The Impact of Storytelling on Attitudes Regarding Sustainable Alternative Transportation

by

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ABSTRACT

Communications around sustainability have been found to be incongruent with eliciting the transformative change required to address global climate change and its' repercussions. Recent research has been exploring storytelling in sustainability, specifically with an emphasis on reflexive and emancipatory methods. These methods encourage embracing and contextualizing complexity and intend to target entire cognitive hierarchies. This study explores the possibility of using emancipatory and reflexive storytelling as a tool to change attitudes pertaining to the Valley Metro Light Rail, an example of a complex sustainability mitigation effort. I explore this in four steps: 1) Conducted a pre-survey to gauge preexisting attitudes and predispositions; 2) Provided a narrative that uses storytelling methodologies of reflexivity and emancipation through a story about the light rail; 3) Conducted a post-survey to gauge attitude shift resulting from the narrative intervention; 4) Facilitated a focus group discussion to examine impact qualitatively. These steps intended to provide an answer to the question: How does emancipatory and reflexive storytelling impact affective, cognitive and conative attitudes regarding local alternative transportation? By using tripartite attitude model, qualitative and quantitative analysis this paper determines that reflexive and emancipatory storytelling impacts attitudinal structures. The impact is marginal in the survey response, though the shift indicated a narrowing of participant responses towards one another, indicative of participants subscribing to emancipation and reflexivity of their held attitudes. From the group discussion, it was evident from qualitative responses that

participants engaged in emancipating themselves from their held attitudes and reflected upon them. In doing so they engaged in collaboration to make suggestions and suggest actions to help those with experiences that differed from their own. Though this research doesn’t provide conclusive evidence, it opens the door for future research to assess these methodologies as a tool to elicit shared values, beliefs and norms, which are necessary for collective action leading to transformative change in response to global climate change.

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INTRODUCTION

"Indeed, if there is one thing certain among all the uncertainty, it's recognition of the need for more collective action, approaches that allow different stakeholders to come together and especially that allow for co-existence of worldviews and that embrace plural ways of knowing." (Relva and Jung, 2021, p.2)

As society grapples with pressing environmental issues that threaten current cultural, economic, and societal norms on global and local scales, we struggle to address these issues in a socially cohesive and productive manner. Individual and collective actions are often incongruent with the pace of climate mitigation strategies required to avoid the worst climate change impacts and to equitably respond to those impacts. Our actions — both individually and collectively — tend to be the result of our attitudes.

Humans, by nature, have a bounded rationality, which suggests that individuals are limited by their mental capacity and the knowledge they hold (Gsottbauer et al, 2010). The knowledge a person holds emerges and is informed by the social systems they exist within (Heberlein et al, 2012). These social systems develop a person's individual attitudes. Attitudes are cognitive structures made up of values, beliefs, norms, intended behavior and behavior. Attitudes grow stronger when the values, beliefs and norms that are held are shared with a community, when they are reaffirmed through experiences, and when they are tested (DeSombre, 2018; Heberlein, 2012). The social norms and beliefs that reside in this attitudinal structure have been shown to dictate individual behavior (Relva and Jung, 2021). This can express itself in what we

decide to eat for dinner, our video game preferences, our political ideology and support or opposition to policies that could mitigate global climate change and address its negative ramifications. As a result, the strong attitudes we form have an impact on society. Currently, society has expressed a difficulty in collectively responding to sustainability issues (DeSombre, 2018). The implications of this difficulty in collectively responding to climate change are drastic, it infringes society's ability to mitigate and address the impacts of global climate change on current and future generations. One of the reasons for this issue is how we communicate and collaborate around these sustainability issues and how that communication and collaboration impacts our attitudes (Relva and Jung, 2021; DeSombre, 2018).

