership ideals, measured as secularized views on the choice of a partner, the importance of marriage, partner preferences, and views about love marriage. Moreover, we show that accessing the Internet independently—vis-à-vis through a shared device—is what matters the most, and that results are stronger among high-educated individuals. We assess the selectivity of the sample by conducting subgroup analyses and replicating our findings on the National Family Health Survey (NFHS) 2019–2021. Lastly, we offer evidence that these findings can be deemed causal, complementing our results with an instrumental-variable approach leveraging digital geographical information. Our findings reveal that digital technologies may be gradually contributing to shifting views about marriage and family formation, even in a context such as India, which has traditionally exhibited strong resistance to modernization forces, at least in the realm of the family.

Key words: ideals; India; Internet; technology; union formation.

Introduction

The so-called "digital revolution" is affecting every aspect of daily life across the world, but particularly in low- and middle-income countries (LMICs), where technologies such as mobile phones, mobile Internet, and broader Internet access have diffused very rapidly (Aker and Mbiti 2010). Family outcomes are no exception among these, with a growing body of research

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documenting how access to the Internet shapes fertility, marriage, divorce, migration, and gender-related outcomes in contexts as varied as Ethiopia, Germany, India, Italy, Malawi, and Tanzania (Billari, Giuntella, and Stella 2019; Billari, Rotondi, and Trinitapoli 2020; Pesando et al. 2021; Pesando 2022; Rotondi et al. 2020).

In light of this blossoming literature, this study explores how digital technologies—and, in particular, daily Internet access—may influence partnership ideals in urban India. We define partnership ideals as views and opinions regarding different aspects of family life related to union formation, such as the choice of partner, the importance of marriage, partner preferences, and views about love marriage. In line with sociological work on developmental idealism (referred to as DI henceforth) and world society perspectives (Meyer et al. 1997; Thornton 2001; Thornton et al. 2012a) and economic scholarship on the role of the media in shaping social development outcomes through diffusion processes (Hjort and Poulsen 2019; Kearney and Levine 2015; La Ferrara, Chong, and Duryea 2012; Manacorda and Tesei 2020), this work builds on the premise that the Internet may provide access to globalized cultural scripts in a swift and timely manner. Through faster communication, effective information dissemination, and reciprocal exchange of norms and ideals, recurrent exposure to globalized scripts through technology may shape demographic attitudes and behavior, including family-related outcomes (Westoff and Koffman 2011).

Exploring a question of this kind in the context of urban India provides a novel contribution to the literature for at least three reasons. First, a plethora of online news stress the potential of the digital revolution for partner search, union formation, and the whole wedding industry in India (e.g., "How Technology is Changing Indian Weddings"; BBC 2013), thus hinting at the possibility that widespread Internet access may play a powerful role in this context. Although online dating has the potential to change how couples meet in India, as it has in other contexts such as Canada, China, Germany, and the United States (Kornrich and Robbins 2024; Potarca 2021; Qian, Shen, and Cai 2022; Qian and Hu 2024; Rosenfeld 2017), in our study we take a step back from matchmaking, focusing more broadly on whether Internet use and its frequency relate to unmarried women's attitudes and opinions in several realms of union formation.

Second, despite these "breaking headlines," limited work has been conducted on the implications of Internet use for family dynamics in India, aside from small-scale work characterizing the context in which online dating and virtual mate-seeking occur (Chakraborty 2012; Chakraborty 2019), or scholarship relating mobile phone ownership to family planning and female autonomy (Mohan et al. 2020; Rajkhowa and Qaim 2022). This is mostly due to the lack of adequate survey questions on digital technologies, a gap we fill by introducing new data covering major urban areas of India and providing unique information on digital technology, such as frequency of use and places the Internet is accessed, alongside variables on partnership ideals and preferences. While this is a cross-sectional dataset, the rich set of variables collected, merged with external geospatial information allows us to minimize confounding due to unobserved factors that may correlate with both Internet use and modern partnership ideals.

Third, and most importantly, previous studies on family change in India suggest that India is quite unique among LMICs in that it has shown some resistance to modernization forces, as parents continue to be involved in the vast majority of marital choices, even if they are not the sole decision-makers (Allendorf and Pandian 2016; Chakravorty, Goli, and James 2021), challenging some predictions of modernization theories and DI (Breton 2019; Visaria 2022). Nonetheless, the country has witnessed a steady decline in fertility (Dyson, Cassen, and Visaria 2004) along with substantial increases in age at marriage (Desai and Andrist 2010; Singh, Shekhar, and Shri 2023), jointly arranged marriages (Allendorf and Pandian 2016), inter-caste marriages (Ray, Roy Chaudhuri, and Sahai 2020), and upward trends in divorce (Dommaraju 2016). These nuanced transformations suggest that the family demography of India is going through a transition, yet through a hybridized model in which both modern and traditional beliefs and practices coexist (Reed 2025). As such, a key factor that is yet to be understood is prevailing ideals, particularly among unmarried women, given their potentially more reactive nature to globalized scripts

vis-à-vis actual behavior (Varriale et al. 2022; Pierotti 2013), as well as their role as long-term drivers of union formation practices.

As the Internet provides a proxy for a "modernizing engine" spreading globalized cultural scripts, a study of this kind is well-suited to converse with existing sociological work on family change in India, as well as work in digital demography. Giving easy access to the "life of others," the Internet may serve as a modernizing tool, expanding one's own reference group, reshaping aspirations, fostering emulation, and borrowing foreign social and cultural constructs in a dialogical and continuous way (Pesando et al. 2021). Social networking sites, virtual communities and forums, blogs, YouTube, and Internet-enabled chat services provide exposure to media-rich communication that exposes individuals to foreign—often Western-centric—modes of family formation. In addition, these services allow multiple individuals to communicate at once, enabling better, faster, and more recurrent communication between young adults navigating the landscape of relationship formation. To the best of our knowledge, this study is the first of its kind to explore digital factors capturing elements of DI and cultural diffusion in this diverse population group, now the largest in the world.

Background

The growth of the internet in India

Internet penetration in India surpassed a new milestone of over 800 million total active users in 2023, meaning that over half of Indians (55 percent) used the Internet over the previous year. Similar figures suggest that India was home to 467 million social media users in 2023, corresponding to about 33 percent of the total population. Relatedly, mobile phone penetration stands at around 77 percent, with over 1.1 billion active cellular mobile connections (Kantar 2021). The Global System for Mobile Communications (GSMA) estimates that out of the 200 million new mobile service subscribers in Asia Pacific by 2025, half of them will be accounted for by India, which will also reach a smartphone penetration of 85 percent by the same date, in turn enabling users to have access to widespread mobile Internet (GSMA 2020, 2021; Galpaya et al. 2023). These estimates point to a massive social transformation in the country, likely shaping a range of social development outcomes.

A focus on Internet access and use among women in India is topical, as the gender ratio among all Internet users—not only mobile Internet—has shifted from 71:29 in favor of males (2015) to a more balanced 54:46 ratio (2022), aligning with the overall sex ratio of the country's population (Kantar 2021). Relatedly, studying the implications of Internet diffusion on families in urban India is relevant as persistent rural–urban divides remain in terms of access to platforms and platform use, despite narrowing rural–urban gaps in terms of Internet penetration driven by faster growth rates in rural areas (Kantar 2021). Data from the latest National Family Health Survey (NFHS) 2019–2021 suggest that 53 percent of women in urban areas have *ever* used the Internet, relative to only 25 percent in rural areas. Most of these gaps are explained by skill-based digital divides, far more pervasive in rural areas.

Scholarship on the role of the Internet and broader digital technologies in family formation processes in India is scant. Existing studies fall under three streams. One focuses on characterizing the context in which online dating and virtual mate-seeking occur. For instance, Chakraborty (2019) explored the correlates of dating-app use in urban India focusing on 296 college goers and young professionals, documenting four main reasons for using apps, namely having fun, drawing life satisfaction, having verbal exchanges (i.e., for companionship), and simplicity of use. Similarly, Chakraborty (2012) found that virtual relationships are becoming increasingly common as an "experimental" way through which young Muslim women in urban slums of Kolkata try to alter their life course and expand their social circles.

The second stream focuses on "cyber-matchmaking," that is, the idea that the apparent waning of parental authority is being increasingly replaced by virtual ways of arranging marriages and forming (or preserving) kin. Agrawal (2015) found that the dominant Indian variant of online

matchmaking may at times aid in the sustenance of caste- and community-based identities and networks, albeit in new hybridized forms. For instance, matchmaking may facilitate conventional marriage preferences under unfavorable conditions.

