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Family, External Environment and Gender Attitudes: Evidence from Students' Survey

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Abstract

We use student survey data to investigate the role of family and environmental influences in shaping gender attitudes within young adults. Our main objective is to test if there is correlation between explicit and implicit gender attitudes amongst this group. We found that although levels of implicit bias vary systematically with other demographic characteristics, there is not a consistent correlation between implicit and explicit gender attitudes. We also found that females hold more rigid implicit traditional gender role ideology compared to the males even though females are more likely than males to explicitly lobby for gender equality. We also show that to some degree, the media in its current state has helped reinforce rather than challenge traditional gender role ideology. Individuals who spend more time on social media were found to have more implicit bias than those who spend less time on these platforms. Overall, these results suggest that in order to effectively tackle gender inequality, a wider policy approach is required, one that can address some of these factors that contribute to gender unequal outcomes.

1 Introduction

Are gender attitudes and values learnt at an early age from family members and community persistent throughout an individual's life? To answer this question, we investigate the impact of family and environmental influences on gender attitudes. The aim of this study is to understand the extent to which implicit gender attitudes learnt through the family system and those adopted from the surrounding environment are correlated with explicit

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¹Note that we define implicit bias as a stronger association towards men with careers and women with family or higher positive IAT scores.

gender attitudes of younger adults as measured by their responses from a survey. Explicit attitudes are subject to conscious control and are observable through an individual's actions and expressions, whilst implicit attitudes are hidden and exist outside of conscious awareness (Greenwald & Banaji, 1995).

Given this context, the objective of this paper is to determine if there is a transmission of gender role attitudes from older to younger generations as well as to determine the impact of other influences external to the family setting such as religion and social media in shaping gender attitudes of young individuals. Using a survey on student and parent characteristics, we aim to answer two questions: first, do explicit and implicit attitudes correlate? Second, what influences these attitudes? Understanding what drives gender attitudes in the younger generation is important since it helps to inform intervention strategies targeted at improving gender gaps in the society at large.

We make three contributions to the existing literature. First, we collect a dataset on students' family and social background, explicit gender attitudes as well as Gender-Career Implicit Association Test scores. Second, with this data, we provide empirical evidence on how some of the individual-specific characteristics, family and environmental factors correlate with explicit and implicit attitudes. And finally, we add to economic literature that uses social psychology and implicit bias in explaining gender outcomes. For example, using the Gender-Science Implicit Association Test as a measure for teachers' stereotypes, Carlana (2019) analyses the association between student exposure to these attitudes and student achievement. The research shows that a larger gender gap exists in maths scores when teachers have strong gender stereotypes. Female students perform worse in maths and are encouraged to follow lower or less demanding curricula in high school due in part to these stereotypes held by the teachers. Similar research done by Reuben, Wiswall, and Zafar (2017) shows that these gender stereotypes even manifest as bias in the workplace, with females expected to perform poorly on math-related tasks. These expectations are not revised by employers quickly, even after the female employees' ability is revealed. In our current study, we do not find evidence of a correlation between student's implicit and explicit gender role attitudes suggesting a discrepancy between implicit and explicit attitudes. Implicit attitudes are subject to system 1 thinking making them unconscious, instinctive, automatic and a remnant of one's past); and explicit attitudes which are

subject to system 2 thinking which is more conscious, deliberate, rational, logical and can be controlled (Greenwald & Krieger, 2006; Kahneman, 2011; Nickerson, 1998). We also find that females have more implicit bias than males even though women are more likely to openly call for more gender equality as shown in their responses to the survey questions.

2 Background

In this section we discuss gender-related concepts whose foundations are rooted in the field of social psychology. These concepts are important in understanding the development of gender attitudes which is the focus of this paper. We find that the field of social psychology offers important explanations for gender attitudes and outcomes that are removed from economic rationale and yet significantly inform on decision making that has economic consequences. According to Leaper and Friedman (2007), child development of gender concepts such as gender identity, roles, beliefs and attitudes are transformed over time as a result of influences from the family, peers, the media, church, school or even the work environment. Any gender roles and/or inequities within these smaller social environments will become highlighted and reinforced in the society at large (see Leaper, 2000; Wood & Eagly, 2002). In what follows, we use social psychology-related theoretical and empirical concepts to explore some of these influences in the formation of gender-role attitudes.

2.1 Family and Parental Influence

Literature in the field of psychology points to a number of ways that the family setting and parents can influence children's gender role attitudes. It is generally accepted that parents play a significant role in shaping and reinforcing their children's socio-cultural views on a wide range of issues, including those pertaining to gender roles. Socialisation is often used to explain this parent-child association in socio-cultural views (Vollebergh, Iedema, & Raaijmakers, 2001). One of the building blocks of this theory is that attitudes pertaining to socio-cultural issues such as gender are formed and developed during childhood and adolescence (Denzin, 1977). Parents may implicitly express their attitudes in everyday settings, for example in the playground when they emphasise that girls play on certain platforms perceived to be "safe and decent" for girls whilst boys can participate slightly

more dangerous and explorative games. Toys that parents buy their children also transmit parental gender attitudes, for example, trucks for boys and dolls for girls (Gelman, Taylor, Nguyen, Leaper, & Bigler, 2004). By making such distinctions, they are implicitly communicating a certain set of standards, attitudes and expectations about what is "right" for either sex.

Children are also more likely to learn that males and females perform different roles in two-parent households where the father is breadwinner and mother is home-maker who does not work outside the home. In such a setting, traditional gender role attitudes are reinforced in the younger generation (Gähler & Oláh, 2020). Alternatively, in two-parent households where gender roles are not as rigid, fathers and mothers equally share housework and the mothers are employed, then traditional gender role attitudes are minimised as children are less likely to learn that roles are gendered and thus may adopt less rigid traditional gender role attitudes.

Another important dimension on the role of parental influence in the transmission of gender attitudes is understanding whether it is the mother or father who exerts a stronger influence on children's gender role attitudes. It is often argued that fathers and mothers tend to take different roles in encouraging gender-typed behaviour in their children. One school of thought suggests that mothers are more likely to influence children's gender role attitudes than fathers due to a number of reasons. First, in most households, mothers do most of the childcare and rearing than fathers when children are younger thus they spend more time with their children. Mothers also tend to show more emotion compared to fathers; and to talk more with their children compared to fathers (van der Pol et al., 2015). As a result, two things may happen, one; young children will be disproportionately exposed to role modelling and direct teachings about gender from their mothers compared to their fathers. Secondly, children may become more attached to mothers than fathers and this attachment is an important factor that explains children's engagement with parents, level of respect directed to each parent and extent to which they may adopt or reject parental beliefs and attitudes (see Biblarz & Stacey, 2010; Cano, Perales, & Baxter, 2019; Carlson & Knoester, 2011; Craig, Powell, & Smyth, 2014; Min, Silverstein, & Lendon, 2012; Perales, Hoffmann, King, Vidal, & Baxter, 2020).

From another perspective, an opposite scenario may occur in which the father's

gender-role attitudes may be more influential on young adults than the mother's. According to [West and Zimmerman \(1987\)](#) in most patriarchal societies, fathers (or males) are perceived as having a higher status than women. As a result, it may be the case that younger adults may consider older males as being more capable than older females within their family settings. It therefore becomes plausible to assume that children may view their father's teachings about socio-cultural issues such as gender roles as more credible than their mother's. [Perales et al. \(2020\)](#) also state that father's tend to be more dominant, repressive and strict in their interactions with children. Moreover, it is often the father who most likely reprimands their children when they err or engage in acts that the parents deem inappropriate (see [Biblarz & Stacey, 2010](#); [Klann, Wong, & Rydell, 2018](#)). For these reasons, children may feel more pressure to obey and fit in with their father's preference on social issues including gender relations ([Bussey & Bandura, 1999](#)). Though we do not have an exact measure for parents' gender role attitudes, we believe that sharing beliefs with either parent might influence students' gender role attitudes. We use shared religion with either mother or father as a channel for transmission of gender attitudes.

