

When norms collide: The effect of religious holidays on compliance with COVID guidelines

Abstract

Aim: This paper investigates the effect of a religious holiday (*Eid-ul-Fitr* in Pakistan) on compliance behaviour instituted during the COVID-19 pandemic. Longstanding religion-based norms of behaviour during the Eid holidays (traveling to meet family members, praying in large gatherings, hugging) may counteract newly established (and weaker) norms of health-preserving behaviours.

Method: We study the impact of *Eid-ul-Fitr* on compliance with COVID guidelines for a sample of university students. Our effects are identified by unprompted delays in fielding a survey measuring compliance with prescribed behaviours.

Results: We find that compliance with guidelines declines immediately after the religious holiday in our sample of students, with no observable decline in other well documented predictors of compliance behaviour (risk perceptions, trust in the authorities). We find that this decline in compliance is largely attributable to male participants, with one important exception. We further confirm our results by conducting robustness checks incorporating matching techniques and a smaller follow-up study where we randomize invitations to the survey.

Conclusion: We conclude that amid the pandemic, newly formed norms pertaining to healthcare guidelines (focusing on social-distancing) emerged, and were subsequently undercut by longstanding norms of behaviour following a religious celebration: *Eid-ul-Fitr*. This paper underscores the fragility of these newly emerged norms, especially when challenged by a more well-entrenched, traditional norm.

JEL Codes: B55, C22, C99, D84, D91, Z1

Keywords: Coronavirus, Compliance, Social norms, Gender, Pakistan

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- Consent for publication: NA

Introduction

The COVID-19 pandemic has had a tremendous impact on lives and livelihoods throughout the world. In the absence of pharmaceutical interventions in 2020, behavioural interventions had been widespread. Some nations (such as the UK) imposed fines in a bid to boost compliance with prescribed guidelines, whilst a majority (particularly in the developing world) relied upon voluntary compliance in a bid to reduce transmission. The empirical literature on compliance with guidelines in previous pandemics broadly highlights two main mechanisms through which compliance is increased: increased perceived risk (Bults et al. 2011), and higher trust in authorities (Leung et al. 2005a). Alongside this, researchers have argued for the importance of social context (in general), and social norms (in particular) – see for example Van Bavel et al. (2020).

This paper focuses on the effect of social norms (due to a religious holiday) on compliance with health-promoting behaviours. Figure 1 presents the global number of confirmed coronavirus cases from January 1st, 2020 to September 13th, 2021. The vertical lines indicate the two major religious holidays for Christians (*Easter* and *Christmas*, observed by approximately 2.5 billion individuals-32% of the global population) and Muslims (*Eid-ul-Fitr* and *Eid-ul-Adha*, observed by approximately 1.9 billion individuals-24% of the global population). Overall, the figure displays a pattern of increasing confirmed cases following these holidays in all cases save one (*Eid-ul-Fitr*, May 2021). This highlights the potential effect of religious holidays and their impact on compliance with health-promoting behaviours. Many governments recognized the impact of such events, sometimes attempting to reduce the impact through targeted lockdowns.

For Muslim communities worldwide, the deeply entrenched religious norms of *Eid-ul-Fitr* (Arabic: “Festival of Breaking Fast”) celebrations ran counter to newly formed norms of social-distancing, on May 24th - 26th, 2020. In order for cases to sharply increase in the aftermath of religious holidays, it must be the case that compliance with health promoting behaviours weakened during the holidays. However, where compliance broke down, and whether the effects differed by gender is of particular interest. This is because it is not immediately clear how compliance behaviour breaks down in such circumstances, and whether the effects differ by gender, particularly in such heavily gendered contexts as in Pakistan. Using data from a survey of college students in Pakistan (where approximately 97% of the population are Muslim), collected within two weeks of the *Eid-ul-Fitr* holidays, we study the impact of the holiday on compliance with COVID related guidelines. Specifically, we exploit variation in the days the survey was fielded, in order to identify which behaviours broke down. This variation was (as we argue below) due to a quasi-random process whereby some university administrators forwarded the survey invitation to their students after the *Eid-ul-Fitr* holidays, while others forwarded the survey invitation before the holidays. We observe reductions in some compliance behaviours (staying home, avoiding crowds, avoiding physical greetings, avoiding going to the mosque), but not in others (avoiding grocery-shopping and mask-wearing). We discuss the implications of these findings for policy.

In addition to compliance, our survey measures perceptions, preferences, and demographics within a two-week period immediately before and after the *Eid-ul-Fitr* holidays. Delays by partner institutions caused the survey to be fielded past the *Eid-ul-Fitr* holidays in some institutions (yielding 214 observations), but not in others (yielding 143 observations). We argue that these administrative delays are due to random factors, which allow us to study the effect of *Eid-ul-Fitr* norms on compliance behaviour. Importantly, we show that the samples before and after *Eid-ul-Fitr* are similar on many observables and use matching techniques to account for average sample differences. In addition, we conduct a small follow up study with a single university where we randomize invitations to undertake the survey before and after *Eid-ul-Adha*. We find a similar pattern, though our results are not statistically significant due to the small sample and low response rate.

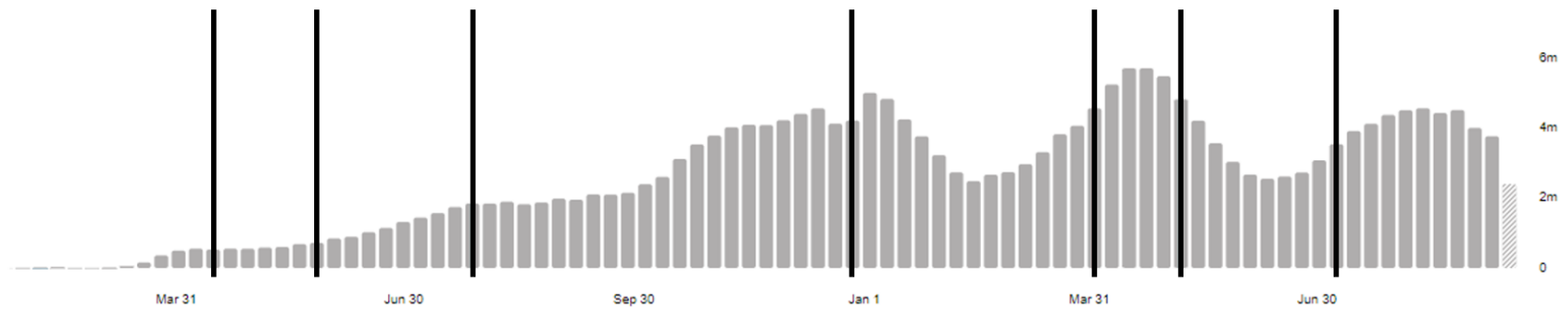


Figure 1: Global Weekly Confirmed Cases (Source: WHO Coronavirus COVID-19 Dashboard)

Note: The vertical lines indicate approximate dates of major Christian and Muslim holidays in this period.

In previous pandemics, behavioural models of compliance to health guidelines focus on the role of risk perceptions (Bults et al. 2011), or trust in authorities (Leung et al. 2005b), to explain compliance behaviours. Using data from previous pandemics (particularly those from the 2003 SARS outbreak and the 2011 Swine flu outbreak) has demonstrated robust evidence in favour of these models. More recently, however, the literature has focused on behavioural measures (Bish and Michie 2010; Krpan et al. 2020; Pfattheicher et al. 2020; Van Bavel et al. 2020) arguing for the role of social norms and efficacy in guiding behaviour, even without the presence of fear and anxiety (Jørgensen et al. 2021).

We find that while the main mechanisms predicting compliance (risk perceptions and trust in authorities) are largely unchanged between the two subsamples, important compliance behaviours (staying home, avoiding crowds, avoiding physical greetings, avoiding going to the mosque) are significantly lower among the participants after *Eid-ul-Fitr*, relative to the participants before *Eid-ul-Fitr*. These effects persist, even when controlling for perceptions of risk and trust, as well as other socio-demographics. Importantly, these effects are not observed universally, as some behaviours remain unchanged (avoiding grocery-shopping and mask-wearing). We interpret these findings in light of religious norms which require adherents to engage in activities that run directly counter to COVID related prescriptions.

These results contribute to the literature on compliance with guidelines during a pandemic, and carry important lessons for policymakers, especially when confronted with events that carry well established norms that run counter to compliance related behaviour. Moreover, Pakistan is a gendered society with males bearing disproportionately higher cost of social-distancing healthcare guidelines, relative to females. Therefore, one would expect the effect of a religious holiday such as *Eid-ul-Fitr* to be gender-differentiated. Indeed, this is what we observe. Our main contribution lies in the understanding of why increases in cases occur in the aftermath of religious holidays, and we provide direct evidence of reductions in some compliance behaviours but not in others. We further report of which types of compliance behaviours are affected, and how gender interacts with compliance breakdowns, to round out our contributions.

This paper begins by setting the context and discussing the relevant literature on health-promoting compliance behaviour during pandemics in section 2. Section 3 discusses study design details and furthermore, it discusses our pre and post-Eid subsamples. Section 4 presents the econometric methodology adopted. Section 5 focuses on the results confirming the decline in compliance behaviour post-Eid. The penultimate section considers alternative pathways and discusses each alternative explanation one-by-one. Section 7 concludes.

Context and Literature

COVID-19: The Pakistani Context

Pakistan registered its first confirmed case of Coronavirus on February 26th and implemented a strict lockdown in the week of March 23rd (actual dates may differ by province). This lockdown was eased on May 9th, two weeks before *Eid-ul-Fitr*. As restrictions eased, transport and most businesses re-opened but cinemas, theatres, restaurants, and schools remained closed. On May 23rd, the day before *Eid-ul-Fitr*, the Prime Minister Imran Khan

announced that Pakistani's should celebrate while maintaining social distancing, even during prayers. Registered COVID-19 cases in Pakistan markedly increased immediately after *Eid-ul-Fitr* (see figure 2), with a clear spike in cases post- *Eid-ul-Fitr*.

Pakistan is a collective society with deeply entrenched social/religious norms surrounding *Eid-ul-Fitr*. Moreover, Pakistani society is characterized by hierarchy and high-power distance (Basabe and Ros 2005). Going against what one believes carries fear of sanctions (implicit or explicit) (San Martin et al. 2018; Stewart et al. 2003). One way to observe the impact of *Eid-ul-Fitr* on compliance is to look at Community Mobility Reports published by Google. These reports provide a percentage change in 6 categories of mobile activity of the population, relative to a baseline 5-week period of between January 3rd and February 6th.