The third stream focuses on the potential of mobile phones to connect women to information and social networks, often enhancing their autonomy in decision-making and sexual and reproductive health. Rajkhowa and Qaim (2022) found women's mobile phone use to positively correlate with their physical mobility and use of nonsurgical contraceptives (e.g., oral pills, condoms, etc.), particularly among educated, upper-caste women. Similarly, Mohan et al. (2020) found mobile phone access in urban areas to be positively associated with skilled birth attendance, postnatal care, and use of modern contraceptives. However, phone access was not associated with improvements in health indicators in rural settings, aligning with Rajkhowa and Qaim (2022) in suggesting that digital divides persist between rural and urban areas, and between advantaged and disadvantaged social strata. An important limitation of this cross-sectional literature is the inability to distinguish simple feature phones from smartphones, thus preventing scholars from assessing the relative importance of offline versus online mechanisms.

Existing research on family ideals in India

The literature on family change in India is extensive and beyond the scope of this paper (for a review, see Chakravorty, Goli, and James 2021). This work focuses specifically on partnership ideals, that is, views, attitudes, and opinions regarding different aspects of union formation. This is an important outcome, as ideals may be more "malleable" and responsive to modernizing forces than actual behavior, especially in contexts characterized by rooted social and cultural norms and institutions, such as families in India (Netting 2010). For instance, exposure to globalized cultural scripts through technology may shift women's opinions, views, and preferences toward age at marriage, parental authority, partner preferences, etc., yet rooted institutions such as arranged marriage may prevent these more secularized views from translating into actual behavior. Identifying potential mismatches between ideals and behaviors is crucial from a policy perspective, as it may inform the relative success of interventions targeting broader contextual barriers—potentially more effective in this context—over policies aimed at shaping individual perceptions and beliefs.

A few scholars have focused on these more "ideational" family outcomes in the context of India, finding mixed results on the role of modernizing forces. On one hand, focusing on fertility, Visaria (2022) found no evidence that the transition to small families in India is due to cultural shifts toward post-modern attitudes and norms that stress individuality and self-actualization. Rather, the shift is attributable to high aspirations among urban middle-class parents which can only be fulfilled when they have one or two children. On the other hand, leveraging interviews with 30 young professionals in Gujarat, Netting (2010) found that educated youth are moving beyond the conventional love-versus-arranged marriage dichotomy, embracing broader goals of intimacy, equality, and personal choice. Building on Appadurai's theory on "ideoscapes" claiming that Western-inspired ideals travel across countries by means of migration, media, and technology diffusion (Appadurai 1996), the author finds that Indian upper-middle-class youth are increasingly responding to modernizing forces by generating culturally appropriate hybrid goals and systems of mate selection.

In this respect, implications of the growth of Internet access through mobile phones, tablets, and laptops would easily fit within Appadurai's definition of ideoscapes or, rather, "technoscapes." As theorized by Netting (2010), the ideoscape of "romantic love" in India constitutes a core element of how upper-class women operationalize the idea of a modern relationship. This ideoscape has been linked to other development constructs such as freedom, rights, and self-worth, and has been praised in literature and television, as well as facilitated by technoscapes of Internet and mobile phone communication. Our study does not directly include measures of the types of content that women consume. However, women in our sample are more likely to have social media accounts than even email accounts which, following other research, include

Facebook, Twitter, Instagram, and YouTube accounts (Poonam and Bansal 2023; Venkatraman 2017). Although young Indian women on Facebook and Twitter often only befriend others in their kin group because their kin can see who they become friends with (Venkatraman 2017), platforms like YouTube are more anonymous and are also extremely popular (Poonam and Bansal 2023). Black (2017) argues that YouTube has helped move concepts like "love marriage" into the broader Indian discourse, instead of being concentrated among the educated or diasporic Indian communities. Given the ubiquity of American or Western-centric media (Poonam and Bansal 2023) and the association between marriage ideals such as marrying later and choosing spouses in the United States (Thornton, Ghimire, and Mitchell 2012b), these platforms may correlate with the spread of these types of ideals.

In line with the logics of reciprocal causation embedded in DI, the shift toward modern partnership ideals may contribute to growing individuation as part of the culture of development, which may manifest in terms of more individualized use of technologies and higher technological sophistication, alongside more independent perceptions of the value of education, economic growth, gender equality, democratic governance, etc. (Thornton, Dorius, and Swindle 2015).

Theoretical framework and hypotheses

Developmental idealism is a bundle of cultural schemas embracing beliefs and values favoring modern societies and families over traditional ones and viewing societies on a dynamic path towards modernity (Allendorf and Thornton 2015; Lai and Thornton 2015; Thornton et al. 2019). According to DI, any behavior, belief, and value can be categorized as "modern" if it is in line with a developmental trajectory—or triggered by it in a path-dependent way. Modern ideals tend to be more egalitarian, display social/communal solidarity, and be progressive with current times while at the same time shifting away from traditional norms.

Extensive work has shown that DI can shape ideals surrounding marriage and families in South Asian contexts such as India and Nepal (Allendorf and Thornton 2015; Thornton et al. 2019) and that individuals living closer to urban areas, with higher levels of education, working outside of the family, and more frequently exposed to media sources are more likely to endorse DI (Thornton, Ghimire, and Mitchell 2012). Additionally, Allendorf and Thornton (2015) found that unmarried individuals in India with greater endorsement of DI were more likely to choose their own spouses, including spouses of different castes, rather than having an arranged marriage.

Guided by this logic, if women feel they can exercise greater agency in partner selection, place higher value onto achieved (versus ascribed) socioeconomic attributes of partners and believe that marriages are primarily about mutual love and companionship, then we could classify these women as holding "modern" values and beliefs. Nonetheless, existing research also underscores the complex and often hybrid nature of marriage norms (Allendorf and Pandian 2016), suggesting that partnership ideals may take on complex and unexpected configurations.

Based on DI perspectives identifying mass media as a correlate of modernity and building on cross-national scholarship documenting that digital technologies may play a key role in the "modernization process" of partnership ideals, we hypothesize that exposure to the Internet will be positively associated with modern partnership ideals in our sample of unmarried urban women (*HP1*). Furthermore, we expect frequent exposure to the Internet to matter more in cases in which women have independent access to technology (e.g., through a smartphone or a personal computer), rather than shared access (e.g., one laptop for all household members). The rationale behind this stronger association (*HP2*) is twofold: first, independent access to the Internet means that exposure to globalized cultural scripts may be magnified due to, potentially, more control over the technology, more time spent online, and a broader ability to access personalized content on a regular basis (e.g., accessing social media, reading news, exchanging information with peers, etc.). Second, independent access to technology is a distal proxy for women's agency within and outside of households (Masika and Bailur 2015; Pesando 2022). This is all the more the case in a context such as India in which smartphone and laptop penetration are far from complete (Galpaya et al. 2023), *access-based* and *skill-based* digital gender divides persist

(Kantar 2021; Rajkhowa and Qaim 2022), and traditional gender roles coexist with rigid social institutions such as parental authority (Rammohan and Vu 2018).

Education could also play a powerful role in shaping ideals. Yet the potential role of education in shaping partnership ideals is context-specific and dependent on family norms and regional cultural scripts. On one hand, exposure to the Internet may have a stronger impact among more disadvantaged social strata, likely more traditional to start with. This hypothesis would be consistent with existing global research by Rotondi et al. (2020), who found larger payoffs of mobile phone ownership on women's health and well-being among the poorest. On the other hand, Internet exposure may have a stronger impact among highly educated individuals. As Internet access, digital behavior (e.g., chatting on the Internet or exchanging emails with a potential spouse), and modern partnership ideals in India are stratified by social class (Vikram 2024), highly educated individuals may be better able to reap benefits from Internet exposure through the content they access, such as newspapers, magazines, blogs, books, TV shows, and matrimonial sites. In other words, being better able to comprehend, discern, process, and use global digital information to their own advantage, highly educated individuals may be the primary beneficiaries of Internet exposure. In a global perspective, having access to mobile phones, especially simple feature phones, is less selective than possessing adequate digital skills to navigate the Internet. Hence, in line with existing work in India showing larger payoffs to technology among more advantaged social strata (Rajkhowa and Qaim 2022), we hypothesize that, when combined with high education levels, Internet exposure will be more strongly correlated with prevalence of modern partnership ideals than education or Internet alone (*HP3*).

