A Community-Based Intervention to Increase Energy Saving Behaviors Among Children & Families

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A Community-Based Intervention to Increase Energy Saving Behaviors Among Children & Families

**Purpose:** To apply behavioral theories and methods used in public health promotion to change energy-related behaviors.

**Specific Aims:**
1. To increase children’s energy-saving behaviors
2. To reduce family/household energy use

**Target Group:** Upper elementary school-aged children and their families
GLEE Study Design

• Cluster Randomized Controlled Trial
  – Troop as unit of randomization & analysis

• 30 Junior (age 9-11) troops (N=331 girls/families)

• Interventions consisting of 5 “lessons” during troop meetings plus home/community activities over ~3 months
  – 15 troops: home energy use
  – 15 troops: food and transportation energy use

• Baseline and post-test questionnaires, 3-6 month follow-up
  – Parent and child

• Household electricity and gas usage
**GLEE Implementation**

- Curriculum based on principles from social cognitive theory

<table>
<thead>
<tr>
<th>Curriculum</th>
<th>Goal Setting</th>
<th>Monitoring</th>
<th>Skills Training</th>
<th>Problem Solving</th>
<th>Modeling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Energy</td>
<td>Pledging</td>
<td>Action Jar</td>
<td>Vampire energy + Energy relay</td>
<td>Role play skits</td>
<td>Newscast</td>
</tr>
<tr>
<td>Food and Transport</td>
<td>Pledging</td>
<td>Action Jar</td>
<td>The origins game + tire pressure</td>
<td>Role play skits</td>
<td>Newscast + Letter to the president</td>
</tr>
</tbody>
</table>

- Attendance high in both treatments
  - Home energy = 4.48 out of 5 sessions
  - Food & transport = 4.49 out of 5 sessions

- Video evidence of consistent implementation across troops

- 24 of 30 troops had consistent instructor across all sessions
Welcome to GLEE (Girls Learning Environment and Energy)! We’re so excited that you and your Girl Scout are participating in our program. For five troop meetings, your Girl Scout will learn how to save energy and protect the environment.

WELCOME TO GLEE
Welcome to GLEE (Girls Learning Environment and Energy)! We’re so excited that you and your Girl Scout are participating in our program. For five troop meetings, your Girl Scout will learn how to save energy and protect the environment.

TARGET ACTIONS
Through this program, your Girl Scout will learn about things she can do at home to save energy, both alone and with your help. Some of the actions we’ll discuss include:
- Turning off lights, televisions, and computers when not in use.
- Plugging electronics into a power strip and switching power strips off at night.
- Changing standard incandescent light bulbs to more efficient CFLs or LEDs.
- Washing clothes in cold water and hang drying the laundry.
- Adjusting the temperature settings on the refrigerator, water heater, and heating-and-cooling (HVAC) system.

CHOICES MATTER
The ways we use energy have huge impacts on the planet and our families. Most of the energy we use in the United States comes from non-renewable sources, which means that someday we will run out of our most important resources, such as coal. And burning coal and other traditional energy sources generates gases and other pollutants that dirty our air and water and also contribute to climate change. Cutting back on our energy use can go a long way toward solving some of the world’s biggest environmental challenges.

Cutting energy use also pays off for families. The average American family spends almost $1,600 every year on energy bills. Reducing energy use around the home means families can spend less on energy bills and more on other priorities.

GLEE SESSIONS
Each session will include hands-on activities to help girls fit these actions into their daily lives. The activities include an action jar (which will allow Girl Scouts to monitor their progress), pledges to set goals for the following session, a self-made newsprint about what they’ve learned, and a game or activity. We encourage you to become involved, too. For example, you can ask your daughter about each week’s GLEE activities and support her as she accomplishes her weekly pledge.

DID YOU KNOW?
Almost all of the energy we use in the United States—92 percent—comes from non-renewable sources such as coal and petroleum.

Source: energystat.gov

DID YOU KNOW?
Over 600 gallons of water are needed to produce a single hamburger (most of it to grow the grain to feed the cows).