The methods we currently use to communicate sustainability issues tend to be persuasive, emotionally charged and promote otherism (Brynjarsdóttir, 2012). This style of rhetoric tends to have the opposite of the intended effect, rather than elicit collaboration and collective action. It further engrains individuals in their existing beliefs, norms, and attitudes (DeSombre, 2018). This can increase polarization which can be disastrous for efforts to address the implications of climate change on our current socio-ecological systems. In the United States, political gridlock has heavily impacted how we respond to climate change, impeding legislation and response efforts to the climate crisis (Sterman et al, 2007). Researchers have suggested this might be due to how we form and hold attitudes around these complex sustainability problems (Relva and Jung, 2021; Van Riper et al, 2019; Heberlein, 2012). Individuals form strong and weak

attitudinal structures; the stronger our attitudes, the harder they are to change, and the weaker they are, the more they can change (Heberlein, 2012). It is difficult to build strong attitudes around sustainability issues due to their complexity. This results in perceiving sustainability issues through the lens of other stronger attitudes.

How does one shift attitudes towards sustainability issues? Though some persuasive communication methods have proven to be effective (Gustafson et al, 2020), these methods are effective in the short term rather than conducive to long-term mitigation strategies that are necessary for addressing global climate change (Van Riper et al, 2019; Brynjarsdóttir et al, 2012). Researchers suggest that persuasive methods or conversations that blame or label held beliefs and attitudes as wrong only embolden those beliefs and attitudes (Brynjarsdóttir et al, 2012; DeSombre, 2018; Heberlein 2012). Persuasion tends to address individual behaviors but is less effective at systemically addressing complex issues spurred by global climate change. For example, persuasion might work in getting someone to recycle a soda can, but not necessarily to engage in a lifestyle that reduces waste. Additionally, individual behaviors tend to be quick to change and situation dependent, resulting in less continuity, if there is no recycling bin in the vicinity, you might not recycle (Heberlein, 2012; Vaske and Donnelly, 1999).

Persuasion tends to impact these individual behaviors and not underlying beliefs, norms, or attitudes (Van Riper et al, 2012). Though behaviors are important, they are not indicative of lasting change on individual or collective decision making. Individual and collective decision making occurs as a result of

our values, held beliefs and norms (DeSombre, 2018). To shift how we respond to global climate change in a consistent manner, deeper focus needs to be placed on the entire cognitive hierarchy, values, beliefs, norms and behaviors rather than just on behaviors (Relva and Jung, 2021). Changes in these attitudinal structures, in relation to sustainability, have been difficult for researchers to explore. Values are developed over a person's lived experience. They help form our beliefs and when those beliefs are shared, they develop norms and all together, those can have an impact in how we intend to act and how we actually act. This is why shifting individual behavior through persuasion may have less longitudinal impact than addressing other parts of the cognitive hierarchy (DeSombre, 2018).

The sustainability problems we are collectively facing are emergent and complex which is at odds with strongly held attitudes. Strong attitudes are unlikely to change when provided new information (Lewandowsky, 2016; Heberlein, 2012), and the difficulty in building strong attitudes around sustainability issues rather than through the lens of another attitude are inhibiting our collective ability to respond to these "wicked" and complex sustainability problems (Brynjarsdóttir, 2012). "Wicked" and complex problems are defined as not easy to solve, do not have one-size-fits-all solutions, are constantly changing and require adaptability. This is seemingly at odds with strong attitudes, they are typically inflexible, slow to change and do not adapt well to new information. Lewandowsky (2020) suggests that climate change presents a challenge to people's cognitive hierarchies, by creating "an adversarial political and rhetorical

environment” (p.8). The implication of this adversarial and rhetorical environment and how we currently communicate predisposes individuals to engage rhetoric that stagnates progress in the space of sustainable mitigation. This stagnation can look like greenwashing, political gridlock, otherism and misinformation (Lewandowsky 2020; Brynjarsdóttir 2012). These predispositions reinforce and thrive in strong attitudes. This creates a homeostasis of inaction. This inaction threatens our ability to address global climate change and its socio-ecological repercussions equitably, progressively, and continuously.