Data and Methods

Dataset

This paper is based on survey data collected by our team from about 2,000 unmarried partnered women living in 20 cities clustered across all six geographic regions of India. Women were asked if they had a romantic partner or fiancé, and those who responded affirmatively were included in the survey. We recognize this a relatively select group, given the continued importance of arranged marriage in India. Nonetheless, as women's age at marriage in India increases and women move into work and higher education before marriage, they face more opportunities to enter relationships before marriage. The existing literature supports this idea, suggesting that South Asian urban women increasingly navigate romantic relationships, embracing casual dating and, at times, engaging in premarital sex despite still living with their families (Alexander et al. 2006; Jaya and Hindin 2009).

We sampled unmarried partnered women in urban areas intentionally, seeing this as an opportunity given how little is known about premarital relationships in countries where arranged marriages are common (Alexander et al. 2006; Ghimire et al. 2006). Also, complementary data efforts such as the Indian Human Development Survey (IHDS) do not collect partnership ideals variables among unmarried women (as the women's survey is *ever* married), while the National Family Health Survey (NFHS) does not allow us to properly identify unmarried women in partnerships. By investigating ideals among unmarried women in relationships, we intended to understand the broad transition in how women meet their spouses and how they navigate relationships in urban landscapes. Nonetheless, in the following analyses we take multiple steps to assess the selectivity of this sample and provide corresponding results on the whole universe of unmarried women (not just partnered ones) through the NFHS 2019–2021.

The survey was conducted in July/August of 2022 with the support of Morsel India, a research organization based in the country. We focused on urban residents as our goal was to evaluate some of the causes of sociodemographic transformations such as increasing age at marriage, higher inter-caste marriages, and lower child marriage, which are more visible in urban areas (Desai and Andrist 2010; Narzary and Ladusingh 2019). Because these facets of family change, including casual dating, are less prevalent in rural areas (Jaya and Hindin 2009)—and given the significantly higher digital connectivity in urban areas (Kantar 2021)—including rural areas would

not provide additional leverage. Not least, given that over 60 percent of India is rural, fielding a survey of this kind in rural areas was not feasible from a budget perspective.

Despite the focus on urban areas, one goal behind the design of the survey was to ensure that most regions of India were included, to capture cultural, religious, and ethnic variation. We selected 20 of the 37 union territories and states of India and selected the primary urban area from each state—see Supplementary Figure A1 for surveyed cities within each region and Supplementary Appendix for sampling details. To ensure enumerators selected women from heterogeneous backgrounds, we requested quota sampling on education to match the educational distribution among urban women in the NFHS 2019–2021 (100 unmarried respondents from each city).

Although the survey is nonrandom, most respondents' characteristics in our sample, such as regional and caste representation, are similar to estimates from the NFHS (Supplementary Table A1) when limiting the latter sample to similar age ranges and women living in urban areas. The age-wise sample distribution from our survey data is closely comparable too (Supplementary Figure A2), although our respondents are slightly older than women in the NFHS as, unlike the NFHS, we targeted unmarried women in relationships. The overall sample includes 2,013 women, yet our analytical sample consists of 1,798 women (8 percent of the original sample). While complete information on Internet variables (main predictor) and partnership ideals (main outcome) is available for 1,951 women (97 percent of the original sample), missing information on basic controls such as education, caste, religion, and region reduce the sample from 1,951 to 1,798 women. As such, we present descriptive statistics and conduct analyses on this latter sample. Attrition analyses and strategies to deal with missing data are discussed later.

Variables

We relied on two measures of Internet exposure at the individual level. The first is frequency of Internet use through the following categories: never, weekly (or monthly/yearly), and daily. The second is whether the Internet is accessed through a shared or own device. We intersected these two variables creating two dummies, one for daily Internet access (1 if daily Internet access and 0 otherwise) and another for daily Internet access through own device (1 if daily Internet access through own device and 0 otherwise). We also created a categorical variable taking three values: never/rarely using the Internet, using daily on shared device, and using daily on own device. The distinction between shared and own device is a key novelty of this dataset given that other large-scale datasets with information on digital technologies in LMICs do not allow us to measure shared device use, an overlooked issue in contexts characterized by resource constraints, extended households, and limited decision-making power of specific household members, often women (James 2011; Pesando 2022).

The key outcome variable stems from the measurement of partnership ideals. We first filtered questions recording information on partnership ideals and beliefs across a range of domains. Questions are as follows: "How important is having prior *acquaintance* with the potential person you want to marry or have a relationship with?" (IMP-A), "How important is receiving *parental approval* to start a relationship and/or enter a marriage?" (IMP-P), "Which of the following people do you think are best to find a partner or spouse?" (BES-P), "How important is the *education level* of the potential person you want to marry or have a relationship with?" (IMP-E), "How important is the *caste* of the potential person you want to marry or have a relationship with?" (IMP-C), "Would you allow your children to enter a love marriage?" (LOV-C). All variables are categorical with three or four categories. Questions about importance (IMP-X) are coded as "very," "moderately," or "not." BES-P is coded as "self," "parents," "self+parents," and "other." Lastly, LOV-C is coded as "not," "maybe," and "yes." Note that a love marriage can be described as a union where individuals choose their partner based on mutual love, affection, and compatibility, instead of ascribed characteristics such as caste, religion, or social status (Allendorf 2013; Bhandari 2020).

We then created dummy variables for each question, coded as 1 if responses to the specific items were in line with "secularized" ideals and/or more autonomous choices, that is, if prior

acquaintance is very important (IMP-A = "Very"), if parental approval is not important (IMP-P = "Not"), if individuals themselves are best suited to choose a partner (BES-P = "Self"), if partner's education is very important (IMP-E = "Very"), if partner's caste is not important (IMP-C = "Not"), and if respondents would allow their children to enter a love marriage (LOV-C = "Yes"). Lastly, we created a continuous index built as the sum of these items, ranging from 0 to 6 where 0 corresponds to very traditional ideals and 6 corresponds to very secularized or modern. The Supplementary Appendix discusses alternative classifications, all of which deliver consistent results.

Other control variables for the analysis are age (18 to 37), length of current relationship, education (primary, secondary, higher secondary, and university), region (north, central, northeast, west, east, and south), caste (General, Other Backward Classes, Scheduled Caste, and Scheduled Tribe), religion (Hindu, Muslim, Christian, and Other), living arrangement (alone, with partner, with parents/relatives), and occupational status (not working, working full-time, working part-time, and studying). To capture broader developmental and technology-diffusion processes at the level of cities and states, we also included geographical variables from external sources (see Supplementary Appendix for full details). Among city-level variables we included light intensity per 1,000 people—a commonly used proxy for local socioeconomic development (Bruederle and Hodler 2018 ; Chen and Nordhaus 2011), primarily in urban areas, including in India (Asher et al. 2021)—percent of households with access to electricity, and number of 3G, 4G, and 5G mobile networks (ratio of the number in the city relative to the number in all India). Among state-level variables we included average expenditure on data over the previous month and the share of households with working Internet connection (phone or fiber/ADSL).

Lastly, we merged two other geographical variables that we exploit as Instrumental Variables (IVs), namely city-level download speed (bitrates) and state-level number of deaths from lightning strikes (ratio of the number in the state relative to the number in all India). Note that heavy rainfalls and hailstorms in India are extremely common, and deaths from lightning strikes can reach up to 25 people per day in states such as Gujarat (BBC 2023). The rationale behind the choice of these variables is discussed in the next subsection—correlations between them are presented in Supplementary Table A2.

Table 1 presents unweighted descriptive statistics on the analytical sample. Estimates show that 87.4 percent of women in the sample use the Internet daily, yet this percentage declines to 50.7 percent when limiting to Internet use through own device. In terms of partnership ideals, 75.8 percent of women report that knowing the partner before entering a partnership is very important; 82.4 percent of women report that parental approval is very important; 72 percent report that partner's education is a very important trait when selecting a partner, while this same estimate declines to 51.6 percent for the importance of caste.

In terms of demographic characteristics, unmarried women in the sample are on average 24.3 years old and they have been in a relationship for just over 3 years (84.5 percent of women have been in a relationship for 5 years or less). The sample is relatively highly educated, as 75.9 percent of women hold either higher secondary or university education. Importantly, while these women are partnered, only 6.7 percent of them live with the partner, with the remaining ones either living alone (6.4 percent) or with parents/relatives (86.9 percent).

Table A3 in Supplementary Appendix provides descriptive variation in modern partnership ideals (mean of index) across sociodemographic groups. While similarly aged women who have been in an unmarried relationship for a longer time may be perceived as more "modern" (i.e., more akin to cohabiting), they are not different from the rest of unmarried women in the sample in terms of partnership ideals.