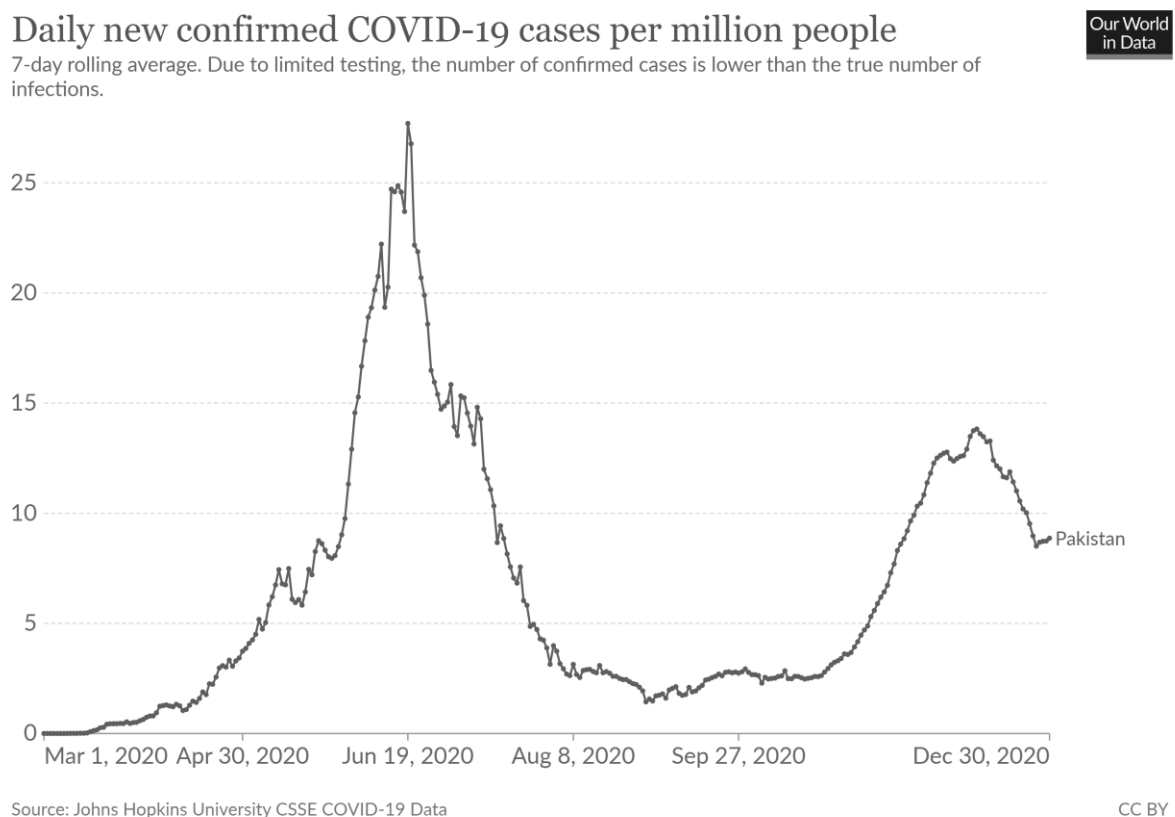


Figure 2: Daily New Cases in Pakistan (Source: Our World in Data)

In Figure 3a below, we report the average percentage change during the two-week period before *Eid-ul-Fitr* (and after the lockdown ended) – May 10th, 2020 to May 23rd, 2020. We compare this with the average percentage change during the two week period immediately following *Eid-ul-Fitr* (May 27th to June 10th 2020), for each of the 6 categories reported by Google: (i) traveling to Retail and Recreation, (ii) to Grocery and Pharmacies, (iii) to Parks, (iv) to Transit stations, (v) to workplaces, and finally, (vi) staying at residence. We note a marked decline of Pakistanis staying in their residence, a 3.49 percentage point decrease in the 2 weeks after *Eid-ul-Fitr*, relative to before. This is due to increases in work-related travel, as well as recreational travel, but not travel associated with necessities, which remains largely the same as in the previous period. Similarly, figure 3b plots the percentage change (from baseline) on

residential mobility (i.e. what percentage change over the baseline stayed in their homes). Note the marked decrease in the proportion of people staying home on *Eid-ul-Fitr* day. This yields a sustained shift downwards in the post- *Eid-ul-Fitr* period but does not carry a downward trend in the pre-*Eid-ul-Fitr* period.

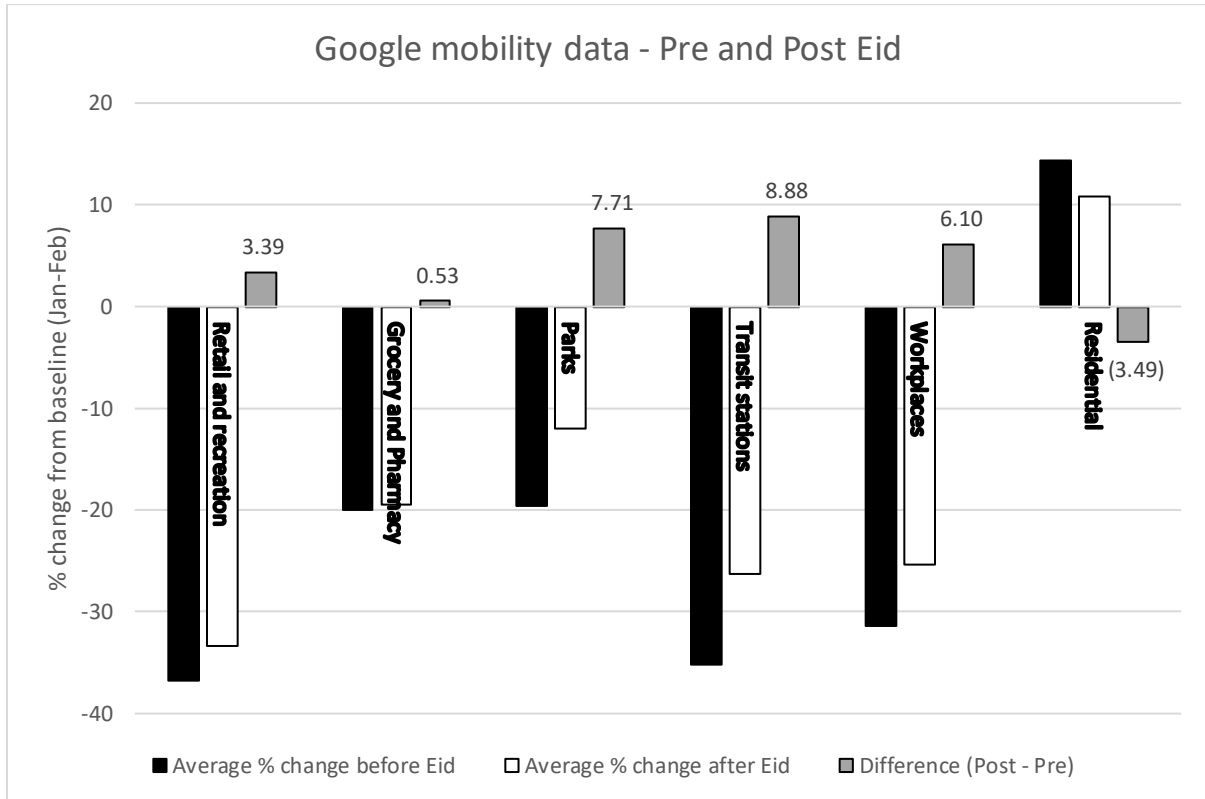


Figure 3a: Google Mobility data for Pakistan – Pre and Post *Eid-ul-Fitr* 2020 (source: Google Community Mobility Reports)

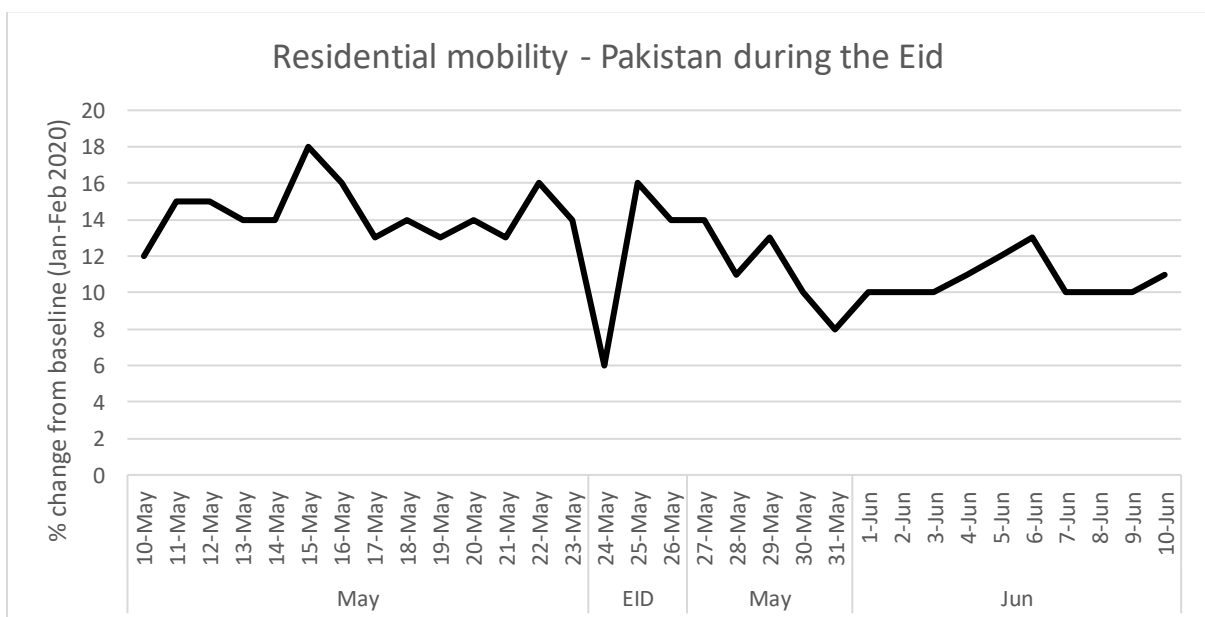


Figure 3b: Residential mobility data for Pakistan (source: Google Community Mobility Reports)

Emergence and Persistence of Social Norms

Very simply a ‘norm’ is a statistical regularity – a social norm is what people in a group believe to be typical and appropriate action in their (reference) group (Paluck et al. 2010). The construction of a social norm involves the role of social expectations vis-a-vis one’s beliefs about what others do, and one’s beliefs about what others think one should do (Mackie et al. 2015). Some social norms are stronger than others, and may involve strong social regularities of coordination and cooperation (such as driving on the right side of the road because everyone else does); these norms are held in place by reciprocal expectations. Because of the interdependence of expectation and action, social norms can be resistant to change. Especially because most social norms are maintained by social influence: approval/rewards; or disapproval/sanctions; or by one’s belief in the legitimacy of others’ expectations (Mackie et al. 2015).

