MEASURING FEAR IN RISKY PLACES

April 29, 2021

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• Comparing two types of real-time data collection on experiences: Ecological Momentary Assessments (EMA) and Experience Sampling Method (ESM)

• Recent studies on use of smartphone-based EMAs to collect data on fear of crime

• Prospects of EMAs for research and practice regarding risky places

• Challenges of using EMAs
<table>
<thead>
<tr>
<th><strong>EMA</strong></th>
<th><strong>ESM</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Researchers take repeated samples of study subjects’ real-time behaviors and experiences in the subjects’ natural environment via self-reports</td>
<td>Researchers take repeated samples of study subjects’ real-time behaviors and experiences in the subjects’ natural environment via self-reports</td>
</tr>
<tr>
<td><strong>Its purpose is to:</strong></td>
<td><strong>Its purpose is to:</strong></td>
</tr>
<tr>
<td>capture emergence of an individual-level phenomenon in its natural environment</td>
<td>identify the regularities in individuals’ behaviors, emotions, and perceptions in their natural environment</td>
</tr>
<tr>
<td><strong>Its measures are:</strong></td>
<td><strong>Its measures are:</strong></td>
</tr>
<tr>
<td>Time contingent</td>
<td>Time contingent</td>
</tr>
<tr>
<td>Signal contingent</td>
<td>Signal contingent</td>
</tr>
<tr>
<td><strong>Event contingent</strong></td>
<td><strong>It can collect information via paper diaries, electronic diaries, e-mail, SMS, smart device apps, and physiological sensors</strong></td>
</tr>
<tr>
<td><strong>It can collect information via paper diaries, electronic diaries, e-mail, SMS, smart device apps, and physiological sensors</strong></td>
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</tr>
</tbody>
</table>

**ECOLOGICAL MOMENTARY ASSESSMENTS (EMA) VS. EXPERIENCE SAMPLING METHOD (ESM)**
Ecological momentary assessment of individuals’ fear in real time, in individuals’ natural environments

Vs.

Static measurements of fear via traditional methods:

“How safe do you feel or would you feel being out alone in your neighborhood at night?”

“How afraid (worried) are you of crime?”

“How much do you fear crime X on a scale from very worried to not at all worried?”

<table>
<thead>
<tr>
<th>Study Location</th>
<th>Camden and Islington, UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample/Study Duration</td>
<td>Six people from a university setting/approximately 4 weeks</td>
</tr>
</tbody>
</table>
| Survey timing | *Time-based (when pinged, up to 4 times a day)  
*Event-based (retrospective in high-risk situations) |
| Variables measured | Single item fear of crime: *In this moment, how worried are you about becoming a victim of crime?* |
# The Geography of Crime Fear: A Pilot Study Exploring Event-Based Perceptions of Risk Using Mobile Technology

**CHATAWAY, M. L., HART, T. C., COOMBER, R., & BOND, C. (2017).**

**Study Location**
Queensland, Australia

**Sample/Study Duration**
20 students from a university setting/3 months

**Survey timing**
*Time-based (participant comes close to a reference point)

**Variables**
1) Frequency of **worry**
2) **Likelihood** of personal victimization
3) **Attitudes** about consequences of victimization
4) How often they **believed** that crime would occur in the area during the next month
5) Perceived **control** over crime
6) Attitudes about **social and physical incivility**
7) **Informal social control** and **social capital**

<table>
<thead>
<tr>
<th>Study Location</th>
<th>Queensland, Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample/Study Duration</td>
<td>72 young adults/3 months</td>
</tr>
<tr>
<td>Survey timing</td>
<td>*Time-based (surveys were sent every three days, at two random time points, with a 5-hour interval in between each time-point).</td>
</tr>
</tbody>
</table>
| Variables measured      | 1) Frequency of **worry**  
                         | 2) **Likelihood** of personal victimization  
                         | 3) **Attitudes** about consequences of victimization  
                         | 4) How often they **believed** that crime would occur in the area during the next month  
                         | 5) Perceived **control** over crime  
                         | 6) Attitudes about social and physical incivility  
                         | 7) Informal social control and social capital |
KRONKVIST, K., & ENGSTRÖM, A. (2020). FEASIBILITY OF GATHERING MOMENTARY AND DAILY ASSESSMENTS OF FEAR OF CRIME USING A SMARTPHONE APPLICATION (STUNDA)

