Lessons Learnt from Comparing WhatsApp Privacy Concerns Across Saudi and Indian Populations

Jayati Dev  
Indiana University Bloomington

Pablo Moriano  
Oak Ridge National Laboratory

L. Jean Camp  
Indiana University Bloomington
Whatsapp is used in over 128 countries

Multimedia messaging application for texting, sharing data, and calling
Origin is a factor in influencing privacy
Research Questions

TO WHAT EXTENT ARE PRIVACY CONCERNS OF SAUDIS DIFFERENT FROM INDIANS?

TO WHAT EXTENT DOES GENDER IMPINGE ON PRIVACY CONCERNS FOR BOTH THE POPULATIONS?

HOW DO PRIVACY CONCERNS AFFECT PRIVACY BEHAVIOR FOR BOTH POPULATIONS?
Research Questions

TO WHAT EXTENT ARE PRIVACY CONCERNS OF SAUDIS DIFFERENT FROM INDIANS?

TO WHAT EXTENT DOES GENDER IMPINGE ON PRIVACY CONCERNS FOR BOTH THE POPULATIONS?

HOW DO PRIVACY CONCERNS AFFECT PRIVACY BEHAVIOR FOR BOTH POPULATIONS?
Research Questions

TO WHAT EXTENT ARE PRIVACY CONCERNS OF SAUDIS DIFFERENT FROM INDIANS?

TO WHAT EXTENT DOES GENDER IMPINGE ON PRIVACY CONCERNS FOR BOTH THE POPULATIONS?

HOW DO PRIVACY CONCERNS AFFECT PRIVACY BEHAVIOR FOR BOTH POPULATIONS?
<table>
<thead>
<tr>
<th></th>
<th>Saudi Arabia</th>
<th>India</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>159</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>293</td>
</tr>
<tr>
<td>Age</td>
<td>18-24</td>
<td>99</td>
</tr>
<tr>
<td></td>
<td>25-30</td>
<td>225</td>
</tr>
<tr>
<td></td>
<td>31-40</td>
<td>103</td>
</tr>
<tr>
<td></td>
<td>41-50</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>➢ 50</td>
<td>4</td>
</tr>
<tr>
<td>Education</td>
<td>High school or less</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Some college</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>Bachelors</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>Masters or Professional</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Doctoral</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>452</strong></td>
</tr>
</tbody>
</table>

Saudi and Indian WhatsApp users

Snowball sampling
Analysis

RQ1, RQ2
(MWW Test)

• **IV**: Origin, Gender
• **DV**: Sensitive Data, Professional Contact, Targeted Ads, Group Add Ask, Stranger Contact Concern

RQ3
(Exploratory Factor Analysis)

• **IV**: Sensitive Data, Professional Contact, Targeted Ads, Group Add Ask, Stranger Contact Concern, Platform, Frequency of Use, Length of Use
• **DV**: (Saudi) Sensitive Data, Platform, Frequency, Education and Group Permission, Age and Targeted Ads, Professional Contact (India) Age and Education, Platform, Gender, Information Sensitivity, Targeted Ads

RQ3
(Regression Analysis)

• **IV**: (Saudi) Sensitive Data, Platform, Frequency, Education and Group Permission, Age and Targeted Ads, Professional Contact (India) Age and Education, Platform, Gender, Information Sensitivity, Targeted Ads
• **DV**: Blocking, Auto-Download, Location, Notification, Profile Photo, Last Seen, Status

IV – Independent Variable (s); DV – Dependent Variable (s)
Findings
Origin
Origin

W=37,254; p < .001
Origin

$W = 66,299; \ p < .001$
Gender
Gender
Gender

W = 11,648; p = .015
Gender

W=65.69; p < .001
Gender

W = 12,222; p < .001
Gender

W=8,545; p < .001
Privacy Concerns Affecting Behavior (Saudi Arabia)