Sustainability science has a robust history in touting technical and infrastructure fixes, considering the concept of the cognitive fix to be too difficult to approach (Heberlein, 2012; DeSombre 2018). Researchers have suggested that our approach to developing “cognitive fixes’’ pales in comparison to developing “technologic and infrastructure fixes”. This can often lead to treating symptoms of sustainability problems rather than underlying causes (Brynjarsdóttir, 2012). This research hopes to provide tools to navigate the cognitive fix space but does not suggest there is a sole “fix”. However, a focus on this research is necessary as technologic and infrastructure fixes simply raise our capacity but are typically limited in addressing underlying systemic issues (Fischer et al, 2023; Heberlein, 2012).

Researchers studying attitudes around climate change and sustainability routinely suggest that it is necessary to shift social norms and develop a culture of sustainability to better respond to its systemic issues. “(These) psychological processes deserve widespread and deep consideration in sustainability science,

because if leveraged, they can bring about transformative systems change" (Van Riper et al, 2019, p.10). This research addresses that space. This is not as an alternative to technological and infrastructure approaches but should be approached hand in hand. This research suggests reflection in the space of social norms, beliefs, and attitude formation through using narrative to engage reflexivity and emancipation.

This study will use storytelling as an emancipatory and reflexive tool in shifting strongly held attitudes (Fischer et al, 2023). Storytelling has been used as a tool to shift attitudes since humankind came into being (Dahlstrom, 2014). They make knowledge easier for individuals to contextualize (Dahlstrom, 2014). The earliest forms of story on record, Indigenous storytelling, were used to share knowledge, develop shared values, beliefs, and norms (Fernandez-Llamazares et al, 2018). Research suggests it was used to encourage dialogue over conversation, share knowledge and balance local ecological systems (Fernandez-Llamazares et al, 2018). New research has focused more specifically on emancipation and reflexivity, the ability to separate oneself from elements of their cognitive hierarchy and reflect on them to adapt to a situation with more knowledge (Fischer et al, 2023). By applying this methodology of narratives emphasizing emancipation and reflexivity, this study explores whether a narrative intervention could impact elements of the cognitive hierarchy and attitudinal structures.

This study analyzes cognitive, affective, and conative judgements, before and after a narrative intervention, regarding the light rail in the Phoenix Metro

Area as a microcosm for the potential of communicating through emancipatory and reflexive storytelling. By asking:

"How does emancipatory and reflexive storytelling impact affective, cognitive and conative attitudes regarding local alternative transportation?"

This study examines the impact of storytelling, reflectivity, and emancipation of thought. As a microcosm, it may have limitations in how it translates to other sustainability problems, but it offers insight into how sustainability communications might proceed to advance one approach to a cognitive fix.

CHAPTER 2

LITERATURE REVIEW

The term “attitude” is commonly defined as positive and negative judgments regarding an object or phenomena that are multifaceted (Larson et al, 2023). Since the inception of attitude research in psychology, social psychology and sociology, many methods evaluate various concepts and elements attributed to what make up our attitudes, how they function and how they relate to our behavior. Current research into environmental attitudes describe attitudes as “multidimensional and hierarchical” nature (Larson, 2009, 2011; Vaske and Donnelly, 1999; Rokeach, 1973). In this paper I will use the tripartite model for assessing affective, cognitive and conative attitudes (Larson, 2009, 2011; Dunlap and Jones 2002; Bogozzi et al, 1979), the theoretical framework of cognitive hierarchy (Rokeach, 1973; Vaske and Donnelly, 1999; Fulton et al, 1996), the three principles of attitude change (Heberlein, 2012), and the theoretical framework of horizontal and vertical attitudinal structures and their related strength (Heberlein 2012; Milfont, et al, 2009).

