How To Create a Research Poster

Summer 2024

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Purpose of the Poster

- Final or partial culmination of your research work
- Provide a brief background (BIG picture), your methods or approach to doing the research, as well as results and conclusions
- Can lay the groundwork for presenting at a national conference
- Can be posted on the website for future researchers to view
What should be on a poster?
Content of a Poster

- Title
- Authors – who should be listed?
- Affiliation (yourself and other authors)
- Introduction/Abstract
- Figures/Photos with captions
- Methods/Procedures – pictures are great!
- Tables/graphs
- Conclusions and Discussion or Results
- Acknowledgement to sponsors (funding and others)
- References (if needed)
Suggestions and Ideas

Review PowerPoint poster templates available on the CougPrints website, along with helpful poster creation advice: https://cougprintsplus.wsu.edu/making-posters-with-powerpoint/

Additional advice from nature photographer and biologist Colin Purrington on designing academic posters: colinpurrington.com/tips/academic/posterdesign

Check out the tips section online posters.wsu.edu/ or surca.wsu.edu/participants/poster-presentations/

Check the size limit for your poster before you start – Every conference is different!
Other Tips

Get your poster reviewed by all co-authors before printing – and give them enough time to review it.

Sometimes your project is not complete. That is fine! Do your best with what you have, present future steps, and remember, you can always bring additional results to the symposium.

Don’t forget to acknowledge your funding source!
Nuts and Bolts of Getting it Printed

Create the poster in PowerPoint

Look at it at 100% size
Are the images clear and easy to see?
Are all text boxes complete?
Do you have any Greek Symbols? Check them.

If printed on campus (CougPrints) – you can upload the file on their website. Check their deadlines for submission.
Make sure you have a method to pay for it – check with your research mentor

Pick up your poster and check it (before the day of!)
If Attending a Meeting...

Practice your poster with lab mates, peer mentors, advisor, etc.

Practice your poster with roommates or others outside of your field

Look at the rubric for the meeting, if your poster will be judged
Let’s look at some poster examples
Characterization and Modification of Asphalt With Epoxy Resins Synthesized From Pyrolysis Oil, a Derivative of Lignocellulosic Biomass

Kylie Thompson1, Junna Xin2, Jinwen Zhang2

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2. Composite Materials and Engineering Center, Washington State University, Pullman, Washington

Introduction
Asphalt is an important commodity that has a vital role in civil infrastructure, both in urban and rural areas alike. Polymer modified asphalt has become a popular topic of interest due to the advantageous property modifications provided by polymer components. Such alterations include increased matrix viscosity, higher tensile, better resistance to longitudinal deformation, greater elasticity, and lower temperature susceptibility. In this study, asphalt was modified with an epoxy resin synthesized from pyrolysis oil of a derivative of lignocellulosic biomass. Typically, in commercial and industrial settings, epoxy resins are formed by treating epoxy (a polyfunctional epoxide) and amine (a polyamine) in a molten environment like those found in processing, and thus can be used as a substitute.

Overall Process Flowchart
Three separate samples were obtained from extraction and separation processes performed on the starting materials of asphalt, the pyrolysis oil and the lignocellulosic biomass feedstock. The pyrolysis oil was taken from the pyrolysis oil distillation in these samples were more effective in the anhydrotropic O3-100. The lignocellulosic biomass was then dried for 150°C for 60 minutes, and then cooled down to 40°C. 350 mg of sodium hydroxide was added, and stirring occurred for 3 hours. The remaining sodium hydroxide was then evaporated, leaving the desired epoxy monomer. The epoxy monomer was then mixed with the Durasol red produced from the reaction between dopamine and maleic anhydride (DPAHCA). A 1:1.5 ethyl-4-methylpyridine was then added as a catalyst. The mixture was then combined with neat asphalt. The epoxy modified asphalt was then cured at 130°C for 2 hours and then 200°C for 5 hours. The pyrolysis reactions were performed of all of the samples in the same temperature settings as described.

Experimental Methods

Analytical Methods and Results

Figure 1: Flowchart defining the overall process of asphalt modification via pyrolysis oil.

Figure 2: Reaction scheme and an example list of pyrolysis reactions.

Figure 3: Reaction scheme and an example list of pyrolysis reactions.

Figure 4: GPC size molecular weight and size molecular weight.

Figure 5: TGA-thermal gravimetric analysis.

Figure 6: TGA-thermal gravimetric analysis.