Analytical strategy

We start our analysis by exploring variation in partnership ideals by level of exposure to the Internet. We describe each item separately, and then create macro-categories of "Traditional," "Hybrid," and "Modern" from the continuous index introduced above. Next, we run multivariate

Table 1. Descriptive statistics on key variables, analytical sample.

	Mean or %
Internet variables	
Using Internet daily	87.4
Using Internet daily on own device	50.7
Partnership ideals (items)	
Importance of prior acquaintance (IMP-A)	
Very	75.8
Moderately	16.6
Not	7.60
Importance of parental approval (IMP-P)	
Very	82.4
Moderately	14.7
Not	2.89
Best people for partner arrangement (BES-P)	
Self	22.8
Parents	32.3
Self + parents	32.9
Other	12.0
Importance of partner's education (IMP-E)	
Very	71.8
Moderately	19.6
Not	8.59
Importance of partner's caste (IMP-C)	
Very	51.6
Moderately	20.2
Not	28.2
Allow love marriage for children (LOV-C)	
Not	19.5
Maybe	10.7
Yes	69.8
Controls	
Age	24.3
Length of current relationship (years)	3.26
Education	
Primary	4.89
Secondary	19.2
Higher secondary	38.9
University	37.0
Region	
North	35.4
Northeast	10.6
Central	16.6
West	11.2
East	5.56
South	20.6
Caste	
General	32.7
OBC	29.5
SC	25.6
ST	12.2
Religion	
Hindu	83.0
Muslim	5.17

(continued)

Table 1. Continued.

	Mean or %
Christian	6.56
Other	5.28
Living with	
Alone	6.45
Partner	6.67
Parents/relatives/other	86.9
Occupational status	
Not working	40.9
Working full-time	23.9
Working part-time/occasionally	12.0
Studying	23.2
Geographic variables	
City-level	
Light intensity (per 1,000 people)	94.58
Household electricity (% households)	86.95
3G, 4G, 5G mobile networks	0.796
State-level	
Average expenditure on data	0.651
Share of HH with working Internet connection	0.210
IVs	
Download speed, bitrates (city-level)	4.986
Deaths from lightning strikes (state-level)	0.793

Source: Analytical sample of 1,798 women. Geographic variables obtained from ancillary external sources: 3G, 4G, and 5G mobile networks and download speed (bitrates) obtained from nPerf Speed Tests (from year 2022). Household electricity obtained from the World Bank Spatial Database (from year 2015). Average expenditure on data and share of HH with working Internet connection are obtained from the AfterAccess survey (from year 2017). Deaths from lightning strikes obtained from the Earth Networks Total Lightning Network and Minister of State for Earth Sciences (from years 2019/2020). *Note*: Unweighted data.

ordinary least squares (OLS) models using the two Internet dummies as predictors (in separate models) and the partnership ideals index as main outcome. We run four models adding controls sequentially: (i) Internet use only; (ii) individual-level controls; (iii) city-level controls; and (iv) state-level controls (full specification, henceforth). We also run multinomial logit models and extract predicted probabilities of falling into the three macro-categories of ideals. To explore the intersection of education and Internet use as compounding predictors, we run models including interaction terms and graphically visualize the results. Models do not include city fixed-effects as city-level and state-level geographical variables are accounted for as controls. While descriptive statistics are unweighted, regression analyses account for weights computed using data from the NFHS (age, region, and education) to make our sample as close as possible to representative of unmarried urban women.

We deal with missing values in two different ways. First, we conduct attrition analyses assessing whether partnership ideals differ for women with (1,798) and without (153) information on relevant controls. Second, we rerun all analyses implementing multiple imputation with chained equations (White, Royston, and Wood 2011)—analyses are provided in Supplementary Appendix.

Lastly, although the inclusion of georeferenced controls measuring development patterns, technological diffusion, and digital connectivity helps reduce endogeneity concerns, we are working with cross-sectional data. As such, unobserved heterogeneity may prevent us from drawing solid causal conclusions. For example, although women using the Internet may lead to more modern partnership ideals, it is equally likely that women with more secularized ideals may spend more time on the Internet or be more willing to purchase a smartphone with independent

digital connectivity. While these issues cannot be solved without experimental variation, we complement our associations with estimates from Instrumental Variable (IV) techniques as robustness check.

The main assumption for IV approaches is that an exogenous instrument can be found that affects the "treatment" (Internet use) but is excludable from the outcome equation, that is, is uncorrelated with partnership ideals. We made a good faith effort to identify instruments satisfying these conditions, yet it is hard to exclude all possible threats to validity. We used two variables as instruments. First, a city-level one capturing download speed (bitrates), that is, the amount of video data being transferred in a particular amount of time. This variable is likely to affect a woman's likelihood to use the Internet regularly (positive *first-stage* coefficient), yet it is arguably exogenous to that woman's partnership ideals—especially after controlling for other measures of technology diffusion and digital divides. Second, we obtained a state-level variable measuring the number of deaths that can be attributed to lightning strikes. Extensive previous research demonstrates that technology adoption is slower and digital connectivity weaker in areas where strikes are more frequent (Manacorda and Tesei 2020; Rotondi et al. 2020; Varriale et al. 2022), likely because of damaged antennas on the ground (negative *first-stage* coefficient). Relatedly, deaths from lightning strikes in a specific state are unlikely to have any independent relationship with traditional versus modern partnership ideals after variables capturing infrastructural barriers are controlled for. The benefit of using both IVs together is that a Sargan-Hansen statistic (*J* test) can be obtained. We adopt a simple two-stage least-squares (2SLS) approach. As these IVs only vary across 20 cities or states, we treat this IV approach as a robustness check, calling for additional research on India exploiting experimental variation in Internet diffusion—in a spirit similar to Hjort and Poulsen (2019) in Africa.

Descriptive findings

Figure 1 estimates proportions of responses for each of the six items of partnership ideals by level of exposure to the Internet. We do not observe marked patterns between Internet users and nonusers in terms of the importance of prior acquaintance. In terms of parental approval, daily Internet users are least likely to consider parental approval as very important and most likely to consider parental approval as not important. Women who use the Internet every day, particularly those who access it from their own devices, mostly believe that finding a partner by themselves is the best way to arrange a partnership. A similar gradient—yet reversed—is observed for the response on parents as the main people responsible for arranging a partnership. Associations between Internet use and joint arrangements are weaker, though Internet users are slightly more likely to see "self + parents" as the optimal combination relative to nonusers. Moving to the importance of partners' traits, Internet nonusers are more likely to see caste as a very important factor to consider, while evidence on partner's education is more mixed. Lastly, we observe a gradient for the love marriage question, whereby regular Internet users are significantly more likely to see love marriage as acceptable for their children.

Figure 2 provides similar estimates, yet combining all categorical items dichotomized—following the process outlined in the previous section—into a score ranging from 0 to 6 where 0 corresponds to very traditional and 6 corresponds to very modern. This score is then broken into categories where 0 and 1 are coded as "Traditional," 2 and 3 are coded as "Hybrid," and 4, 5, and 6 are coded as "Modern." Findings confirm the above gradient: Internet nonusers are significantly more likely to hold traditional ideals, while Internet users through own device are significantly more likely to hold modern ideals, followed by Internet users through shared device and nonusers, respectively. Conversely, associations between Internet use and hybrid partnership ideals are less clear-cut. Thus, descriptive evidence provides *prima facie* confirmation that our hypotheses may be valid: there is a positive association between regular Internet use and modern partnership ideals, and shared device use is less strongly associated with modern partnership ideals relative to independent device use. Results using alternative categorizations are unchanged and reported in Supplementary Figure A3.

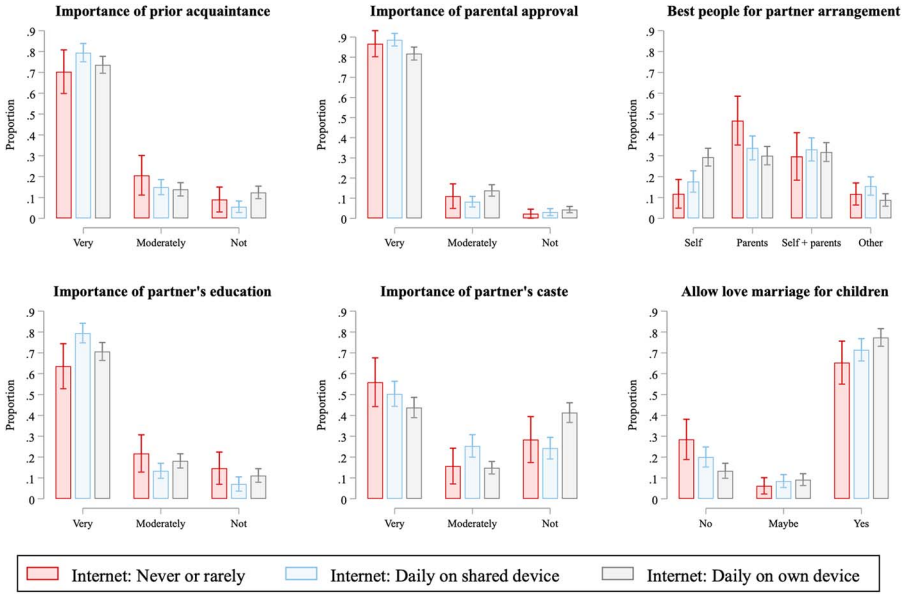

Figure 1. Partnership ideal variables by level of exposure to the Internet (proportions) (weighted proportions). Analytical sample of 1,798 women.