The Tripartite Model; Measuring Affective, Cognitive and Conative Judgements

The tripartite model was developed in attitudinal literature (Dunlap and Jones 2002, Bogozzi et al, 1979) and later adapted for use by Larson et al (2009, 2011) to specifically measure judgements within the space of environmental attitudes. Affective judgements and attitudes are that are emotional assessments about the attitude object, an affective judgment might sound like “I feel that public

transportation is scary". Cognitive judgements and attitudes are how we think and believe something to be true based on our perspective and experience, this might be expressed in a statement like "public transportation is economically unsound". It may be true or untrue but is assumed to be true based on the lived experience of the individual holding the judgment. Finally, conative judgements and attitudes are the behavioral intent of the person holding the attitude, how they act, this could be more negative or more positive (Larson et al, 2009). A conative statement might sound like "I would vote in support of local transportation development". This suggests a positive predisposition in behavioral intent, the individual who holds this judgment intends to positively support the subject through their behavior. This tripartite method represents dimensions of our attitudinal structures and provides an analysis of what affective, cognitive and conative judgements are. If measuring before and after an intervention, this model can be used as a method to determine shifts in judgment and therefore, a reflection of held attitudes.

Conceptualizing Attitudes and Attitude Change:

This paper will utilize the theoretical framework of "cognitive hierarchy", initially conceptualized by Milton Rokeach (1973). Fulton and Manfredo (1996) and later Vaske and Donnelly (1999) further developed this theoretical framework of a cognitive hierarchy in the field of sustainability and envisioned the model as

the inverted pyramid seen in figure 1. Let's walk through what makes up each layer of this pyramid and how they function.

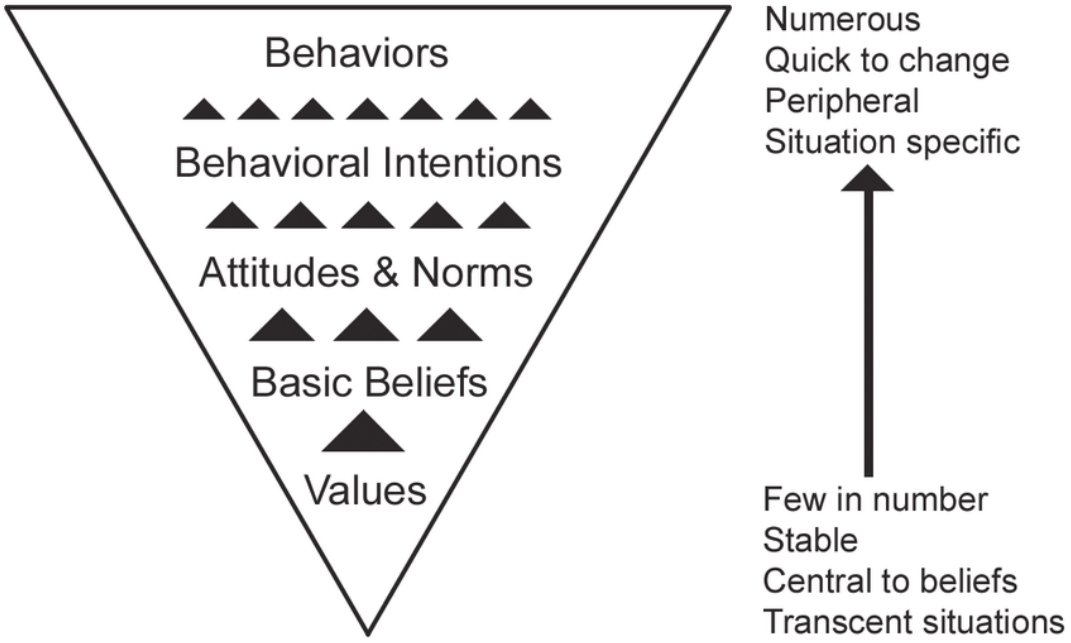

Figure 1 – Inverted Cognitive Hierarchy Pyramid (Vaske and Donnely, 1999)