The role of social norms in adopting health behaviours is well documented, but contentious. Recent literature with reference to the present pandemic argues that social distancing has emerged as a newly formed social norm supporting compliance behaviour, and makes the case to elicit further support for this norm and thereby ‘nudge’ people toward compliance (Bicchieri et al. 2020; Goldberg et al. 2020; Habersaat et al. 2020). Social expectations are critical to ensure conformity to a social norm: Goldberg et al. (2020) suggests strengthening of norms manifesting in compliance behaviour by increasing people’s perceptions of the frequency of preventive behaviours that close social network members are *doing* (descriptive norms) as well as what close social network members *approve of* (injunctive norms). Their findings suggest that the proportion of Americans performing preventive behaviours substantially increased if people communicated with friends and family that they were engaging in these behaviours themselves, and that *you should too*, to keep yourself and others safe (Goldberg et al. 2020). Similarly, Bicchieri, Dimant, and Gächter (2020) suggest that the state via appropriate messaging about others’ behaviour (just informing people of how many in their reference group adhered to the norm) can bolster social expectations and further strengthen the norm of social distancing.

Other drivers that can mediate expectations and support compliance behaviour are perceived risk and trust (which includes both trust in the legitimacy of the government, but also trust in scientists, as recently proposed by Bicchieri, Dimant, and Gächter 2020). Literature on previous pandemics, and more recently on Covid-19, confirms a significant role of both these factors in conforming compliance to healthcare guidelines. Papers have used observational data (some across time and space) to understand how these preferences evolve during a global crisis (Bults et al. 2020). Some turn to optimism bias to explain low risk perception and in turn less compliance (Raude et al. 2020), in contrast, others have argued that risk is over-estimated and fatalism bias may exist (Akesson et al. 2022). Akesson et al. (2022) uses an online experiment to study individual beliefs and behaviours during the COVID-19 pandemic and find that individuals overestimate both the infectiousness and dangerousness of COVID-19 relative to expert opinion. The authors find that people who believe that COVID-19 is more infectious, are less

willing to take social distancing measures – the “fatalism effect” – but they also find that people quickly correct themselves when provided with accurate information.

With reference to trust in authority, it is important to realise that the state cannot simply depend on coercion, particularly when it comes to behaviour that is not directly observable or enforceable. The more trust people have in the perceived competence of the government in managing problems, the more they feel obliged to aid the authorities, and adhere to its decisions, policies, and rules (Tyler 2006). Bicchieri, Dimant, and Gächter (2020) use a cross-country experimental design and find that the role of trust in authorities mediates social expectations. That is, higher trust in authorities translates into greater compliance. Our paper goes beyond these mechanisms and provides evidence for a change in social norms (brought about by a religious holiday) reducing compliance.

In Muslim societies, *Eid-ul-Fitr* is a holiday with strong norms of behaviour, involving traveling to visit family members (elders in particular) and close friends, embracing each other as a greeting (including strangers), sharing food and drink, giving and receiving gifts (usually money), and wearing new clothes. *Eid-ul-Fitr* during a pandemic is particularly difficult to navigate as one would have to break old customs to comply with behavioural guidelines. One risks offending elders, which usually carries heavy social sanctions.

The typical focus of *Eid-ul-Fitr* is on social gathering. Even if one was to comply with behavioural guidelines regarding meeting family members, there is still the strong norm of attending prayer (which has been considered mandatory and tends to be observed even by non-practicing Muslims). Further, migrant workers travel to their ancestral homes to celebrate *Eid-ul-Fitr* with family. The traditional greeting involves embracing; presents (usually money); feasts are arranged (Raza 1991). In 2020, with the onset of COVID-19 and the newly established social norm surrounding preventive healthcare guidelines (social-distancing in particular), norms guiding behaviour came into direct conflict with norms governing behaviour during *Eid-ul-Fitr*.

In the lead up to *Eid-ul-Fitr*, adherence to distancing rules carried over from the lockdown, and further reinforced by sustained closures of cinemas, theatres, restaurants, and schools. Hence, during the period of the study (two weeks before and after *Eid-ul-Fitr*), no changes in policy concerning lockdown were announced. As Eid occurred, however, the norms of compliance with COVID guidelines would potentially be overruled by norms of adherence to familial customs. Some may be convinced of the necessity of observing social distancing, but the expectation (or at least their understanding of the expectation) to socialize at *Eid-ul-Fitr*, would push them to comply with religious norms.

Norms and Gender

The specifics of compliance to COVID guidelines have some unique implications in a gendered society like Pakistan, though the experience does not necessarily differ with other Muslim majority countries. In particular, due to preexisting norms regarding gender differentiation surrounding paid and unpaid work, females spend more time in their own dwelling doing unpaid care work than men (Mete et al. 2012). In Pakistan there is gendered division of labour in time use patterns, with females spending more time on household maintenance and care work within their

own dwelling (Lloyd et al. 2008) and this is not effected by school/college enrollment. Moreover, despite controlling for time spent at the educational institute, other public spaces (besides schools, colleges, etc) such as libraries, parks, community centers, remain heavily masculinized spaces in Pakistan with 55 percent of the females do not report going out on an average day(Adeel et al. 2014). This has implications for compliance to social distancing guidelines during the pandemic, as females already spend less time outside their own dwellings and are expected to pay lower costs to adopt social distancing (specifically leaving home), relative to males.

Study Design, Measures and Data

A 50-item survey instrument was developed and distributed among nine randomly selected Heads of Departments at Pakistani colleges/universities through an email, who then distributed it among their student bodies. The survey instrument was emailed to the Heads of Departments on May 16th and 17th 2020 with a request to share the invitation with students (Table A in Appendix A contains the exact text of the email). The text of the email, after introduction, stated that the aim of the study is to understand the risk and time preferences of the youth of Pakistan and did not mention COVID-19, compliance behaviour, or timings of *Eid-ul-Fitr*.

Heads of Departments sent out the emails to their student bodies of their own volition. We did not send any reminder notices, and in a few cases, we never heard back. Therefore, the total sample is a mixture of responses from core universities (that were directly sent the invitation) and snowball universities (who received the survey through other students). There are 15 responses from snowball methodology and our findings are robust to restricting our sample to core universities.

While some institutions responded to our call immediately, others delayed their response till after *Eid-ul-Fitr*. In addition, we observe that we get a large proportion of responses from same university within the span of 24-hours. Note that our initial email was sent a week prior to the *Eid-ul-Fitr* holidays, so it is reasonable to believe that some administrators would be too busy to respond immediately, while others would not. We find no discernible pattern in administrator's response to our email. We also find little differences across the two subsamples with respect to observables (see Table 3). We treat this delay in sending out invitations as a quasi-random event, which then allows us to identify the effects of *Eid-ul-Fitr* on compliance. Later in the paper we discuss the alternative pathways in detail.

Survey Modules & Measures

The survey collected demographic information of the participants (age, gender, field of study and household characteristics indicating their socio-economic status) as well as participant preferences (participant risk taking, time, religiosity, honesty and trust). Our measures of Religiosity, honesty, trusting others and their own trustworthiness are on a scale of 10. We also utilized a standard World Values survey risk elicitation (“Are you a person who is prepared to take risks in general, or do you avoid taking risks?”), in addition to the scenarios. Generally, survey measures of risk attitudes are valid indicators, but are noisy (Ding et al. 2010).

To measure time preferences, the participant was asked two consecutive questions: the amount of money (between Rs 0 – 50,000) they would want today instead of receiving Rs 50,000 for sure in (i) 6 months, and (ii) in 12 months. Due to survey limitations we were only able to field these two questions, though more variation is preferable. However, survey questions for time preferences may be difficult to comprehend without detailed instructions (Falk et al. 2022), as well as (since these again deal with money) different liquidities before and after *Eid-ul-Fitr*. For these reasons, we need to be cautious while interpreting risk and time preference measures.

Our third module in the survey is about COVID-19. We measure preferences for compliance, perceptions about COVID-19 dangers, appropriateness of government measures (provincial and federal) and perceptions of media reporting. The module begins with the question on fear of the Coronavirus (on a 10-point Likert scale). We then follow this question with our main variables of interest, compliance with coronavirus guidelines. We measure compliance in 6 dimensions: participants reducing leaving home, their avoidance of large crowds, their avoidance of physical greetings, wearing a mask (when outdoors), and avoidance of grocery shopping and mosque visits. Refer to Table 1 for exact survey questions used to measure the six dimensions of compliance and the primary control variables, perceived risk and trust in authorities. Four of the six social compliance measures are binary variables (avoiding physical greetings, wearing a mask, avoiding grocery and mosque visits). The survey question for the variable *reduced leaving home* has three categories; i) not at all, ii) yes, I go out less often and iii) yes, I go out very much less often. Lastly, the survey question for the variable *avoids large crowds* has a scale of 0-10 where 0 = not at all and 10 = completely. For consistency and simplicity, we transformed the variables of reduced leaving home and avoiding large crowds into binary variables, with 1 indicating full compliance, and 0 otherwise. These six social compliance indicators are the main dependent variables.

Note that in the case of leaving home, only 5.8 percent of the participants reported not reducing leaving home at all while 28 percent reported reducing leaving home a little. We lumped these two together as a 0 against the choice of reducing leaving home very often as 1. On the other hand, the question on large crowds had a scale of 10 and to convert it into a binary variable we only assigned 1 to participants who chose 10 (43 % of the total sample) and 0 otherwise.

Table 1: The survey questions used to measure the social compliance and primary control variables.

Variable Name	Survey Question
Reduced Leaving Home	Have you reduced going outside because of the Corona virus?
Avoids Large Crowds	How strongly do you avoid large crowds in public (public-transportation services, markets, restaurants, etc.)? (0 = no at all; 10 = completely)
Avoids Physical Greetings	Do you avoid handshake/physical greetings?
Wears Masks	Do you wear face mask when going out?
Stopped Mosque Visits	Did you stop going to mosque/church?
Reduced Grocery Shopping	Did you reduce the number of times your family goes out for grocery?
Perceived Risk of COVID-19 Infection	What do you think is the probability that you will be infected with the virus within the next four weeks? (Please enter a value between 0 and 100)
COVID-19 Fear	How much are you afraid of the Corona virus? (0 = no at all afraid; 10 = very much afraid)
Government's Truthfulness	How factually truthful do you think your country's government has been about the coronavirus outbreak?

The primary control variables include the perceived risk of COVID-19 and trust in authorities. We use two variables to measure risk perceptions: (i) fear of COVID-19 and (ii) perceived risk of COVID-19. Trust in authorities is measured using a 5-point Likert scale to assess how truthful the participant thinks government is with regard to COVID-19; 1 = very untruthful, and 5 = very truthful.

