



Religion and Contraceptive Use in Kazakhstan

A Study of Mediating Mechanisms

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Abstract

A resurgence of religiosity has been observed in post-Soviet Kazakhstan. However, since the late 1990s, there has been a lack of research on the impact of religion on contraceptive use and the differences in such use across religious groups in the country and Central Asia. The two major religious groups, Islam and Christianity, have closely aligned with the country's two main ethnicities, Kazakhs and Russians, which have shown significant variations in fertility development and stages of demographic transition. This study utilizes Kazakhstan's Generations and Gender Survey 2020 to examine the variations in contraceptive use among different religious affiliations and explore the potential factors behind these differences. Causal mediation analysis is employed separately for women and men. The findings reveal that Muslims exhibit lower contraceptive use compared to Christians. While higher demand for children, increased religiosity, and socioeconomic factors partially explain these differences, existing theories fail to fully account for the diverse patterns of family planning observed within the same national context.

Keywords: contraceptive use, religion, religiosity, mediation, Kazakhstan, GGS

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Introduction

Empirical evidence shows that religion continues to be an important factor in shaping women's and couples' contraceptive use in both less developed and more developed countries (Moulasha & Rama Rao, 1999; Barrett et al., 2014; Pinter et al., 2016; Geist & Cole, 2020). Existing theories explain religious differentials in contraceptive use by differences in theological doctrines, different socioeconomic and demographic characteristics of religious people, interaction between religious orientations and socioeconomic characteristics, or the minority status of one of the religious groups (Goldscheider, 1971; Chamie, 1981). However, explanations grounded in theological differences and the minority status hypothesis can rarely be linked to empirical evidence, apart from simply attributing differentials in outcomes to differences in doctrines or belonging to a minority status. Empirical support for both characteristics and interaction hypotheses is also weak. The mechanisms by which religious affiliation influences contraceptive use have not been thoroughly examined, and this exploration could offer vital insights for policy interventions and programmatic decisions by developmental organizations such as the United Nations Population Fund (UNFPA), which aim to enhance contraceptive use rates in developing countries.

By using Kazakhstan as a case study – a post-Soviet country – I will evaluate various explanations for religious disparities in contraceptive use and investigate the mechanisms through which affiliation with a specific religion influences contraceptive use. Kazakhstan is an interesting case to study religious differentials in contraceptive use and the potential mechanisms behind the association because it has two major ethnic and religious groups – ethnic Kazakhs (Muslims) and ethnic Russians (Christians) – that are at different stages in the demographic transition (Kan, 2022). Hence, we can examine whether variations in fertility

intentions among different ethnic-religious groups constitute the primary factor contributing to disparities in contraceptive use.

On the other hand, different levels of religiosity between Muslims and Christians may also contribute to these disparities. Similarly to many other Post-Soviet countries, Kazakhstan experienced state-supported restrictions on religious activities during the Soviet era.

However, there has been a recent resurgence of religiosity, particularly among Muslims, viewed as a means of self-identification and nation-building by ethnic Kazakhs, to distinguish themselves from the long-lasting dominance of Russian culture (Telebaev, 2003; Aydingün, 2007; Yerekesheva, 2020). Furthermore, the minority status of ethnic Russians and Russian-speaking people in Kazakhstan may have an impact on these minorities' reproductive behaviour (Agadjanian, 1999, 2002; Agadjanian et al., 2008; 2013). Socioeconomic factors, including education, employment, and wealth status, are also worthy of study, as the composition of the two groups may vary. This is particularly relevant because membership in specific ethnic or religious groups can influence access to education and participation in the labour force, indirectly influencing reproductive behaviour. These potential pathways are expected to explain much of the variation in contraceptive use between Muslims and Christians.

This study employs the *Ready–Willing–Able* framework (Coale, 1973; Lesthaeghe & Vanderhoeft, 2001) to define different pathways and mechanisms for how affiliation to a particular religion can influence contraceptive use. Causal mediation analysis will be used to differentiate the total, direct, and mediated effect of affiliation to a particular religion on contraceptive use. Using the most recent data from the Kazakhstan Generations and Gender Survey (GGS) of 2020, the current study assesses the effect of affiliation to a particular religion (Islam or Christianity) on contraceptive use (any method) by considering potential

mediators such as fertility demand, religiosity, modern values, and socioeconomic indicators. The analysis accounts for gender differences by studying women and men separately.

To the best of my knowledge, this study is the first to investigate the mechanisms underlying the relationship between the affiliation to a specific religion and contraceptive use.

Furthermore, it offers valuable insights not only for Central Asia and other post-Soviet countries but also for other middle-income countries facing similar demographic developments.

Theoretical framework

The relationship between religion and fertility control has been explained through several hypotheses, including the particularized theology hypothesis, the characteristics hypothesis, the minority status hypothesis, and the interaction hypothesis.

The particularized theology hypothesis suggests that differentials in fertility control are driven by the differences in religious doctrines and prescriptions regarding marriage, contraception and abortion (Goldscheider, 1971). In contrast to Jewish and Christian teachings, which consistently prohibit contraception, Islamic law, irrespective of the school of thought, generally permits contraception within the context of marriage. There is no explicit prohibition against family planning in the Quran or Hadiths (Musallam, 1981; Najimudeen, 2020). Unlike the Roman Catholic Church, in Islam there is no single authority to establish official religious doctrine on contemporary social issues, and Islamic scholars derive their positions primarily from the Quran and the Prophet's tradition, and secondarily from early Islamic legal formulations and analogy (Wynn et al., 2005). When the Quran and Sunnah are silent on a particular issue, as in the case of contraception, Islamic positions are derived through interpretation. Most Islamic scholars and schools of Islamic law permit the use of modern forms of contraception, as there is no prohibition against planning or limiting

childbirth in the Quran or in the reported utterances of the Prophet (Sheikh Jad al-Haq, as cited in Wynn et al., 2005). The Hanafi school of Islam even permits elective abortion before ensoulment, which is believed to occur at 120 days after implantation, while scholars of other schools and sub-schools opine that ensoulment takes place at other points (Wynn et al., 2005).

According to Orthodox Christianity, human life is sacred from the moment of conception, and procreation through marriage is a priority. Therefore, the Russian Orthodox Church strongly condemns the use of contraceptives for the purpose of birth control, as it goes against the fundamental purpose of human sexuality and marriage (Mikirtichan et al., 2021). The Church considers contraception to be immoral, especially when it encourages promiscuity, and its use on a continuous basis to prevent childbirth without medical indications is a sin (van den Bercken, 2002). Some forms of contraception, such as those with an abortive effect, are considered sinful and unacceptable, as they interrupt an already-conceived life at the very first stage and are no different from deliberate abortion (Koios, 2009). The Russian Orthodox Church considers abortion to be a form of murder and strongly opposes it (Mikirtichan et al., 2021). The Church acknowledges that there may be circumstances in which a woman's life is in direct danger if her pregnancy continues, in which case a more lenient pastoral practice is recommended (Mikirtichan et al., 2021; Tarabrin, 2022).

Based on a comparison of theological doctrines and perspectives on contraceptive use, it would be reasonable to expect that Muslims would be more accepting of contraceptive use than Christians.

The characteristics hypothesis (Goldscheider, 1971) suggests that the difference in fertility control across religious groups is due to different demographic and socioeconomic

characteristics. Theoretically, once you control for these characteristics, the differentials would be negligible. The characteristics hypothesis and the particularized theology hypothesis are not seen as mutually exclusive, so if there are differentials after controlling for socioeconomic and demographic characteristics, the remaining difference can be associated with differences in religious ideology regarding birth control (ibid.)

According to the minority status hypothesis (Goldscheider & Uhlenberg, 1969), fertility differentials exist because minority ethnic or religious groups tend to adjust their fertility to maximize their security and/or social mobility. Minority adjustment could work in both directions: a minority group can decrease fertility to maximize social mobility, or increase fertility to grow their population and deal with insecurities related to the changed status of becoming a minority.

The minority status hypothesis and the particularized theology hypothesis are difficult to distinguish empirically, and differentials can be attributed to either doctrinal differences or the minority status of a group, if it is a minority. In contrast, the characteristics hypothesis has widely been used because it is easy to test empirically by controlling for demographic and socioeconomic characteristics.

Chamie (1981) extensively reviewed these three hypotheses related to fertility differentials based on case studies, but found discrepancies that prevented him from confirming any of them. Instead, he proposed a modified hypothesis called the “interaction hypothesis”, which considers the interaction between religious affiliation and socioeconomic status. Chamie suggests that fertility differentials are more evident in lower socioeconomic status groups, while higher socioeconomic status groups, regardless of religious affiliation, tend to converge in their use of fertility control.

If we look more broadly at explanations of contraceptive use, we can turn to the *Ready–Willing–Able framework*, which initially was formed by Coale (1973) and further formulated into a framework by Lesthaeghe and Vanderhoeft (2001) (for other applications of this framework to contemporary contraceptive research, see Mannan & Beaujot, 2006; Dereuddre et al., 2016; Svallfors & Billingsley, 2019).