A value is a fundamental belief we hold. This might look like "equality", "freedom", "security", or "right to a comfortable life" (values identified by Milton Rokeach, 1973). These values typically reflect the goals a person might want to achieve in their lifetime. They are rather common and people who operate in different and similar ways can and do share many common values. These values are slow to change and do not typically change in response to specific situations, they transcend situations. An example can be holding the value of "a comfortable life" (Rokeach, 1973). An individual can hold this value but still engage in things that make life uncomfortable further up the inverted pyramid. That does not change the value and sometimes is perceived as upholding the value. For example, we can hold a value of security and exhibit a behavior of using public

transit, which might make an individual feel insecure. This does not invalidate the value of security.

A belief is something someone holds to be true based on evidence. Beliefs are unemotional and factual to the holder of that belief. Beliefs can change more fluidly than a value but typically transcend situations (Heberlein 2012; Vaske and Donnelly; 1999; Fulton et al, 1996; Rokeach, 1973). We might believe that public transit is uncomfortable, but our financial situation or desire for convenience might result in us engaging in the behavior of using public transit anyway. This does not necessarily mean our belief would change, but perhaps routine experiences where we feel more comfortable on public transit might lead an individual to shift their belief of public transit being unsafe. There are more beliefs than values, as beliefs contextualize our values in practice.

Norms, or "the behavioral expectations that we hold collectively as a community, and our individual desires to live up to these standards," build on shared beliefs and values (DeSombre, 2018, p.133). We identify with and build our communities when we have shared values, and beliefs. If we have a group of friends that strongly supports and rides public transit, there is a norm in place to support and ride public transit. This emerges if many people in the group share beliefs around the use and support of public transit.

Behavioral intentions are how we intend to act (Vaske and Donnelly, 1999; Fulton et al, 1996; Rokeach, 1973). An individual may hold a belief that public transit should be utilized and supported. This may be supported by a value of "equality" and there may be a social norm in their community that you should

take public transit when possible. This means the individual would likely have the behavioral intention of utilizing public transit. However, higher up on the inverted pyramid, there are more numerous elements (you could take a taxi, ride a bike, take some drive to a public transit station and ride from there), and they are more situation dependent; for example, delayed trains might motivate a person to drive instead even if their intention is to not.

Finally, behavior is the actual thing that happens; not the intention, the belief, or the value, but the actual behavior a person engages in. Behaviors are the most situation dependent, numerous, and transient (Vaske and Donnelly, 1999; Fulton et al, 1996, Rokeach, 1973). An individual can hold a belief that vehicles are more comfortable than public transit and then their vehicle might break down, and that person uses public transit to get to work until it's fixed. It is not in line with beliefs, but the broken vehicle made it situation dependent. This is the cognitive hierarchy; through this hierarchy we develop attitudinal structures around attitude objects. These attitude objects are whatever the attitude is built around. This can be an idea, a place, a person or a thing (Heberlein, 2012). This could include fear, public transportation, or movements in support or against causes. It can clearly be observed that behaviors and judgements stem from, and can be entrenched in, values. Values are stable, slow to change and transcend situations, making them hard to shift. Van Riper et al. advises that more precedence should be placed on values, that their relationships to influencing behavior is complex and in need to further research. (Van Riper et al, 2018). The cognitive hierarchy is expressed through cognitive, affective and

conative judgements. The cognitive hierarchy provides insight into how these judgements are formed through attitudinal structures. This allows for shifts in the attitudinal structure to be measured utilizing the tripartite model.