Descriptive Statistics

A total of 357 participants completed the survey with 49 percent females and an average age of 21 years. Table 2 gives the distribution of the sample by age where the largest proportion lies in the bracket of 20 – 22 years followed by 17-19 years. 83 percent of the participants are undergraduate students. 68 percent of the sample went to private schools and 82 percent had English as the medium of teaching. Table 2 presents this data.

Table 2: Individual and Household Characteristics of the Sample

Covariates	Frequency	Percentage
Individual Characteristics		
<i>Age Category</i>		
17 – 19 years	116	32.49
20 – 22 years	158	44.26
23 – 25 years	49	13.73
26 – 28 years	20	5.60
29 – 40 years	14	3.92
Female	172	48.18
English Medium Schooling	291	81.51
Schooling from a Private School	246	68.91
Employed	102	28.57
<i>Political Party Affiliation</i>		
PPP	8	2.24
PMLN	53	14.85
PTI	200	56.02

	JUI	2	0.56
	Others	94	26.33
Household Characteristics			
Household's Monthly Income			
	PKR 10,000 – 25,000	57	15.97
	PKR 25,001 – 50,000	63	17.65
	PKR 50,001 – 75,000	46	12.89
	PKR 75,001 – 100,000	55	15.41
	PKR 100,000 +	136	38.10
Assets Owned			
	House	292	81.79
	Television	295	82.63
	Cell-Phone	333	93.28
	Motorbike	202	56.58
	Car	205	57.42
	Computer	148	41.46
	Laptop	313	87.68
	Agricultural Land	56	15.69
Participant has Access to			
	Wi-Fi	302	84.59
	Mobile Data	289	80.95
Social Compliance Indicators			
	Reduced Leaving Home	236	66.11
	Avoids Large Crowds	155	43.42
	Avoids Physical Greetings	302	84.59
	Wears Mask	303	84.87
	Stopped Mosque Visits	285	79.83
	Reduced Grocery Visits	330	92.44

Table 3 provides the distribution of the sample across institutions before and after *Eid-ul-Fitr*. It is important to note that the responses from the same institution are not spread before and after *Eid-ul-Fitr*. Further, a large majority of universities are extremely specialized; we have either social science schools (Lahore University of Management Sciences, Institute of Management Sciences and Lahore School of Economics), institutions specialized in engineering/technology (University of Engineering and Technology, Information Technology University) and health sciences (Akhtar Saeed Medical & Dental College).

Table 3: Distribution of Sample by Institution, before and after *Eid-ul-Fitr*

Institution Name	Total		Before Eid		After Eid	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Lahore University of Management Science	11	3.08	11	7.69	0	0
University of the Punjab, Lahore	31	8.68	28	19.58	3	1.40
Institute of Business Administration	101	28.29	100	69.93	1	0.47
University of Engineering and Technology	2	0.56	2	1.40	0	0
Riphah International University	1	0.28	1	0.70	0	0
Lahore School of Economics	1	0.28	1	0.70	0	0
Akhtar Saeed Medical & Dental College,	16	4.48	0	0	16	7.48
Information Technology University	127	35.57	0	0	127	59.35
Virtual University	1	0.28	0	0	1	0.47
Kinnard College Lahore	1	0.28	0	0	1	0.47
Govt. Post Graduate College for Women,	56	15.69	0	0	56	26.17
Other	8	2.24	0	0	8	3.74
King's College London	1	0.28	0	0	1	0.47
Total	357	100.00	143	100.00	214	100.00

Balance table

The identification of the effect of *Eid-ul-Fitr* is from a quasi-random process: when the invited Heads of Departments shared the survey invitation with their student body. The invitation email stated that the aim of the survey is to understand the risk and time preferences of Pakistani youth, with no mention of Covid-19 and/or *Eid-ul-Fitr*. However, we cannot rule out (by virtue of design) that this was a non-random process. In the penultimate section, we discuss alternate interpretations of our results, and demonstrate the likelihood of several channels. For now, however, we present a balance table (Table 4) for all observables. The first column in Table 4 lists the coefficients of bivariate regressions of each respective covariate on a dummy variable, equalling 1 if the participant completed the survey after *Eid-ul-Fitr*, or 0 otherwise. It is important to note that the participants are balanced in terms of gender, self-perception about honesty and trust, trust in authorities, how truthful authorities are about COVID-19, perceived fear of COVID-19, appropriateness of the measures taken by the government, and perception of media reporting. Our sample is balanced on the two most crucial determinants of social compliance according to existing literature; risk perceptions and trust in authorities. Indeed, averages for these measures are remarkably close to each other.

Table 4: Balance Table estimating subsample differences before and after Eid-ul-Fitr

Covariates	After-Eid (dummy)	Mean	SD	N
Demographics				
Age	-1.046*	21.25	3.101	357
Female	-0.276	0.481	0.500	357
Socio- Economic Status				
Household Income	-1.184*	3.420	1.524	357
Assets	-0.0909	5.165	1.692	357
Employed	-0.276	0.286	0.452	357
Log (Own Income)	-0.577*	9.521	1.692	99
Wifi Access	-0.781	0.846	0.362	357
Mobile Data Access	-0.750***	0.810	0.393	357
Any Internet Access	0.408	0.989	0.105	357
Private Schooled	-1.293**	0.689	0.464	357
English Medium Schooling	-0.789**	0.815	0.389	357
Preferences				
Religious	0.307	6.625	2.204	357
Risk Tolerance (Self-Assessment)	-0.112	6.171	2.307	357
Risk Aversion (Money)	-0.531***	0.501	0.501	357
Risk Aversion (Wheat)	-0.710***	0.664	0.473	357
Time Preference 6 Month	-7,993**	32,141	18,583	357
Time Preference 12 Month	-5,945*	33,889	18,260	357
Honesty	0.0744	7.877	1.741	357
Purchased Ticket	0.110	1.339	0.772	357
Trust Others	0.102	5.866	2.854	357
Supports Current Government	0.0999	0.560	0.497	357
In Favour of Lockdown	0.329	0.801	0.400	357
Self-Perceptions				
Self-Trustworthiness	-0.400	8.389	1.868	357
Government Trust	0.203	2.905	1.246	357
Government's Truth about Corona	0.0212	3.090	1.126	357
Covid-19 Perceptions				
Fear of Corona	-0.140	5.874	2.883	357
Perceived Risk of Corona	1.026	24.41	25.78	357
Appropriateness of Federal Government's anti-corona measures	-0.206	5.821	2.925	357

Appropriateness of Provincial Government's anti-corona measures	-0.299	5.807	2.893	357
Insufficient Government's Reaction to Covid-19 Situation	-0.153	3.496	0.982	357
Contact Health Facility on Symptoms	-0.396*	7.252	2.909	357
Media Reporting of Corona	-0.233	3.126	1.027	357
Social Compliance Components				
Reduces Leaving Home	-0.672**	0.661	0.474	357
Avoids Large Crowds	-0.710**	0.434	0.496	357
Avoids Physical Greetings	-0.674**	0.845	0.361	357
Wears Mask	0.389	0.848	0.358	357
Reduced Mosque Visits	-1.131***	0.798	0.401	357
Reduced Grocery Visits	0.195	0.924	0.264	357

Notes: ***, **, * indicate 1%, 5% and 10% significance level, respectively.

In addition to looking at the differences in means, we also explore the distribution of COVID-19 risk perceptions and trust in authorities in Figure 4 below. The kernel density graphs for all three variables are nearly identical. The distribution on the COVID-19 fear variable (Figure 4a) is just a little flatter after *Eid-ul-Fitr* but the difference is statistically insignificant. These indicate that the distributions of both risk perceptions and trust in authorities remain unchanged between the two subsamples. Trust in the authorities and perceived risk of the virus are nominally positive in the post *Eid-ul-Fitr* sample, indicating (if anything) that the subsample should be more compliant, not less.

There are some important differences between the sub-samples, however. Participants after *Eid-ul-Fitr* are marginally younger, less wealthy, less risk tolerant (based on the scenario-based measures) and less patient. Pakistan has a stratified higher education system with middle-income private/public universities and elite private universities. Further, there are only limited funding opportunities, especially with reference to elite private universities, therefore, the student bodies within these institutes differ in terms of their income levels. Household income and wealth indicators remain a strong determinant of the university a student ends up attending. Since, the universities of the participants before and after *Eid-ul-Fitr* are different, it is expected that they differ in terms of wealth indicators and it is difficult to match on these variables across various universities. Access to mobile data and private English-medium schooling are also predictors of affluent backgrounds and hence do not balance in before and after *Eid-ul-Fitr* subsamples.

Moreover, the participants after *Eid-ul-Fitr* are observed to be less risk tolerant and less patient. The World Value survey risk measure is statistically the same before and after Eid. We rely on this measure more than the other two scenario-based measures to elicit risk attitudes as it is straightforward, simple and easy to understand, and free of liquidity concerns. Given these subsample differences, we use these as our main control variables, outside of risk perceptions and trust in authorities. In addition to this, we employ a matching technique to account for these differences, as an additional robustness check.

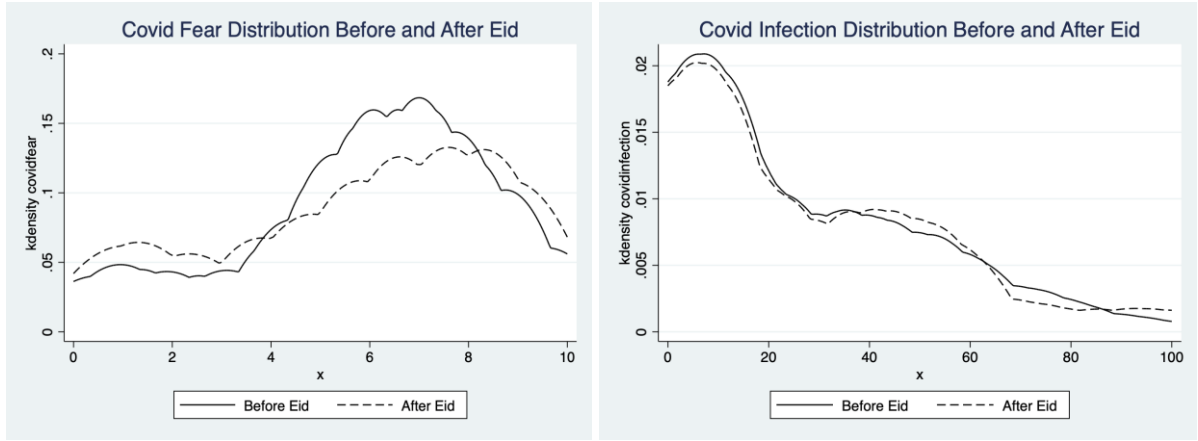


Figure 4(a,b): Distribution of Covid-19 risk perceptions, before and after *Eid-ul-Fitr*

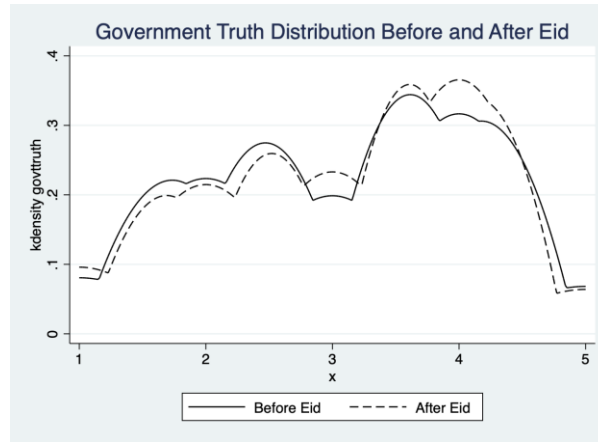


Figure 4(c): Distribution of Trust in authorities, before and after *Eid-ul-Fitr*

Notes: The p-values of Kolmogorov-Smirnov test for the difference in distribution of Covid fear, Covid infection and government truth before and after Eid-ul-Fitr are 0.846, 0.880 and 1.000, respectively.