<table>
<thead>
<tr>
<th>Factors</th>
<th>Blocking</th>
<th>Auto Download</th>
<th>Location</th>
<th>Notification</th>
<th>Profile Photo</th>
<th>Last Seen</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1.208***</td>
<td>0.427***</td>
<td>0.722***</td>
<td>1.291***</td>
<td>0.013</td>
<td>-0.021</td>
<td>-0.058</td>
</tr>
<tr>
<td>Age and Education</td>
<td>-0.024</td>
<td>0.088</td>
<td>-0.157</td>
<td>-0.279*</td>
<td>0.013</td>
<td>-0.021</td>
<td>-0.058</td>
</tr>
<tr>
<td>Usage Platform</td>
<td>-0.139</td>
<td>0.117</td>
<td>0.117</td>
<td>-0.217</td>
<td>-0.027</td>
<td>0.002</td>
<td>-0.068</td>
</tr>
<tr>
<td>Group Permission</td>
<td>0.173</td>
<td>0.416***</td>
<td>0.034</td>
<td>-0.241</td>
<td>-0.109</td>
<td>0.060</td>
<td>0.069</td>
</tr>
<tr>
<td>Gender</td>
<td>0.498***</td>
<td>0.158</td>
<td>-0.165</td>
<td>-0.167</td>
<td>-0.035</td>
<td>-0.143</td>
<td>-0.041</td>
</tr>
<tr>
<td>Information Sensitivity</td>
<td>0.044</td>
<td>-0.177</td>
<td>-0.027</td>
<td>0.138</td>
<td>0.169</td>
<td>0.065</td>
<td>-0.038</td>
</tr>
<tr>
<td>Targeted Ads</td>
<td>0.073</td>
<td>0.161</td>
<td>0.079</td>
<td>-0.307*</td>
<td>-0.152</td>
<td>-0.165</td>
<td>-0.205</td>
</tr>
</tbody>
</table>

Statistical significance levels are indicated as: (*) for p < .05, (**) for p < .01, (***) for p < .001.
### Privacy Concerns Affecting Behavior (India)

<table>
<thead>
<tr>
<th>Factors</th>
<th>Blocking</th>
<th>Auto Download</th>
<th>Location</th>
<th>Notification</th>
<th>Profile Photo</th>
<th>Last Seen</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1.292***</td>
<td>-0.384*</td>
<td>1.244***</td>
<td>2.303***</td>
<td>0.152</td>
<td>-0.016</td>
<td>-0.096</td>
</tr>
<tr>
<td>Sensitive Data</td>
<td>-0.159</td>
<td>0.194</td>
<td>0.082</td>
<td>-0.452</td>
<td>0.353*</td>
<td>0.018</td>
<td>0.253</td>
</tr>
<tr>
<td>Usage Platform</td>
<td>-0.164</td>
<td>0.031</td>
<td>-0.056</td>
<td>-0.169</td>
<td>0.006</td>
<td>-0.098</td>
<td>-0.038</td>
</tr>
<tr>
<td>Usage Frequency</td>
<td>-0.153</td>
<td>0.079</td>
<td>0.254</td>
<td>0.006</td>
<td>-0.098</td>
<td>-0.038</td>
<td>-0.032</td>
</tr>
<tr>
<td>Education and Group Permission</td>
<td>-0.141</td>
<td>-0.017</td>
<td>0.051</td>
<td>0.0368</td>
<td>0.304</td>
<td>0.320*</td>
<td>0.215</td>
</tr>
<tr>
<td>Age and Targeted Ads</td>
<td>0.101</td>
<td>0.170</td>
<td>-0.267</td>
<td>-0.168</td>
<td>0.169</td>
<td>0.025</td>
<td>0.084</td>
</tr>
<tr>
<td>Professional Contact</td>
<td>-0.438</td>
<td>0.356*</td>
<td>-0.043</td>
<td>0.421*</td>
<td>0.081</td>
<td>0.184</td>
<td>-0.137</td>
</tr>
</tbody>
</table>

*Statistical significance levels are indicated as: (*) for $p < .05$, (**) for $p < .01$, (***) for $p < .001$.\*\*\*
Recommendations
Offer an Option for Permissions-Based Contact
Choice and Consent in Joining Groups

X invited you to “Get Together 2019”. Do you wish to be added to this group?
Option for Group Types

Which lists would you like to share this with?

a. Friends
b. Colleagues
c. Family
d. Specific groups...
Key Takeaways

- **RQ1: Origin** affects privacy concerns and consequently, privacy behavior.
- **RQ2: Gender** affects certain privacy concerns, but affects privacy behavior differently in Saudi Arabia and India.
- **RQ3:** Most participants in both populations wanted to be able to control the content and recipient (with a greater focus on recipients) of their shared information.
Thank you!
Questions?

Human Aspects of Technical Security (HATS) Lab
Luddy School of Informatics, Computing, and Engineering
Indiana University
612 N Park Avenue
Bloomington, IN 47408