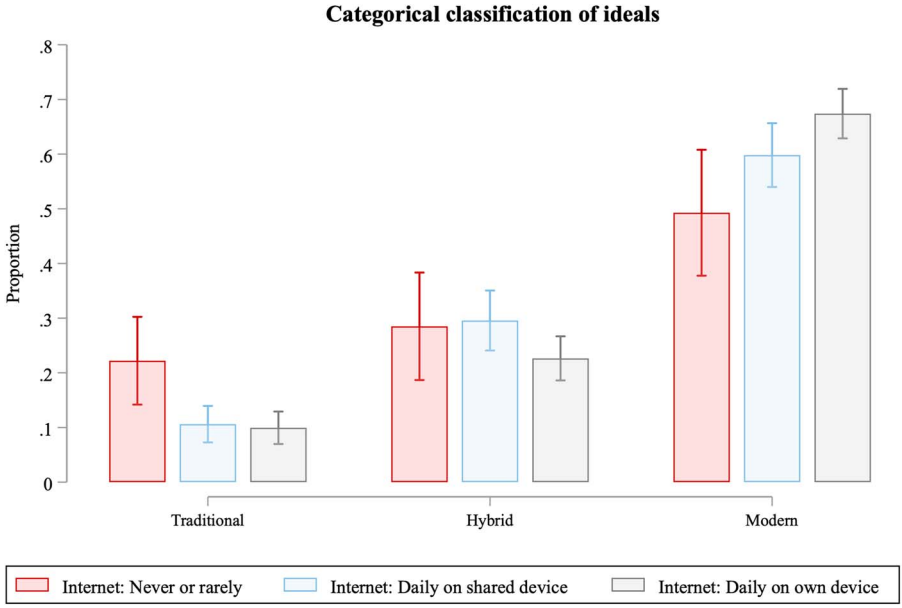

Figure 2. Partnership ideal index, broken down into categories, by level of exposure to the Internet (proportions) (weighted proportions). Analytical sample of 1,798 women. Analogous estimates using an alternative classification of partnership ideals are reported in Supplementary Figure A3.

Despite our effort to "group" ideals, we also document within-individual variation whereby partnership ideals are mixed for each respondent. In other words, respondents exhibiting secularized ideals in terms of partner's education do not necessarily hold secularized ideals in terms

Table 2. Cross-tabulation of selected partnership ideal items.

	Very	Somewhat	Not	Total
Allow children to enter love marriage	Importance of partner's education			
No	18.6	23.3	17.9	19.5
Maybe	10.7	11.3	9.30	10.7
Yes	70.7	65.4	72.8	69.8
Total	100	100	100	100
Best people to find partner	Importance of partner's caste			
Self	19.8	18.7	29.9	22.4
Parents	42.5	25.7	18.6	32.4
Self + Parents	26.6	41.5	39.6	33.2
Other	11.1	14.1	11.9	12.0
Total	100	100	100	100
Best people to find partner	Importance of parental approval			
Self	20.9	29.7	43.1	22.9
Parents	35.5	16.8	21.6	32.3
Self + Parents	32.3	37.9	23.5	32.8
Other	11.3	15.6	11.8	12.0
Total	100	100	100	100

Note: Unweighted data. Analytical sample of 1,798 women.

of allowing love marriage for their children. Similarly, respondents answering that caste is not an important trait for partner selection may answer that parents alone are best positioned to pick a partner. This is shown through three sample cross-tabulations reported in Table 2. Giving some examples, out of respondents answering that partner's education is very important, 18.6 percent would not allow their children to enter love marriage (panel a). Out of respondents answering that partner's caste is not important, 18.6 percent and 39.6 percent consider, respectively, parents alone and parents with children the best people to select a partner (panel b). Finally, out of women reporting that parental approval is very important, 20.9 percent would select their partner alone (panel c). In this sense, our data corroborate the idea of a slowly modernizing realm of the family in which both modern and traditional beliefs and practices coexist in a "hybridized" fashion (Allendorf and Pandian 2016; Reed 2025).

Results

Main findings

Table 3 provides results from OLS models predicting partnership ideals as continuous index. Four models are presented, with the last including all controls. Some general findings emerge. First, while there is a strong positive bivariate association between daily Internet exposure and modern partnership ideals, this wanes as individual-level controls are introduced. The same does not apply when focusing on daily Internet exposure through own device. In this case, associations remain strong and significant after accounting for individual-, city-, and state-level controls, stable around 0.197 (model 1) and 0.199 (model 4). This estimate suggests that being exposed to the Internet daily through a personal device is associated with an increase in the partnership index by close to 0.2 units. With a sample mean of 2.59 for women with no daily Internet exposure, this corresponds to a 7.7 percent increase. Second, education is positively associated with modern partnership ideals, albeit with some nonlinearities. While women with university education are significantly more likely to hold modern ideals relative to primary-educated, the same does not hold for women with secondary education, whose likelihood is significantly lower. Geographically, we observe significantly more modern ideals in the Northeast (relative to North) and significantly less modern ideals in the South. While there is no heterogeneity by caste group, heterogeneity by

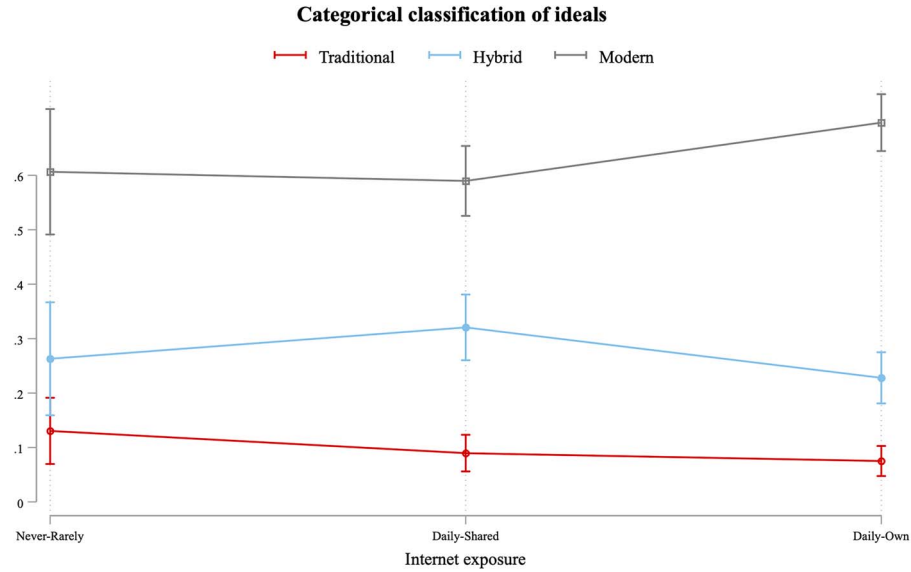

Figure 3. Predicted probabilities from multinomial logistic regression analyses predicting the partnership ideal index broken into the three macro-categories (weighted estimates). Analytical sample of 1,798 women. All controls included. Analogous estimates using an alternative classification of partnership ideals are reported in Supplementary Figure A5.

religion reveals that Muslims hold significantly more traditional ideals relative to Hindus. Third, geographic contextual variables hold strong predictive power, although again with exceptions and nonlinearities.