The three main mechanisms of acceptance of new behaviour (e.g. contraceptive use) are *readiness*, *willingness*, and *ability*. *Readiness* refers to the individual rational choice of having or not having children driven by economic reasons when lower fertility is perceived as more advantageous by individuals, propelling them to change their fertility behaviour (Coale, 1973; Lesthaeghe & Vanderhoeft, 2001). Differences between affiliates of different religions may be related to different levels of urbanization and industrialization among them. The demand for children may thus be different across different religious groups. This also relates to the level of individualism and whether a person's decision truly is driven by cost-benefit calculus or by the influence of others. Different religious groups may have different family/kinship ties that may differentiate their individual decision-making. Fertility intentions are seen as a proximate determinant of fertility behaviour (Balbo et al., 2013; Dereuddre et al., 2016) and as a mediator between an individual's perceived costs of having or not having children, or using or not using contraception, and their actual behaviour (childbearing or using contraception).

Willingness refers to the normative and legitimate acceptability of fertility control and whether individuals are willing to overcome traditional beliefs and codes of conduct by employing it (Coale, 1973; Lesthaeghe & Vanderhoeft, 2001). This makes religious affiliation itself a part of the willingness component, but it can be further measured by different other components. We may look at religious teachings, not only at the narrow vision concerning the permissibility of contraceptive use, but also more broadly at teachings related

to gender roles and family life that may have linkages to fertility outcomes (McQuillan, 2004). Thus, attitudes regarding the importance of familial relations (Dereuddre et al., 2016) may function as a sub-component of the link between religious affiliation and contraceptive use. In addition, as pointed out by McQuillan (2004), the stronger the attachment to the religious community, the higher the potential influence of religion on demographic outcomes. This means that the level of religiosity among the followers of different religious groups should be considered when assessing the effect of religious affiliation on contraceptive use.

The last factor of the framework, *ability*, refers to contraception being available and accessible, giving people the means to use it. At the individual level within the same context, this can refer to people's socioeconomic status, their knowledge of contraceptive techniques (education), and their means to access it (employment and income).

The Ready–Willing–Able framework can be applied to assess how the relationship between contraceptive use and affiliation to a specific religion may be mediated through different factors: readiness (fertility intentions), willingness (level of religiosity and modern values), and ability (education, employment, and wealth status). A more detailed description of the application of the framework is given in the section on expectations.

Empirical findings in other contexts

Religion continues to play a substantial role in influencing contraceptive use in various societies today. Empirical research has provided insights into the contextual dependence of this relationship, shedding light on how religious beliefs and teachings affect contraceptive practices in different countries and contexts.

A study comparing contraceptive practices of Protestants and Catholics in the United States revealed distinct patterns (Goldscheider & Mosher, 1991). Protestants showed higher rates of female sterilization, while Catholics exhibited higher usage of contraceptive pills and

condoms. The study also emphasized the importance of considering the combined effects of religion, race, and ethnicity, as religiosity has varying implications for different ethnic and racial categories within religious groups. Religious affiliation and religiosity are interconnected with contraceptive use through factors such as decisions about sexual activity, family roles, and the influence of peers and communities.

In a study in Poland, despite restrictions on family planning services, the use of modern contraceptives among the sampled population increased significantly from 19% in 1991 to 56% in 2007 (Mishtal & Dannefer, 2010). While most respondents (94.2%) identified as Catholic, the influence of Catholicism on contraceptive decisions was relatively limited. About 79% of the participants reported that the Church had little or no impact on their reproductive choices. Women in the study described reconciling their reproductive practices with Catholicism by utilizing religious elements to support contraceptive use, prioritizing family responsibilities and financial considerations over Church prohibitions, and challenging the Church's credibility in matters of family planning.

In the context of France, a study by Moreau et al. (2013) found that the regular practice of religion was associated with a later sexual debut, regardless of religious affiliation. Among participants below 30 years of age, religious individuals were less likely to have used condoms during their first sexual intercourse and were also less likely to have used any form of contraception. Sexually experienced adolescents who reported regular religious practice had a significantly lower likelihood of using contraception compared to their counterparts who did not practice religion regularly. The findings highlight the complex relationship between religiosity and sexual behaviours, which varies by gender, religious affiliation, and across the life course. For Catholics, regular religious practice was associated with a 50% decrease in the odds of using highly effective contraceptive methods, while it had no effect among Muslims.

Studies conducted in Nigeria and Tanzania also reveal the varying impact of religion on contraceptive use. In Nigeria, Obasohan (2015) found that contraceptive use was highest among Christian women, while Muslim women had the lowest usage rates. The effects of religion on contraceptive use were predominantly influenced by the religious environment within communities, with contraceptive use tending to be highest in religiously mixed areas (Agadjanian et al., 2009). However, the optimal religious makeup for contraceptive use varied between Nigeria and Tanzania due to historical and political configurations of religious expressions in each country. In Tanzania, Muslim women eventually surpassed Christians in contraceptive use, although other group characteristics explained the differences. Wusu (2015) emphasized the significant increase in awareness of modern contraceptives in Nigeria over the past two decades, but also highlighted persistently high levels of non-use, particularly among women adhering to Islam and traditional religions.

Studies conducted in Pakistan and India offer further insights into the influence of religion on contraceptive practices. Mahmood and Ringheim (1996) identified factors that influence fertility regulation in Pakistan, including communication between spouses, religious beliefs, female autonomy, son preference, and access to family planning services. In India, Leon (2011) found that women's overall domestic power was associated with contraceptive use among Hindus and Buddhists but not among Muslims, Christians, or Sikhs. Moulasha and Rama Rao (1999) discovered substantial differences in contraceptive knowledge among religious groups in India, with Muslim women having higher knowledge and usage rates compared to Hindu women. Ghosh and Chattopadhyay (2017) examined the Bengali-speaking communities in the Indian subcontinent and found evidence of latent son preference influencing modern contraceptive adoption among Hindus and Muslims in eastern India, while in Bangladesh, religious identity played a dominant role in shaping contraceptive behaviour.

These studies highlight the complex interplay between religion, cultural norms, gender dynamics, and access to family planning services in influencing contraceptive practices across different religious groups and regions. The impact of religion on contraceptive use is contextually dependent, and understanding this relationship requires considering broader cultural, social, and economic factors that interact with religious beliefs and teachings. Religious affiliation, adherence to traditional gender roles, access to reproductive health services within religious institutions, and the broader sociocultural context all contribute to shaping the relationship between religion and contraceptive use. By considering these contextual factors, a more nuanced understanding of how religion influences contraceptive behaviours in different societies can be gained.

The context of Kazakhstan

Kazakhstan became a Russian majority country by the late 1930s, and the Kazakh language and culture were highly discriminated against during Soviet times. The local language and culture were neglected and Russification of the population was enforced. The interplay between cultures and the marginalization of the local language and culture during the Soviet period laid the foundation for a resurgence of interest in Kazakh roots and traditions following the collapse of the Soviet Union.

The Soviet regime also had a unique political ideology, as it was anti-clerical and promoted “a radical atheistic worldview” (Froese, 2005, p.475). In an attempt to undermine the presence of religion in Central Asia, the regime focused on eradicating religious symbols. Both mosques and churches were destroyed in Kazakhstan in the mid-20th century. The Soviets eliminated or banned numerous religious rituals and dismantled the institutional structures associated with them. However, it seems that they were unable to entirely convert

people to atheism; instead, they compelled individuals to conceal their religious beliefs and practice within highly private settings.

Islam

Numerous rituals and symbols of Islamic adherence were practiced in private settings, enabling individuals to uphold their religious affiliations during the era of anti-clerical ideology. (Aydingün, 2007). Instead of openly staging the ceremonies, they were conducted in closed settings, being passed down from older to younger generations. Many ceremonies eventually became more culturally bound and a representation of being a Kazakh during the Soviet time, rather than having a truly religious connotation.

Additionally, it is worth noting that Kazakhs have traditionally adhered to the Hanafi School of Islam, known for its more liberal tenets and adaptability to local contexts. As a result, this school facilitated a smoother integration into the daily lives of nomadic tribes in Central Asia by not demanding the complete abandonment of earlier rituals, such as ancestor worship, which are prohibited in more conservative and radical schools of Islam. Even in modern times, the practice of ancestor worship has been preserved. The liberal nature of the Hanafi School allowed local Muslims to adapt to the Soviet regime and gain profits from industrialization and modernization programmes, while at the same time preserving their more traditional family beliefs. Furthermore, according to some local scholars, during the communist era, Muslims in Central Asia existed in ‘two dimensions’: publicly, they embraced Soviet attitudes, values, and loyalties, while privately, they maintained a predominantly traditional outlook shaped by Islamic customs and preconceptions (Froese, 2005). In addition, the transmission of these local customs and rituals was facilitated by the patriarchal structure of Kazakh families, which remained unchanged despite the Soviet regime's attempts to modify it.

