

Muslim Women Physicists' Career Choice; Investigating the Effect of Culture

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Background and Motivations

- Women are under-represented in physics, they constitute approximately 20% of undergraduate physics degree recipients in the US [1].
- Learning is not merely a matter of acquiring knowledge and it ought to be thought of as a process of Identity formation [2,3].
- Learning a subject is conceived of as a process of becoming a member of a certain community that entails the ability to communicate in the language of this community and act according to its particular norms [4].
- Physicists learn what they need to know and desire in order to be considered serious members in the physics community [5].
- Identity refers to one's understanding of herself in relation to both her past and potential future. Identity refers to ways in which one participates in the world and the ways in which others interpret that participation [6].
- Femininity is a set of attributes, behaviors, and roles generally associated with girls and women [7].
- Ethnographical studies suggest that physics is associated with masculinity and femininity is considered incompatible with physics by the public as well as the physics community [8-10].
- Several Muslim majority countries have the highest rates of women's participation in physics (Figure 1.)

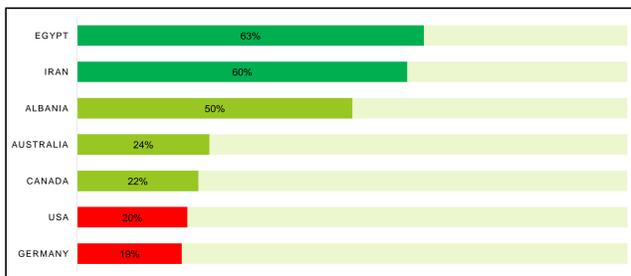


Figure 1. Percentage of Undergraduate Physics Degrees Awarded to Women [11]

Research Question

How does culture affect definitions of femininity and masculinity in ways that are compatible or incompatible with having a physics identity?

Methodology

- We conducted five interviews, each about one hour.
- Using purposeful and snowball sampling, the interviewees were female physicists and engineers who were educated in Muslim majority countries and became faculty members at US universities.
- The interviews were recorded and transcribed and thematic text analysis was performed to analyze the interviews. The results have been used to develop hypothesis about the cultural factors facilitating the participation of women in Muslim majority countries.

Result and Discussion

- The interviews revealed differences in what is considered gender appropriate as well as differences in physics culture in Muslim majority countries compared to the US.
- Based on the interviews we came up with 6 different hypothesis about cultural factors explaining why in some Muslim majority countries women are over-represented in undergraduate physics majors.

Women are seen as better at communication and being social [8,12, 27].

Stereotype about scientist working alone disadvantages women in the West [19,20].

(My brother used to say:) If you go to the co-education, boys will work with you, they will be studying with you, so I not want my sister that boys look at her. That was the main issue. It's not like education. Not as education, it was more like conservative approach (Farah).

Let me tell you, for example (in my home country) it's not really common that the girls become friends with boys from the religious and culture side (Fatima)

H1: less interaction encouraged between opposite genders, so women encouraged to work alone or in less interactive environments.

Thus women may not be as disadvantaged by the lone scientist stereotype.

One of the expressions of femininity is considered to be physical attractiveness (21-23).

Girlly girl expression of femininity is not encouraged in physics community [8, 28].

He (my father) never said that not to put makeup because it is bad. He would say, "People who put makeup, they just want to look attractive. But make your personality attractive, not the look (Farah)

H2: expression of femininity through modesty rather than physical attractiveness. So dress is less focused on.
Thus physical expression of femininity becomes less of a disadvantage.

In the US, women are perceived as more religious. In MM countries, religion is equally important to women and men. [13].

Scientists are seen as areligious [13].

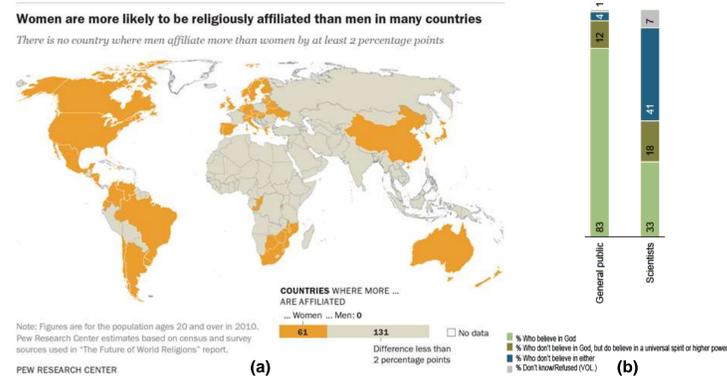


Figure 2. (a) Religious affiliation for men and women around the globe [13]. (b) Religious affiliation for scientists in the US.

I used to read Quran, the translation, and I found that Allah is asking us to learn about the mystery of His creation. I said that I should do that so He would be pleased (Shams)

I know Islam is very much into education, and for me, actually I go with that teaching that ... education is a kind of ibadat (worship) (Farah)

H3: knowledge pursuits, are highly religiously valued for everyone. In MM countries, religiosity is not tied to gender.

Thus religiosity does not disadvantage one group in physics over the other.

In the west, communal is perceived as feminine [14,18,29,30].

Physicist stereotypes about not being communal disadvantage women in the west [14,24,30].

One of the things that were a bit shocking, and I think a little bit disappointing is the lack of social interactions and social support. There's a lot of individualism here, even among graduate students, and so that was kind of a very contrasting type of interactions that I wasn't used to (Sarah)

H4: in Muslim majority countries, communal is valued as both masculine and feminine.

H5: in Muslim majority countries, Physics is perceived as more communal compare to west.
Thus being communal does not disadvantage one group in physics over the other.

Women are more prone to take on family responsibilities and housework [16,17,25,26]

In the west, physics is considered very demanding major and physicists are encouraged being single minded, with no time to spend on the other aspects of life [8,15]

It (physics) is a very demanding job, and the mentality in the field is that there's really no work-life balance. (back home) there's more often kind of a work-life balance than compared to here. Even in Europe, when I talk to my colleagues in Europe, it's a very different atmosphere and environment compared to here (Sarah)

the view of success as scientists or a physicist means that you have no other aspect of your personality other than being a scientist or a researcher (Sarah)

H6: In Muslim majority countries, physics is not defined in contrast with other activities.
Thus individuals with other interests and goals in life can still be physicists.

Acknowledgement

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References

References are available as supplementary upon request.