<table>
<thead>
<tr>
<th>Study Location</th>
<th>Malmö, Sweden</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample/Study Duration</td>
<td>191 undergraduate students/14 days</td>
</tr>
</tbody>
</table>
| Survey timing           | *Time-based #1 (signal contingent surveys/3 times a day/stratified random sample)  
*Time based (interval contingent –once a day)  
*Event contingent |
| Variables measured      | Current situation: *where* the participants were located (functional location), *what* they were doing, and *who else* they were with.  
Perceived safety, worry of crime and how likely they believed they were to become victim of a crime at the moment. Also included a qualitative element to describe Feasibility indicators: number of surveys; duration of participation, compliance rate (#of self-reports/# of surveys sent), correlates of participation. |

**Aim of Study:** Examine the feasibility of administration of Ecological Momentary Assessments (EMAs) via our custom built smartphone application information on individuals’ experiences of public transit, including their fear of crime victimization

**Pilot location:** Lahore, Pakistan

**# of study participants:** 6 (3 females and 3 males)

**Duration of pilot data collection:** 4-days, November 2017

**# of EMAs (# of total surveys completed):** 220

**Funder:** World Bank & SVRI (USD 100,000)
Survey Response Options

App User receives a ping

- Option 1: User responds as soon as receiving the ping (N/A when in vehicle)
- Option 2: User clicks Respond Later, the app records date and time, and a) user completes the survey later or b) user never completes the survey

App user wants to report an "ongoing" fear event

- Option 1: User clicks Start Survey and completes a survey right away (N/A when in vehicle)
- Option 2: User clicks Respond Later, the app records date and time, and a) user completes the survey later or b) user never completes the survey

App user wants to report a "past" fear event

- Option: User clicks Start Survey/Report Past Incident; indicates the time and location of fear incident; and completes the survey
EMA Survey Instrument Question Categories

1. A Likert scale question of how fearful user is (was) to become a victim of sexual harassment, mugging, physical assault, or pickpocketing (on a scale of 1 to 5, 1 being not at all fearful and 5 being extremely fearful)

2. A Likert scale question of how likely the participants think (thought) they can (could) become a victim of sexual harassment, mugging, physical assault, or pickpocketing (on a scale of 1 to 5, 1 being not at all likely and 5 being extremely likely)

3. Participants were asked to choose from several walking, waiting at a transit stop, or traveling in a vehicle response categories to identify the stage of the respondent’s journey at the time of each reporting

4. Participants were asked to choose from a list of indicators to describe their environment specific to different stages of journey

5. Participants were asked to choose from a list of suggestions to provide input about what would have made their experience a better experience or improve the conditions at the moment of their experience
Pilot Study Participants

• Convenience sample of 6 university students (3 male and 3 female, ages ranged between 23 and 37)

• All participants received a one-day training and an informed consent was sought from each participant

• Training included: Introduction to the project, risks associated with participation, session with project’s on call psychologist

• The participants agreed to participate in the study for four days, and were randomly assigned to a combination of different routes to travel around the city of Lahore
EMA Response Characteristics

Figure 5. Number of Reports by Reporting Type

- **Report Past Incident**: A small number of reports, mostly self-reported.
- **Report Later**: More reports, primarily self-reported, with a small portion pinged.
- **Report Now**: A significant number of reports, with most being pinged and a smaller portion self-reported.