Closely linked to this is how the gender of the child and their association with each parent contributes to the child's gender role attitudes. Psychological research shows that there are strong bonds between same-gender parent-child dyads ([Perales, Jarallah, & Baxter, 2018](#); [Raley & Bianchi, 2006](#)). This is often the case because research shows that mothers generally spend more times with daughters, whilst fathers spend more time with sons ([McHale, Crouter, & Whiteman, 2003](#); [Rossi & Rossi, 1990](#)). Because of these differences in time spent together as well as attachments developed between parents and sons/daughter, each parent's gender role attitudes, teachings and role modelling may disproportionately reach their sons and daughters ([Burt & Scott, 2002](#); [Kulik, 2002](#); [Platt & Polavieja, 2016](#)). As a result, female and male children may show different levels of gender role attitudes.

The family setting is also an important factor in the development of gender -role attitudes. In single-parent households where the mother is the only parent - she often has to take the double role of mother and father hence ends up being genderless and the notion of traditional gender roles become non-existent in that household. These single mothers have also been found to hold less rigid gender attitudes than mothers in two-

parent households (see Kurdek & Siesky Jr, 1980; Leaper, Leve, Strasser, & Schwartz, 1995; Leve & Fagot, 1997). Also, the absence of a father figure has been associated with less biased gender-role attitudes and behaviour especially in male children (Stevens, Golombok, Beveridge, & Study Team, 2002). Consequentially, there may be attitudinal differences among students raised only by a mother compared to those raised by both parents.²

According to Muschalik, Elfeddali, Candel, Crutzen, and de Vries (2019), the relationship between attitudes (explicit and implicit) and behaviour, and the strength of this relationship, varies by context. In some cases, studies have found that implicit and explicit attitudes regarding one behaviour may not always match (i.e. negative explicit and positive implicit or vice versa). This is called the implicit-explicit discrepancy (Muschalik et al., 2019). On the other hand, some studies find that implicit and explicit attitudes and attitude -related behaviours do correlate (see Reuben et al., 2017; Rooth, 2010). We believe that if family and parental influences persist, children may adopt their parents' and other family members' implied gender role attitudes as their own. To this effect, our first hypothesis is *students' implicit and explicit attitudes are positively correlated (Hypothesis 1)*.

2.2 External Influences

As children grow into young adults, further development and/or reshaping of gender self-concepts, stereotypes and attitudes occurs as they begin to associate more with individuals outside of their family structure. These can be peers at school or church and even at work. Young adults will have to learn what their peers consider as acceptable and unacceptable gender identities and attitudes and adapt accordingly. Over time and with continued interaction, an individual might internalise these expectations as his/her own (Bussey & Bandura, 1999). Below we discuss 2 of these external influences.

²We focus on those raised by only the mother or female guardian and not father or male guardian due to sample size. Only 9 students reported that they were raised by only a father or male guardian.

2.2.1 Religious Influence

According to [Klingorová and Havlíček \(2015\)](#) every religion promotes different norms, creates different institutions, and builds on different cultural and historical foundations. [Seguino \(2011\)](#) states that because most societies in the world, and especially Africa are patriarchal, most religious norms and practices tend to reinforce those patriarchal values. For example, the role of God/creator has always been assumed by a male whilst the woman's primary role is in family life, especially as a caring mother and submissive wife.

According to UN Women (2016), the relationship between religion and gender attitudes and outcomes is two-way. On one hand, religion is an important factor that shapes cultural, social, economic, and political norms in many parts of the world. On the other hand, gender roles and the status of women and men in society are dependent on how religious texts have been interpreted over the years as well as the social structure in terms of culture and social institutions in which religion is introduced. According to UN Women (2016), in almost all religions of the world, men have been at the forefront in interpreting religious texts and they have done so in ways that typically reinforce their dominant position over women.

Whilst women are the majority of believers in most religious settings and play a crucial role in religious life, they tend to be under-represented at the highest levels of decision-making in religious communities (IPS, 2002). Moreover, it is also often argued that during difficult times, women tend to rely more on religion than men as a source of solace yet religion has also been used to make women more submissive to their male counterparts even under abusive conditions (IPS, 2002).

2.2.2 Social Media

In recent years, the social media has become an important source of information the world over (see [Kim, Yoo-Lee, & Joanna Sin, 2011](#); [Swigger, 2013](#)). It has also been noted that social media has a significant role in shaping users' beliefs as well as their decision-making in a variety of issues including gender ([Swigger, 2013](#)). Social media has a large impact on gender identification and construction especially among women ([Blower,](#)

2016) but its impact gender issues has been mixed (Webb & Temple, 2015). In some instances, it encourages the enactment of traditional gender roles, whilst in other cases, it provides opportunities for users to speak up and voice their unique ideas that people often find difficult to openly voice. Some researchers argue that social media deepens users' pre-existing biases (see Bozdag, 2013; Pariser, 2011). This is because most social media websites show users what the websites think they want to see and not what users need to see. As a result, people may end up being isolated into information bubbles. Empirical research shows that women outnumber men on social media (Webb & Temple, 2015). They also spend more time on social networking sites than men (Junco, Merson, & Salter, 2010). It is therefore possible that to some degree women may internalise information they see on social media more than men and use this information to reinforce gender norms.

An important factor in explanation why social media affects people's beliefs is confirmation bias. This bias predicts that human beings tend to search for, favour, remember and interpret information in a way that confirms their previous beliefs and hypotheses while paying less attention to alternative ideas (see Kerstholt et al., 2010; Nickerson, 1998). Various reasons have been put forth to explain the existence of confirmation bias and these include wishful thinking, the ideas that human beings have a limited capacity to process information and the cost of being wrong (Nickerson, 1998). As a second hypothesis we state that *the external environment, such as church and social media influences students' gender-role attitudes.*

3 Study Design

The study consists of two parts, an attitude assessment tool - Implicit Association Test (IAT) and a survey. The IAT tool measures implicit attitudes, while the survey measures explicit attitudes.

3.1 The Gender Implicit Association Test (IAT)

To measure implicit attitudes, we applied the Gender-Implicit Association Test (Greenwald, McGhee, & Schwartz, 1998) which associates gender roles with home and workplace, for example associating men more strongly with careers and women more strongly with

family; or men more strongly with family and women more strongly with careers. This test is a computer-based tool. In taking the test, male or female names are placed on the top left and right corners of the screen respectively and words appear in the middle of the screen that are associated with home/family and career. The individuals are asked to categorise these words either to the left or right of a computer screen depending on how much they associate them with male or female.

The test is taken in 2 rounds. In the first round, female names and family nouns are categorised on the same side, while male names and career nouns on the other. In the second round, the matching is reversed, female names and career nouns are categorised together, while male names and family nouns are categorised together. By so doing, this provides a measure of the association between any two concepts they are matching (e.g male-career/female-family or male-family/female-career). To measure the strength of the association between any 2 concepts, the test then uses the reaction times.³ The basic assumption of the IAT is that if a mental task is easy to carry out, then one's responses would be faster and the chances for making mistakes much lower. If the male-career (female-family) matching takes a shorter time than male-family (female-career), then the individual is said to have a strong association for men with careers and women with families (which in this study we will refer to as implicit gender bias), the reverse will be suggested if the male-career (female-family) matching takes longer than male-family (female-career) matching takes longer.