Various studies have shown an increase in religiosity, particularly among Muslims, following Kazakhstan's independence in 1991 (Telebaev, 2003; Aydingün, 2007; Yerekesheva, 2020). This rise in religiosity and the resurgence of traditionalism in the country can be attributed to a range of factors. It can be argued that this occurred as a result of the repression and discrimination against Kazakh culture and Islam during the Soviet period, as previously described. An alternative explanation could be that a void was created once communist ideology was eradicated. The country underwent a significant economic crisis during the transition to a market economy, coupled with the redistribution of property through a process known as 'privatization' of previously state-owned industries. The 1990s were also marked by widespread marginalization as numerous industries and professions ceased to exist following the collapse of the centralized Soviet economy. There was a lack of employment opportunities and significant wage arrears, which resulted in an unprecedented increase in criminal activity during the 1990s, unlike any period before or since. The people lost the previous certainty of how the State and society operated and what they could expect. The basic social protection that was provided by the Soviet state disappeared and it was not certain when the new elites and the new government could provide it. It was unclear which ideology they would adhere to. In such a state of uncertainty, returning to one's cultural and religious 'roots' could be viewed as a means of coping with the challenges of criminal activities and low living standards.

During these uncertain times, Kazakhstani society sought a guiding framework to navigate through the challenges. As Geertz (1964) highlighted, culture and religion serve as ideologies that provide "mechanisms for perceiving, understanding, judging, and manipulating the world" (p. 199). Kazakhs sought an ideology to legitimize their independent state and distinguish themselves from the significant Russian population. Religion and the revival of traditionalism have frequently been employed as tools for nation-building. In the context of

Kazakhs in Kazakhstan, a combination of nationalism, reconstructed traditionalism, and growing religiosity emerged as responses to the period of gaining independence, the emergence of new ruling elites, an inexperienced government, and the proliferation of mass communication.

It is worth noting that Kazakhs (Muslims) maintained and adhered to strict family-kin groupings even during the Soviet period. Particularly in the context of family formation, they observed a clear differentiation by hordes (with three main hordes or ‘zhuz’ in Kazakh), followed by identification of tribes within a horde, and further identification of specific clans or kin (‘ruu’ in Kazakh) within a tribe. This family-kin grouping continues to be observed in the modern era, distinguishing them from followers of Christianity in Kazakhstan who are less influenced by such familial ties.

Christianity

Christians were mainly represented by the Russian Orthodox Church and also experienced periods of persecution both in Central Asia and in other parts of the Soviet Union. The Russian Orthodox Church was the first to be persecuted, but also the first to start cooperating with the Soviet state during World War II, with increasing reliance on Russian nationalism (Bociurkiw, 1959). Central Asia saw the emergence of new settlements as a result of agricultural and industrialization initiatives, which were accompanied by more lenient rules regarding religious practices. Additionally, the population of Christian communities in the region grew due to the forced relocation of various ethnic and religious groups (Peyrouse, 2008).

The number of religious institutions decreased considerably during the Soviet period, and gaining independence brought a revival of not only Islam but also Christianity. The period of ideological instability in the newly formed state in the 1990s and becoming a minority in

Kazakhstan led many ethnic Russians to return to religion as a source of ethnic identification. Hence, several scholars highlight a resurgence, particularly of the Orthodox denomination within Christianity, in Kazakhstan following the dissolution of the Soviet Union (Zhapekova et al., 2018; Ganje, 2019). Furthermore, despite being a secular state, Kazakhstan acknowledges the prominent status of Sunni Islam and Orthodox Christianity as the two primary denominations within the country. This is evident in the designation of Orthodox Christmas and the festival of Kurban-ait (Eid al-Adha, "the Feast of the Sacrifice", an Islamic holiday) as non-working days, allowing people to observe the respective religious rituals and customs. (Erekesheva, 2012).

Recent studies comparing religiosity between followers of Islam and Christianity in Kazakhstan found some differences. A survey conducted among urban residents in Kazakhstan revealed that approximately 12% of self-identified Orthodox Christian women and 5% of men reported being active believers, whereas the corresponding figures for both women and men practicing Islam were around 42% (Alimbekova et al., 2022). Another study (Burova et al., 2020) demonstrated that 40% of Muslims and 20% of Orthodox Christians expressed support for an increased influence of religion. Similarly, the study revealed disparities in the endorsement and adherence to secular norms, with 30.5% of Muslim respondents compared to 62.2% of Orthodox Christian respondents.

Current religious composition

According to the latest Kazakhstan National Census from 2021 (Statistics Committee, 2022), 69% of the population of Kazakhstan belong to Islam, while Christians (mainly Russian Orthodox) constitute 17%. Ethnic Kazakhs and other Central Asian ethnicities, such as Uzbeks, Kyrgyz, Tajiks, and others, predominantly follow Islam. On the other hand, ethnic Russians, Belarusians, Ukrainians, and other European ethnicities tend to follow Christianity.

The proportion of Muslims and Christians in the country closely correlates with the proportion of ethnic Kazakhs (70.4%) and ethnic Russians (15.5%). Among the other ethnicities, there are Uzbeks, Uighurs, Dungans, and Tatars, who are predominantly Muslims, as well as Ukrainians, Germans, Belarusians, Poles, and Koreans, who are predominantly Christians.

Reproductive behaviour

Kazakhs have long had a higher total fertility rate (TFR) than Russians, both during the Soviet era (Urlanis, 1974; Mazur, 1976) and after gaining independence (Agadjanian et al., 2013; Spoorenberg, 2013, 2015). During the significant influx of ethnic Russians to Kazakhstan in the mid-1960s, ethnic Kazakhs were in the pre-transitional stage of the demographic transition (Urlanis, 1974; Mazur, 1976), while ethnic Russians were assumed to have completed the first demographic transition by that time (Zakharov, 2008).

Only a few studies in Kazakhstan have focused on religion as the primary independent variable concerning reproductive behaviour, whereas several studies have examined ethnic differentials. Several studies have thus assessed ethnic differentials between Kazakhs and Russians in fertility intentions and preferences as well as parity progressions (Agadjanian, 1999; Agadjanian et al., 2008, 2013; Spoorenberg 2013, 2015; Kan, 2022). Kan (2022) found a sustained fertility increase across all birth orders during the 2000s that is shared across both main ethnicities in the country. Some indication of fertility postponement was observed among ethnic Russian women in the early 21st century. In contrast, no indication of a continuous trend towards a postponement of becoming a mother was found among ethnic Kazakh women. Moreover, Kan (2022) found increasing rates for all higher-order births for ethnic Kazakh women, which was associated with a development contrary to what would be

expected from the classical demographic transition theory, solidifying the difference in fertility rates between Russians and Kazakhs.

Most studies on differentials in contraceptive use and abortions in Kazakhstan refer to the 1990s. Scholars found that abortions were more widespread among Russians than Kazakhs in the 1990s (Mahler, 1997; Westoff, 2000; Agadjanian, 2002). Furthermore, Westoff (2000) found separate effects of both religion and ethnicity on abortion rates in Kazakhstan.

Agadjanian (2002) found that contraceptive prevalence rose for both married Russian women (from 65 to 70%) and married Kazakh women (from 54 to 64%) between 1995 and 1999. He also pointed out to the use of a combination of contraception and abortion to regulate fertility by Kazakhstani women. In neighbouring Uzbekistan, Barrett (2007) found a negative association between ever using contraception and Muslim religion in a study of urban Muslim and Christian women. Meanwhile, Buckley and colleagues (2008) found that being of non-Kazakh ethnicity increased the odds of accessing family planning information among young Kazakhstani women.

Access to contraception and family planning indicators

Access to contraception in Kazakhstan faces significant challenges, according to the Kazakhstan Family Planning National Framework Program 2017–2021 (UNFPA, 2016). While the government guarantees the delivery of family planning services and does not restrict the rights of people in choosing a contraceptive method, it does not provide contraceptives. Contraceptives are not included in the list of free-of-charge services for vulnerable groups or the guaranteed healthcare benefit package. Although some local budgets may allow for the provision of free contraceptives, the availability of resources and the lack of monitoring and data make it difficult to assess. The survey of the Kazakh Association of Sexual and Reproductive Health from 2011 (ibid.) identified the high price of contraceptives

as a significant barrier for young people. The private pharmaceutical market with no government regulation results in Kazakhstan having some of the most expensive contraceptives in ex-Soviet countries. Moreover, the UNFPA's analysis in 2014 found that access to contraception was limited for rural residents, adolescents, youths from disadvantaged families, labour migrants, disabled people, and groups with behavioural risk of HIV transmission due to affordability and availability issues (ibid.).

The contraceptive prevalence rate for women aged 15–49 in Kazakhstan is 43% (UNFPA, 2022). Furthermore, the abortion culture that used to be prevalent during the Soviet times is still present in the country. Kazakhstan is still in the top list of countries with a high abortion rate. In 2015–2019, there were a total of 696,000 pregnancies annually in Kazakhstan, of which 259,000 were unintended and 212,000 ended in abortion (Guttmacher Institute, 2022).

Expectations

We cannot test the particularized theology or minority status hypotheses directly, apart from attributing religious differentials to theological differences or assuming a minority status of Christians in Kazakhstan. A minority status of Christians in Kazakhstan is also questionable because, as described in the context section, the country has articulated a special position of both Islam and Christianity. However, we can test the other two dominant hypotheses, and then we can look at the potential underlying mechanisms using the Ready–Willing–Able framework (Coale, 1973).

1. In line with the characteristics hypothesis, we would expect that religious differentials in contraceptive use in Kazakhstan will be negligible once we control for demographic and socioeconomic characteristics.

2. In line with the interaction hypothesis, we would expect religious differentials in contraceptive use to be found among the lower socioeconomic class while we expect convergence or absence of religious differentials for higher socioeconomic class.