The chart illustrates the distribution of reports across different reporting options.
Higher Fear and Perceived Risk of Victimization Ratings by Journey Stage

- Sexual Harassment Higher Fear Perception (%)
- Pickpocketing Higher Fear Perception (%)
- Physical Assault Higher Fear Perception (%)
- Mugging Higher Fear Perception (%)
- Sexual Harassment Higher Fear (%)
- Pickpocketing Higher Fear (%)
- Physical Assault Higher Fear (%)
- Mugging Higher Fear (%)

- Traveling in a Public Transit Vehicle
- Waiting at a Public Transit Stop
- Walking

Percentage
OBSERVATIONS IN HIGH FEAR CONDITIONS AND SUGGESTIONS FOR IMPROVEMENT

APP USERS’ OBSERVATIONS IN HIGH FEAR SITUATIONS (WALKING OR WAITING AT A STOP)

• Too many pedestrians
• Persons observed to be under the influence
• Trash lying around and graffiti
• Too many street vendors
• Taxi stands too close to bus stops

APP USERS’ SUGGESTIONS TO IMPROVE CONDITIONS IN HIGH FEAR SITUATIONS (WALKING OR WAITING AT A STOP)

• Placement of signs explaining the laws and penalties about crime
• Signs and instructions for helplines
• Increased security and police personnel
• Improving the overall safety and cleanliness of their environment
PROSPECTS OF SMARTPHONE BASED EMAs FOR CRIMINOLOGY

*EMAs prospect for collection of experiential data at risky places and to identify places that induce fear and perceived as high risk

*EMAs and situational approaches to crime prevention at risky places

*Ecological momentary assessments as interventions

Source: Lorenc T, Petticrew M, Whitehead M. (2014)
**Considerations for Use of EMAs**

**Duration of Data Collection**
LENGTHY SIGNAL OR INTERVAL-CONTINGENT STUDIES MIGHT BE TOO BURDENSOME

**Construction of EMAs**
CONSIDER THE MOMENTARY NATURE OF ASSESSMENTS WHILE DEVISING QUESTIONS

THE MEDIUM/DEVICE UTILIZED BY PARTICIPANTS CAN LIMIT THE QUESTION LENGTH AND SPACE FOR INSTRUCTIONS

**Measurement Issues**
**Reactivity & Validity:** Be alert for change of participant response due to EMA experience

**Compliance:** Consider strategies for increasing participants' compliance with recurring measurements

**Inclusion & Beneficence**
Consider access issues and needs of participants to fully engage in EMAs

Consider strategies to reduce negative experiences due to EMA use and identity resources for participants
THANK YOU! QUESTIONS?

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- TWITTER: @YIRVINERICKSON
## Situational Indicators

**TABLE 2. LIST OF SITUATIONAL INDICATOR RESPONSE OPTIONS PROVIDED IN THE APP SURVEY**

<table>
<thead>
<tr>
<th>JOURNEY STAGE</th>
<th>JOURNEY STAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking/Waiting at a Transit Stop</td>
<td>Traveling in a Vehicle</td>
</tr>
<tr>
<td>I am close to a taxi stand</td>
<td>The vehicle is crowded</td>
</tr>
<tr>
<td>I am close to a street market</td>
<td>There are not enough seats in the vehicle</td>
</tr>
<tr>
<td>I am close to the entertainment district</td>
<td>There are beggars in the vehicle</td>
</tr>
<tr>
<td>There are vendors around</td>
<td>There are vendors in the vehicle</td>
</tr>
<tr>
<td>There are many pedestrians around</td>
<td>There is loud music playing in the vehicle</td>
</tr>
<tr>
<td>There are few pedestrians around</td>
<td>I see drunk people in the vehicle</td>
</tr>
<tr>
<td>There are vacant lots around</td>
<td>The vehicle is in poor condition</td>
</tr>
<tr>
<td>I see buildings in poor conditions</td>
<td>I hear verbal altercations between people</td>
</tr>
<tr>
<td>I see graffiti</td>
<td>Driver made unscheduled stops</td>
</tr>
<tr>
<td>I see drunk people around</td>
<td>Driver is driving fast</td>
</tr>
<tr>
<td>There is not enough street lighting</td>
<td>Other (please specify)</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td></td>
</tr>
</tbody>
</table>
## Improvement Suggestions