3.2 The Survey

The students' survey includes questions on gender attitudes similar to the World Values Survey (WVS) questions, as well as other questions that capture gender attitudes. The WVS is a cross-country project focusing on values and beliefs of individuals. This project started in 1981 and is carried out in waves. Questions asked cover demographics, individual economic characteristics, religious affiliation, trust towards other groups of people, gender and political preferences and attitudes. Among other gender-related questions, the WVS has questions concerning gender identities, women's role as mothers and workers and

³A measure referred to as D score. The D score is a variation on the Cohen d and is calculated by taking the difference in the mean reaction times for any 2 sequences divided by the pooled standard deviation.

beliefs about gender ordering and preferences in the labour market, education and political participation. Some of the gender attitude questions in the WVS that we include to capture explicit bias are: (1) When jobs are scarce men should have more right to a job than women (Jobscarcity); (2) Being a housewife is just as fulfilling as working for pay (Housewife); (3) A pre-school child suffers with a working mother (Mother's guilt); (4) University is more important for a boy than a girl (University). Our fifth question is not part of the WVS and it reads (5) Men should have the final say in all family decisions (Male superiority). We also include other questions that reveal social media usage amongst the students such as: (1) When did you open your first social media account? (2) List the media platforms you are subscribed to? (3) How many hours per day do you spent on social media platforms?

3.3 Methodology

We conducted a survey of 651 first year economics undergraduate students. We focused on this group given that we wanted to capture a stage in the young adults' lives when they are undergoing some transition away from home into the world. We believe this is an important stage at which they start developing their adult identities by reconciling what they would have learnt throughout their lives at home and new ideas they start being exposed to at University. All first year economics students were sent an invitation through the university's learning management system, asking them to participate in a survey. The students who chose to participate following the invitation were provided with a link to the survey questions that they could take on-line. The link first took them to a series of survey questions and then to the IAT. It was explained to the participants that the survey was part of a research project aimed at understanding students' social backgrounds. To avoid biasing responses, there was no reference to gender attitudes or biases. There was a R500 lottery reward for one of the students for taking part in the survey. Using the results, we evaluated each of the responses and scored them on a scale from lower gender bias to higher gender bias. The survey provides us with a very rich data set on students' personal and family background characteristics as well as their explicit and implicit gender attitudes. As a first step, in this paper we test our hypotheses using a descriptive statistics and analysis.

4 Data Analysis

4.1 Descriptive Statistics

Table 1: Comparison of sample to population statistics by gender

	UP population 2020	Polpn %	Sample 2020	Sample %
Female	30 643	0.5735	388	0.5969
Male	22 787	0.4265	262	0.4031

Table 4.1 shows that the UP enrolment statistics for 2020, the proportion of females enrolled was 0.5735 (57.35%), whilst the proportion of females in our sample was 0.5969. We did a proportions test to check if this difference is significant. Our null hypothesis is that these two proportions are the same. We test this against the alternative hypothesis that the sample proportion is less than the population proportion (i.e $H_a: p < 0.5735$). We found that the probability of drawing a sample of 650 students with a proportion of females less than 0.5969 is 0.8864. This is above the threshold of 0.05, hence we reject the alternative and accept the null that they are the same. We can therefore conclude that our gender composition in the sample is representative of the university's gender composition.

Table 2: Comparison of sample to population statistics by race

	UP population 2020	Polpn %	Sample 2020	Sample %
African	27 537	0.5173	375	0.6127
Coloured	1 466	0.0275	15	0.0245
Indian	3015	0.0566	31	0.0507
White	21218	0.3986	191	0.3120

We also compared the statistical difference in the sample and population means across race as shown in Table 4.2. We find that there is no statistically significant difference in the proportions for all 4 races included in the sample. We can therefore conclude that our sample race composition is representative of the university's race composition.

4.2 Full Sample Characteristics

Table 4.3 shows the descriptive statistics of some of the key demographic variables in our dataset. The first 2 columns report the statistics by gender. 40% of our sample is male whilst 60% is female. The third column reports the full sample statistics whilst the last column reports p-values from tests of equality of distributions between males and females. Looking at the self-reported income status, our sample is mostly made up of low to middle income students. About two-thirds of these students were raised religiously (85.4%) and their mothers worked throughout their childhood (61.4% pre-primary, 62.3% during primary and 60.9% during high school. Students of Black/African origin make up 57.7% of our sample, whilst Whites make up 29.2%, Indian/Asian 4.8% and Coloured 2.3%.

There are no statistically significant gender differences in terms of income status, maternal employment during pre-primary and high school stages and the age at which the students opened their first social media account. However, we do find some significant differences between males and females in terms of IAT scores, being raised religiously, maternal employment during primary school and the hours spent on social media. On average, females score significantly higher IAT scores than males ($p = 0.00$) suggesting that females may have more implicit bias than males. Across all races, females make up the larger part of our sample. Moreover, females are more likely to report that they were raised religiously than males. We also find that on aggregate, a large percentage of the females in the sample spend more than 3 hours on social media and this is larger than for males in the sample. Our full sample is made up of 16 ethnic groups. ⁴ However, due to the small sample sizes in some of the ethnic groups in our data, the rest of our analysis we focuses on 5 groups with larger sample sizes. These include Afrikaans, English, Tswana, Pedi and Zulu.⁵

⁴These groups include Afrikaans, English, Coloured, Indian, Ndebele, Pedi, Shona, Sotho, Swahili, Swazi, Tsonga, Tswana, Venda, Xhosa, Yoruba and Zulu.

⁵The full sample data shows similar results.

Table 3: Sample characteristics by gender

Columns by: Gender	Male	Female	Total	P-value
Sample size n (%)	262 (40.3)	388 (59.7)	651 (100.0)	
Gender_IAT, mean (sd)	0.201 (0.479)	0.337 (0.436)	0.283 (0.458)	0.00
Age, mean	19.309	18.760	18.982	0.00
Income, n (%)				
Lower, n (%)	122 (46.6)	162 (41.8)	284 (43.7)	
Average, n (%)	121 (46.2)	195 (50.3)	316 (48.6)	
Higher, n (%)	19 (7.3)	31 (8.0)	50 (7.7)	0.48
Race, n (%)				
Black African, n (%)	132 (50.4)	243 (62.6)	375 (57.7)	
White, n (%)	84 (32.1)	106 (27.3)	190 (29.2)	
Coloured, n (%)	4 (1.5)	11 (2.8)	15 (2.3)	
Indian/Asian, n (%)	15 (5.7)	16 (4.1)	31 (4.8)	0.00
Religion, n (%)				
No, n (%)	46 (17.6)	49 (12.6)	95 (14.6)	
Yes, n (%)	216 (82.4)	339 (87.4)	555 (85.4)	0.08
Maternal Employment				
Pre-primary, n (%)				
No, n (%)	50 (19.1)	99 (25.5)	149 (22.9)	
Part time, n (%)	47 (17.9)	55 (14.2)	102 (15.7)	
Full time, n (%)	165 (63.0)	234 (60.3)	399 (61.4)	0.11
Primary, n (%)				
No, n (%)	37 (14.1)	79 (20.4)	116 (17.8)	
Part time, n (%)	63 (24.0)	66 (17.0)	129 (19.8)	
Full time, n (%)	162 (61.8)	243 (62.6)	405 (62.3)	0.03
High School, n (%)				
No, n (%)	59 (22.5)	91 (23.5)	150 (23.1)	
Part time, n (%)	43 (16.4)	61 (15.7)	104 (16.0)	
Full time, n (%)	160 (61.1)	236 (60.8)	396 (60.9)	0.95
Age at which first social media account was opened, n (%)				
less than 10 year, n (%)	4 (1.5)	10 (2.6)	14 (2.2)	
10-16 years, n (%)	242 (92.4)	358 (93.0)	600 (92.7)	
17-21 years, n (%)	16 (6.1)	17 (4.4)	33 (5.1)	0.43
Hours spent on social media, n (%)				
less than an hour, n (%)	41 (15.6)	29 (7.5)	70 (10.8)	
between 1 to 3 hours, n (%)	137 (52.3)	147 (37.9)	284 (43.7)	
between 3 to 5 hours, n (%)	53 (20.2)	120 (30.9)	173 (26.6)	
between 5 to 7 hours, n (%)	22 (8.4)	65 (16.8)	87 (13.4)	
More than 7 hours, n (%)	9 (3.4)	27 (7.0)	36 (5.5)	0.00