Figure 7: TGA-thermal gravimetric analysis.

Figure 8: TGA-thermal gravimetric analysis.

Figure 9: TGA-thermal gravimetric analysis.

Figure 10: TGA-thermal gravimetric analysis.

Figure 11: TGA-thermal gravimetric analysis.

Conclusions

Acknowledgements

References


Further information on the research can be found in the references provided above.
Profiles of Social Relationships for Low-Income Youth in Physical Activity Based Positive Youth Development Programs

Sarah Ultrich-French1, Meghan H. McDonough2, Dawn Anderson-Butcher3, Anthony Amorose4
1Washington State University 2Purdue University 3Ohio State University 4Illinois State University

Introduction

Positive Youth Development

Positive youth development (PYD) programs are aimed at providing youth with resources to foster growth in personal and social assets and address barriers to well-being (GQNlson et al., 2006, Holt, 2008). PYD programs have the potential to be especially important to low-income populations who have limited resources and are often disadvantaged in multiple areas (e.g., Kronenke, 2007, Vatsala-Droz, 2008). Physical activity settings are excellent PYD contexts because they are linked to improved physical and psychosocial health, and provide involved, interactive, emotional, and social context for teaching life skills (Hellison et al., 2000, Fraser-Thomas et al., 2005).

Role of Social Relationships

Social relationships play an important role in the experience and outcomes of PYD programs (Benson et al., 2006). Physical competence, social competence, and support from program staff positively predict changes in physical self-worth, global self-worth, attraction to physical activity, and hope across a four-week summer program (Ultrich-French, McDonough, & Smith, under review). Leader support has also been linked to continued participation in the same summer program (Ultrich-French & McDonough, under review). A positive relationship with a caring adult is a crucial element facilitating PYD (Game-Overway et al., 2009, Catalano et al., 2004). Research with low-income youth has also showed that autonomy support from teachers and parents predicts physical activity behavior and motivation (Velling, Standage, & Treasure, 2007).

Purpose

This study examined (1) whether participants in summer physical activity based PYD programs have distinct profiles of social relationship variables (leader support, autonomy support, and belonging), and (2) whether profile groups differ in psychosocial outcomes that PYD programs aim to address.

Methods

Participants: Low-income youth in 2 summer PYD programs:

Program A: N = 243
  M = 10.87, SD = 1.38
  46% female
  40.1% Hispanic, 15.8% White, 17.0% Asian, 18.0% Black, 1.4%

Program B: N = 298
  M = 12.00, SD = 1.81
  46% female
  35.4% Hispanic, 8.8% White, 78.6% Black, 1.4%
  9.5% Asian, 6.6% Native American, 3.0%

Procedures and Measures

PYD program participants completed questionnaires at the beginning and end of the program on the following:

Social Relationship Measures:
- Leader Support (Cox & Williams, 2008; Goodenow, 1993)
- Autonomy Support (Standage, Duda, & Ntoumanis, 2005; Williams & Eccles, 1998)
- Belonging (Anderson-Butcher & Conry, 2002)

Psychosocial Outcome Measures:
- Physical Competence (A. Hart, 1995; B. Amorose, 2002)
- Social Responsibility (Anderson-Butcher et al., in progress)

All measures demonstrated adequate internal consistency reliability (> .70).

Data Analysis

Hierarchical cluster analysis was performed with standardized scores of the social relationship variables at the end of the program to help determine the most appropriate cluster solution. Next, non-hierarchical cluster analysis was conducted using initial cluster centers identified from hierarchical analysis specifying a three cluster solution. This procedure was conducted with program A, then verified with program B data.

MANOVA was conducted to examine differences between the clusters on social responsibility, social competence, and physical competence variables at the end of the program.

Results

Cluster Analysis

Three distinct profiles emerged. Consistent solutions were obtained with and without outliers, therefore complete samples were used. Program B data confirmed the three profiles.

Conclusions

Although distinct positive, "average," and "negative" social experience profiles emerged, the labels for clusters are relative and not in absolute terms. Participants had relatively high scores on the social relationship variables.

However, profiles were significantly different on outcome variables, suggesting that small to moderate differences in social relationships in PYD programs may affect psychosocial outcomes that these programs aim to improve.

Consistent findings across two independent PYD programs support generalizability of profiles and differences.