Forming Attitudinal Structures around Sustainability Issues

Researchers have found that forming attitudes around sustainability issues (the issue being the attitude object) tends to be difficult. Sustainability issues tend to either have a flexible (weak) attitudinal structure or are perceived through the lens of inflexible (stronger) attitudinal structures (Heberlein, 2012). Heberlein uses the idea of "attitudinal structures'' to determine how/what leads to strong and inflexible versus weak and flexible attitudes. A stronger attitude is one that is reinforced through the entire cognitive hierarchy (values, beliefs, norms and behavior) and has many other attitude structures that bolster it, making it "horizontal". A weaker, flexible attitude is less formed with less reinforcement and is referred to as "vertical" (Heberlein, 2012).

The attitude structure in figure 2 is a vertical attitude structure and is only connected to one value. When attitudes are narrowly built, are only connected to one value, few beliefs and minimal social norms, they are weaker, more flexible and prone to change. If one element in the vertical

Vertical Attitude Structure		Key
I like public transportation		(Attitude)
Public transportation gives me more options and decisions		(Evaluative Belief)
Public transportation allows me to not rely solely on my car	Public transportation saves me money	(Belief)
Independence		(Value)

Figure 2 - Vertical Attitude Structure (conceived by Heberlein, 2012, adapted for this study by Jake Swanson, 2023)

structure changes, their whole attitudinal structure may change. If an attitude structure is more horizontal (Figure 3), it is connected to more values, beliefs and social norms. This means that the attitude is stronger, less flexible and less prone to change. If one element changes, the attitudinal structure stays strong as it is linked to other values, beliefs and norms. These structures are known as vertical and horizontal attitude structures (Heberlein, 2012; Milfont, 2009).

<table>
<tr><td colspan="8">Horizontal Attitude Structure</td><td>Key</td></tr>
<tr><td colspan="8">I like public transportation</td><td>(Attitude)</td></tr>
<tr><td colspan="2">By using public transportation I promote equality</td><td colspan="2">The bus is cheaper and saves money for other things</td><td colspan="2">My friends and I are public transportation users</td><td colspan="2">Public transit is more exciting</td><td>(Evaluative Belief)</td></tr>
<tr><td>Transportation is a public good</td><td>Cars are cost prohibitive</td><td>A vehicle costs to much</td><td>Public transportation is cheaper</td><td>Friends take public transit</td><td>People with similar beliefs as me take public transit</td><td>More interaction on public transit</td><td>Vehicle traffic is boring</td><td>(Belief)</td></tr>
<tr><td colspan="2">Equality</td><td colspan="2">A comfortable life</td><td colspan="2">Social recognition</td><td colspan="2">Exciting life</td><td>(Value)</td></tr>
</table>

Figure 3 – Horizontal Attitude Structure (conceived by Heberlein, 2012, adapted for this study by Jake Swanson, 2023)

It would be beneficial to be able to build a strong, horizontal attitude structure around a sustainability issue, but this can be quite difficult. Heberlein (2012) suggests that this difficulty in developing attitudinal structures around sustainability issues may come from the complex and “wicked” nature of sustainability problems (Polasky et al, 2011). “Complexity” generally means that the system has many individual moving parts that interact with one another, leading to emergence and outcomes that are not easily predictable (Mitchell, 2009). Further, “wicked problems” can be defined as having a lack of discernible cause, as being unique in nature, having many tradeoffs, and having no alternative or clear solutions (Conklin, 2006). These qualities make it very difficult for the public to develop attitudes around sustainability problems. This may be

because attitudes are built and change in response to consistency, links to identity, and direct experience (Heberlein, 2012).

Though not a hard and fast rule, attitudes tend towards consistency (Heberlein, 2012). Typically, values align with beliefs which align with behavioral intentions (DeSombre 2018; Vaske and Donnelly, 1999; Fulton et al, 1996; Rokeach, 1973). However, wicked and complex problems tend to lack perceivable consistency which makes it difficult for an individual to build an attitude around it (Heberlein, 2012; Polasky et al, 2011). For example, recycling in the United States constantly reevaluates what can and cannot be thrown away. This results in less people having strong attitudes around recycling due to the inconsistency in recommended behaviors. This impedes efforts to recycle material because of this inconsistency. The socio-ecological repercussions resulting from climate change may not be connected to actions, inhibiting the ability for individuals to build consistent attitudes based on direct experience. Additionally, these complex problems are prone to oversimplification, this can impede our ability to form attitudes around sustainability as an attitude object, recycling may be important, but a reduction in material use, plastics and oil are the overall goal. By simplifying the message, we may build an attitude around recycling that is strong, but that attitude is not conducive to the larger necessary shifts to reduce waste. Humans tend to prefer answers that are clear, even when clear answers are not available.