Empirical Strategy

The aim of this paper is to study the effect of *Eid-ul-Fitr* on compliance. Our main empirical specification is a logit regression in the form:

$$SC_{ji} = \alpha + \beta \cdot Eid + \pi \cdot X_i + \mu$$

where SC_j is the j^{th} indicator of compliance for individual i namely, avoiding leaving home, avoiding large crowds, avoiding physical greetings, wearing a mask, mosque visits and grocery visits, *Eid* is a binary variable that equals 1 if it is on or after *Eid-ul-Fitr*, 0 otherwise; X_i are the individual level control variables and μ is the stochastic error term. Standard errors are clustered at the university level making 13 clusters.

Our main outcomes of interest are the six social compliance indicators: reduced leaving home, avoids large crowds, avoids physical greetings, wears a mask, stopped mosque visits, and reduced grocery visits. *Reduced leaving home* equals 1 if the participant states that they “go out very much less often” and 0 otherwise, while *avoids large crowds* takes the value of 1 if the participant fully “avoid large crowds in public,” and 0 otherwise. *Avoids physical greetings* equals 1 if the participant avoids “handshake/physical greetings,” and 0 otherwise. *Wears mask* takes the value

of 1 if participant “wear a face mask when going out,” and 0 otherwise. *Stopped mosque visits* equal 1 if “stop going to mosque/church,” and 0 otherwise. Finally, *reduced grocery visits* equal 1 if the participant reported reducing “the number of times your family goes out for grocery,” and 0 otherwise. Hence, in our setup 1 always signified high/full compliance.

The vector X includes the primary control variables: perceived risk of Covid-19, perceived fear of Covid-19, and trust in authorities. It also includes other demographic factors (age and gender), wealth indicators (household income, access to mobile data, schooling at private school and English medium of instruction), risk and time preferences, as discussed above. In addition, we control for employment status: we add a binary variable for students who work.

Next, to examine gender differences, our specification includes an interaction term as follows:

$$SC_{ji} = \alpha + \beta.Eid + \gamma.Female + \theta.Eid * Female + \pi.X_i + \mu$$

where *Female* is a binary variable which captures the gender of the participant. In this specification, β is the effect of *Eid-ul-Fitr* for males, γ captures the pre-Eid effect on females (relative to pre-Eid males), while the interaction term estimates the effect of *Eid-ul-Fitr* for females (relative to pre-Eid males). A significant coefficient on the interaction term (θ) indicates that *Eid-ul-Fitr* had a differential effect for males and females.

Results and Discussion

Main Results

This section summarizes the effect of *Eid-ul-Fitr* on our six indicators of compliance with Covid-related behavioural guidelines. We first discuss the main results, followed by gender differences. As mentioned above, since all compliance indicators are binary variables, logit regressions were used to estimate the effect of *Eid-ul-Fitr*. Table 5 reports the respective marginal effects for the logit estimates where each column represents a compliance indicator, namely, (1) reduced leaving home, (2) avoids large crowds, (3) avoids physical greetings, (4) wears masks, (5) stopped mosque visits and (6) reduced grocery visits. Controls include risk perceptions, trust, socio-economic indicators, risk preferences, and time preferences. For all six indicators, higher numbers indicate greater compliance. The effect of *Eid-ul-Fitr* is consistently negative across four of the six compliance indicators. That is, self-reported compliance is lower for participants responding after *Eid-ul-Fitr*, relative to those responding before, as predicted by religious norms overtaking compliance norms.

Table 5: Marginal effects of logit estimates of the effect of *Eid-ul-Fitr* on compliance

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Reduced Leaving Home	Avoids Large Crowds	Avoids Physical Greetings	Wears Mask	Stopped Mosque Visits	Reduced Grocery Visits
After Eid	-0.105** (0.046)	-0.195*** (0.040)	-0.081*** (0.018)	0.047 (0.030)	-0.137*** (0.035)	-0.017 (0.029)
Female	0.092** (0.037)	0.069 (0.060)	0.081 (0.053)	0.160*** (0.042)	0.040 (0.041)	-0.028 (0.028)
Perceived Risk of Covid-19 Infection	-0.001 (0.000)	-0.002*** (0.001)	0.001 (0.001)	0.002** (0.001)	0.002*** (0.001)	-0.000 (0.000)
Covid-19 Fear	0.036*** (0.006)	0.050*** (0.012)	0.027*** (0.003)	0.023*** (0.005)	0.028** (0.013)	0.016*** (0.004)
Government's Truthfulness	0.012 (0.010)	0.017 (0.017)	0.032*** (0.008)	0.019 (0.016)	0.053*** (0.010)	-0.003 (0.011)
Control Variables ¹	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R ²	0.1282	0.1140	0.1622	0.1681	0.1822	0.1126
Log Likelihood	-199.82	-216.49	-128.51	-126.18	-146.77	-84.88
Observations	357	357	357	357	357	357

Notes: The standard errors in the parenthesis are clustered by University and ***, **, * indicate 1%, 5% and 10% significance level, respectively. The control variables include age, wealth indicators, risk and time preference measures.

1: Control Variables include risk perceptions and trust in authority measures, age, household income, access to mobile data, private and English medium schooling, if the student works, risk and time preference measures.

Column (1) of Table 5 reports that participants responding after *Eid-ul-Fitr* exhibit 10.5 percentage points lower compliance in terms of reduction in leaving home, while keeping risk perceptions and trust in authorities constant. Moreover, notice that females comply 9 percentage points more than the males. As mentioned earlier, however, gender norms with respect to household work would yield this result, as Pakistan is a patriarchal society and females are generally less prone to leave home unnecessarily. Column (2) reports the marginal effects of logit estimates for avoiding large crowds. After *Eid-ul-Fitr* the participants reduced compliance (avoiding large crowds) by 19.5 percentage points. These findings support the argument that deeply entrenched religious norms collide and overturn newly formed compliance norms.

Avoidance of physical greetings are also reduced by 8 percentage points post *Eid-ul-Fitr* as shown in column (3) of table 5. Respondents were significantly less likely to report stopping visits to the mosque, post *Eid-ul-Fitr*. we observe a reduction of 13.7 percentage points as reported in column (5). Note that we have two observations on two of the three *Eid-ul-Fitr* days and the results are robust to exclusion of the two observations. The results are not reported but can be provided on request.

For the last two social compliance indicators, wearing masks and reducing visits for grocery shopping, the effect of *Eid-ul-Fitr* is statistically insignificant. This could be because groceries are a necessity despite all the compliance guidelines. In line with previous models of compliance, at least one of our indicators of risk perceptions related to COVID-19 (general fear of the virus) is positive and statistically significant for all compliance indicators, indicating that higher perceived risk of the virus is associated with greater compliance. Similarly, the probability of catching the virus in the next 4 weeks is similarly positive, with one interesting exception: the avoidance of large crowds, where it is significant and negative. Trust in authorities is similarly positive, though the effects are significant for two of our six indicators (wearing masks and

stopped visiting the mosque), and negative, but insignificant, for one, reduced visits to for groceries.

The negative effect on the avoidance of large crowds may well be due the fact that we also control for fear of the virus in the regression such that those that fear the virus generally increase compliance, but those that perceive the probability of catching the virus to be high, reduce their compliance in line with models of fatalism (the probability is so high, why bother complying), in line with Akesson et al. (2022).

Overall, we observe a general trend towards a lower level of compliance in the post *Eid-ul-Fitr* subsample, relative to the subsample responding before Eid. This effect persists in four out of six compliance indicators, even when controlling for risk perceptions and trust in authorities (which have been previously shown to be associated with compliance related behaviours). To assess the robustness, following other studies using quasi-experimental techniques (Cyan et al. 2017; Kim and Steiner 2016; Valenzuela et al. 2014), we use two matching methodologies for causal inference; propensity score matching and inverse probability weights regression adjustment. Table A7 in appendix gives the average treatment effect using both methods. Note that depending on the technique, our results for three (four) of the compliance indicators remain negative and significant. The only difference between these results and the ones reported above, is that using propensity score matching, participants reporting compliance after *Eid-ul-Fitr* are no longer significantly less likely to comply. Other than this, our core results remain.

Gender differences

Norms of mobility, access to public spaces, working, and even going out for religious activities, differ by gender in Pakistan. Therefore, the costs of compliance are higher for one gender (males) over the other. Furthermore, religious norms associated with *Eid-ul-Fitr* also differ by gender, with greater expectation for males to comply (for example praying at the mosque) than females. Hence, to exploring the differential effect of *Eid-ul-Fitr* on males and females, we rerun the logit estimation with an interaction term (female X after Eid). As indicated in table 7, the coefficient on the interaction term is significant for four social compliance indicators; reduced leaving home, avoids large crowds, avoids physical greetings and reduced grocery visits.

The first row in table 7 shows the difference in compliance for male participants responding after *Eid-ul-Fitr*. For reducing leaving home, male participants responding after *Eid-ul-Fitr* are lower, but the difference is not significant. Female participants, however, are more likely to report complying before *Eid-ul-Fitr*, but those responding after *Eid-ul-Fitr* are significantly less likely to report compliance. Hence, in this particular case, the reduction in compliance is driven mainly by females, who are more likely to report leaving home in the post *Eid-ul-Fitr* period. We conjecture that this is due to a high rate of female compliance in the pre-Eid period, which shifts due to the increased visits during *Eid-ul-Fitr*. For the remaining compliance indicators, we observe a general pattern of male respondents post Eid, complying significantly less than male respondents pre-Eid.