For more information contact
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Wildfire Hazards: An Analysis of Duration, Cost, and Size

Jude Bayham\textsuperscript{1} Jonathan Yoder\textsuperscript{1} School of Economic Sciences, Washington State University

Motivation
- Wildfire suppression expenditures have exceeded $2 billion per year over past decade
- Better understanding of suppression behavior over the course of a fire leads to more efficient wildfire management
- Wildfires often studied as a set of single outcomes (i.e., cost and size), neglecting the allocation decisions within a fire that drive those outcomes

Objectives of Study
- Develop a theory of wildfire suppression and to motivate the empirical hazard model
- Integrate joint hazard (frailty) model that accounts for correlation in three wildfire outcomes: duration, total cost, and final fire size

Theory of Wildfire Suppression
The wildfire management team chooses suppression effort to minimize suppression costs and losses to values at risk over the course of the fire.

Theory cont.
- Manager faces tradeoff between two forms of suppression effort: 1) High cost, lower fire growth; 2) lower cost, higher fire growth
- Efforts fought in a dynamic uncertain environment where managers acquire information and revise action
- Fire managers may divert suppression effort from overall containment to protecting specific assets at the expense of fire duration, total cost, and size

Hazard Framework
- Focused on the time (accumulation of cost or area) until a wildfire is contained
- Hazard rate $h(x)$ is the probability that a fire is contained in the next interval of time (cost, or area) conditional on not yet having been contained
- Survival function $S(x)$ represents the proportion of fires expected to last longer than time $x$ conditional on variables $x$
- Unobservable differences between fires arise from variation in management and geography and are allowed to be correlated across fire outcomes duration, cost, size

Data
- Wildfire data from incident status reports filed by firefighters intermittently throughout the course of a fire. U.S. fires from 2001 to 2008
- Housing data from 2010 U.S. Census

Results
The percent of one unit change in covariate on the baseline hazard rate. Lower hazard implies larger expected outcome.

<table>
<thead>
<tr>
<th>Covariate</th>
<th>Duration</th>
<th>Cost</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threatened Outbuildings</td>
<td>-36.8</td>
<td>-91.6**</td>
<td>-96.9***</td>
</tr>
<tr>
<td>(1000s of Structures)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Threatened Residential</td>
<td>-36.4***</td>
<td>-67.1***</td>
<td>-89.4***</td>
</tr>
<tr>
<td>(1000s of Structures)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potential Evacuation (No</td>
<td>-56.4***</td>
<td>-76.6***</td>
<td>-79.8***</td>
</tr>
<tr>
<td>Incorporation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home Value $&lt;$ 20 M.</td>
<td>-0.28**</td>
<td>-0.30*</td>
<td>-0.34***</td>
</tr>
<tr>
<td>($ Billion)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fatalities</td>
<td>-21.7***</td>
<td>-26.5***</td>
<td>-22.0***</td>
</tr>
<tr>
<td>Wind</td>
<td>-5.56</td>
<td>-16.6**</td>
<td>-49.5***</td>
</tr>
<tr>
<td>(100 mph)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource Scarcity (50,000</td>
<td>0.00</td>
<td>0.06**</td>
<td>-0.15***</td>
</tr>
<tr>
<td>Acres)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cause Lightning (Human)</td>
<td>-52.6***</td>
<td>-77.2***</td>
<td>-72.24***</td>
</tr>
<tr>
<td>Year</td>
<td>-4.09***</td>
<td>-2.70*</td>
<td>-2.07***</td>
</tr>
<tr>
<td>(2001-08)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Washington &amp; Oregon</td>
<td>15.90</td>
<td>-52.9***</td>
<td>-23.72**</td>
</tr>
<tr>
<td>(Southern U.S.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>California</td>
<td>99.84***</td>
<td>-75.4***</td>
<td>11.08***</td>
</tr>
<tr>
<td>(Southern U.S.)</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

* $p < 0.01$, ** $p < 0.05$, *** $p < 0.10$.
* Example: When 100 moderated structure homes threatened, the duration hazard of contained fires by 53% which implies a larger expected duration.

- Increased values at risk (i.e., evacuation) reduce the hazard rate and imply longer, larger, and more costly expected fires consistent with theory.
- Resource Scarcity is aggregate fire activity in a region over the monthly average (instrument for opportunity cost).
- Higher resource scarcity implies larger and more expensive fires.
- California fires cost more despite shorter and smaller fires relative to those in the Southern U.S. Result likely due to high density of high value homes.
- Model may be integrated with tools currently used to predict wildfire spread to provide probabilistic information on economic outcomes.
HealthWISE: Engaging Student Pharmacists in Elementary School Science Education
Lisa J. Woodard, PharmD, MPH, Judith S. Wilson, MA, James Blankenship, PhD, Raymond M. Quock, PhD, Marti Lindsey, PhD, Janni J. Kinsler, PhD

INTRODUCTION
Service-learning is an important curricular tool to help student pharmacists develop the knowledge, skills and attitudes needed for practice. It positively impacts the health and wellness of the communities served.