Attitudes are strongly influenced by our “linked identities”. Heberlein (2012) offers a study of farmers and their attitudes regarding wolf restoration. A

farmer has personal relationships, responsibilities, attitudes, and values that connect them to their profession. It is a “way of life”, or identity. Studies show that farmers do not favor wolf restoration, even if they’ve never had direct experiences with wolves. Additionally, “Those with the most accurate knowledge of wolves did not support or oppose restoration any more than those with less accurate knowledge” (Heberlein, 2012, p.26). This suggests that having accurate information and knowledge about a concept does not necessarily translate to having more flexible attitudes and that links to identity reinforce inflexible attitudes even when those holding inflexible attitudes have access to accurate information and evidence that opposes their held attitudinal structure (Heberlein, 2012). Their attitudes around wolves are tied to their identity (developed through social norms), which is the lens through which they view the issue. Similarly, people have identities that conflict with sustainability efforts. Someone might acknowledge climate change exists and be concerned about the future, but their political party does not support legislation to address it. Due to linked identities, this stronger attitude will win out in the decision-making process.

Heberlein (2012) suggests that attitudes that are based on direct experience, rather than consistency or links to identity, are better developed and refers to this effect colloquially as “been there, done that.” When we experience something, we tend to use that experience to inform our attitudes. Though experience has been shown to build very strong attitudinal structures, it is very difficult to have direct experiences with sustainability issues and mitigation efforts. One reason for this is that timelines for sustainability issues and

mitigation efforts exist outside of the typical human timescale, which makes it seem as though actions being taken now are not impactful and our current events are not the result of our past actions (Polasky et al, 2011). This same concept makes it hard to discern impact from individual actions. If you commit an individual action or vote for a policy that only has impact from collective action, you do not see the immediate results from your action which may impede a person from feeling the results as a direct experience (Heberlein 2012; Polasky, et al, 2011).

Heberlein (2012) offers the idea that to shift attitudes around sustainability we need to engage in more complex thought and either reduce or specify how individuals connect environmental issues to strong, inflexible attitudes. Van Riper et al (2019) echoes this sentiment by suggesting we need future research to "improve individual capacity for self-realization".

Potential Impacts of Negating a Cognitive Approach

> *"In short, sociocultural values and worldviews influence risk perceptions and policy preferences…" (Larson et al, 2009, p.1014)*

The way we are currently communicating what needs to be done to avert the direct consequences of climate change, respond to them equitably and shift to a paradigm of balancing our socio-ecological systems is not efficient (DeSombre, 2018; Polasky et al, 2011). Current research identifies a value-action gap, a drive to utilize persuasion (which is not indicative of altering cognitive hierarchies longitudinally), and a lack of research driven towards addressing cognitive hierarchies and shared values, beliefs and norms

(DeSombre, 2018; Brynjarsdottir, 2012; Heberlein, 2012). The consequences of this could result in impeding long term collective action, bringing great harm to current, vulnerable and future populations and harm the earth's ecological and habitable state by inhibiting policy development and individual actions that build into collective action (Polasky et al, 2011).