**Table 3. List of Improvement Suggestion Response Options Provided in the App Survey**

<table>
<thead>
<tr>
<th>Journey Stage 1: Walking/Waiting at a Transit Stop</th>
<th>Journey Stage 2: Traveling in a Vehicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post signs for laws and penalties for crimes</td>
<td>Post signs for laws and penalties for crimes</td>
</tr>
<tr>
<td>Post signs and instructions for safety and helpline numbers</td>
<td>Post signs for safety and helpline numbers</td>
</tr>
<tr>
<td>Increase patrolling by transport security staff</td>
<td>Provide more seating</td>
</tr>
<tr>
<td>Increase overall security presence</td>
<td>Improve conditions for people standing</td>
</tr>
<tr>
<td>Provide a safer and cleaner environment</td>
<td>Improve vehicle conditions</td>
</tr>
<tr>
<td>Install CCTV (cameras)</td>
<td>Install CCTV (cameras)</td>
</tr>
<tr>
<td>Increase police patrol</td>
<td>Increase patrols/checks in the vehicle</td>
</tr>
<tr>
<td>Install emergency phones at stations/stops platforms</td>
<td>Run women only vehicle services</td>
</tr>
<tr>
<td>Control crowdedness</td>
<td>Provide alerts for victims/witnesses</td>
</tr>
<tr>
<td>Post instructions for victims and witnesses of crime</td>
<td>Improve lighting</td>
</tr>
<tr>
<td>Improve street lighting</td>
<td>Send alerts through mobile phones</td>
</tr>
<tr>
<td>Send safety alerts through mobile phones</td>
<td>Provide request stop programs after dark</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>Other (please specify)</td>
</tr>
</tbody>
</table>
# Pilot Routes

<table>
<thead>
<tr>
<th>Day</th>
<th>Male #1</th>
<th>Female #1</th>
<th>Male #2</th>
<th>Female #2</th>
<th>Male #3</th>
<th>Female #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sheranwala Gate → RA Bazar → Chungi Amar Siddhu → Gajju Matta</td>
<td>Thokar Niaz Baig → Doctor's Hospital → Kalma Chowk → Shahdara</td>
<td>Mohlanval → Multan Chungi → Canal → Shahdara</td>
<td>Gajju Matta → Shahdara → Kashmiri Gate</td>
<td>Kaana Nahu → Gajju Matta → Shahdara</td>
<td>Rehmat Chowk → Gondal Chowk → Ittifaq Chowk</td>
</tr>
<tr>
<td>2</td>
<td>Thokar Niaz Baig → Doctor's Hospital → Kalma Chowk → Shahdara</td>
<td>Sheranwala Gate → RA Bazar → Chungi Amar Siddhu → Gajju Matta</td>
<td>Shahdara → Qartaba Chowk → Governor House → Shimla Hill</td>
<td>Ghazi Chowk → Kalma Chowk → Babu Sabu → Liaqat Chowk</td>
<td>Gajju Matta → Qartaba Chowk → Railway Station → Chouburji Bus Stop</td>
<td>Kaana Nahu → Gajju Matta → Shahdara</td>
</tr>
<tr>
<td>3</td>
<td>Gajju Matta → Shahdara → Taxali Gate</td>
<td>Bhatta Chowk → RA Bazar → Qainchi → Gajju Matta</td>
<td>Gajju Matta → Shahdara → Kashmiri Gate</td>
<td>Mohlanval → Multan Chungi → Canal → Shahdara</td>
<td>Nishat Colony → RA Bazar → Civil Secretariat → Shahdara</td>
<td>Gajju Matta → Qartaba Chowk → Railway Station → Chouburji</td>
</tr>
<tr>
<td>4</td>
<td>Bhatta Chowk → RA Bazar → Qainchi → Gajju Matta</td>
<td>Gajju Matta → Shahdara → Taxali Gate</td>
<td>Ghazi Chowk → Kalma Chowk → Babu Sabu → Liaqat Chowk</td>
<td>Shahdara → Qartaba Chowk → Governor House → Shimla Hill</td>
<td>Rehmat Chowk → Gondal Chowk → Ittifaq Chowk</td>
<td>Nishat Colony → RA Bazar → Civil Secretariat → Shahdara</td>
</tr>
</tbody>
</table>
Figure 30. All Participant Observations in Metrobus vs. Other Public Transit Vehicle

Observations in Metrobus and Other Public Transit

- Beggars in the vehicle
- Crowded vehicle
- Driver is driving fast
- Driver made unscheduled stops
- Loud music
- Not enough seating
- People under the influence
- Vehicle is in poor condition
- Vendors in the vehicle
- Verbal altercations