The Ready–Willing–Able framework (Coale, 1973) and its components are not mutually exclusive with the hypotheses mentioned above. Instead, they incorporate various mechanisms that explain the relationship between religion and contraceptive use, which can be supported by the aforementioned hypotheses.

1. In line with the *Readiness* factor, we expect that the effect of religion on contraceptive use will be mediated by the demand for children measured by fertility intentions. Kazakhs and other Central Asian ethnic groups (Muslims) are at earlier stages of demographic transition than Russians and other European origin groups (Christians) and thereby have a higher demand for children. Furthermore, based on the strong family-kin ties among Muslims, it could be assumed that they may be less exposed to the individualistic rational choice driven by cost-benefit analyses that is behind the readiness factor. This may make them less ‘ready’ to use contraception. It will be tested through mediation via a short-term fertility intentions mediator (planning to have children in the next three years).
2. In line with the *Willingness* factor, which refers to the normative and legitimate acceptability of contraception use and the possibility of countering traditional beliefs, we expect that:
 - a. Assuming that religiosity is associated with more traditional values, the influence of religion on contraceptive use is likely to be mediated by the level of religiosity. A higher level of religiosity would be connected to a reduced *willingness* to use contraception. After the collapse of the Soviet Union, Kazakhs (Muslims) were searching for self-identification, including through the increase in religiosity as a

nation-building instrument, differentiating themselves from Russians. Thus, it is assumed that Muslims are more prone to be more religious and follow religious norms, and this may have a stronger effect on contraceptive use. It will be tested through mediation via religiosity level.

- b. The effect of religion on contraceptive use will be mediated by the level of modern values, where a higher degree of modern values is associated with a greater *willingness* to use contraception. This could be connected to previous research on religious differentials which were explained by a higher resistance to modern values among Muslims (Kirk, 1967). Also, modernization is connected with “the breakdown of the dominance and centrality of family-kin groupings” (Goldscheider, 1971, p.149). This breakdown of kinship dominance and the shift to a nuclear family, closely tied with modernization, is seen as a prerequisite for emerging new behavioural patterns and a transition from high to low fertility (Goldscheider, 1971). As described in the context section, Kazakhs (Muslims) preserve and strictly follow family-kin grouping. Thus, it is expected that there are differentials in modern values that are closely connected with family formation and that in turn may affect contraceptive use through the *Willingness* factor. It will be tested through mediation via a composite variable of post-modern values.
3. The *Ability* factor (or availability and accessibility of contraception) relates to the characteristics and interaction hypotheses because of its focus on socioeconomic characteristics. It is expected that the effect of religion will be mediated through socioeconomic factors because we may assume that religious teachings, especially in the context of religious revival, may have additional effect on people’s education and employment, especially when considering gender differences in such outcomes. We expect that the religious differentials in contraceptive use would be mediated through

the means to use innovations (education), or *ability* to use contraceptives, and *accessibility* (employment and income) of fertility control. It will be tested through mediation via education, employment, and self-assessed wealth status.

Data and methods

Data

The first wave of the Generations and Gender Survey (GGS) 2020 in Kazakhstan (Dossanova et al., 2020) was used for the analysis. It has a sample of 16,000 respondents aged 18–79 (response rate 93%, N=14,857), which includes both women and men. We restrict the sample to married and cohabiting women (age 18–45) and men (age 18–49) in a heterosexual partnership who are not pregnant or sterilized, and whose partner is not pregnant or sterilized, and who belong either to Islam or Christianity (including mostly Orthodox Christians but also a very small number of Catholics and Protestants). The sample is restricted to these main denominations, which represent more than 90% of the population of the country. The non-affiliated is a distinct category that is too small in this sample (N=86) to use as a comparison. Another religious group – a combined Buddhist/Hindu category (N=261) – was also excluded from the sample because we cannot accurately link it to any ethnic group (Kazakhs or Russians) to position it in the previous literature on ethnic and religious differentials in the country. In addition, according to data from the World Religion Database (2020) these denominations represent only 0.12% (Buddhists) and 0.01% (Hindus) of the country's population.¹ Thus, the restricted sample size is 3,204 people (see Figure A1 in the Appendix for a detailed breakdown of the sample selection).

¹ Hindus represent 5.7% of the total GGS survey sample (840 of 14,857) and 6.6% of the restricted sample (age and pregnancy criteria) for the analysis (261 of 3,934). The author has reservations regarding the reporting of affiliation to this particular religious group since it represents only 0.01 to 0.12% of the total population. However, 99.6% of the respondents referred to as Buddhist/Hindu were surveyed in the Kazakh language, while the majority of Muslims (who are also mostly ethnic Kazakhs and other Turkic Central Asian groups) were surveyed in Russian or “other” language (probably Uzbek or Uighur). The overrepresentation of the

The GGS survey conducted in Kazakhstan utilized the 2009 population census as a basis for sampling (Dossanova et al., 2020). A comparison between Kazakhstan's GGS and descriptive statistics of the 2009 population census showed that women were overrepresented, while 18–34-year-olds were underrepresented compared to the census data. The sample also had a higher proportion of individuals with lower secondary and tertiary education as well as working men and women. A comparison of relevant descriptive statistics for unweighted and weighted samples is presented in Table A1 in the Appendix. Due to the differences observed, analytical post-stratification weights were applied in the main effect and interaction models, while the mediation method used in this analysis does not allow to use analytical weights.

The GGS data has the advantages of capturing questions not found in population censuses. Additionally, the survey provides more precise measurements of religious affiliation and religiosity than previous surveys conducted in the country. It is worth noting that it also has limitations due to its cross-sectional design. These limitations include difficulties in establishing cause-and-effect relationships between variables, the possibility of conjunctural effects specific to the time and place of data collection, the inability to analyse changes over time, and response bias arising from factors like social desirability bias.

Dependent variable

The main dependent variable is the use of any contraception method. The cross-sectional variable of current contraceptive method type was recorded into a binary variable measuring whether the respondent was using any contraception (1) or not (0) at the time of the interview. Contraceptive methods include condoms, pills, intra-uterine devices (IUDs),

Buddhist/Hindu group in the survey in comparison to the official figures, and also the language of the interview as well as fertility characteristics (being even higher than among Muslims and with even greater skewedness towards higher-order births), raised concerns about selection bias and reservations in the interpretation of differentials between this religious group and the main denominations. Another reservation for the use of this category is that in the context of Kazakhstan, Buddhism is mainly followed by ethnic Koreans, who do not have high fertility and would rather be interviewed in the Russian language.

injections, condoms, foam or jelly, injectables, implants, withdrawal, and the safe period (rhythm) method.

Independent variables

The main independent variable is the binary variable religion, measuring whether a respondent is Christian or Muslim.

Control variables

Control variables include a number of individual background characteristics that may vary across religious denominations and are likely to influence the propensity to use contraception.

The variable age measures the respondent's age at the time of the interview and is grouped into 5-year categories (except for the youngest group, which includes ages 18–24). Binary variables for the respondent's education and partner's education measure the highest level of education completed by the time of the interview (lower than tertiary or tertiary). The self-reported variable "Can make ends meet" (6 categories: with great difficulty, with difficulty, with some difficulty, fairly easily, easily, very easily) was dichotomised into a wealth status binary variable² (difficult or easy to make ends meet). The respondent's and partner's employment statuses are binary variables measuring whether or not a respondent/partner is working at the time of the interview. Other demographic variables are total number of children ever born, age of youngest child, and region of residence (North Kazakhstan combining Akmola, Kostanay, Pavlodar, and North Kazakhstan oblasts; East and Central Kazakhstan with Karaganda and East Kazakhstan oblasts; West Kazakhstan including Aktobe, Atyrau, West Kazakhstan and Mangistau oblasts; and South Kazakhstan with Almatinskaya, Zhambyl, Kyzylorda and Turkistan oblasts, including Shymkent city and the cities of Almaty and Astana). Although urban/rural residence could be essential to control for

² A sensitivity analysis was also conducted, treating the variable as continuous.

in the analysis, this information is missing in the dataset. However, regional residence may in some way reflect these differentials. Thus, the category “the cities of Almaty and Astana” is urban, whereas 62% of South Kazakhstan’s population is rural. East and Central Kazakhstan has 70% urban population, whereas 45% of the people in the regions of West and North Kazakhstan live in rural areas (Statistics Committee, 2022).

Mediating variables

The *short-term fertility intentions* variable was constructed based on the question whether a respondent has the intention to have a child within the next three years. The answers “definitely not”, “probably not”, and “unsure” were further categorized as “no” (0), while the answers “probably yes” and “definitely yes” were categorized as “yes” (1).

Self-assessed religiosity at the time of the interview, varying from 0 to 10, was dichotomized into a binary variable. Answers from 0 to 5 were categorized as less religious (0) and answers from 6 to 10 as more religious (1) for easier interpretation in the mediation analysis.

Sensitivity analysis of the results was conducted treating the variable as a continuous variable.