Glee.stanford.edu
GLEE Follow-up

• 3 to 6 months after completion of program
• Girl Scouts & parents
• Activities
  – Thank you video
  – Girl Scout & parent surveys
  – Energy data collection
  – Troop Video
• Challenges of collecting energy data
## Girl Scout and Parent Participation

<table>
<thead>
<tr>
<th></th>
<th>Recruitment</th>
<th>Baseline</th>
<th>Post</th>
<th>Follow-up (ongoing)</th>
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<tbody>
<tr>
<td><strong>Total</strong></td>
<td>30 troops</td>
<td>30 troops</td>
<td>30 troops</td>
<td>21 troops (N=224)</td>
</tr>
<tr>
<td></td>
<td>331 Girl Scouts</td>
<td>321 Girl Scouts</td>
<td>309 Girl Scouts</td>
<td>188 Girl Scouts</td>
</tr>
<tr>
<td></td>
<td>288 Parents</td>
<td>276 Parents</td>
<td>276 Parents</td>
<td>185 Parents</td>
</tr>
<tr>
<td><strong>Home</strong></td>
<td>15 troops</td>
<td>15 troops</td>
<td>15 troops</td>
<td>11 Troops (N=107)</td>
</tr>
<tr>
<td></td>
<td>158 Girl Scouts</td>
<td>152 Girl Scouts</td>
<td>151 Girl Scouts</td>
<td>84 Girl Scouts</td>
</tr>
<tr>
<td></td>
<td>136 Parents</td>
<td>133 Parents</td>
<td>133 Parents</td>
<td>86 Parents</td>
</tr>
<tr>
<td><strong>Energy</strong></td>
<td>15 troops</td>
<td>15 troops</td>
<td>15 troops</td>
<td>10 Troops (N=117)</td>
</tr>
<tr>
<td></td>
<td>173 Girl Scouts</td>
<td>169 Girl Scouts</td>
<td>158 Girl Scouts</td>
<td>101 Girl Scouts</td>
</tr>
<tr>
<td></td>
<td>152 Parents</td>
<td>143 Parents</td>
<td>143 Parents</td>
<td>99 Parents</td>
</tr>
</tbody>
</table>

| **Food & Transport**   | 15 troops   | 15 troops | 15 troops | 10 Troops (N=117)  |
|                        | 173 Girl Scouts | 169 Girl Scouts | 158 Girl Scouts | 101 Girl Scouts |
|                        | 152 Parents | 143 Parents | 143 Parents | 99 Parents |

† Current rate of survey completion

- 97% completion
- 96% completion
- 86% completion
GLEE Demographics

- 90% married
- 63% have parent with graduate degree
- 53% have household income above $160K/yr
- 49% white, 30% Asian, 15% multiracial
GLEE Locations

Home

Food & Transport
Results: Girl Home Energy

Percent correct answers to home energy knowledge questions

Baseline: 28%
Post: 69%
Results: Girl Home Energy

Plugging electronics into a power strip

Baseline: 19%

Post: 54%
Results: Girl Home Energy

Unplugging TV, DVD and turning off power strips at night

- Always
- A lot
- A little
- Never
Results: Girl Home Energy

Percent with reminder stickers posted at home

Baseline: 7%

Post: 73%
Results: Girl Home Energy

Computer behavior when done using it

Baseline

Post

Unplug
Turn off
Sleep
On
Results: Girl Home Energy

Percent who air dry dishes in dishwasher

Baseline: 34%
Post: 63%
Results: Girl Home Energy

Frequency of hang drying clothes

- Always or Almost Always
- Sometimes
- Never

Baseline

Post
Results: Girl Home Energy

Index of parent controlled home energy behaviors*

*Installing CFL, adjusting fridge and hot water heater temperatures, cold water wash
Results: Girl Home Energy

Index of child friendly behaviors*

*Turning off TV, DVD player, lights, unplugging chargers
Results: Girl Home Energy

Percent “don’t know” answers to home energy behavior questions

Baseline: 37%
Post: 15%
Next steps

• Complete 3- to 6-month follow-ups
• Collect household electricity and gas data
• Complete database creation
• Analyze data and write-up
• Disseminate findings
• Package and disseminate curricula
Backup
31 Troops
342 Girl Scouts

Home Energy

15 Troops
152 Girl Baseline
136 Parent Baseline

Average attendance: 4.49/5 sessions

15 Troops
150 Girl Post
130 Parent Post

Food & Transport

16 Troops
180 Girl Baseline
162 Parent Baseline

Average attendance: 4.48/5 sessions

16 Troops
167 Girl Post
151 Parent Post
# Study population demographics

## Household Demographics

<table>
<thead>
<tr>
<th>Marital status</th>
<th>90%</th>
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<tbody>
<tr>
<td>Married</td>
<td>90%</td>
</tr>
<tr>
<td>Not married</td>
<td>10%</td>
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<table>
<thead>
<tr>
<th>Parent education</th>
<th></th>
</tr>
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<tbody>
<tr>
<td>Did not finish High School</td>
<td>1%</td>
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<tr>
<td>High School Graduate or GED</td>
<td>4%</td>
</tr>
<tr>
<td>College Graduate</td>
<td>32%</td>
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<tr>
<td>Masters Degree</td>
<td>39%</td>
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<tr>
<td>Doctoral Degree</td>
<td>24%</td>
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<table>
<thead>
<tr>
<th>Income</th>
<th></th>
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<tbody>
<tr>
<td>less than $40,000</td>
<td>3%</td>
</tr>
<tr>
<td>$40,000-$79,999</td>
<td>6%</td>
</tr>
<tr>
<td>$80,000-$119,999</td>
<td>16%</td>
</tr>
<tr>
<td>$120,000-$159,999</td>
<td>22%</td>
</tr>
<tr>
<td>$160,000-$199,999</td>
<td>18%</td>
</tr>
<tr>
<td>$200,000 or more</td>
<td>35%</td>
</tr>
</tbody>
</table>

| Average parent age              | 44      |
| Average household size          | 4.3     |

