

Examining Daily Activity Space in Rural and Non-Rural Settings: A Feasibility Study

- Rapid Assessment of the feasibility of examining the **daily activity space** of individuals **and measures of** overall **well-being** in **rural & non-rural settings**
- Almost all studies of activity space have been **in urban environments**. Increasingly, tracking done with mobile devices (smartphones)
- Smartphones also increasingly used to conduct **Ecological Momentary Assessments** (EMA) to obtain high-frequency measures of behaviors, mood, affect & overall well-being

Examining Daily Activity Space in Rural and Non-Rural Settings: A Feasibility Study (cont.)

- Important question is how activity spaces and momentary well-being differs in **rural & non-rural** (urban) **environments**
- Is it feasible to reliably conduct comparable studies in rural environments, using same protocols?
- Can one conduct these studies with individuals' own mobile devices?
- Will compliance to intensive protocols (EMA 3 x a day for 7 days & continuous monitoring of individuals' geo-spatial locations) be the same?
- Can you conduct study during COVID-19 pandemic, following “no physical contact” protocols?
- **We** undertook a **Rapid Assessment** to find out!

- **Conducted assessment enrolling participants from two on-going studies:**
 - Great Smoky Mountains Study (**GSMS**), [Copeland, PI](#)
 - On-going longitudinal study of then adolescents in western North Carolina since 1996 drawn from non-rural and rural areas, including members of Eastern Band of Cherokee Nation
 - Funded by NIDA, NICHD, NIA
 - Project on Research on Adaptive Interests, Skills, and Environments (**RAISE**), [Hoyle, PI](#)
 - Study of self-regulation across adolescence in families across North Carolina (2015)
 - Funded by NIDA under P30 DA023026 grant for Center for the Study of Adolescent Risk and Resilience (C-StARR)

- **Recruitment:**

- **GSMS:** Recruited from randomly selected sample members from Cherokee Nation tribe. All rural and in 30s & 40s
 - Used existing GSMS Field Staff to recruit and monitor study
- **RAISE:** Recruited from randomly selected sample members:
 - From rural, suburban and urban location of North Carolina
 - Between ages 35-50 to maintain comparability with GSMS sample.
 - Used Project RAISE Field Staff to recruit and monitor study
- Subjects had to have smartphone & to agree to have tracking software installed on them
- While different field staff, **comparable** recruitment protocols, consenting procedures and **same** technology for activity tracking were used

• Participation Requirements of Assessment

- Participate in study for 8-day period
- Answer 3 EMA surveys per day (morning, afternoon, evening) for 7 days using own smartphone
- Allow Geospatial Tracking with software loaded on their smartphones
- Answer longer Final Interview on Day 8

- ✓ *Software for surveys and tracking: MetricWire*
- ✓ *Design Phase took 12 weeks, including pre-test*
- ✓ *Field Work took 16 weeks*

• Subjects' Compensation Schedule

Table 18: Compensation breakdown for all participants

| Participant Activity | Payment |
|---|---------------------------------|
| Daily surveys (21 possible) | \$5 per survey (\$105 possible) |
| Daily survey bonus (if 15 or more were completed) | \$20 |
| Final survey | \$10 |
| Total possible compensation | \$135 |

Initial Findings from Assessment

Distribution of Participants by RUCC Codes

Table 1: Number Completed Study by RUCC breakdown for RAISE & GSMS Participants

| RUCC | Description | RAISE | GSMS¹ |
|----------------|--|--------------|-------------------------|
| 1 | Counties in metro areas of 1 million population or more | 45 | |
| 2 | Counties in metro areas of 250,000 to 1 million population | 71 | |
| 3 | Counties in metro areas of fewer than 250,000 population | 1 | |
| 4 | Urban population of 20,000 or more, adjacent to a metro area | 19 | |
| 5 | Urban population of 20,000 or more, not adjacent to a metro area | 3 | |
| 6 | Urban population of 2,500 to 19,999, adjacent to a metro area | 19 | |
| 7 | Urban population of 2,500 to 19,999, not adjacent to a metro area | 1 | 20 |
| 8 | Completely rural or less than 2,500 urban population, adjacent to a metro area | 3 | |
| 9 | Completely rural or less than 2,500 urban population, not adjacent to a metro | 0 | |
| Total N | | 162 | 20 |

¹All of the GSMS participants were from rural locations, i.e., RUCC codes 6-9, but information on the codes for their locations are not currently available.