The Modern values composite variable is based on eight questions with a scale of answers that include “Strongly agree” (1), “Agree” (2), “Neither agree or disagree” (3), “Disagree” (4), and “Strongly disagree” (5). For the questions “women need children to be fulfilled”, “a child needs a father and mother”, “men need children to be fulfilled”, and “pre-school children suffer if their mother works”, the survey items were used as moving from more traditional to more modern. For the questions “divorce is permissible”, “single motherhood is acceptable”, “a working mother can secure warm relations”, and “pre-school children suffer if their father works long hours”, reverse-score items were created to make all items that constitute the composite variable moving from more traditional to more modern. The

composite variable is created similar to that of Dereuddre and colleagues (2016), apart from some variables (“marriage is outdated”, “cohabitation is acceptable”, “marriage should be for lifetime”) which were not used because they did not increase the reliability score of the composite variable. The Cronbach’s alpha of the composite variable was 0.7, a level that is universally considered high internal consistency (Nunnally & Bernstein, 1994)). The continuous composite variable ranges from 1 to 5.

The above-mentioned respondent’s *education*, *employment*, and *wealth status* were also assessed separately as mediators. The dichotomization of socioeconomic variables is driven by the causal mediation analysis package, which allows either continuous or binary variables.

Methods

Main effect models

I use a linear probability regression model with robust standard errors to analyse data with a binary outcome for the main effect models (to check whether contraceptive use remains higher among one religious group than the other, as well as to assess the *characteristics hypothesis*). The regression estimates the probability that contraception is used using a linear function. The model directly estimates the effect of independent variables on the probability of contraceptive use by providing the coefficients that represent the change in the predicted probability for a one-unit change in the independent variable. This simplicity makes it easier to understand and interpret the results, especially for non-technical audiences.

Interaction effect models

A linear probability regression model with robust standard errors is used to analyse possible interactions between *religion* and the socioeconomic indicators *education*, *employment* and *wealth status* for the interaction effect models (to check the *interaction hypothesis*).

Mediation analysis

I first assess whether the relationship between religion and contraceptive use is changed by entering potential mediators one at a time in separate models. Then, I employ causal mediation analysis to explore the mechanisms that may explain the relationship between religion and contraceptive use. Univariate counterfactual mediation was conducted in Stata 17. As Hicks and Tingley (2011, p. 608) succinctly explain, “the mediation package calculates the average mediation and direct effects by simulating predicted values of the mediator or outcome variable, which we do not observe, and then calculating the appropriate quantities of interest (average causal mediation, direct effects, and total effects)”.

According to causal mediation analysis (Imai, Keele, & Tingley, 2010), to properly identify the average causal mediated effect (ACME) and average direct effect (ADE), the assumption of sequential ignorability (SI) should be met (Imai, Keele, & Yamamoto, 2010). According to this, 1) it is assumed that the exposure is not related to potential unmeasured confounders, and 2) an observed mediator is supposed to be not related to potential unmeasured confounders. Due to the strong assumption of SI, I conduct sensitivity analyses to check the robustness of the results to the violation of the SI assumption (Hicks & Tingley, 2011).

Ethical issues

Since the study includes sensitive topics such as religious affiliation and health-related variables (contraceptive use), it was evaluated and granted ethical approval by the Swedish Ethical Review Authority (Dnr 2022-03710-01) before commencement of the analysis. The data was obtained from the Generations and Gender Programme (GGP) through a registration process and signing the GGP Terms of Acceptable Usage.

Descriptive results

Table 1 shows descriptive statistics for the samples of women and men. This is individual, not couple data. Contraceptive use is reported by respondents describing the method they use with a partner. Thus, a man can respond that an IUD is used. We can observe similar levels of contraceptive use reported by women and men. Almost all contraceptive use for both women and men consist of modern methods. Also, both women's and men's samples are rather similar proportion-wise in terms of the main independent variable of interest – religion. In terms of proportions, there are more women with tertiary education, while there are more men who are employed. Also, it is worth noting that both women's and men's samples are quite similar in terms of religiosity, fertility intentions, and modern values.

Table 1. Distribution of the characteristics of the sample population by gender

	Women		Men	
	N=2044	%	N=1487	%
Religion				
Christian	568	27.8	402	27.0
Muslim	1476	72.2	1085	73.0
Contraceptive use (any)				
No	748	38.7	557	40.7
Yes	1187	61.3	811	59.3
Modern contraception use				
No	811	41.9	610	44.6
Yes	1124	58.1	758	55.4
Age in 5-year groups				
18–24	186	9.1	69	4.6
25–29	449	22.0	250	16.8
30–34	488	23.9	349	23.5
35–39	440	21.5	298	20.0
40+	481	23.5	521	35.0
Mean age	33.56		36.03	
Region of residence				
North Kazakhstan	396	19.4	355	23.9
East and Central Kazakhstan	351	17.2	195	13.1
West Kazakhstan	282	13.8	151	10.2
South Kazakhstan	695	34.1	558	37.5
Astana and Almaty	317	15.5	228	15.3
Education				
Lower than tertiary	1153	56.4	1003	67.5
Tertiary	891	43.6	484	32.6
Employment				
Not employed	966	47.3	183	12.3
Employed	1078	52.7	1304	87.7

Partner's employment				
Not employed	222	10.9	704	47.4
Employed	1813	89.1	780	52.6
Can make ends meet				
Difficult	1402	70.3	999	68.7
Easy	592	29.7	456	31.3
Total children ever born				
0	183	9.0	152	10.2
1	460	22.5	368	24.8
2	710	34.7	477	32.1
3	395	19.3	295	19.8
4	185	9.1	126	8.5
5	70	3.4	50	3.4
6+	41	2.0	19	1.3
Mean number of children	2.15		2.07	
Age of youngest child				
No children	183	9.0	152	10.3
0–2 years	695	34.1	507	34.2
3–5 years	450	22.1	281	19.0
6–8 years	266	13.1	221	14.9
9 years and older	444	21.8	322	21.7
Religiosity				
Less religious	873	43.9	665	45.5
More religious	1115	56.1	797	54.5
Fertility intentions				
No	1062	56.4	702	52.0
Yes	820	43.6	647	48.0
Modern values				
Less modern	1211	59.5	899	60.8
More modern	824	40.5	579	39.2

Source: Kazakhstan's Generations and Gender Survey of 2020, author's calculations.

Table 2 shows descriptive statistics for Muslims and Christians in the sample. We can observe that there are more women than men in the sample of Muslims, while the opposite is true for the sample of Christians. Contraceptive use was reported by 71.5% of Christians in the sample, while the respective number for Muslims was only 56.3%. The samples are quite similar in terms of mean age. In terms of education, proportion-wise there are more people with tertiary education in the Muslim sample (42.8%) than in the Christian sample (28.9%). The mean number of children is higher among Muslims than among Christians (2.32 and 1.58, respectively). According to the descriptive statistics, Muslims exhibit significantly

higher levels of religiosity, demonstrate greater fertility intentions, and hold less modern values.

Table 2. Distribution of the characteristics of the sample population by religion

	Muslims		Christians	
	N=2561	%	N=970	%
Gender				
Women	1476	57.6	402	41.4
Men	1085	42.4	568	58.6
Contraceptive use (any)				
No	1046	43.7	259	28.5
Yes	1347	56.3	651	71.5
Modern contraception use				
No	1120	46.8	301	33.1
Yes	1273	53.2	609	66.9
Age in 5-year groups				
18–24	170	6.6	85	8.8
25–29	544	21.2	155	16.0
30–34	581	22.7	256	26.4
35–39	527	20.6	211	21.8
40+	739	28.9	263	27.1
Mean age	34.64		34.48	
Region of residence				
North Kazakhstan	361	14.1	390	40.2
East and Central Kazakhstan	308	12.0	238	24.5
West Kazakhstan	362	14.2	71	7.3
South Kazakhstan	1122	43.9	131	13.5
Astana and Almaty	405	15.8	140	14.4
Education				
Lower than tertiary	1466	57.2	690	71.1
Tertiary	1095	42.8	280	28.9
Employment				
Not employed	859	33.5	290	29.9
Employed	1702	66.5	680	70.1
Partner's employment				
Not employed	715	28.0	211	21.8
Employed	1835	72.0	78.22	78.2
Can make ends meet				
Difficult	1762	70.5	639	67.3
Easy	738	29.5	310	32.7
Total children ever born				
0	217	8.5	118	9.5
1	484	18.9	344	23.5
2	806	31.5	381	33.6
3	594	23.2	96	19.5

4	289	11.3	22	8.8
5	114	4.5	6	3.4
6+	57	2.2	3	1.7
Mean number of children	2.32		1.58	
Age of youngest child				
No children	217	8.5	118	12.2
0–2 years	978	38.3	224	23.1
3–5 years	544	21.3	187	19.3
6–8 years	335	13.1	152	15.7
9 years and older	479	18.8	287	29.7
Religiosity				
Less religious	939	37.5	599	63.1
More religious	1562	62.5	350	36.9
Fertility intentions				
No	1171	50.2	593	65.9
Yes	1160	49.8	307	34.1
Modern values				
Less modern	1619	63.6	491	50.8
More modern	927	36.4	476	49.2

Source: Kazakhstan's Generations and Gender Survey of 2020, author's calculations.