The U.S. Department of Education has identified that America's schools are not producing students with the science excellence required for global economic leadership and homeland security in the 21st century. America's youth lack both proficiency and interest in science. Student pharmacists who engage in service-learning in elementary classrooms can be an asset to both the lack of proficiency and interest in the students they serve.

To address these needs, a one-credit elective course was designed allowing student pharmacists to integrate academic and clinical skills with principles of community health promotion and prevention while strengthening science education in elementary schools. Elementary students were taught the closing live insects curriculum focused on insects for the 2nd grade, and Immunization Plus curriculum focused on immunology for the 5th grade.

OBJECTIVES
The goals of the HealthWISE program were to:
1. Prepare student pharmacists to develop skills to communicate and collaborate with others.
2. Prepare student pharmacists to promote health improvement, wellness and disease prevention.
3. Prepare student pharmacists to provide mentorship to improve the profession and influence the next generation of pharmacists.
4. Improve health science education for elementary school students.

METHODS
A quasi-experimental pre-test/post-test research design was used to assess whether elementary student's science knowledge and attitudes changed as a result of the curriculum. Four different intervention conditions were implemented with lessons taught by (1) teachers only, (2) student pharmacists only, (3) teachers + student pharmacists, or (4) no intervention - control group. Elementary school teacher satisfaction with the curriculum and student pharmacist performance and feedback were assessed using questionnaires and reflective writing assessments.

The Institutional Review Boards at the University of Pacific, Washington State University, and the University of Arizona determined this study was exempt from review.

RESULTS/DISCUSSION
Elementary Student Knowledge and Attitudes Toward Science
- 281 2nd grade students participated.
- 264 5th grade students participated.
- Knowledge increased significantly from pre-test to post-test for all intervention groups.
- Attitude toward science increased significantly for only the teacher only intervention group.
- Demographic characteristics (gender, age, race, language spoken/read) did not predict post-test knowledge gain.

Classroom Teacher Satisfaction with the Curriculum and Student Pharmacists Performance
- Teachers were generally satisfied with curriculum, 100% said they would implement again in their classrooms.
- Teachers were satisfied with student pharmacist performance. Comments included: communicated well, impressed students, professional, enthusiastic, well-prepared, good role models.
- Classroom teacher quotes: "I think it is very important for students to see that there are wonderful careers in math and science. The student pharmacists were a great example of this."

Student Pharmacist Learning
- Student pharmacists felt they were successful in achieving the outcomes of the elective course including: improved communication, promoting health and wellness, professional mentorship.
- Student pharmacists were prepared for lifelong service in STEM education in their communities.
- Student quotes: "From this experience, I have become a better communicator." "I hope I have left a positive influence on the lives of my students." In working with English language learners – "The experience reminded me of the difficulties of communication because as pharmacists we must educate and communicate effectively to our patients."

CONCLUSION
HealthWISE is a viable approach to reach out to communities to bring the expertise of student pharmacists into elementary school education. Student pharmacists improve communication skills and promote wellness and professional mentorship. Elementary school teachers value the student pharmacist knowledge and professionalism. Elementary school children improve science knowledge from the student pharmacist lessons.

REFERENCES/ACKNOWLEDGEMENTS
Some examples from WSU summer research programs:

Smart Environments REU project examples: https://eecs.wsu.edu/~holder/reu/past_projects.html

Environmental Engineering REU project examples: https://lar.wsu.edu/reu/
Summer Research Symposium

Friday, August 2 in CUE Atrium

- 8:00am – 9:00am
  Check-in and poster set-up

- 9:00am – 10:00am
  Welcome and keynote speaker in CUE 203

- 10:00am – 1:00pm
  Students are at their posters, available to discuss their research and to answer questions
  - 11:30am – 12:30pm
    Staggered lunch is provided for student researchers

- 1:00pm – 2:00pm
  Put posters away and tear down event
Office of Undergraduate Research
ug.research@wsu.edu
CUE 519

https://summerresearch.wsu.edu/