4.3 Correlation between and implicit attitudes

In Table 4.4 , we test the correlation between explicit and implicit attitudes using 5 of the largest groups in our sample. These 5 ethnicities consist mostly of lower to middle income students who were mostly raised religiously and these between group differences are statistically significant ($p=0.00$) for both income status and religion. We find significant mean group differences in IAT scores ($p=0.01$). This significant difference across groups is driven by the Afrikaans and Zulu respondents who show statistically significant differences in IAT scores ($p = 0.009$).⁶ Afrikaans respondents on average score higher IAT scores (0.372) whilst Zulu respondents have the lowest average IAT score (0.149). This suggests that Afrikaans speaking individuals may have more implicit bias on average, whilst the Zulu have the least for the 5 largest groups in our sample.

Of the 5 variables we use to capture explicit attitudes, there are no significant differences among the 5 groups for 3 of these variables. These include the perception of the man as a breadwinner (Job scarcity); university preferences between sons and daughters (University) and pre-school children suffering if mother goes to work (mother's guilt). However; we do find significant differences ($p=0.04$) in terms of the man having the final say in all family decisions (Male superiority) and the perception of the woman as a home-maker (Housewife) is also statistically significant ($p = 0.00$). With the highest average IAT scores, Afrikaans respondents are more likely than the other 4 groups to agree (20.9%) that the man should have the final decision in all family decisions. The Tswana, with the third highest mean IAT score (0.366) are the least likely to agree with the same statement (6.8%). Afrikaans respondents are also more likely to agree (68.4%) with perception that the woman's appropriate role is that of home-maker (variable Housewife). The Pedi have the second lowest average IAT score and are the least likely to agree with the perception the same statement (28%).

We tested for correlations between implicit and explicit attitudes⁷. Our explicit questions are structured such that those who agree with the statement can be viewed as having more gender bias than those who disagree with the statements. We do not find any statistically significant difference between the mean IAT scores of those students who agree with

⁶We use one-way ANOVA tests to measure the differences between the mean IAT scores for the 5 groups

⁷Figure A1 in the appendix shows the correlation between implicit and implicit attitudes.

each of our explicit attitudes questions from those who disagree with them. We therefore conclude that there is no correlation between the explicit and implicit attitudes.⁸ This is called Implicit-Explicit Discrepancy (IED). A number of factors have been cited as potential sources of IED. According to Muschalik et al. (2019), IED may be present among those individuals whose self-presentation concerns are very high. These are individuals who tend to present themselves, their ideas and opinions in the manner they believe their audience would like to hear. As such, they may even deliberately alter their explicit views from their implicit associations so as to align them with the desired outcome causing the discrepancy.

Another potential source of IED is the degree of one's need for congruency or consistency in their personal cognitions. Individuals who are very concerned with attaining this congruency will try to match their implicit and explicit attitudes as much as possible such that their IED is much lower. Conversely, individuals who do not share that concern may have higher IED. Theoretically, the associative-proposition evaluation, model (APE) has been used to offer an explanation for IED (Muschalik et al., 2019). Based on this theory, human beings possess two independent systems of reasoning, the slow-learning system and the fast-learning system. The former system guides implicit attitudes and operates by slowly establishing associations of information gathered in memory. These associations are automatic reactions when any relevant stimulus is presented to them. On the other hand, the fast-learning system guides explicit attitudes and relies on logic at a higher levels of cognitive processing. People are assumed to have control over this system and thus can adjust their explicit attitudes faster than they can adjust implicit attitudes, resulting in IED (Gawronski & Bodenhausen, 2006).

⁸We performed a two-sample t test with equal variances.

Table 4: Explicit attitudes of the 5 largest groups

Columns by: Ethnicity	Afrikaans	English	Pedi	Tswana	Zulu	Total	P-value
Observations n(%)	119 (25.9)	131 (28.5)	57 (12.4)	79 (17.2)	73 (15.9)	459 (100.0)	
Gender_IAT, mean (sd)	0.372 (0.469)	0.251 (0.445)	0.366 (0.487)	0.307 (0.391)	0.149 (0.439)	0.291 (0.452)	0.01
Income, n (%)							
Lower, n (%)	34 (28.6)	41 (31.3)	33 (57.9)	38 (48.1)	39 (53.4)	185 (40.3)	
Average, n (%)	71 (59.7)	70 (53.4)	21 (36.8)	39 (49.4)	30 (41.1)	231 (50.3)	
Higher, n (%)	14 (11.8)	20 (15.3)	3 (5.3)	2 (2.5)	4 (5.5)	43 (9.4)	0.00
Raised Religiously? n (%)							
No, n (%)	2 (1.7)	33 (25.2)	8 (14.0)	10 (12.7)	15 (20.5)	68 (14.8)	
Yes, n (%)	117 (98.3)	98 (74.8)	49 (86.0)	69 (87.3)	58 (79.5)	391 (85.2)	0.00
Job scarcity (Q5), n (%)							
Disagree, n	95 (79.8)	100 (76.3)	41 (71.9)	59 (74.7)	45 (62.5)	340 (74.2)	
Agree, n (%)	9 (7.6)	12 (9.2)	9 (15.8)	9 (11.4)	13 (18.1)	52 (11.4)	0.30
University (Q7), n (%)							
Disagree, n (%)	111 (94.1)	121 (95.3)	51 (89.5)	71 (91.0)	68 (93.2)	422 (93.2)	
Agree, n (%)	7 (5.9)	6 (4.7)	6 (10.5)	7 (9.0)	5 (6.8)	31 (6.8)	0.59
Mother's guilt (Q9), n (%)							
Disagree, n (%)	100 (86.2)	108 (85.0)	50 (89.3)	69 (88.5)	61 (84.7)	388 (86.4)	
Agree, n (%)	16 (13.8)	19 (15.0)	6 (10.7)	9 (11.5)	11 (15.3)	61 (13.6)	0.90
Male Superior (Q20), n (%)							
Disagree, n (%)	91 (79.1)	110 (86.6)	48 (88.9)	73 (93.6)	64 (90.1)	386 (86.7)	
Agree, n (%)	24 (20.9)	17 (13.4)	6 (11.1)	5 (6.4)	7 (9.9)	59 (13.3)	0.04
Housewife (Q21), n (%)							
Disagree, n (%)	31 (31.6)	36 (32.1)	36 (72.0)	43 (68.3)	39 (67.2)	185 (48.6)	