Results

Table 3 presents the results of linear probability models of contraceptive use (both modern and traditional methods) in Kazakhstan. In Model 1 (women) and Model 3 (men), the effect of religion on contraceptive use is estimated without adjusting for other characteristics. Being Muslim in Kazakhstan is related to a lower probability of contraceptive use for both women and men. Model 2 (women) and Model 4 (men) are adjusted for control variables. Although the effect of religion remains quite strong for both women and men even after adjusting for demographic and socioeconomic characteristics, there is a reduction in the variance explained by affiliation when controlling for these factors. Education does not seem to be related to contraceptive use, at least not when all other factors are controlled for. Being employed is positively related to contraceptive use among men. Partner's employment is also positively related to contraceptive use among women.

Further, to assess the interaction hypothesis, I ran separate models with an interaction between religious affiliation and different socioeconomic characteristics (education, employment, and wealth status) adjusted for all other available demographic characteristics in the main effect models. No interactions improved the model fit according to AIC/BIC criteria or produced statistically significant results (see Appendix for the tables). Thereby, the interaction hypothesis was also not supported as an explanation for how religious differences operate in contraceptive use.

Table 3. Probabilities from linear probability models of associations between Kazakhstan women's and men's contraceptive use (any method) and characteristics, weighted

	Women		Men	
	Unadjusted probability Model 1	Adjusted probability Model 2	Unadjusted probability Model 3	Adjusted probability Model 4
Religion (ref. Christian)				
Muslim	-0.155***	-0.124***	-0.169***	-0.136***
Age in 5-year groups (ref.25–29)				
18–24		0.045		-0.018
30–34		0.044		-0.07
35–39		0.07		-0.041
40+		0.095*		-0.01
Region (ref. North Kazakhstan)				
East and Central Kazakhstan		-0.029		0.016
West Kazakhstan		-0.162***		-0.223***
South Kazakhstan		-0.172***		-0.169***
Astana and Almaty		-0.021		-0.121**
Education (ref. Lower than tertiary)				
Tertiary		0.022		-0.034
Employment (ref. Unemployed)				
Employed		0.014		0.136***
Can make ends meet (ref. Difficult)				
Easy		0.012		-0.006
Total children ever born (ref. 0)				
1		0.303***		0.259***
2		0.399***		0.329***
3		0.408***		0.371***
4		0.371***		0.470***
5		0.295***		0.377***
6+		0.307**		0.333*
Age of youngest child (ref. 3–5)				
No children		(omitted)		(omitted)
0–2 years		-0.05		-0.004
6–8 years		-0.111**		-0.035
9 years and older		-0.117**		-0.121**
Employment of partner (ref. Unemployed)				
Employed		0.116**		0.028
Constant	0.714***	0.336***	0.709***	0.435***
N	1,875	1,875	1,329	1,329
Adj. R-squared	0.02	0.10	0.02	0.09

Source: Kazakhstan's Generations and Gender Survey of 2020, author's calculations.

* p<0.05, ** p<0.01, *** p<0.001

To explore the difference between Christians and Muslims in contraceptive use further, I assessed various mediating mechanisms. Starting with the adjusted linear probability model presented in Table 3, I entered one mediator at a time and observed whether the relationship between religion and contraceptive use is attenuated or changes direction when the specific mediator is added to the model, as presented in Table 4. Models 5–7 are adjusted for other control variables, including controls for socioeconomic variables. For Models 8–10, first, adjusted models are presented without the specific socioeconomic variable of interest (either employment or education or wealth status) and then models including the variable that acts as mediator.

Adding fertility intentions to the model partially reduces the strength of the negative relationship between being Muslim and contraceptive use for both women and men. Women and men who want children within three years have a lower propensity for using contraception than those who do have this intention, with quite strong coefficient effects (Model 5).

Adding religiosity to the model also partially deflates the relationship between being Muslim and contraceptive use for both genders. Both religious women and men exhibit a similar pattern, with a nearly 12% lower probability of using contraception compared to their less religious counterparts. We assess willingness to use contraception also through modern values. The relationship for both women and men is not statistically significant, although it shows a positive relationship for both women and men but with a low effect size. The coefficients for both education and wealth status (ability factors) were not statistically significant. Employed men (also an ability factor) have a higher propensity for using contraception than unemployed men.

Table 4. Probabilities from linear probability models of associations between Kazakhstan women's and men's contraceptive use (any method) and religion, potential mechanisms, weighed

	Women		Men	
	Adjusted probability without mediator	Adjusted probability with mediator	Adjusted probability without mediator	Adjusted probability with mediator
Model 5^a				
Muslim	-0.126***	-0.089**	-0.138***	-0.103**
Fertility intentions (ref. No)				
Yes		-0.275***		-0.250***
Constant	0.709***	0.803***	0.734***	0.805***
N	1,746	1,746	1,225	1,225
Adj. R-squared	0.09	0.15	0.10	0.14
Model 6^a				
Muslim	-0.122***	-0.099***	-0.132***	-0.098**
Religiosity (ref. Less religious)				
More religious		-0.110***		-0.123***
Constant	0.717***	0.750***	0.738***	0.764***
N	1,830	1,830	1,313	1,313
Adj. R-squared	0.09	0.11	0.09	0.10
Model 7^a				
Muslim	-0.123***	-0.118***	-0.138***	-0.132***
Modern values		0.039		0.051
Constant	0.728***	0.617***	0.745***	0.597***
N	1,870	1,870	1,326	1,326
Adj. R-squared	0.09	0.09	0.09	0.10
Model 8^b				
Muslim	-0.124***	-0.124***	-0.139***	-0.136***
Employment (ref. Not employed)				
Employed		0.014		0.136***
Constant	0.732***	0.730***	0.851***	0.742***
N	1,875	1,875	1,329	1,329
Adj. R-squared	0.10	0.10	0.09	0.09
Model 9^b				
Muslim	-0.121***	-0.124***	-0.141***	-0.136***
Education (ref. Lower than tertiary)				
Tertiary		0.022		-0.034
Constant	0.730***	0.730***	0.743***	0.742***
N	1,875	1,875	1,329	1,329
Adj. R-squared	0.10	0.10	0.09	0.09
Model 10^b				
Muslim	-0.124***	-0.124***	-0.136***	-0.136***
Wealth status (ref. Difficult to make ends meet)				
Not difficult/Easy		0.012		-0.006
Constant	0.732***	0.730***	0.741***	0.742***
N	1,875	1,875	1,329	1,329
Adj. R-squared	0.10	0.10	0.09	0.09

* p<0.05, ** p<0.01, *** p<0.001. The coefficients for adjusted probabilities without mediator (columns 1 and 3) are slightly different from Table 3 due to the need of similar sample sizes to compare with models with mediator. ^a=Adjusted for age, region, education, employment, wealth status, total children ever born, age of youngest child and partner's employment. ^b=Adjusted for the same control variables as ^a apart from the mediator.

The average causal mediation effect (ACME) is presented separately for each potential mediator in Table 5 (women) and Table 6 (men), adjusting for individual characteristics. Fertility intentions, religiosity (for both genders), education (for women), and modern values (for men) were found to partially mediate the relationship between religious differences and contraceptive use, as shown in Tables 5 and 6. However, the direct association between religious affiliation and contraceptive use remained for both women and men.

Fertility intentions played a role in mediating religious differences in contraceptive use between Muslims and Christians, accounting for approximately 24-26% of the total effect of religious affiliation on contraceptive use, with similar patterns observed across genders. Surprisingly, despite confirming the expectation about operationalization through the readiness factor, the study revealed that this mediation was only partial, challenging the assumption that fertility differences were the primary driving force behind contraceptive use differentials among religious groups.

Religiosity was found to mediate 19% of the total effect of religious differences on contraceptive use in the women's sample and 21% in the men's sample, supporting the expectation of mediation through willingness factors. On the other hand, modern values only mediated around 6% of the total effect of religious affiliation on contraceptive use in the men's sample.

Additionally, the mediation analysis demonstrated a statistically significant effect of education in the women's sample, attenuating the negative effect of religious affiliation on contraceptive use by 6.1%. This partially supported the expectation of mediation through socioeconomic status parameters (the ability factor), but only for education and only among women.

Table 5. Average causal mediation effects (and 95% confidence intervals) from mediation analyses of religious differentials, Kazakhstan women's contraceptive use (any method), and potential mechanisms

Mediator	Total effect	Confidence interval		ADE	Confidence interval		ACME	Confidence interval		% mediated
Fertility intentions ^a	-0.161	-0.216	-0.107	-0.119	-0.173	-0.067	-0.043	-0.060	-0.027	26.4%
Religiosity ^b	-0.160	-0.214	-0.105	-0.130	-0.185	-0.077	-0.030	-0.044	-0.018	18.7%
Modern values ^c	-0.159	-0.213	-0.109	-0.152	-0.207	-0.100	-0.007	-0.016	0.001	4.4%
Education ^d	-0.150	-0.201	-0.098	-0.159	-0.211	-0.108	0.009	0.003	0.017	-6.1%
Employment ^e	-0.159	-0.211	-0.108	-0.159	-0.211	-0.108	0.000	-0.002	0.002	0.0%
Wealth status ^f	-0.159	-0.212	-0.108	-0.159	-0.211	-0.108	0.000	-0.003	0.001	0.2%

Table 6. Average causal mediation effects (and 95% confidence intervals) from mediation analyses of religious differentials, Kazakhstan men's contraceptive use (any method), and potential mechanisms

Mediator	Total effect	Confidence interval		ADE	Confidence interval		ACME	Confidence interval		% mediated
Fertility intentions ^a	-0.176	-0.244	-0.109	-0.135	-0.202	-0.070	-0.042	-0.062	-0.025	23.6%
Religiosity ^b	-0.166	-0.232	-0.099	-0.131	-0.198	-0.066	-0.036	-0.053	-0.019	21.3%
Modern values ^c	-0.172	-0.238	-0.111	-0.162	-0.228	-0.099	-0.009	-0.020	-0.001	5.5%
Education ^d	-0.170	-0.232	-0.109	-0.170	-0.233	-0.108	0.000	-0.007	0.006	0.3%
Employment ^e	-0.173	-0.235	-0.110	-0.170	-0.233	-0.108	-0.003	-0.010	0.003	1.5%
Wealth status ^f	-0.170	-0.233	-0.108	-0.170	-0.233	-0.108	0.000	-0.003	0.002	0.1%

Source: Kazakhstan's Generations and Gender Survey of 2020, author's calculations.