Additional full-specification models on each dichotomized item making up the continuous index are reported in Supplementary Figure A4. These confirm much stronger predictive power of the daily Internet exposure through own device variable, showcasing that associations are positive across all items except for the importance of education (IMP-E). Strongest results are observed for the importance of prior acquaintance (IMP-A) and for love marriage among children (LOV-C), followed closely by best people to find a partner (BES-P) and the importance of caste (IMP-C). Furthermore, figure 3 summarizes predicted probabilities from multinomial logistic regressions predicting belonging to the three partnership categories visualized in figure 2, namely traditional, hybrid, and modern. Most variation is driven by using the Internet daily through own device, and modern and hybrid ideals are more responsive to Internet exposure. Results using an alternative categorization are virtually unchanged and reported in Supplementary Figure A5. All in all, evidence from Table 3 and figure 3 supports hypotheses 1 and 2: daily Internet exposure is positively and significantly associated with modern partnership ideals, yet this is only the case when the Internet is accessed independently.

To conclude, figure 4 plots linear combinations from interaction terms between Internet exposure (daily Internet use, top panel; daily Internet use through own device, bottom panel) and respondents' levels of education. The top panel shows a roughly linear gradient whereby estimates are larger at higher levels of education. Conversely, the bottom panel shows some nonlinearities whereby estimates are biggest in magnitude for secondary and higher secondary education (and statistically different from primary education, as confidence intervals do not overlap), yet they get closer to zero for university education. Among women with secondary and higher secondary education, using Internet daily through own device is associated with a significant increase in the partnership index by 0.626 and 0.343 units, respectively—an effect size which is two to three times bigger relative to the all-sample one (0.199). Consistent across panels,

Table 3. Multivariate analyses predicting modern partnership ideals.

Partnership ideals index (score, 6 items)	Daily Internet vs. not				Daily Internet on own device vs. not			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Internet exposure	0.396[c]	0.138	0.131	0.118	0.197[b]	0.107	0.182[b]	0.199[b]
	(0.118)	(0.122)	(0.120)	(0.120)	(0.083)	(0.080)	(0.081)	(0.082)
Age of the respondent		−0.021[a]	−0.016	−0.017		−0.022[a]	−0.017	−0.018
		(0.012)	(0.012)	(0.012)		(0.012)	(0.012)	(0.012)
Respondent's education (Ref.: Primary)								
Secondary		−0.284	−0.347[a]	−0.381[a]		−0.255	−0.327	−0.366[a]
		(0.178)	(0.194)	(0.202)		(0.177)	(0.199)	(0.210)
Higher secondary		0.206	0.175	0.151		0.242	0.189	0.154
		(0.171)	(0.184)	(0.192)		(0.163)	(0.183)	(0.194)
University		0.376[b]	0.350[a]	0.328[a]		0.413[b]	0.359[a]	0.325
		(0.175)	(0.187)	(0.194)		(0.167)	(0.187)	(0.198)
Length of current relationship (yrs)		0.022[a]	0.021[a]	0.016		0.023[a]	0.022[a]	0.017
		(0.013)	(0.012)	(0.012)		(0.013)	(0.012)	(0.012)
Current living arrangement (Ref.: Alone)								
With partner		−0.003	0.109	0.161		−0.021	0.106	0.160
		(0.217)	(0.216)	(0.214)		(0.217)	(0.211)	(0.208)
With parents/ relatives/others		−0.017	0.053	0.049		−0.018	0.084	0.082
		(0.166)	(0.171)	(0.170)		(0.166)	(0.170)	(0.168)
Occupational status (Ref.: Not working)								
Working full-time		−0.058	−0.060	−0.040		−0.063	−0.066	−0.043
		(0.095)	(0.093)	(0.094)		(0.095)	(0.094)	(0.094)
Working part-time/ occasionally		−0.100	−0.090	−0.087		−0.099	−0.084	−0.079
		(0.154)	(0.153)	(0.155)		(0.156)	(0.157)	(0.159)
Studying		0.022	0.053	0.072		0.025	0.056	0.078
		(0.103)	(0.105)	(0.104)		(0.103)	(0.105)	(0.105)
Region (Ref.: North)								
Northeast		0.330[b]	0.454[c]	0.342[b]		0.348[b]	0.477[c]	0.356[c]
		(0.143)	(0.150)	(0.142)		(0.139)	(0.146)	(0.138)
Central		−0.282[b]	−0.074	−0.137		−0.291[c]	−0.080	−0.151
		(0.110)	(0.118)	(0.113)		(0.110)	(0.117)	(0.113)
West		−0.246[a]	−0.041	−0.074		−0.235[a]	−0.022	−0.046
		(0.126)	(0.130)	(0.142)		(0.127)	(0.133)	(0.143)
East		0.134	0.110	−0.164		0.142	0.072	−0.229
		(0.135)	(0.138)	(0.148)		(0.134)	(0.140)	(0.152)
South		−0.158	−0.157	−0.351[c]		−0.156	−0.173	−0.377[c]
		(0.111)	(0.125)	(0.130)		(0.110)	(0.124)	(0.131)
Respondent's caste group (Ref.: Gen)								
OBC		0.048	0.016	−0.019		0.071	0.045	0.013
		(0.102)	(0.102)	(0.103)		(0.102)	(0.102)	(0.103)
SC		0.158	0.082	0.069		0.163	0.085	0.073
		(0.104)	(0.105)	(0.104)		(0.104)	(0.106)	(0.105)
ST		0.130	0.078	0.057		0.150	0.102	0.083
		(0.134)	(0.138)	(0.135)		(0.133)	(0.135)	(0.132)
Respondent's religion (Ref.: Hindu)								
Muslim		−0.422[b]	−0.391[b]	−0.435[b]		−0.392[b]	−0.325[a]	−0.369[a]
		(0.186)	(0.189)	(0.195)		(0.184)	(0.186)	(0.191)
Christian		−0.122	−0.023	−0.146		−0.152	−0.070	−0.205
		(0.194)	(0.214)	(0.208)		(0.191)	(0.212)	(0.205)
Buddhist Jain Sikh		0.411	0.502[b]	0.564[b]		0.417	0.533[b]	0.602[b]
		(0.251)	(0.246)	(0.244)		(0.254)	(0.248)	(0.247)

(continued)

Table 3. Continued.

Partnership ideals index (score, 6 items)	Daily Internet vs. not				Daily Internet on own device vs. not			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Light intensity per 1,000 people (city)			0.001	−0.000			0.000	−0.000
			(0.000)	(0.000)			(0.000)	(0.000)
% hh with access to electricity (city)			−0.013[c]	−0.013[c]			−0.016[c]	−0.016[c]
			(0.004)	(0.004)			(0.004)	(0.004)
3G, 4G, 5G cellular data networks (city)			0.096[b]	0.127[c]			0.108[b]	0.141[c]
			(0.044)	(0.044)			(0.044)	(0.044)
Average expenditure on data (state)				0.373[c]				0.392[c]
				(0.103)				(0.102)
Share hh with working Internet connection (state)				−0.979[a]				−1.153[b]
				(0.545)				(0.540)
Constant	2.391[c]	2.892[c]	3.666[c]	3.911[c]	2.653[c]	2.930[c]	3.897[c]	4.163[c]
	(0.110)	(0.358)	(0.405)	(0.402)	(0.063)	(0.355)	(0.396)	(0.393)
Observations	1,798	1,798	1,798	1,798	1,798	1,798	1,798	1,798

Note: Weighted data. Robust standard errors in parentheses. [a]$P < .1$. [b]$P < .05$. [c]$P < .01$.

the estimated association between Internet exposure and modern partnership ideals is negative in sign but indistinguishable from zero, likely because women with primary education comprise less than 5 percent of the sample. These findings confirm our hypothesis 3: when combined with higher education levels, Internet exposure is more strongly associated with modern partnership ideals than education or Internet alone. We see this as suggestive of access-based and skill-based digital divides whereby low-educated women have neither access to digital technologies nor adequate skills to leverage their potential and reap benefits from them.

Additional analyses

Missing data and attrition

Table 4 reports attrition analyses exploring whether women with and without missing information differ significantly in terms of key variables of interest, that is, partnership ideals and Internet exposure. Results are clear: the women we lose hold, on average, more modern ideals (3.098 versus 2.752 on the continuous index) and are significantly more likely to access Internet daily on their own devices relative to nonmissing women (0.730 versus 0.500), while differences on daily Internet use are not statistically significant. Thus, we are losing relatively advantaged women for whom the association between Internet exposure and partnership ideals may be even stronger, that is, our findings may be seen as conservative.

To make sure our results are not driven by missing data, we rerun estimates by means of multiple imputation, imputing missing data on education, caste, region, and religion. Supplementary Table A4 shows results from full specifications with and without multiple imputations. Results are essentially unchanged.