The effect of *Eid-ul-Fitr* on reduced grocery visits was statistically insignificant in our main results, emerges as significant for both males and females, but is in opposite directions: Post-Eid males exhibit lower compliance, but post-Eid females exhibit higher compliance. We are not aware of why this might be the case, however it is clear that if visits outside the home are becoming routine after Eid, males are more likely to engage in visits to grocery stores than females. The results of our survey indicate that *Eid-ul-Fitr* in Pakistan resulted in a decline in compliance overall, with the effect being driven largely by males.

Table 7: Logit estimates of the effect of Eid-ul-Fitr on compliance – Gender differences

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Avoids Leaving Home	Avoids Large Crowds	Avoids Physical Greetings	Wears Mask	Reduced Mosque Visits	Reduced Grocery Visits
After Eid	-0.0859 (0.125)	-1.169*** (0.174)	-1.215*** (0.212)	0.357 (0.297)	-1.259*** (0.322)	-0.691* (0.402)
Female	1.337*** (0.132)	0.0294 (0.262)	-0.145 (0.687)	1.310*** (0.471)	-0.0489 (0.307)	-0.954*** (0.301)
After Eid * Female	-1.292*** (0.353)	0.520 (0.369)	1.312* (0.721)	0.314 (0.450)	0.484 (0.771)	0.946** (0.442)
Control Variables ¹	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R ²	0.1355	0.1151	0.1717	0.1684	0.1835	0.1167
Log Likelihood	-197.61	-216.22	-127.06	-126.14	-146.54	-84.50
Observations	357	357	357	357	357	357

Notes: The standard errors in the parenthesis are clustered by University and ***, **, * indicate 1%, 5% and 10% significance level, respectively.
1: Control Variables include risk perceptions and trust in authority measures, age, household income, access to mobile data, private and English medium schooling, if the student works, risk and time preference measures.

External Validity

We seek to investigate compliance behaviour of Pakistani university students. Pakistan has the world's largest youth bulge in its history (64 percent of Pakistanis are under the age of 30)(Dewan and Sarkar 2017). Therefore, the sample is extremely relevant, even if it may not be representative of the entire population. While compliance behaviour may differ over the life-cycle, there is evidence that various games (such as the gift-exchange game) yield similar results for students and non-students (Falk and Heckman 2009). Therefore, the effects on compliance behaviour should track to at least the youth (if not the entire population).

Alternate explanations

It is important to note that our interpretation of the results of the survey are conditional on the delays in fielding the survey among our partner institutions follow a random process. If they do, the differences between the pre-Eid and post Eid subsamples are due to random processes, rendering our study akin to a natural experiment. There exist, however, a series of threats to our interpretation of the findings, that we discuss. Broadly, they constitute three main areas: (i) differences in institutions pre- and post-Eid, which suggest our results are driven by unobservable factors; (ii) other events taking place during the month-long window pre- and post-Eid; and (iii) post-Eid responses to compliance questions are specific to behaviour on Eid, and are not sustained beyond Eid.

Differences in institutions

Since different institutions fielded the survey before and after *Eid-ul-Fitr*, it is possible that differences in institutions, or differences in the student body of said institutions are driving our results. For example, the universities fielding the survey later may be of lower quality. Similarly, the quality of students may be correlated with the administrative quality of the universities that sent out the survey later. While we are not aware of any research pointing to weaker students being less compliant than stronger students, we are unable to rule this alternative explanation out using our data alone, particularly since we did not collect any data on grade point average, or other indicators of quality. However, this seems a less plausible explanation than the effect of norms, which other studies have found to be powerful motivators (Christakis and Fowler 2013; Dickie et al. 2018; Schultz et al. 2007; Sparkman and Walton 2017). We also are not aware of any reason why these would generate samples that are different on just compliance and socio-economic status, but not other factors. Two of the universities in our sample (the Institute of Business Administration, and the Lahore University of Management Sciences) are of demonstrably higher quality than others, and both fielded the survey prior to *Eid-ul-Fitr*. We offer the simplest test we can to check to see if the pre-Eid elite university students are different than the pre-Eid non-elite university students. We estimated a bivariate model of elite student dummy on compliance indicators with the pre-Eid subsample, and found an insignificant effect on all compliance indicators with the exception of avoiding large crowds -- for that, we found the elite students to be less compliant as compared to non-elite students. Therefore, we find that elite university subsample is less compliant relative to non-elites on one measure of compliance, indicating that the bias (if any exists) works against our findings.

Other (non-Eid related) events

The second alternative explanation might be other events that occur during the same period that might bias the results. While we note that the lockdown had already been removed when we fielded the survey, the period prior to *Eid-ul-Fitr* are the last days of the month of fasting (Ramadan), which may well have temporarily increased compliance (hence the post-Eid period constitutes a return to baseline). In normal circumstances during Ramadan there is lower mobility outside the house due to fasting, when Muslims might be expected to stay at home as they cannot eat or drink during the day, and many businesses (particularly the hospitality sector) are closed during certain hours. However, our data begins from May 16th 2020, and captures the last week of Ramadan, when the preparation for *Eid-ul-Fitr* festivities were peaking. Therefore, one would expect more trips to be made outside one's dwelling in the lead up to *Eid-ul-Fitr* (less compliance). Therefore, Ramadan seems an implausible explanation. Moreover, most businesses (such as cinemas, theatres, restaurants, and schools) remained closed for the entire duration of our study, and hence the likelihood of traveling for entertainment during the day stayed constant.

The heads of all the Muslim majority countries (as well as scholars) were reported to appeal to their respective nations for low-key celebrations in the face of the Covid-19 threat (Al-Jazeera 2020; Arab News 2020). Some Muslim countries in the Middle East even imposed strict

lockdowns right before and during *Eid-ul-Fitr* holidays to avoid a spike in Covid-19 infections (Al-Jazeera 2020). In Pakistan the lockdown on worship places, markets and malls was lifted on May 9th under the influence of religious scholars (Greenfield and Farooq 2020) even when the infections were rising and remained unchanged post Eid. This policy was criticized, nationally and internationally, as it may lead to increased social gatherings with and without implementation of required standard operating procedures (SOPs) advised by the government. The sudden surge in the number of cases in Pakistan and overflowing of corona patients in hospitals confirms the carefree approach of the Pakistani nation before and during Eid-al-Fitr (The Express Tribune 2020). Therefore, if any effect of Ramadan is expected, it's in the opposite direction, as in the last week of Ramadan *Eid-ul-Fitr* preparations peaked, and lockdown on markets and mosques was removed.

Moreover, it is entirely possible that those responding later would be less compliant than those responding earlier due to policy or narrative shifts, or difference in number of cases or fatigue. Given the extremely small window of time when our survey was fielded (8 days prior to and 12 days after Eid), where little policy shifting occurred. The trend of active new cases steeply rises after *Eid-ul-Fitr* as shown above in Figure 1, yet we do not see any differences in the risk perceptions of the participants that could lead to changes in compliance. Also, we would have expected an increase in the perceptions of risk of contracting COVID-19, but we observe no differences in perceptions in our subsamples.

Different interpretation of compliance questions

One final alternate interpretation is down to how our participants interpreted the questions about compliance. Those responding after Eid might have interpreted the questions on compliance to be about the Eid celebration period, rather than the period following Eid. Hence, the differences we observe are differences in compliance behaviour on Eid, rather than following Eid. This matters, as it could be that the reduction in compliance was not a sustained reduction, but a temporary one to celebrate the holiday.

While we have no real way to disentangle these interpretations post Eid, we might expect that the participants responding in the few days following Eid would report lower levels of compliance than those reporting a week after Eid. We conjecture that if subjects are interpreting the questions about behaviour in the past few days, those further away from Eid might be more likely to respond about the period following Eid, rather than Eid itself. To test if this is the case, the post Eid subsample was divided over the median - 6th day after Eid-ul-Fitr (May 30th). We specify a dummy variable equalling 1 if the participant responds after the median day, and equals 0 if they respond after *Eid-ul-Fitr* but before or on the median date. Table A0 in Appendix A reports the proportions test. We would expect systematically higher (positive coefficient) compliance in the days further away from Eid. While we are unable to completely rule out this explanation, we observe in Table A0 that there is no systematic pattern of compliance after the median date. In the post median dates, while compliance reduces for leaving home, it increases for physical greetings and wearing masks. Hence, though we cannot completely rule out this channel given data constraints, we do not observe systematic differences in the post-Eid

subsample. Furthermore, the google community mobility report data (figure 2b) supports a sustained downward trend in compliance indicated by lower residential mobility in post Eid-ul-Fitr days. Hence, we find this to be an unlikely alternative interpretation of our results.

Conclusion

In sum, this paper exploits variation in the timing of invitations sent to University students in Pakistan in order to study the effect of religious holidays on compliance with COVID-19 guidelines. We find that amid the pandemic, newly formed norms pertaining to healthcare guidelines (focusing on social-distancing) emerged, and were subsequently undercut by longstanding norms of behaviour following a religious celebration: *Eid-ul-Fitr*. We observe changes in certain compliance behaviours associated with religious holidays (staying home, avoiding crowds, avoiding physical greetings, avoiding going to the mosque), but not in others that are not associated with religious holidays (avoiding grocery-shopping and mask-wearing). This paper underscores the fragility of these newly emerged norms, especially when challenged by a more well-entrenched, traditional norm. Furthermore, we find different effects by gender: men are less likely to avoid crowds, physical greetings, and the mosque after Eid, while women are less likely to avoid leaving home. The overall rate of mask wearing and grocery shopping (behaviours that are orthogonal to compliance with guidelines) remain unchanged, though we observe some evidence of shifts in grocery shopping from males to females.

Eid-ul-Fitr in Pakistan resulted in a decline in our measures of compliance, even after controlling for perceived risk of infection, and trust in government, which are leading predictors of compliance. Reduced leaving home, avoidance of large crowds, avoidance of physical greetings and reduction in mosque visits, all declined post-Eid. Moreover, the effect was gender differentiated, with the reduction in compliance largely being driven by men. We further confirm our results by conducting robustness checks incorporating matching techniques. We realise that ours is a quasi-random design and cognizant there might be alternative explanations to the decline in compliance witnesses post- *Eid-ul-Fitr*. We address these alternative explanations one-by-one in the above section. Naturally, further investigation of the effects of religious events during the pandemic are needed, however, we provide evidence that changes in compliance can follow due to changing norms of behaviour associated with such events, and these changes in compliance are not just a blip, but persist even after the event.

Finally, with respect to policy implications, behaviour surrounding existing social norms pertaining to religious/social gatherings informs policymakers when designing policy guidelines to prevent the spread of the disease during such occasions. It is not easy to change social norms: involving change agents, such as elders in the community, religious leaders, politicians and scientists, could accelerate the change. Otherwise, social norms surrounding religious/social gatherings are so well-entrenched that when they come in direct conflict with prescriptions limiting social interactions, such prescriptions are generally overridden.