Adjusted for age, region, education, employment, wealth status, total children ever born, age of youngest child, and partner's employment for ^a, ^b, and ^c.

Adjusted for the same control variables apart from the mediator for ^d, ^e, and ^f.

Discussion and conclusion

This study explored pathways through which religious affiliation (Islam or Christianity) influences contraceptive use in Kazakhstan by employing causal mediation analysis. As expected based on of past research, but in contrast to what religious doctrine would predict, Muslims were less likely to use contraception than Christians in 2018. Prevailing hypotheses in the literature were assessed and the findings suggest that we can reject the characteristics hypothesis and the interaction hypothesis because socioeconomic factors do not explain away differences between these religious groups, nor do patterns converge at a higher socioeconomic status.

In terms of the mechanisms of the association between religious affiliation and contraceptive use, it was found that part of the effect of religious belonging was mediated through short-term fertility intentions. Based on previous studies on Kazakhstan revealing ethnic differentials in fertility and different stages of demographic transition between the two ethnic and religious groups in the country, and thereby different levels of demand for children (Spoorenberg 2013, 2015; Kan, 2022), one could assume that the mediation through fertility intentions would explain much more of the variation in contraceptive use between Muslims and Christians. However, despite having the strongest effect among other potential mediators for both women and men, it still explains only a fraction of the variation. We may assume that short-term fertility intentions have less explanatory power for contraceptive use if the desired number of children is not considered. Especially in a context where unplanned pregnancies are very common, short-term fertility intentions alone may not capture a person's overall reproductive goals. Without considering the desired number of children, it is possible to misinterpret people's contraceptive behaviours. For example, someone who is not actively trying to conceive in the short term might still want a large family and therefore won't be using contraception consistently. Including the desired number of children in future analyses

may enhance the explanatory power of the effect of short-term fertility intentions on contraceptive use.

Based on previous studies arguing that there is a revival of religiosity especially among ethnic Kazakhs (Telebaev, 2003; Aydingün, 2007; Yerekesheva, 2020), it was assumed that the differences in religiosity between Muslims and Christians also were behind the religious differentials in contraceptive use in Kazakhstan. The findings of the study reveal that this indeed also is one of the mediators of the difference in contraceptive use. Yet, again it explains only a fraction of the variation and can thereby not be taken as the main explanation behind religious differentials.

Based on the findings that the strongest mediators – religiosity and fertility intentions – explain rather little of the variation, we must assume that the religious differentials are driven by other, untested mechanisms. For example, there could be misconceptions regarding the permissibility of contraception, especially by followers of Islam. As explained in the context section, Islam’s teachings on contraceptive use are more relaxed than the teachings in Christianity, but they are also more open to interpretations. This means that after the time of religious prohibition, those who translated the teachings of Islam in the Kazakh context after gaining independence may not fully have explained Islam’s position on the permissibility of contraception to its followers. As pointed out by Barrett (2007) in a qualitative study on the neighbouring Uzbekistan, Muslim women were uncertain about religious positions on contraception and highly articulated a reliance on “how many Allah gives” in regard to family planning.

Another factor that could potentially contribute to disparities between religious groups is the varying exposure to education among Muslims and Christians. While this could be a significant factor in some contexts, it is important to note that all ethnic and religious groups

in Kazakhstan have relatively high educational attainment. Mediation via education revealed only a very small attenuation of the total difference by religious affiliation in contraceptive use among women.

Education serves as a valuable tool for understanding differences in norms and family values. However, it is crucial to recognize that in the specific context of Kazakhstan, the educational level may not accurately reflect access to or knowledge of family planning methods. This limitation is primarily due to the absence of sexual education in the country's educational curriculum. Therefore, while education can provide insights into cultural and societal perspectives, it may not fully capture individuals' understanding or awareness of family planning in this particular context.

It is important to consider that the discrepancies between Muslims and Christians in accessing family planning may not solely stem from religious dimensions but could also be interconnected with the cultural norms of ethnic Kazakhs. There is a highly articulated norm of taboo or shame (“uyat” in Kazakh) that is connected with a fear of condemnation by “others” (relatives, neighbours, etc.). Sexual reproductive health and sexual education is “uyat” in traditional and religious families, which thus can limit accessibility of family planning knowledge and actual use.

Another explanation for the unexplained variation could have to do with a high acceptance of unintended pregnancies following non-use of contraception (Curtis et al., 2011). It could be that Muslims in Kazakhstan have a higher acceptance of unplanned pregnancies than Christians.

On the other hand, the abortion culture that prevailed in the Soviet Union, is still in place in the country, and it may be that fertility control and family planning occurs through these means instead of contraception. However, ethnic differentials in abortion can hardly explain

the religious differentials in contraceptive use. Thus, ethnic Russians (Christians) have a mean number of induced abortions two times higher than ethnic Kazakhs (Muslims) (Statistics Committee, 2016). There is a possibility that ethnic Kazakhs (Muslims) to a higher extent than Christians underreport their abortion histories due to social desirability bias, and that the survey data thus may not be accurate. However, the vital statistics of medical abortions by region (Statistics Committee, 2021) show lower abortion rates in southern regions that are more homogenously Muslim than in northern Kazakhstan, which has a higher proportion of Christians. Illegal abortions (outside of medical facilities), especially in regions of southern Kazakhstan, still exist and thus do not appear in these statistics. It could be that Muslims in Kazakhstan are more exposed to illegal abortions outside of medical facilities.

People in Kazakhstan, as in many other post-Soviet countries, still have reservations about hormonal contraception such as fear of cancer, obesity and thromboembolism, and these reservations are still supported by many obstetricians and gynaecologists (Lokshin & Kobzar, 2015). This may in turn decrease the possibilities of greater women's empowerment because this is one of the methods that allow women to make their own decisions and choices on reproductive health without relying on men's participation or agreement, as in the case of male condom use or seeking medical help for IUD insertion. This lack of access and knowledge about hormonal contraception may further strengthen the differentials in women's empowerment in reproductive health decision-making between Muslims and Christians in Kazakhstan. The potential low level in women's empowerment in decision-making related to their own health may also be behind the big unexplained part of religious differentials.

Future research may look at identifying qualitatively how religious affiliation prevents contraceptive use, for example whether there are misinterpretations of how particular religions permit contraception. Comparative studies in Central Asia, with the possibility of comparing the same ethnic groups belonging to particular religious confessions across

borders, would improve our understanding of how context influences decisions on contraceptive use. It would also be beneficial to study whether there is any non-overlapping effect of religion and ethnicity. Policy implications of the current study may be to work with religious leaders to spread information about contraception and how religion (either Islam or Christianity) considers contraception permissible. It also hints at potential differentials in sexual education that should be further promoted by governmental and non-governmental organizations to remove cultural taboos on sensitive topics related to sexual and reproductive health. Such initiatives as the Uyatemes (or “not a shame” in Kazakh) website should be further promoted and expanded.

This study contributes to the literature on family planning in Central Asia and post-Soviet countries by analysing the mechanisms of the association between religious differentials and contraceptive use. The insights could be helpful for similar contexts, not only in Central Asian states and post-Soviet countries but also for other middle-income countries with diverse populations.