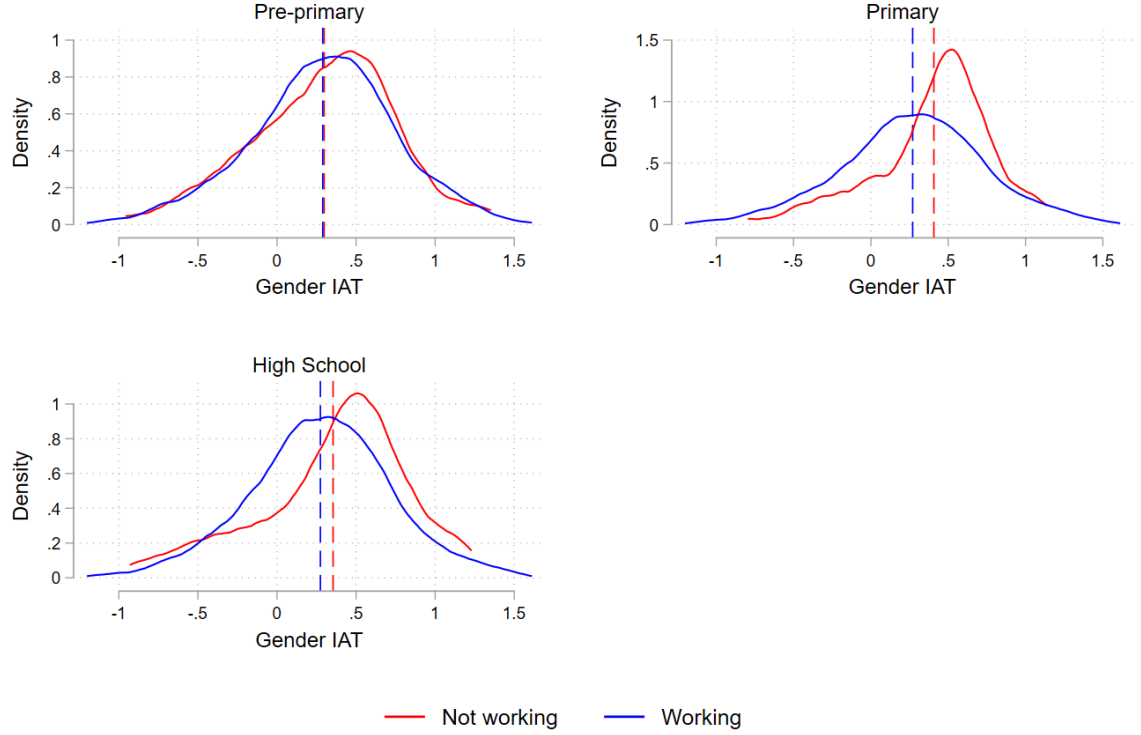
4.4 Family and parental influence channels

We test several channels under the family-parent influence hypothesis. We investigate the impact of maternal employment on students' gender attitudes. We also show the impact of parental presence (single vs. both parents) and shared religion with either parents influences students' gender role attitudes. We also test if female and male students have the same levels of gender bias.

4.4.1 Maternal Employment

Next we tested the hypothesis that those students whose mothers were employed through their childhood have less implicit bias than their peers whose mothers were not working. Figure 4.1 shows that maternal employment appears to have a stronger effect on children's implicit attitudes once they get to primary and high school levels, but this effect is much smaller during students' pre-primary stage. Students whose mothers were not employed during primary and high school appear to have higher average IAT scores, indicating more gender bias, than those whose mothers worked.

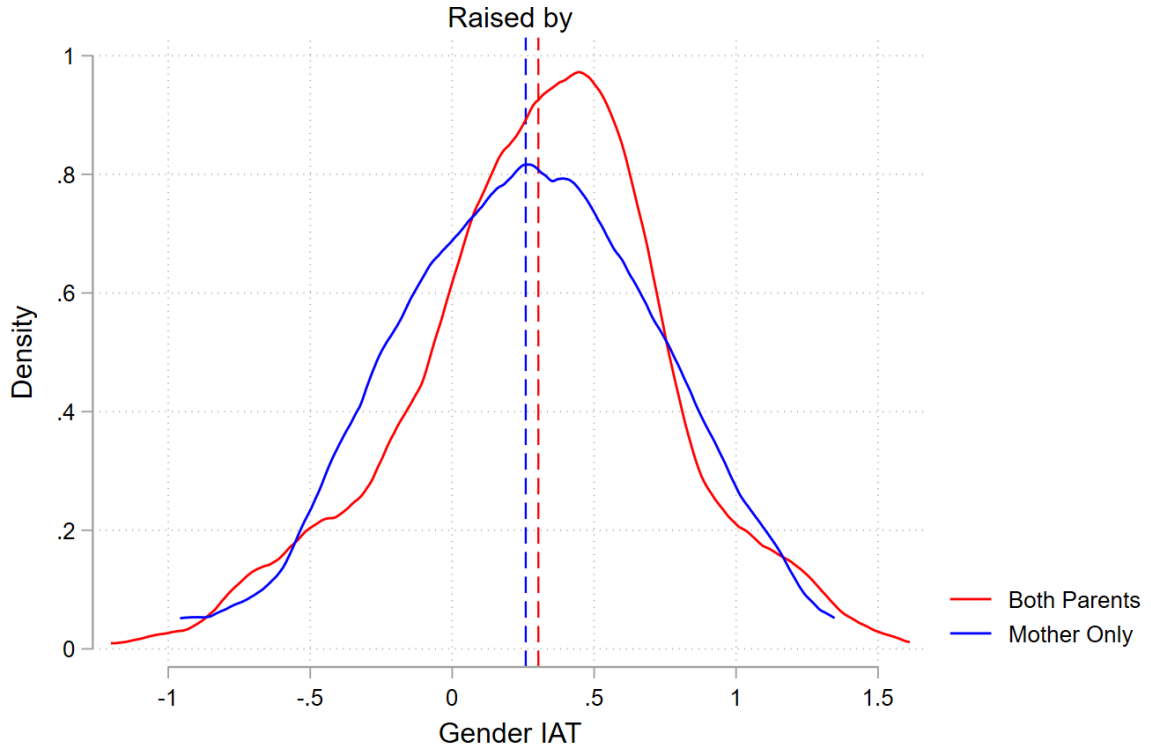
Figure 1: Students implicit attitudes and maternal employment



4.4.2 Parental Presence: Single mother vs Both parents

In Figure 4.2, we show that students who were raised by both parents have slightly more biased gender role attitudes than those raised by only a mother. This result supports some of the arguments made earlier than single mothers tend to be genderless and in their homes, traditional gender roles may not exist as they double as both mother and father and thus teach their children similar values (Kurdek & Siesky Jr, 1980; Leaper et al., 1995; Leve & Fagot, 1997).