Appendix A

Table A: The text of the email sent out to heads of department and faculty members.

“Some fellow researchers and I are trying to collect some data to better understand how our Pakistani youth behaves, especially in terms of propensity to take risks and time preference. I would be highly grateful if you could please share this email with your students. We assure that this is a completely academic exercise and participant's identity (if they decide to share it with us) will remain confidential. This survey won't take more than 10-15 minutes.

Kindly click on this link to continue filling the form: <https://cutt.ly/VyEorVb>

Students are requested to further share it with other students in their family and friends' network across Pakistan.”

Table A0: Proportions test examining the difference in compliance between participants responding closer to *Eid-ul-Fitr* or after a week.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Reduced Leaving Home	Avoids Large Crowds	Avoids Physical Greetings	Wears Mask	Stopped Mosque Visits	Reduced Grocery Shopping
Proportions Test						
Difference	-0.152**	0.024	0.135**	0.087*	0.079	0.011
P-Value	0.027	0.723	0.014	0.069	0.205	0.766
No. of Observations (Total)	214	214	214	214	214	214
Pre-Median	135	135	135	135	135	135
Post-Median	79	79	79	79	79	79

Notes: ***, **, * indicate 1%, 5% and 10% significance level, respectively.

Table A1: Marginal effects of logit estimates of the *Eid-ul-Fitr* effect on reduction in leaving home.

VARIABLES	(1)	(2)	(3)
After Eid	-0.153*	-0.144*	-0.105**
	(0.079)	(0.073)	(0.046)
Female	0.081	0.052	0.092**
	(0.081)	(0.073)	(0.037)
Perceived Risk of Covid-19 Infection		-0.001	-0.001
		(0.000)	(0.000)
Covid-19 Fear		0.033***	0.036***
		(0.005)	(0.006)
Government's Truthfulness		0.011	0.012
		(0.013)	(0.010)
Age			-0.007
			(0.007)
<hr/>			
Household Income			
	PKR 25,001 – 50,000 ¹		0.230***
			(0.035)
	PKR 50,001 – 75,000 ¹		0.069
			(0.066)
	PKR 75,001 – 100,000 ¹		0.281***
			(0.083)
	More than PKR 100,000 ¹		0.255***
			(0.066)
Mobile Data Access			-0.087
			(0.056)
Private School			0.032
			(0.031)
English Medium School			-0.109**
			(0.053)
Student Works			-0.056
			(0.057)
Self-Assessed Risk ²			-0.005
			(0.010)
Risk Money ³			0.084**
			(0.039)
Risk Wheat ³			0.108***
			(0.030)
Time Preference 6 Month ⁴			0.013
			(0.077)
Time Preference 12 Month ⁵			-0.009
			(0.086)
Pseudo R ²	0.0247	0.0613	0.1259
Observations	357	357	357

Notes: The standard errors in the parenthesis are clustered by University and ***, **, * indicate 1%, 5% and 10% significance level, respectively.

1: Reference Category: Household Income = PKR 10,000 – 25,000

2: Are you a person who is prepared to take risks in general, or do you avoid taking risks? (0 = not at all prepared to take risks; 10 = very prepared to take risks)

3: Equals 1 if in a hypothetical situation the participant chooses the risk tolerant option.

4: The amount the participant is willing to take instead of waiting for sure payment of PKR 50,000 in 6 months.

5: The amount the participant is willing to take instead of waiting for sure payment of PKR 50,000 in 12 months.

Table A2: Marginal effects of logit estimates of the *Eid-ul-Fitr* effect on avoidance of large crowds.

VARIABLES	(1)	(2)	(3)
After Eid	-0.178** (0.074)	-0.168*** (0.053)	-0.195*** (0.040)
Female	0.127*** (0.049)	0.076 (0.060)	0.069 (0.060)
Perceived Risk of Covid-19 Infection		-0.002** (0.001)	-0.002*** (0.001)
Covid-19 Fear		0.049*** (0.012)	0.050*** (0.012)
Government's Truthfulness		0.019 (0.018)	0.017 (0.017)
Age			-0.002 (0.008)
<hr/>			
Household Income			
PKR 25,001 – 50,000 ¹			0.001 (0.065)
PKR 50,001 – 75,000 ¹			0.049 (0.052)
PKR 75,001 – 100,000 ¹			0.017 (0.048)
More than PKR 100,000 ¹			0.013 (0.039)
Mobile Data Access			-0.093 (0.061)
Private School			-0.013 (0.035)
English Medium School			-0.057 (0.114)
Student Works			-0.054 (0.036)
Self-Assessed Risk ²			0.002 (0.012)
Risk Money ³			-0.035 (0.043)
Risk Wheat ³			0.011 (0.048)
Time Preference 6 Month ⁴			0.052 (0.105)
Time Preference 12 Month ⁵			-0.059 (0.077)
<hr/>			
Pseudo R ²	0.0341	0.1021	0.1140
Observations	357	357	357

Notes: The standard errors in the parenthesis are clustered by University and ***, **, * indicate 1%, 5% and 10% significance level, respectively.

1: Reference Category: Household Income = PKR 10,000 – 25,000

2: Are you a person who is prepared to take risks in general, or do you avoid taking risks? (0 = not at all prepared to take risks; 10 = very prepared to take risks)

3: Equals 1 if in a hypothetical situation the participant chooses the risk tolerant option.

4: The amount the participant is willing to take instead of waiting for sure payment of PKR 50,000 in 6 months.

5: The amount the participant is willing to take instead of waiting for sure payment of PKR 50,000 in 12 months.

Table A3: Marginal effects of logit estimates of the *Eid-ul-Fitr* effect on avoidance of physical greetings.

VARIABLES	(1)	(2)	(3)
After Eid	-0.093*** (0.030)	-0.083*** (0.027)	-0.081*** (0.018)
Female	0.091* (0.050)	0.068 (0.051)	0.081 (0.053)
Perceived Risk of Covid-19 Infection		0.000 (0.000)	0.001 (0.001)
Covid-19 Fear		0.027*** (0.004)	0.027*** (0.003)
Government's Truthfulness		0.027*** (0.008)	0.032*** (0.008)
Age			0.018** (0.009)
<hr/>			
Household Income			
PKR 25,001 – 50,000 ¹			-0.106** (0.044)
PKR 50,001 – 75,000 ¹			-0.100** (0.044)
PKR 75,001 – 100,000 ¹			-0.107** (0.043)
More than PKR 100,000 ¹			-0.054 (0.043)
Mobile Data Access			-0.030 (0.052)
Private School			-0.044 (0.028)
English Medium School			0.011 (0.044)
Student Works			-0.027 (0.046)
Self-Assessed Risk ²			0.019 (0.012)
Risk Money ³			-0.053** (0.025)
Risk Wheat ³			-0.031 (0.040)
Time Preference 6 Month ⁴			0.011 (0.072)
Time Preference 12 Month ⁵			-0.013 (0.064)
Pseudo R ²	0.0335	0.1107	0.1622
Observations	357	357	357

Notes: The standard errors in the parenthesis are clustered by University and ***, **, * indicate 1%, 5% and 10% significance level, respectively.

1: Reference Category: Household Income = PKR 10,000 – 25,000

2: Are you a person who is prepared to take risks in general, or do you avoid taking risks? (0 = not at all prepared to take risks; 10 = very prepared to take risks)

3: Equals 1 if in a hypothetical situation the participant chooses the risk tolerant option.

4: The amount the participant is willing to take instead of waiting for sure payment of PKR 50,000 in 6 months.

5: The amount the participant is willing to take instead of waiting for sure payment of PKR 50,000 in 12 months.

Table A4: Marginal effects of logit estimates of the *Eid-ul-Fitr* effect on usage of masks when going out.

VARIABLES	(1)	(2)	(3)
After Eid	0.039** (0.019)	0.046** (0.018)	0.047 (0.030)
Female	0.164*** (0.026)	0.147*** (0.026)	0.160*** (0.042)
Perceived Risk of Covid-19 Infection		0.002* (0.001)	0.002** (0.001)
Covid-19 Fear		0.024*** (0.004)	0.023*** (0.005)
Government's Truthfulness		0.018 (0.016)	0.019 (0.016)
Age			0.001 (0.011)
<hr/>			
Household Income			
PKR 25,001 – 50,000 ¹			-0.026 (0.073)
PKR 50,001 – 75,000 ¹			-0.051 (0.035)
PKR 75,001 – 100,000 ¹			-0.057 (0.046)
More than PKR 100,000 ¹			0.003 (0.029)
Mobile Data Access			0.010 (0.044)
Private School			0.031 (0.047)
English Medium School			0.034 (0.040)
Student Works			0.011 (0.052)
Self-Assessed Risk ²			0.002 (0.012)
Risk Money ³			0.012 (0.038)
Risk Wheat ³			-0.059* (0.035)
Time Preference 6 Month ⁴			-0.013 (0.043)
Time Preference 12 Month ⁵			-0.047 (0.038)
Pseudo R ²	0.0634	0.1444	0.1681
Observations	357	357	357

Notes: The standard errors in the parenthesis are clustered by University and ***, **, * indicate 1%, 5% and 10% significance level, respectively.

1: Reference Category: Household Income = PKR 10,000 – 25,000

2: Are you a person who is prepared to take risks in general, or do you avoid taking risks? (0 = not at all prepared to take risks; 10 = very prepared to take risks)

3: Equals 1 if in a hypothetical situation the participant chooses the risk tolerant option.

4: The amount the participant is willing to take instead of waiting for sure payment of PKR 50,000 in 6 months.

5: The amount the participant is willing to take instead of waiting for sure payment of PKR 50,000 in 12 months.

Table A5: Marginal effects of logit estimates of the *Eid-ul-Fitr* effect on mosque visits.

VARIABLES	(1)	(2)	(3)
After Eid	-0.176*** (0.047)	-0.168*** (0.055)	-0.137*** (0.035)
Female	0.018 (0.069)	-0.002 (0.060)	0.040 (0.041)
Perceived Risk of Covid-19 Infection		0.002*** (0.000)	0.002*** (0.001)
Covid-19 Fear		0.028** (0.013)	0.028** (0.013)
Government's Truthfulness		0.042*** (0.010)	0.053*** (0.010)
Age			-0.002 (0.005)
<hr/>			
Household Income			
PKR 25,001 – 50,000 ¹			0.108** (0.050)
PKR 50,001 – 75,000 ¹			0.076 (0.049)
PKR 75,001 – 100,000 ¹			0.142** (0.067)
More than PKR 100,000 ¹			0.205*** (0.072)
Mobile Data Access			-0.018 (0.026)
Private School			-0.004 (0.036)
English Medium School			0.014 (0.078)
Student Works			0.002 (0.042)
Self-Assessed Risk ²			0.019*** (0.005)
Risk Money ³			-0.030 (0.028)
Risk Wheat ³			-0.019 (0.032)
Time Preference 6 Month ⁴			-0.010 (0.091)
Time Preference 12 Month ⁵			0.080 (0.118)
<hr/>			
Pseudo R ²	0.0420	0.1275	0.1822
Observations	357	357	357

Notes: The standard errors in the parenthesis are clustered by University and ***, **, * indicate 1%, 5% and 10% significance level, respectively.