Instrumental-variable estimates

We conclude this study by providing instrumental-variable (IV) estimates on the relationship of interest, using the city-level and state-level IVs presented above (Table 5). We limit these analyses to one Internet predictor only, that is, accessing Internet daily through own device versus not. This is sensible considering our findings so far, yet it is also justified by the fact that the first stage does not hold for the other predictor, that is, city- and state-level variables do not predict strong enough variation in daily Internet use. To avoid any collinearity with download speed, the

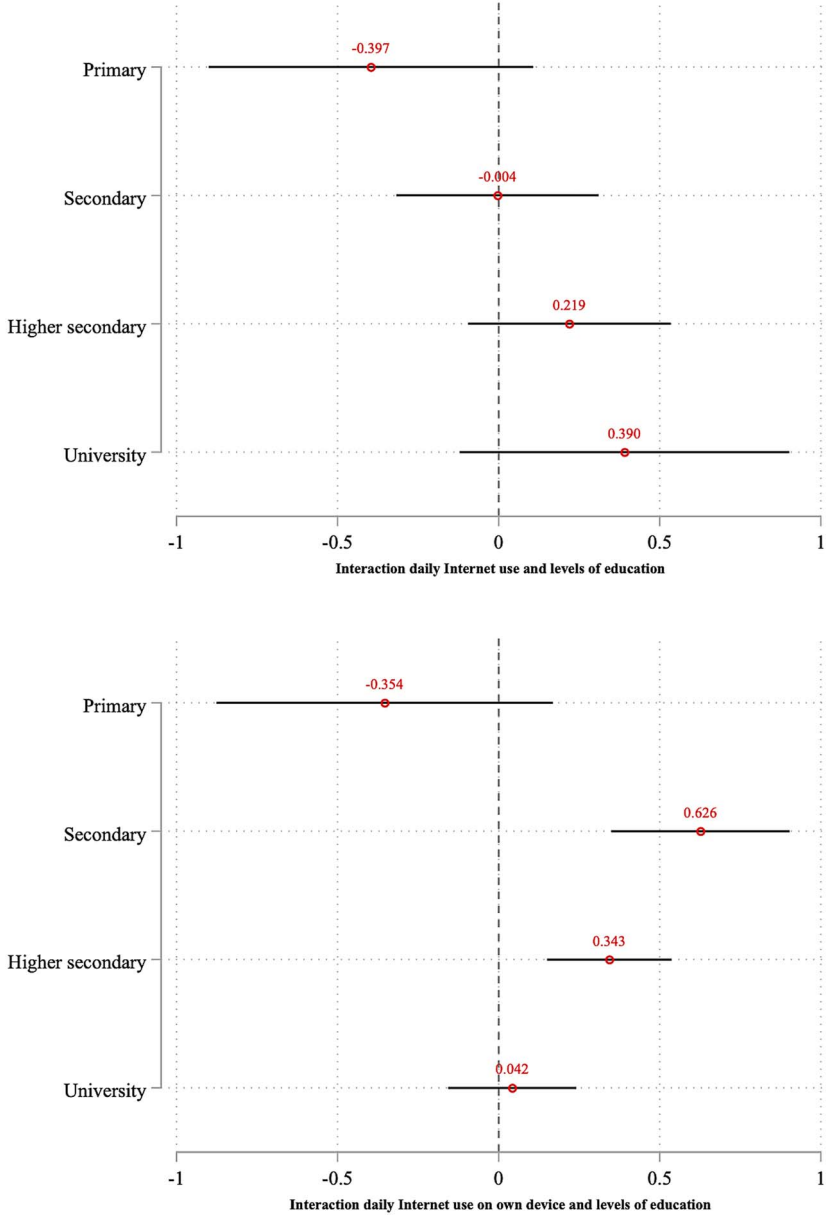

Figure 4. Interaction between Internet exposure and levels of education, linear combinations (weighted estimates; robust standard errors). Analytical sample of 1,798 women. 90 percent confidence intervals.

number of mobile networks (correlated 0.99) previously used as city-level control is omitted from the analyses.

The table reports first-stage (bottom panel) and second-stage (top panel) estimates. Starting from the former, associations are significant and in line with our theoretical expectations: the speed of download is positively associated with daily Internet use on own device, and deaths from lightning strikes are negatively associated with Internet exposure, likely due to poorer connectivity driven by damaged ground infrastructure. The two remain highly significant

Table 4. Attrition analyses.

	Obs.	Mean	(SD)	Min	Max
Nonmissing					
Partnership ideals index (score, 6 items)	1,798	2.752	(1.073)	0	6
Traditional (categorical, built from score)	1,798	0.118	(0.322)	0	1
Hybrid (categorical, built from score)	1,798	0.269	(0.443)	0	1
Modern (categorical, built from score)	1,798	0.613	(0.487)	0	1
Daily Internet use	1,798	0.910	(0.286)	0	1
Daily Internet use on own device	1,798	0.500	(0.500)	0	1
Missing on controls					
Partnership ideals index (score, 6 items)	153	3.098[c]	(1.042)	1	5
Traditional (categorical, built from score)	153	0.078[a]	(0.270)	0	1
Hybrid (categorical, built from score)	153	0.184[c]	(0.389)	0	1
Modern (categorical, built from score)	153	0.737[c]	(0.442)	0	1
Daily Internet use	153	0.922	(0.269)	0	1
Daily Internet use on own device	153	0.730[c]	(0.445)	0	1

Note: Weighted data. Stars reported in the bottom panel refer to *t*-tests for differences in means between nonmissing and missing women. Obs.: number of observations. [a]$P < .1$. [b]$P < .05$. [c]$P < .01$.

Table 5. IV estimates on analytical sample.

Estimated coefficient on daily Internet use through own device				
IV 2SLS		**Download bitrates (city-level)**	**Deaths from lightning strikes (state-level)**	**Combined**
Partnership ideals index	Coef.	1.385[b]	1.034[a]	1.163[b]
	(SE)	(0.637)	(0.542)	(0.518)
	Obs.	1,798	1,798	1,798
	Hansen J. (P-value)			0.642
		First-stage estimates		
Download bitrates	Coef.	0.094[c]		0.087[c]
	(SE)	(0.023)		(0.023)
Deaths from lightning strikes	Coef.		−0.029[c]	−0.026[c]
	(SE)		(0.007)	(0.007)
All other controls		Yes	Yes	Yes
F stat.		22.9	16.9	22.4
Observations		1,798	1,798	1,798

Note: Weighted data. Robust standard errors in parentheses. All controls from full specification included in both first and second stage (except number of mobile networks which is omitted altogether). [a]$P < .1$. [b]$P < .05$. [c]$P < .01$.

when used in a joint model, with an F statistic above conventional thresholds for significance (F = 22.4). Moving to the second stage, daily Internet exposure through own device is positively and significantly associated with modern partnership ideals irrespective of specification. Most importantly, specifications with both city- and state-level IVs suggest that there is not enough evidence to reject the null hypothesis that the instruments are orthogonal to the second-stage disturbance term, strengthening confidence in the validity of the chosen instruments. The combined model reveals that using Internet daily through own device is associated with an increase in the partnership index by 1.16 units (corresponding to an increase of about 44.8 percent on the mean). This effect size is close to six times as big as the OLS one, likely due to omitted variable biasing OLS estimates downward, alongside concerns related to measurement errors and validity of the instruments. While this finding suggests that the association under investigation

may be deemed causal, it is unclear who the Local Average Treatment Effect (LATE) is capturing; thus, we defer more conclusive causal statements to future experimental studies.

Selectivity of the sample

By sampling only unmarried urban women in partnerships, our sample may capture those who may be "selected on modernity," thus not well representing the whole universe of unmarried women. To address this concern, we conducted multiple robustness checks on our own sample, as well as on the NFHS 2019–2021, which captures both unmarried and married women in urban and rural areas. Starting from our sample, we show in Supplementary Table A3 (panel a) that women who have been in unmarried relationships for a longer time do not exhibit differences in terms of mean partnership index. This test is motivated by the logic that longer unmarried relationships may be considered more modern. We strengthen this evidence by re-running the main analyses presented in Table 3 on a subset of the sample limited to young women (age 25 or less) in recent relationships (duration 5 years of less). Theoretically, these women are the most similar to the broader universe of unmarried unpartnered women whom we cannot observe. Supplementary Table A5 shows analogous results in terms of the association between Internet exposure and partnership ideals. If anything, results are even stronger.