Figure 2: Student implicit attitudes and parental presence: Single mother vs both parents



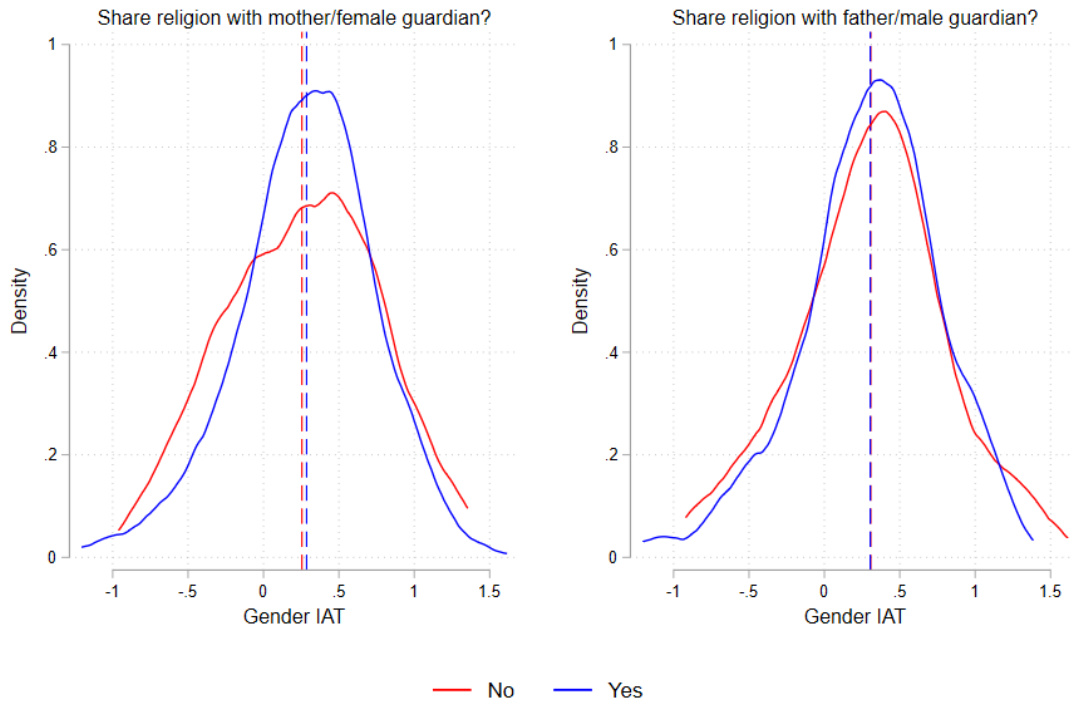
4.4.3 Shared beliefs with parents: Religion

Figure 4.3 shows that students who identified as sharing religion with their mother have slightly higher average IAT scores (more bias) than those who identified as sharing religion with their father. We find this result consistent with some of the empirical findings including (see [Biblarz & Stacey, 2010](#); [Carlson & Knoester, 2011](#); [Craig et al., 2014](#); [Min et al., 2012](#); [Perales et al., 2020](#)) who suggest that in the earlier stages of child development, mothers play more role in child-rearing hence spent more time and engage in more activities with children than fathers. As such, it is possible that children may adopt most of their mother's beliefs, including religious beliefs.

It is also not surprising that children who share religion with mother may have more implicit bias than those sharing with father is not particularly surprising because even

though women tend to participate more in religious settings, their voices have rarely been heard in almost all the history of religions (Klingorová & Havlíček, 2015) thus mothers (or females) within most religious settings continue to be confined within their traditional gender roles and will most likely pass on such values to their children.

Figure 3: Student implicit attitudes and shared religion with parents /guardians



4.4.4 Gender differences in attitudes

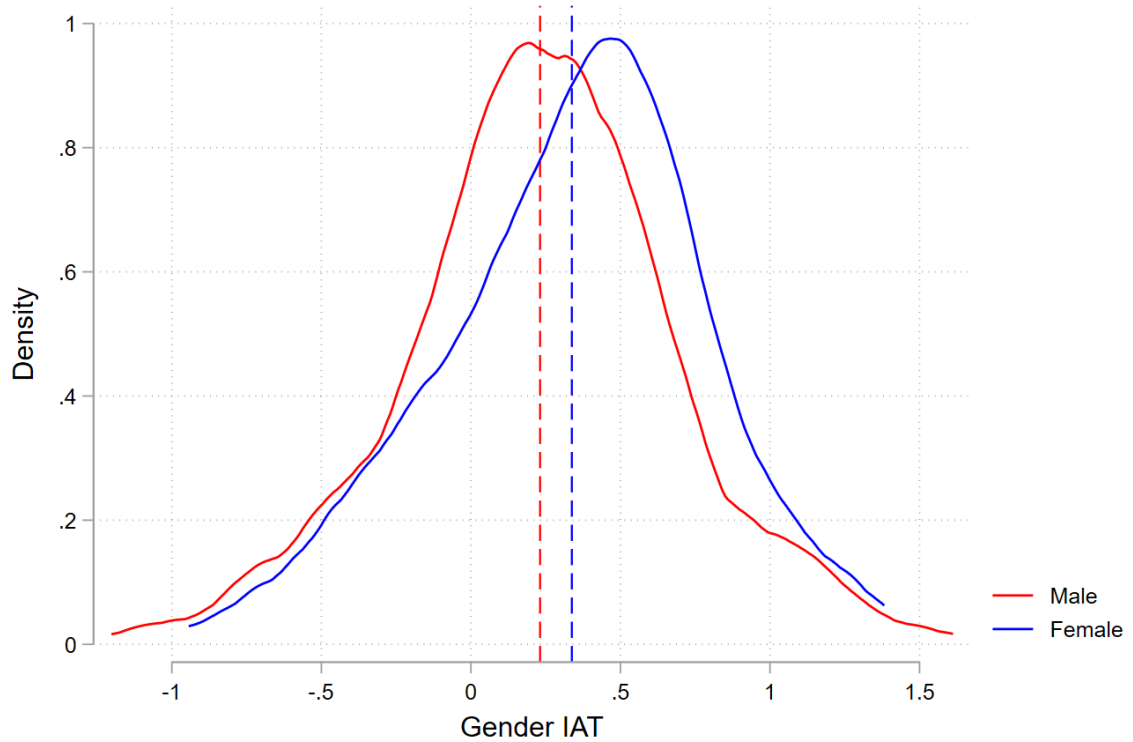
Figure 4.4 shows that on average, females have more implicit bias than males. Females' mean IAT scores are higher than males' mean scores (0.337 vs. 0.201) and this difference is statistically significant ($p = 0.000$). In Table 3, we also compare responses for men and women to the explicit attitudes questions. We find that females and males have significant statistical differences in 2 of the 5 explicit attitudes; the perception of the man as breadwinner (Job scarcity) and that the man should have the final say in all family decisions (Male superiority). In contrast to their implicit attitudes, females are more likely

than males to disagree that a man should have a final say in all family decisions (91.3% vs. 80.7%). They are also more likely to disagree than males that when jobs are scarce men should get jobs first (79.1% vs. 67.7%). In both cases, males are more likely to agree with the statements than females.