Other Transit All Reports (n=11)  Metrobus All Reports (n=33)
EMA Response Characteristics

Figure 6. Number of EMA Reports by Time of the Day
### TABLE 5. NUMBER OF HIGH FEAR* RATINGS BY EACH PILOT PARTICIPANTS

<table>
<thead>
<tr>
<th></th>
<th>Total Reports</th>
<th>Sexual Harassment High Fear Reports</th>
<th>Physical Assault High Fear Reports</th>
<th>Mugging High Fear Reports</th>
<th>Pickpocketing High Fear Reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant #1</td>
<td>47</td>
<td>34</td>
<td>36</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>Participant #2</td>
<td>37</td>
<td>37</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Participant #3</td>
<td>35</td>
<td>11</td>
<td>3</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Participant #4</td>
<td>34</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Participant #5</td>
<td>34</td>
<td>11</td>
<td>5</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Participant #6</td>
<td>33</td>
<td>23</td>
<td>9</td>
<td>11</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: High fear refers to ratings of "extremely fearful" or "fairly fearful." Participants 2, 4, 6 are female and participants 1, 3, 5 are male.
STATIONS WITH HIGHER FEAR REPORTS

Metrobus Stops

- 0-1
- 2-3
- 3-6
- 7-9

Metrobus Route

Study Extent

© OpenStreetMap (and contributors), CC BY-SA
## TABLE 6. MEAN TOTAL FEAR SCORES BY STAGE OF THE JOURNEY

<table>
<thead>
<tr>
<th>Journey Stage</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking</td>
<td>83</td>
<td>10.57</td>
<td>4.30</td>
<td>.47</td>
</tr>
<tr>
<td>Waiting at a Stop</td>
<td>92</td>
<td>9.44</td>
<td>4.13</td>
<td>.43</td>
</tr>
<tr>
<td>Traveling in a Vehicle</td>
<td>43</td>
<td>8.13</td>
<td>3.50</td>
<td>.53</td>
</tr>
<tr>
<td>Total</td>
<td>218</td>
<td>9.61</td>
<td>4.16</td>
<td>.28</td>
</tr>
</tbody>
</table>
Chataway et al. (2017) measures

- Frequency of worry about personal victimisation was measured using a 4-item response set, where 1 indicates “Not once in the last month” and 4 corresponds to “Everyday” (M ¼ 1.57; SD ¼ 0.60).
- Likelihood of personal victimisation was measured on a 7-point scale, where only the endpoints were labeled: 1 ¼ “Definitely not going to happen” and 7 ¼ “Certain to happen” (M ¼ 3.04; SD ¼ 0.96).
- Attitudes about the consequences of personal victimization were also measured on a 7-point scale, with only the endpoints labeled: 1 ¼ “Not at all” and 7 ¼ “To a very great extent” (M ¼ 4.70; SD ¼ 1.66). Using the same 7-point scale, participants were asked about the extent to which they had control over becoming a victim of a personal crime (M¼ 3.42; SD ¼ 1.52). Finally, participants were asked how often they believed that crime would occur in the area during the next month (i.e., belief). A 4-point scale that ranges from 1 “Never in the next month” to 4 “Every day in the next week” was used to measure this dimension of fear (M ¼ 1.89; SD ¼ 0.68).
- In order to assess perceptions of the participants' proximate environment, 5 seven questions were used to measure attitudes towards both physical and social incivility. Participants were asked how much of a problem they felt the following conditions were in the immediate area: (a) vandalism/graffiti; (b) rubbish in the streets; (c) dogs out of control/creating a mess; (d) drug-taking in the open; (e) drinking in the street; (f) teenagers hanging around; and (g) not enough things for young people to do. On average, study participants rated the areas around them 2.49 out of 4.00 (SD ¼ 0.52), where 1 indicates incivilities are “Not a problem at all” and 4 indicates that they are “A very big problem”. Seven questions were also used to measure informal social control and social capital (i.e., social cohesion). Participants were asked how much they agreed with the following statements: (a) the people who live here can be relied upon to call the police if someone is acting suspiciously; (b) if any of the children or young people around here are causing trouble, local people will tell them