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Appendix

Figure A1. Selection flow and final population

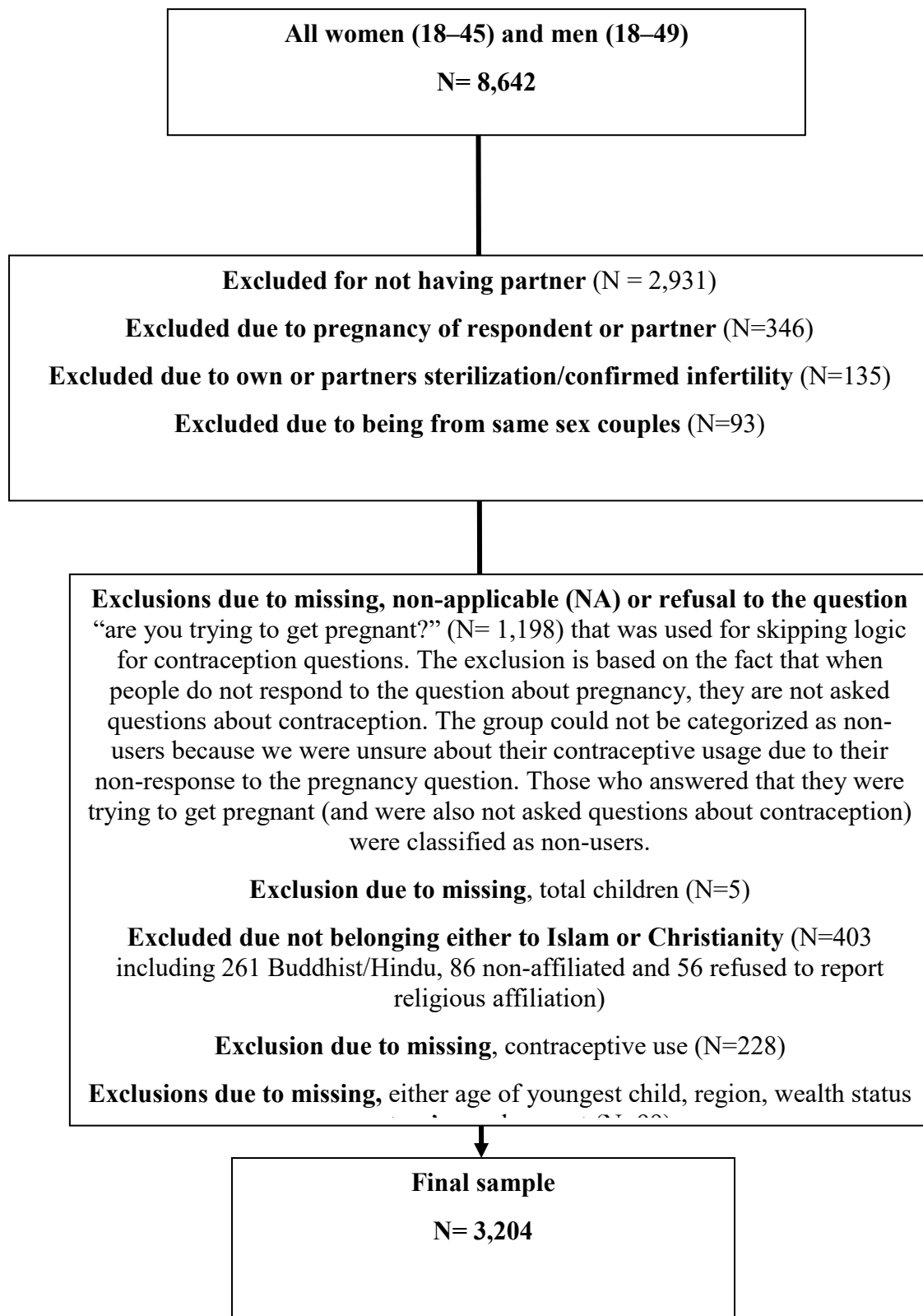


Table A1. Descriptive statistics, GGS full sample vs 2009 population census

	Census 2009 (%)	GGS 2020 full sample	GGS 2020 full sample, weighted
Age			
18–34 (15–34 in 2021 census)	44.5	32.2	41.6
35–64	47.6	55.9	50.2
65–79 (65 and older in 2021 census)	7.8	11.9	8.3
Gender			
Women	51.7	60.9	52.6
Men	48.3	39.1	47.4
Marital status			
Yes	57.1	56.5	55.2
No	42.9	43.5	44.8
Education			
lower secondary and less	18.3	31.9	32.2
secondary	58.7	36.5	36.1
tertiary	23.0	31.6	31.8
Employment			
Yes	54.3	58.8	61.6
No	45.7	41.2	38.4
Women's employment (15 and older for census)	46.4	53.2	55.1
Men's employment (15 and older for census)	63.1	67.7	68.7

Source: Kazakhstan's Generations and Gender Survey of 2020, author's calculations.

Table A2. Regression Results from Linear Probability Models of Women's and Men's Contraceptive Use, by religion and education, weighted

	Women		Men	
	without interaction	with interaction	without interaction	with interaction
Religion (ref. Christian)	–0.124***	–0.118***	–0.136***	–0.144***
Education (ref. Lower than tertiary)	0.022	0.033	–0.034	–0.057
Religion # Education		–0.016		0.029
Constant	0.336***	0.333***	0.435***	0.439***
N	1875	1875	1329	1329
Adjusted R-squared	0.10	0.09	0.09	0.09
AIC	2478.58	2480.49	1783.25	1785.06
BIC	2605.92	2613.36	1902.67	1909.68

* p<0.05, ** p<0.01, *** p<0.001.

Models adjusted for age, age of the youngest child, employment, partner's employment, self-assessed wealth level, total number of children, region.

Table A3. Regression Results from Linear Probability Models of Women's and Men's Contraceptive Use, by religion and employment, weighted

	Women		Men	
	without interaction	with interaction	without interaction	with interaction
Religion (ref. Christian)	-0.124***	-0.153***	-0.136***	-0.169
Employment (ref. Not employed)	0.014	-0.023	0.136***	0.108
Religion # Employment		0.052		0.037
Constant	0.336***	0.357***	0.435***	0.459***
N	1875	1875	1329	1329
Adjusted R-squared	0.10	0.10	0.09	0.09
AIC	2478.58	2479.44	1783.25	1785.09
BIC	2605.92	2612.31	1902.67	1909.7

* p<0.05, ** p<0.01, *** p<0.001.

Models adjusted for age, age of the youngest child, education, partner's employment, self-assessed wealth level, total number of children, region.

Table A4. Regression Results from Linear Probability Models of Women's and Men's Contraceptive Use, by religion and self-assessed wealth level, weighted

	Women		Men	
	without interaction	with interaction	without interaction	with interaction
Religion (ref. Christian)	-0.124***	-0.116***	-0.136***	-0.127***
Can make ends meet (ref. Difficult)	0.012	0.03	-0.006	0.012
Religion # Self-assessed wealth		-0.026		-0.025
Constant	0.336***	0.331***	0.435***	0.430***
N	1875	1875	1329	1329
Adjusted R-squared	0.10	0.09	0.09	0.09
AIC	2478.58	2480.34	1783.25	1785.08
BIC	2605.92	2613.21	1902.67	1909.69

* p<0.05, ** p<0.01, *** p<0.001.

Models adjusted for age, age of the youngest child, education, employment, partner's employment, total number of children, region.

Sensitivity analysis

The sensitivity analysis was conducted using the Stata *medsens* command to address potential unmeasured factors in the study. It examined the robustness of the results by testing the violation of the sequential ignorability (SI) assumption (Hicks and Tingley, 2011). The analysis was performed separately for different mediators (fertility intentions, religiosity, modern values, and education) in both women's and men's samples.

Table A5. Results of the sensitivity analysis with the products of the R2 method

Mediator	Women			Men		
	Fertility intentions	Religiosity	Education	Fertility intentions	Religiosity	Modernization
Rho at which ACME = 0	-0.2737	-0.132	0.0671	-0.2375	-0.129	0.0577
$R^2_M \cdot R^2_{Y^*}$ at which ACME = 0	0.0749	0.0174	0.0045	0.0564	0.0166	0.0033
$R^2_M \sim R^2_{Y^*}$ at which ACME = 0	0.0532	0.0153	0.0038	0.0406	0.0137	0.0029

For the mediation through fertility intentions in the women's sample, a negative correlation of 0.274 between the error terms of the mediator and outcome regression models would indicate a potential violation of the SI assumption. Additionally, the product of the coefficient of determination (R2) method suggested that the mediated effect would be zero if the confounders collectively explained 7.49% or more of the residual variance.

In the men's sample, the sensitivity analysis for fertility intentions revealed that a negative correlation of 0.238 between the error terms would indicate a potential violation of the SI assumption. The product of the coefficient of determination method indicated that the mediated effect would be zero when the confounders explained 5.64% or more of the residual variance.

For religiosity in women's and men's samples, a negative correlation of 0.132 and 0.129 between the error terms, respectively, would suggest a potential violation of the SI assumption. The product of the coefficient of determination method indicated that the

mediated effect would be zero when the confounders explained 1.74% or more of the residual variance for women, and 1.66% or more for men.

Similarly, for modern values in the men's sample, a positive correlation of 0.058 between the error terms would indicate a potential violation of the SI assumption. The product of the coefficient of determination method suggested that the mediated effect would be zero when the confounders explained 0.33% or more of the residual variance.

Lastly, for education in the women's sample, a positive correlation of 0.067 between the error terms would indicate a potential violation of the SI assumption. The product of the coefficient of determination method suggested that the mediated effect would be zero when the confounders explained 0.45% or more of the residual variance.

In relation to the findings, the sensitivity analysis raises concerns about potential violations of the SI assumption. This implies that unmeasured factors could be influencing both the mediator and the outcome, which could introduce bias into the study results. It indicates the need for caution when interpreting the findings, as the presence of unmeasured confounders may impact the validity of the mediated effects.

In summary, the sensitivity analysis points out potential problems by indicating a potential for violations of the SI assumption in various mediation models. These violations suggest the influence of unmeasured confounders, which can affect the study's findings. Therefore, researchers should consider these limitations and exercise caution in drawing conclusions based on the results.

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