Recruitment Process for RAISE & GSMS Participants

Table 2: Recruitment breakdown for RAISE, GSMS, and Combined Studies

| | <u>RAISE</u> | | <u>GSMS</u> ² | | <u>RAISE + GSMS</u> | |
|---|--------------|-------------|--------------------------|-------------|---------------------|-------------|
| | <i>N</i> | <i>Rate</i> | <i>N</i> | <i>Rate</i> | <i>N</i> | <i>Rate</i> |
| Total # contacted | 376 | | 49 | | 425 | |
| Total # consented | 188 | 50.0% | 24 | 49.0% | 212 | 49.9% |
| Of consented, total # eligible ² | 170 | 90.4% | 24 | 100.0% | 194 | 91.5% |
| Average # of contacts to get consent | 1.33 | | 1.50 | | 1.35 | |
| Total # that completed the study (<i>N</i>) | 162 | 95.3% | 20 | 83.3% | 182 | 93.8% |

¹Breakdown of participants that were ineligible: Age > 50 (15); Age < 35 (2); No smartphone (1).

Recruitment Process by Rural and Non-Rural Participants

Table 3: Recruitment breakdown by Rural and Non-Rural (RUCC designations)¹

| | <u><i>Non-Rural</i></u> | | <u><i>Rural</i></u> | |
|--|-------------------------|-------------|---------------------|-------------|
| | <i>N</i> | <i>Rate</i> | <i>N</i> | <i>Rate</i> |
| <i>RAISE Participants</i> | | | | |
| Total # contacted | 333 | | 43 | |
| Total # consented | 161 | 48.3% | 27 | 62.8% |
| Of consented, total # eligible ² | 145 | 90.1% | 25 | 92.6% |
| Average # of contacts to get consent | 1.27 | | 1.59 | |
| Total # that completed the study (<i>N</i>) | 139 | 95.9% | 23 | 92.0% |
| <i>RAISE and GSMS Participants Combined</i> | | | | |
| Total # contacted | 333 | | 92 | |
| Total # consented | 161 | 48.3% | 51 | 55.4% |
| Of consented, total # eligible ² | 145 | 90.1% | 49 | 96.1% |
| Average # of contacts to get consent | 1.27 | | 1.55 | |
| Total # that completed the study (<i>N</i>) | 139 | 95.9% | 43 | 87.8% |

¹The following RUCC codes were used to define Rural and Non-Rural locations: Non-Rural: RUCC 1-5; Rural: RUCC 6-9.

²Breakdown of participants that were ineligible: Age > 50 (15); Age < 35 (2); No smartphone (1).

Table 4: Recruitment – Contact Frequency – for All RAISE members Recruited by Rural vs Non-Rural (RUCC designations)¹

| | <i>Non-Rural</i> | <i>Rural</i> | <i>All RAISE</i> |
|---|------------------|--------------|------------------|
| Max # of contacts | 7 | 6 | 7 |
| Min # of contacts | 1 | 1 | 1 |
| Total # of contacts | 591 | 96 | 688 |
| Avg # of contacts per participant (all P's) | 1.77 | 2.23 | 1.83 |
| Avg # of contacts per P that didn't consent | 2.24 | 3.31 | 2.31 |

¹The following RUCC codes were used to define Rural and Non-Rural locations: Non-Rural: RUCC 1-5; Rural: RUCC 6-9.

Frequency of Participants with Issues Requiring Field Staff Attention

Table 12a: Troubleshooting – Frequency of Participants with Issues Requiring Attention – RAISE, GSMS, and combined sample

| | <i>RAISE</i> | <i>GSMS</i> | <i>Combined</i> |
|---|---------------------|--------------------|------------------------|
| # of P's that had issues (including opt-outs & incompletes) | 92 | 20 | 112 |
| # of P's that had issues (excluding opt-outs & incompletes) | 86 | 16 | 101 |
| % of P's that had issues (excluding opt-outs & incompletes) | 53.1% | 80.0% | 55.5% |
| Avg # of issues per participant | 1.95 | 2.25 | 2.01 |
| Total # of issues | 179 | 45 | 224 |