Table 5: Gender differences in IAT and explicit attitudes

Columns by: Gender	Male	Female	Total	P-value
Sample size n (%)	262 (40.3)	388 (59.7)	650 (100.0)	
Gender_IAT, mean (sd)	0.201 (0.479)	0.337 (0.436)	0.283 (0.458)	0.00
Explicit Attitudes	***	***	***	***
Job scarcity, n (%)				
Disagree, n (%)	172 (65.9)	304 (78.6)	476 (73.5)	
Agree, n (%)	34 (13.0)	43 (11.1)	77 (11.9)	0.00
University, n (%)				
Disagree, n (%)	239 (92.6)	368 (95.3)	607 (94.3)	
Agree, n (%)	19 (7.4)	18 (4.7)	37 (5.7)	0.15
Mother's guilt, n (%)				
Disagree, n (%)	211 (83.7)	334 (87.4)	545 (86.0)	
Agree, n (%)	41 (16.3)	48 (12.6)	89 (14.0)	0.19
Male Superior, n (%)				
Disagree, n (%)	198 (79.5)	352 (92.9)	550 (87.6)	
Agree, n (%)	51 (20.5)	27 (7.1)	78 (12.4)	0.00
Housewife, n (%)				
Disagree, n (%)	117 (58.2)	173 (50.3)	290 (53.2)	
Agree, n (%)	84 (41.8)	171 (49.7)	255 (46.8)	0.07

Figure 4: Gender and Implicit attitudes



4.5 External influences

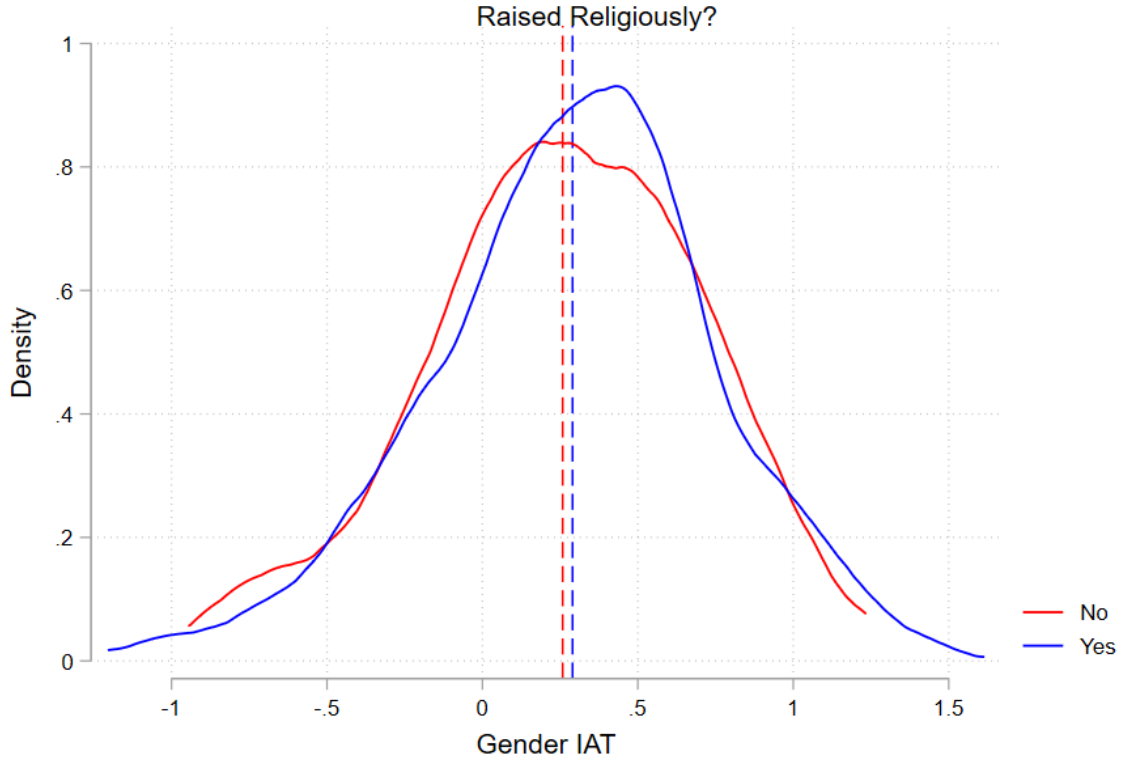
Next we show the how religion and social media affect students' gender role attitudes.

4.5.1 Religion and gender attitudes

Figure 4.5 shows that students who stated that they were raised religiously have more implicit gender bias than those who were not raised religiously and this difference is statistically significant. In general, religious individuals have been found to ascribe to the idea that men are supposed to inhabit the public sphere while women are meant to take care of the domestic or private sphere (Whitehead, 2012). However, how religion influences gender attitudes and ideologies vary with three different measures of religion: religious affiliation, worship service attendance, and biblical literalism. Some studies have found that conservative Protestant denominations tend to support more traditional gender roles

for men and women (see [Bang, Hall, Anderson, & Willingham, 2005](#); [Bartkowski, 2001](#); [Denton, 2004](#); [Gallagher, 2003](#)).

Figure 5: Student implicit attitudes and being raised religiously



Others suggest that levels of religious service attendance are an important predictor of gender ideologies. For one to maintain their traditional gender role beliefs, regardless of religious tradition, they must have frequent interaction with like-minded people (see [Abouchedid & Nasser, 2007](#); [Ammons & Edgell, 2007](#); [Read, 2003](#)). Moreover, even across different religions, and levels of religiosity, individuals who hold their holy scriptures in high regard are much more likely to espouse traditional gender ideologies people (see [Hoffmann & Bartkowski, 2008](#); [Read, 2003](#)).

4.5.2 Social media and gender attitudes

In Figure 4.6, students who spend more than 3 hours per day on social media have higher average IAT scores (more gender bias) than those who spend less time.⁹ As previously stated, social media is an important tool that can either reinforce or reshape gender attitudes. We find that individuals who spend more time on social media have slightly higher implicit gender bias- hence we it is possible that some of these platforms are reinforcing stereotypical gender attitudes. This result is consistent with some arguments made in the literature that social media can deepen users' pre-existing biases (see [Bozdag, 2013](#); [Pariser, 2011](#)). Bias from social media has also been found in other settings such as politics. A number of studies conclude that social media has contributed political bias (see [Hindman, 2008](#); [Mutz, 2006](#); [Pariser, 2011](#); [Sunstein, 2018](#)). These studies suggest that social media creates echo chambers where people only consume media that aligns to a particular set of beliefs they can identify with. A social media echo chamber is when one experiences a biased, tailored media experience that eliminates opposing viewpoints and differing voices. Various reasons have been cited for this biased effect of social media on outcomes and these include selection of belief-consistent information (i.e confirmation bias); the need to find homophily in social ties; as well as web algorithmic biases such as engagement bias (see [Baeza-Yates, 2018](#); [McPherson, Smith-Lovin, & Cook, 2001](#); [Nikolov, Lalmas, Flammini, & Menczer, 2019](#)). In line with our study, empirical research shows that women outnumber men on social media ([Webb & Temple, 2015](#)). They also spend more time on social networking sites than men ([Junco et al., 2010](#)). It is therefore possible that to some degree women may internalise information they see on social media more than men and use this information to reinforce gender norms.

⁹Figure 4.6 shows IAT scores for students after coming to university. We also found a similar trend in attitudes for the period before they came to university.