Moving to the NFHS 2019–2021, we adopted a similar, strategy creating a modern ideals index (ranging from 0 to 4), assessing variation in the index between rural and urban areas and between married and unmarried women, and exploring the association between Internet exposure and the index. Two differences remain: first, the NFHS is primarily focused on fertility, contraception, and reproductive health; hence, the outcome is more fertility-related and less family related. Details on the construction of the index are provided in Supplementary Appendix. Second, the NFHS does not provide information on daily Internet use, nor on own versus shared device. We thus used as main predictor a variable measuring "having *ever* used the Internet," controlling for owning a mobile phone, as mobile Internet is the most common form of accessing the Internet. Supplementary Table A6 shows variation in the ideals index by subgroup, showing that rural areas are more traditional, yet married women are more modern than unmarried ones. Filtering the universe of unmarried women, there is no variation in the index, not even in the group of unmarried women who are likely more traditional, that is, those who have never had sexual intercourse. Supplementary Table A7 reports regression results. In the overall sample, Internet use only predicts modern ideals in urban areas. In the unmarried sample, however, results hold strong in both rural and urban areas, as well as across subgroups, including among young (age 25 or less) urban women who have never had sex. We see this latter group of women as the one we are potentially missing in our own survey. Overall, complementary findings confirm that our sample delivers reliable, robust, and non-selected estimates of the relationship of interest.

Potential mechanisms

While our survey does not provide information on the media content accessed through the Internet, we collected information on whether women hold online accounts, such as emails, social media, and dating apps, as well as whether they have ever used matrimonial sites. Table 6 replicates analyses presented in Table 3, adding ownership of online accounts. Panel b confirms the association between using Internet daily on a personal device and modern partnership ideals, with coefficients that are even higher in magnitude. Among the online accounts considered, only emails and matrimonial sites significantly predict modern ideals. As both types of accounts are far less prevalent than social media (54.8 percent for emails, 5.37 percent for matrimonial sites, and 88.5 percent for social media), we see this finding as strengthening the idea that young, highly educated professionals are those who are benefiting most from Internet exposure. Supplementary Table A8 describing variation in online accounts by education confirms that these accounts are primarily held by individuals with higher secondary or university education, aligning with Vikram (2024). As these accounts do not reduce the explanatory power of Internet exposure (rather, the

opposite), these variables do not operate as relevant mechanisms, calling for additional research exploring the actual content accessed through digital sources.

Conclusions and discussion

Building on the premise that Internet diffusion may shape family-related outcomes, such as views and opinions regarding different aspects of family, by means of exposure through globalized cultural scripts, this study has advanced scholarship in family sociology and digital demography by showing that this is indeed the case among unmarried women in urban India. Leveraging a new data source including detailed questions on partnership ideals as well as information on Internet exposure, we found that recurrent use of the Internet is associated with a significant increase in modern partnership ideals. Moreover, we showed that accessing the Internet independently—vis-à-vis through a shared device—is what matters most, and that results are stronger among high-educated respondents, particularly women with secondary education or higher.

Our findings are new in the context of India. While previous scholarship on LMICs had explored implications of the "digital revolution" for outcomes such as fertility, divorce, marriage, and contraceptive use (Pesando et al. 2021; Rotondi et al. 2020; Toffolutti et al. 2020), this is—to the best of our knowledge—the first study to do so in India, currently the biggest demographic player of the globe. Assessing the implications of the digital revolution for Indian women is an essential endeavor for multiple reasons, including the recent massive increase in Internet penetration in the country, the persistent—yet narrowing—digital gender divide that still puts women at a significant disadvantage, especially when it comes to platform use, social media access, and digital skills (Galpaya et al. 2023), and the extensive sociological debate on the role of modernization forces in shaping family dynamics in India (Allendorf and Thornton 2015; Breton 2019).

Our findings corroborate the idea that modernization cannot be observed across all family domains and that respondents often showcase modern ideals in some domains (e.g., importance of caste), yet not in others (e.g., parental approval). As such, our findings align with previous literature suggesting that individuals are moving towards hybridized family arrangements and mate-selection processes (Allendorf and Pandian 2016; Sarkar and Rizzi 2024). Our results also enrich this scholarship by showing that digital technologies hold an important role that may have been neglected in previous discussions on family change in India. Focusing on partnership ideals provides yet another novel contribution when studying modernization processes in India, given their potentially more reactive nature to globalized scripts vis-à-vis actual behavior (Varriale et al. 2022; Pierotti 2013). Open questions remain on the extent to which these "modernizing" ideals will lead to changes in partnership behavior or family structures, such as parental authority.

Our findings are also policy-relevant in at least two domains. The first is to ensure that individuals can access technology independently of potential partners, peers, or other household members. Independent access to technology is more strongly associated with modern partnership ideals relative to shared access, likely due to the ability to regularly access personalized content, as well as broader control, agency, and empowerment tied to—as well as independent of—technology use. As such, policy efforts toward lowering the cost of technology, as well as the cost of data plans enabling Internet access, hold huge potential to the extent that they allow more and more individuals to *independently* access globalized cultural scripts and discourses they can select themselves autonomously. The second policy area refers to *first-level* (access) and *second-level* (skills) digital divides. Albeit indirectly, our results on shared versus own device use, the stronger results among educated women, and the neat social-class gradients in Internet use/possession of online accounts provide evidence in support of both, calling for policymakers to complement cost-related efforts with investments in digital-skill training since early ages, especially among women.

As the first of its kind, this study has some limitations that pave the way for additional research on the topic. First is the nature of the data. Although rich in terms of variables, the dataset is limited to unmarried partnered women in urban areas. We reweighted the data to make estimates closer to nationally representative and assessed the selectivity of this sample,

Table 6. Analyses predicting modern partnership ideals, controlling for possessing online accounts.

Partnership ideals index (score, 6 items)	Daily Internet vs. not					Daily Internet on own device vs. not				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Internet exposure	0.010	0.218	0.102	0.096	0.150	0.203[b]	0.206[b]	0.195[b]	0.210[c]	0.239[c]
	(0.131)	(0.167)	(0.123)	(0.123)	(0.164)	(0.080)	(0.086)	(0.083)	(0.080)	(0.081)
Email	0.237[b]				0.232[b]	0.245[b]				0.259[b]
	(0.102)				(0.102)	(0.098)				(0.101)
Social media (Facebook, Instagram, TikTok, etc.)		−0.166			−0.201		−0.087			−0.191
		(0.191)			(0.183)		(0.142)			(0.144)
Dating apps (Tinder, Bumble, etc.)			−0.095		−0.192			−0.086		−0.195
			(0.170)		(0.172)			(0.169)		(0.172)
Matrimonial sites (Jeevansathi.com, etc.)				0.321[a]	0.303				0.364[a]	0.346[a]
				(0.193)	(0.193)				(0.198)	(0.199)
All controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	3.942[c]	4.058[c]	4.053[c]	4.033[c]	4.005[c]	4.131[c]	4.334[c]	4.293[c]	4.284[c]	4.292[c]
	(0.403)	(0.402)	(0.405)	(0.400)	(0.399)	(0.404)	(0.403)	(0.397)	(0.394)	(0.399)
Observations	1,768	1,768	1,768	1,768	1,768	1,768	1,768	1,768	1,768	1,768

Note: Weighted data. All controls included. Robust standard errors in parentheses. [a]$P < .1$. [b]$P < .05$. [c]$P < .01$.

including by comparing estimates to the NFHS 2019–2021 and showing that results similarly hold among married women, unmarried women in rural areas, and the broader universe of unmarried women, yet replicating these analyses on other representative samples may provide additional insights. Second, scholars and policymakers interested in the topic might worry that, alongside observed factors omitted from our models, unobserved factors (e.g., personality differences) might influence both Internet use and partnership ideals, raising concerns about the causal interpretation of the estimates. Despite concerns about the magnitude of the IV estimate, the sign of the estimated coefficients is in line with OLS results, corroborating the idea of a relationship flowing from Internet exposure to modern partnership ideals, rather than the opposite. This directionality also aligns with growing qualitative work on the topic (Kashyap 2020; Netting 2010). The consistency of the findings hints at the causal nature of the estimates, yet we shy away from thorough discussions of causality. Still, experimental approaches to these questions could further strengthen our findings. Lastly, given our inability to identify mechanisms, we stress the need for additional work capturing more specific nuances of *how* women use the technology and the kind of media content they access through it.

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Author contributions

L.M.P. designed the study, performed research, analyzed data, and wrote the paper. K.S. and S.K. provided support for data cleaning, text edit, and draft revision.

Supplementary material

Supplementary material is available at *Social Forces* online.

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Data availability

The core survey data come from primary data collection conducted by our team. As such, data are not publicly available but can be shared upon request. Ancillary data sources are detailed in Supplementary Appendix.

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