## Girl Scout Demographics

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th></th>
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<tbody>
<tr>
<td>Asian</td>
<td>30%</td>
</tr>
<tr>
<td>Native Hawaiian or Other Pacific Islander</td>
<td>.3%</td>
</tr>
<tr>
<td>Hispanic, Latino or Spanish origin</td>
<td>4%</td>
</tr>
<tr>
<td>White</td>
<td>49%</td>
</tr>
<tr>
<td>Multiracial</td>
<td>15%</td>
</tr>
<tr>
<td>Other</td>
<td>1%</td>
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</table>

<table>
<thead>
<tr>
<th>Grade</th>
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<tbody>
<tr>
<td>2nd</td>
<td>.3%</td>
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<tr>
<td>3rd</td>
<td>6%</td>
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<tr>
<td>4th</td>
<td>58%</td>
</tr>
<tr>
<td>5th</td>
<td>34%</td>
</tr>
<tr>
<td>6th</td>
<td>1%</td>
</tr>
<tr>
<td>7th</td>
<td>1%</td>
</tr>
</tbody>
</table>

| Average age                     | 9.6    |
Target behaviors

Home energy use:
• Use CFLs / LEDs
• Turn off lights, computers, TVs when not in use
• Use & turn-off power strips
• Air dry dishes
• Wash clothes in cold water
• Hang dry clothes
• Adjust fridge temperature
• Adjust HVAC turn down/up temperature
• Turn down water heater temperature
• Adjust pool pump cycling rate, heating time
• Request home energy audit
• Request TED device
• Educate family members and neighbors

Food / transport energy use:
• Eat less meat
• Eat less packaged/processed food (snacks, fast food)
• Drink tap water (instead of bottled and/or sweetened drinks)
• Use reusable water bottle
• Walk, bike, mass transit, carpool to/from school
• Walk, bike, mass transit, carpool to/from troop meetings
• Adjust tire pressure
• Shop at farmer’s market / CSA box
• Educate family members and neighbors
Formed research team
Reviewed theory and extant literature
Identified target population (Girls Scouts Juniors)
Signed MOU with Girls Scouts of Northern California
Formative studies: ethnographic interviews/focus groups, initial pilot testing of concepts, messages and measures.

- Review of Girl Scouts materials/activities
- Girl Scouts Leadership (National/Northern CA)
- Interviews & pilot activities at a Girl Scouts Green camp
- Interviews of Local troop leaders

IRB Human Subjects proposal submitted
Identified target behaviors
Proposed framing

- Advocacy using mixed media
- Human Subjects IRB Approval
- Created lessons & materials
- Created baseline surveys for girls and parents
- Full pilot test of surveys & each intervention (2 troops)
- Revised and piloted post-test survey based on baseline
- Revised lessons, materials and all surveys based on pilot
- Recruited 30 troops to participate (338 possible girls)
- Obtained informed consent from parents online (313 so far)
- Recruited lead instructors and helpers (students)
- Weekend training with enactive rehearsal, role playing
- Baseline girl and parent surveys complete
- Post-test girl and parent surveys complete
3- to 6-month follow-up girl and parent surveys *(In progress: complete for 20 troops)*
Collecting household electricity and gas use data *(In progress)*
Complete data keypunching, cleaning, QA checks, and database creation *(In progress: complete for baseline and post)*
Data analysis and write-up of results *(In progress)*
Disseminate findings to Girl Scouts, researchers, schools, planners, utilities, and policy makers
Package and disseminate curricula for Girl Scouts of Northern California (subsequently Girl Scouts USA)
Disseminate findings and curricula to a broader audience
Results: Girl Food & Transport

Baseline Trips to/from School Driven Alone

Category 1
GLEE Project schedule

Sept-Nov 2010: Intervention development

Sept-Dec 2010: Troop recruitment for full-scale RCT (N=30)

Nov-Dec 2010: Pilot test with 2 troops

Jan-Jun 2011: Implement full-scale RCT (N=331 girls/families)

May-Jan 2012: 3- to 6-month follow-up