Table 12b: Troubleshooting – Frequency of Participants with Issues Requiring Attention – RAISE Participants by Non-Rural & Rural

| | <i>Non-Rural</i> | <i>Rural</i> |
|---|-------------------------|---------------------|
| # of P's that had issues (including opt-outs & incompletes) | 77 | 15 |
| # of P's that had issues (excluding opt-outs & incompletes) | 73 | 13 |
| % of P's that had issues (excluding opt-outs & incompletes) | 52.5% | 56.5% |
| Avg # of issues per participant | 1.79 | 2.73 |
| Total # of issues | 131 | 41 |

EMA Survey Completion by Day

Table 8: Survey monitoring Daily survey completion rates by Study and by Rural and Non-Rural (RUCC Designations)

| | <i>Day 1</i> | <i>Day 2</i> | <i>Day 3</i> | <i>Day 4</i> | <i>Day 5</i> | <i>Day 6</i> | <i>Day 7</i> |
|---|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| <i>RAISE, All Participants</i> | | | | | | | |
| Avg # of surveys completed | 2.52 | 2.54 | 2.54 | 2.57 | 2.58 | 2.57 | 2.56 |
| Avg compliance (%) | 84.0% | 84.6% | 84.8% | 85.6% | 86.0% | 85.6% | 85.4% |
| <i>RAISE, Participants in Non-Rural Areas</i> | | | | | | | |
| Avg # of surveys completed | 2.48 | 2.53 | 2.5 | 2.54 | 2.58 | 2.55 | 2.53 |
| Avg compliance (%) | 82.7% | 84.4% | 83.5% | 84.7% | 86.1% | 84.9% | 84.4% |
| <i>RAISE, Participants in Rural Areas</i> | | | | | | | |
| Avg # of surveys completed | 2.74 | 2.57 | 2.78 | 2.74 | 2.56 | 2.7 | 2.74 |
| Avg compliance (%) | 91.3% | 85.5% | 92.8% | 91.3% | 85.5% | 89.9% | 91.3% |
| <i>GSMS, All Participants (All in Rural Areas)</i> | | | | | | | |
| Avg # of surveys completed | 2.7 | 2.45 | 2.6 | 2.5 | 2.6 | 2.7 | 2.45 |
| Avg compliance (%) | 90.0% | 81.7% | 86.7% | 83.3% | 86.7% | 90.0% | 81.7% |
| <i>RAISE + GSMS, All Participants</i> | | | | | | | |
| Avg # of surveys completed | 2.54 | 2.53 | 2.55 | 2.56 | 2.58 | 2.58 | 2.55 |
| Avg compliance (%) | 84.6% | 84.3% | 85.0% | 85.4% | 86.1% | 86.1% | 85.0% |

Table 11a: Survey monitoring – Avg # of total daily surveys completed by time of day – for RAISE, GSMS & Combined Participants

| | <i>RAISE</i> | <i>GSMS</i> | <i>Combined</i> |
|--|--------------|-------------|-----------------|
| Morning (Total possible: 7; Survey expired after 90 min) | 5.78 | 5.80 | 5.79 |
| Afternoon (Total possible: 7; Survey expired after 90 min) | 5.73 | 5.70 | 5.73 |
| Evening (Total possible: 7; Survey expired after 3 hr) | 6.38 | 6.55 | 6.40 |

Table 11b: Survey monitoring – Avg # of total daily surveys completed by time of day – RAISE Participants by Rural and Non-Rural (RUCC Designations)

| | <i>Non-Rural</i> | <i>Rural</i> |
|--|------------------|--------------|
| Morning (Total possible: 7; Survey expired after 90 min) | 5.74 | 6.04 |
| Afternoon (Total possible: 7; Survey expired after 90 min) | 5.67 | 6.13 |
| Evening (Total possible: 7; Survey expired after 3 hr) | 6.33 | 6.65 |

- Findings suggest that comparative studies of examining **activity spaces** in **rural & non-rural environments** are **feasible**
 - ✓ Recruitment & participation comparable
 - ✓ Connections work
 - ✓ Compliance high
- Approach particularly effective during pandemic period (can field without in-person contact)
- Using both GSMS and RAISE meant we could draw on different samples with varying characteristics – enhanced Assessment
- Rapid Assessment led to novel collaboration with two existing studies