1: Reference Category: Household Income = PKR 10,000 – 25,000

2: Are you a person who is prepared to take risks in general, or do you avoid taking risks? (0 = not at all prepared to take risks; 10 = very prepared to take risks)

3: Equals 1 if in a hypothetical situation the participant chooses the risk tolerant option.

4: The amount the participant is willing to take instead of waiting for sure payment of PKR 50,000 in 6 months.

5: The amount the participant is willing to take instead of waiting for sure payment of PKR 50,000 in 12 months.

Table A6: Marginal effects of logit estimates of the *Eid-ul-Fitr* effect on Grocery Shopping visits.

VARIABLES	(1)	(2)	(3)
After Eid	0.014 (0.021)	0.019 (0.022)	-0.017 (0.029)
Female	-0.001 (0.029)	-0.011 (0.035)	-0.028 (0.028)
Perceived Risk of Covid-19 Infection		-0.000 (0.001)	-0.000 (0.000)
Covid-19 Fear		0.013** (0.006)	0.016*** (0.004)
Government's Truthfulness		-0.003 0.019	-0.003 (0.011)
Age			-0.000 (0.003)
<hr/>			
Household Income			
	PKR 25,001 – 50,000 ¹		0.047 (0.048)
	PKR 50,001 – 75,000 ¹		-0.011 (0.072)
	PKR 75,001 – 100,000 ¹		-0.020 (0.085)
	More than PKR 100,000 ¹		-0.046 (0.053)
Mobile Data Access			0.014 (0.025)
Private School			-0.019 (0.060)
English Medium School			0.008 (0.035)
Student Works			0.014 (0.034)
Self-Assessed Risk ²			0.010 (0.011)
Risk Money ³			-0.016 (0.035)
Risk Wheat ³			-0.026 (0.023)
Time Preference 6 Month ⁴			-0.104 (0.118)
Time Preference 12 Month ⁵			0.012 (0.067)
Pseudo R ²	0.0012	0.0413	0.1126
Observations	357	357	357

Notes: The standard errors in the parenthesis are clustered by University and ***, **, * indicate 1%, 5% and 10% significance level, respectively.

1: Reference Category: Household Income = PKR 10,000 – 25,000

2: Are you a person who is prepared to take risks in general, or do you avoid taking risks? (0 = not at all prepared to take risks; 10 = very prepared to take risks)

3: Equals 1 if in a hypothetical situation the participant chooses the risk tolerant option.

4: The amount the participant is willing to take instead of waiting for sure payment of PKR 50,000 in 6 months.

5: The amount the participant is willing to take instead of waiting for sure payment of PKR 50,000 in 12 months.

Table A7: Logit estimates of the effect of *Eid-ul-Fitr* on compliance – Gender differences

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Reduced Leaving Home	Avoids Large Crowds	Avoids Physical Greetings	Wears Mask	Stopped Mosque Visits	Reduced Grocery Shopping
After Eid	-0.0859 (0.125)	-1.169*** (0.174)	-1.215*** (0.212)	0.357 (0.297)	-1.259*** (0.322)	-0.691* (0.402)
Female	1.337*** (0.132)	0.0294 (0.262)	-0.145 (0.687)	1.310*** (0.471)	-0.0489 (0.307)	-0.954*** (0.301)
After Eid * Female	-1.292*** (0.353)	0.520 (0.369)	1.312* (0.721)	0.314 (0.450)	0.484 (0.771)	0.946** (0.442)
Perceived Risk of Covid-19 Infection	-0.00141 (0.00275)	-0.0111*** (0.00361)	0.00370 (0.00630)	0.0150* (0.00764)	0.0140*** (0.00459)	-0.00230 (0.00655)
Covid-19 Fear	0.189*** (0.0395)	0.242*** (0.0660)	0.259*** (0.0349)	0.210*** (0.0527)	0.219* (0.129)	0.240*** (0.0559)
Government's Truthfulness	0.0842* (0.0489)	0.0770 (0.0847)	0.275*** (0.0958)	0.175 (0.147)	0.396*** (0.0753)	-0.0469 (0.174)
Age	-0.0306 (0.0424)	-0.0147 (0.0356)	0.161** (0.0809)	0.00964 (0.104)	-0.0143 (0.0405)	-0.00225 (0.0389)
Household Income						
PKR 25,001 – 50,000 ¹	1.165*** (0.214)	0.0523 (0.318)	-0.966** (0.484)	-0.242 (0.680)	0.846** (0.423)	0.714 (0.796)
PKR 50,001 – 75,000 ¹	0.249 (0.386)	0.290 (0.245)	-0.890** (0.425)	-0.447 (0.318)	0.616 (0.448)	-0.155 (1.043)
PKR 75,001 – 100,000 ¹	1.303** (0.527)	0.160 (0.217)	-0.838* (0.438)	-0.491 (0.402)	1.142** (0.487)	-0.206 (1.281)
More than PKR 100,000 ¹	1.263*** (0.278)	0.0997 (0.198)	-0.455 (0.429)	0.0363 (0.280)	1.597*** (0.428)	-0.651 (0.739)
Mobile Data Access	-0.465* (0.277)	-0.438 (0.278)	-0.281 (0.497)	0.0911 (0.407)	-0.146 (0.188)	0.192 (0.411)
Private School	0.130 (0.161)	-0.0377 (0.167)	-0.362 (0.251)	0.291 (0.425)	-0.0219 (0.273)	-0.243 (0.924)
English Medium School	-0.568** (0.248)	-0.283 (0.544)	0.118 (0.409)	0.324 (0.354)	0.114 (0.634)	0.141 (0.545)
Student Works	-0.405 (0.270)	-0.207 (0.212)	-0.183 (0.465)	0.117 (0.492)	0.0408 (0.279)	0.301 (0.524)
Self-Assessed Risk ²	-0.0184 (0.0464)	0.00634 (0.0575)	0.172 (0.125)	0.0174 (0.109)	0.141*** (0.0462)	0.155 (0.175)
Risk Money ³	0.455** (0.179)	-0.173 (0.192)	-0.485** (0.234)	0.119 (0.348)	-0.230 (0.236)	-0.230 (0.502)
Risk Wheat ³	0.590*** (0.181)	0.0516 (0.227)	-0.302 (0.369)	-0.551* (0.333)	-0.151 (0.257)	-0.430 (0.345)
Time Preference 6 Month ⁴	-0.00242 (0.425)	0.272 (0.496)	0.144 (0.603)	-0.105 (0.385)	-0.0617 (0.649)	-1.474 (1.796)
Time Preference 12 Month ⁵	-0.0309 (0.477)	-0.289 (0.371)	-0.117 (0.566)	-0.436 (0.341)	0.611 (0.907)	0.110 (0.997)
Pseudo R ²	0.1355	0.1151	0.1717	0.1684	0.1835	0.1167
Observations	356	356	356	356	356	356

Notes: The standard errors in the parenthesis are clustered by University and ***, **, * indicate 1%, 5% and 10% significance level, respectively.

1: Reference Category: Household Income = PKR 10,000 – 25,000

2: Are you a person who is prepared to take risks in general, or do you avoid taking risks? (0 = not at all prepared to take risks; 10 = very prepared to take risks)

3: Equals 1 if in a hypothetical situation the participant chooses the risk tolerant option.

4: The amount the participant is willing to take instead of waiting for sure payment of PKR 50,000 in 6 months.

5: The amount the participant is willing to take instead of waiting for sure payment of PKR 50,000 in 12 months.

Table A8: Marginal effects of logit estimates of the effect of *Eid-ul-Adha* on compliance

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Reduced Leaving Home	Avoids Large Crowds	Avoids Physical Greetings	Wears Mask*	Stopped Mosque Visits	Reduced Grocery Visits
After Eid	-0.008 (0.11)	-0.053 (0.10)	-0.038 (0.12)	-0.012 (0.06)	-0.035 (0.12)	0.043 (0.11)
Female	0.118 (0.13)	0.192* (0.10)	0.158 (0.14)	0.152* (0.08)	0.295*** (0.11)	0.237* (0.13)
Perceived Risk of Covid-19 Infection	0.000 (0.00)	0.004 (0.00)	0.003 (0.00)	-0.003 (0.00)	0.003 (0.00)	0.040* (0.02)
Covid-19 Fear	0.070*** (0.024)	0.084*** (0.025)	0.064*** (0.021)	0.060** (0.023)	0.049** (0.025)	0.107* (0.055)
Government's Truthfulness	0.056 (0.07)	0.038 (0.04)	0.069 (0.07)	-0.022 (0.05)	0.098 (0.07)	0.003 (0.00)
Control Variables ¹	Yes	Yes	Yes	Yes	Yes	Yes
Observations	56	56	57	56	57	57

Notes: The standard errors in the parenthesis are clustered by University and ***, **, * indicate 1%, 5% and 10% significance level, respectively. The control variables include age, wealth indicators, risk and time preference measures.

1: Control Variables include risk perceptions and trust in authority measures, age, household income, access to mobile data, private and English medium schooling, if the student works, risk preference measure.

* Since only 6 students report not wearing masks of which 3 observations are from before Eid and 3 after Eid, certain categories of age, income and student work perfectly predict the outcome variable and therefore they get omitted.

Table A9: Effect of *Eid-ul-Fitr* using Propensity Score Matching and Inverse Probability Weights Regression Adjustment

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Reduced Leaving Home	Avoids Large Crowds	Avoids Physical Greetings	Wears Mask	Stopped Mosque Visits	Reduced Grocery Visits
Propensity Score Matching						
After Eid	-0.152*** (0.055)	-0.285*** (0.061)	-0.114** (0.047)	0.033 (0.041)	-0.032 (0.088)	-0.025 (0.037)
Inverse Probability Weights Regression Adjustment (IWPR)						
After Eid	-0.154*** (0.049)	-0.215*** (0.052)	-0.083** (0.041)	0.041 (0.037)	-0.127*** (0.039)	-0.005 (0.035)
Observations	357	357	357	356	357	357

Notes: The standard errors in the parenthesis are clustered by University and ***, **, * indicate 1%, 5% and 10% significance level, respectively. The treatment and control groups are matched upon the following variables: Determinants of social compliance (risk perceptions and trust in authority), lifecycle stage (age), socio-economics status (household income, access to mobile data, private and English medium schooling, if the student works) and risk and time preference measures.

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