Figure 6: Student implicit attitudes and amount of time they spend on social media

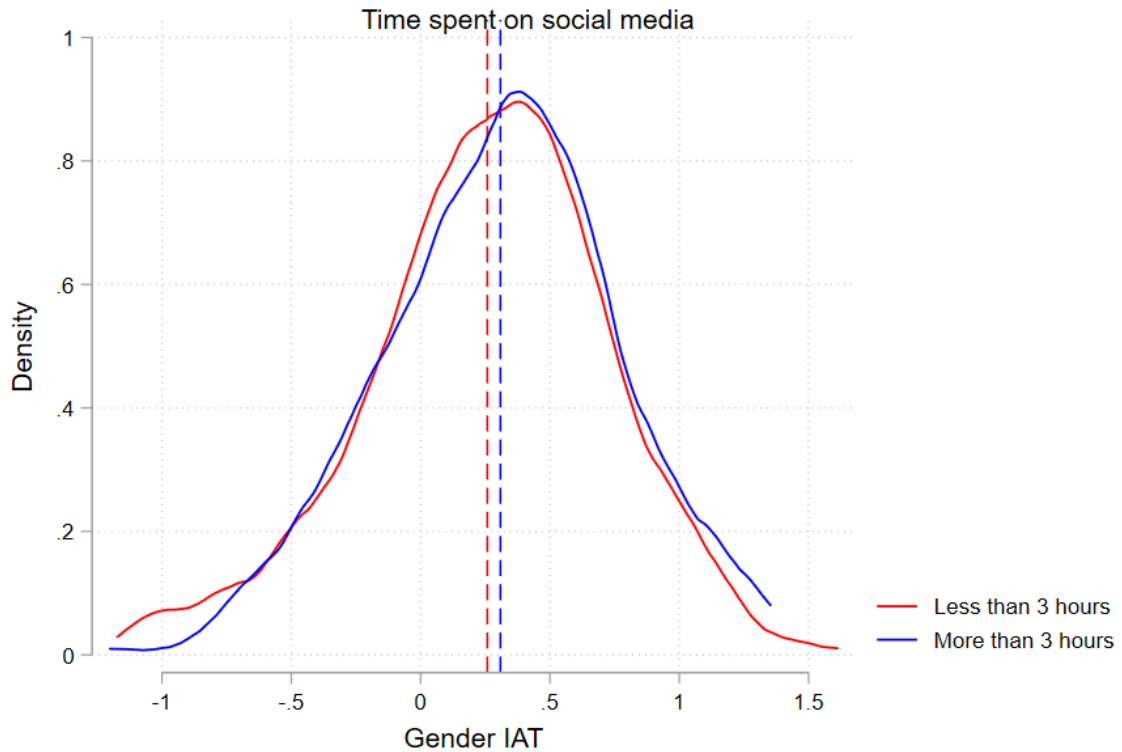
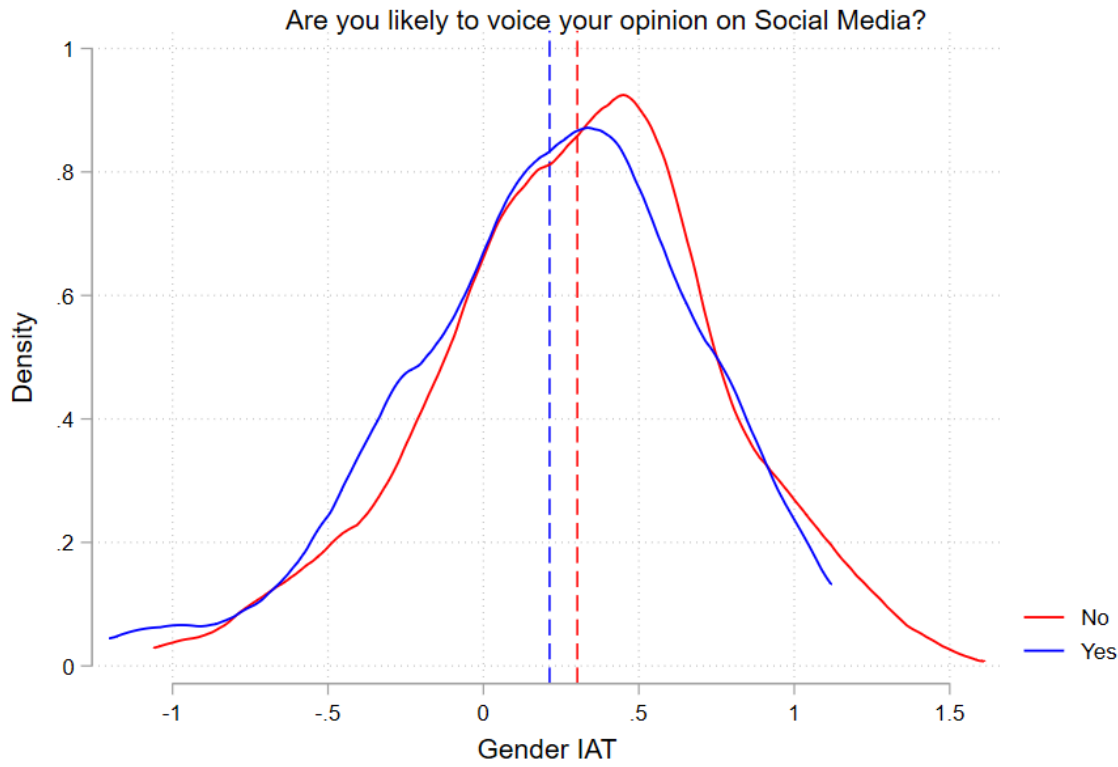


Figure 4.7 shows that students who are less likely to voice their opinions on social media have more implicit bias (higher average IAT scores) than those who were more likely to engage on social media. One possible explanation for this is that those who voice opinions are engaging more, rather than simply being passive receivers of external information. Individuals who are open to discussion and having their views challenged on these platforms have a higher chance of having their cultural and social views reshaped as they interact more with individuals from diverse backgrounds. Similarly, those who are not open to sharing their views may continue having more rigid perceptions.

Figure 7: Student implicit attitudes and their level of participation on social media



5 Conclusion

The main objective in this paper was to investigate the correlation between explicit and implicit attitudes. This kind of analysis allows us to understand the persistence of gender unequal outcomes in the society given that gender attitudes influence a lot of behaviours in and outside the home. We found no evidence of correlation between explicit and implicit attitudes suggesting a discrepancy between implicit and explicit attitudes. Implicit attitudes are subject to system 1 thinking making them unconscious, instinctive, automatic and a remnant of one's past); and explicit attitudes which are subject to system 2 thinking which is more conscious, deliberate, rational, logical and can be controlled. However, we found that certain characteristics such as being raised religiously and sharing religion with mother results in higher implicit bias towards males with career and females with families than the other way round. This indicates that to some degree family setting still plays some role in shaping individuals' gender attitudes. We also found that students who spend more time on social media have more implicit bias than those who spend less time. However, those students who actually voice their opinions on social media showed lower levels of implicit bias than those who do not actively engage on these platforms.

These findings present opportunities for policy-makers in the drive for gender equality. Whilst we understand that altering the attitudes of older individuals may be difficult because their beliefs are more entrenched to accept traditional gender roles, there is hope for the younger generations who have less established traditional gender role ideologies. Through social media platforms, policy makers can redefine and reshape gender attitudes by altering the content that is shown particularly in terms of the gender roles of men and women. Given that the general public tends to associate media content as reality, with time and more egalitarian views being spread on social media platforms, gender attitudes may shift towards more equality.

We also found that for the most part, females possess more implicit bias than males, whilst men possess more explicit bias than females. These are two different platforms which require different kind of remedies because implicit attitudes are more deeply ingrained within a person compared to explicit attitudes. This finding has important policy implications. For example, most of the discussions on gender inequality have focused on "educating" the male population on how to treat women more equally. We believe that

this is a necessary but not sufficient discussion given that women actually possess more traditional gender roles ideology than men (i.e male-career/female-family). As such, a more complete discussion of attaining greater gender inequality should first include an ideological shift amongst women such that when they lobby for gender equality, they first believe in it before trying to "convince" men that they deserve it. Given that we found some discrepancy between implicit and explicit attitudes, as further research, we would like to empirically investigate which of the attitudes (implicit or explicit) better predicts human behaviour.

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