A large portion of the population has values and beliefs that align with addressing sustainability problems, but those beliefs may not be expressed in their behaviors and compete with stronger attitudinal structures (DeSombre, 2018; Heberlein, 2012). In the cognitive hierarchy model, one can clearly see this phenomenon. Behaviors are numerous, quick to change, peripheral and situation dependent, while values are the opposite (Vaske and Donnelly; 1999, Fulton et al, 1996; Rokeach, 1973). Brynjarsdóttir et al (2012) suggests current efforts in this space, efforts of persuasion, fall short of shifting collective cultural values. Van Riper et al (2019) and DeSombre (2018) both suggest an emphasis be placed on developing shared cultural norms and Van Riper extends this to shared cultural values to elicit transformative change.

Misinformation, otherism and greenwashing play off strong attitudes (Lewandowsky, 2021). They exploit strong attitudes by eliciting our affective judgements, taking advantage of our linked identities and offering simple answers that are easier to build strong attitudes around (Hameleers et al, 2020). Lewandowski (2021) states that "attitudes toward climate change are driven largely by motivated cognition that seeks to protect individuals against scientific evidence that is ideologically or economically threatening" (p.4). This is an

example that suggests when we view climate change through other strong attitudes (political ideology or economic status), it can infringe on problem solving (Hameleers et al, 2020; Bail 2018). Greenwashing works similarly, simplifying the issue to identity, or blaming another party, and in doing so, negating an approach to the actual problem. Fischer et al (2023) makes note of this by stating "...ignoring the dynamics and interactions of different factors affecting systems in favor of isolated causal mechanisms makes it easier to focus on specific environmentally friendly behaviors" (p.22). He exemplifies this quote with commentary on plastic bags, an isolated causal mechanism (greenwashing) would provide a linear answer, stop using plastic bags. The factors affecting the system of plastic use extend past this simple response (Fischer et al, 2023).

Our attitudinal structures are multifaceted, multidimensional and hierarchical (Larson et al, 2009, 2011). They consist of values, beliefs, norms, intentions and behaviors. How we form attitudes can be at odds with how society needs to address pressing sustainability issues. Though it is evident society is concerned about these problems, scientists have found a value-action gap. This confounding gap suggests we hold values that value the environment, but our behaviors do not reflect it. (DeSombre, 2018). One of the reasons for this may be that attitude change occurs through consistency, links to identity and direct experience, which is at odds with the complex and wicked nature of sustainability issues (Heberlein, 2012). Due to this difficulty in building attitudes around sustainability issues and mitigation strategies, individuals tend to address them through the lens of, or connect them to, stronger attitudes. Multiple researchers

suggest this value-action gap deserves to be more rigorously examined to shift our collective cognitive hierarchies (Van Riper et al, 2019). One method that can be used to determine attitudes, and their shifts when exposed to interventions, is the tripartite model. The tripartite model can be used to evaluate our affective, cognitive and conative judgements that make up our attitudinal structures (Larson et al, 2011).

Storytelling as a Tool

> *"Stories serve as archetypal frameworks for humans to interpret and assimilate complex thoughts" (Fischer et al, 2023, p20).*

Storytelling and its narrative structure have been used to communicate ideas, imagine futures and "constitute reality as we know it" since the origins of humankind (Veland, et al, 2018). From our childhood, stories are utilized to teach and communicate values, beliefs and social norms. As adults we use them for education, entertainment, inspiration, as a rally cry, to persuade, to reflect and to share. It is a tool that individuals use to develop values, share beliefs and build cultural norms (Dahlstrom, 2014). Recent research has worked towards understanding it as a tool to address global climate change (Relva and Jung, 2021; Gustafson, 2020; Fernández-Llamazares et al, 2018). Researchers acknowledge that communicating knowledge and experiences through narrative make it easier for individuals to contextualize (Dahlstrom, 2014). The earliest forms of story on record, Indigenous storytelling, were used to share knowledge, develop shared values, beliefs, norms, to "encourage dialogue over conversation", and balance local ecological systems (Fernandez-Llamazares et

al, 2018). Though many stories can be propagandist, persuasive and biased, recent research has explored the concept of emancipation and reflexivity within the narrative (Fischer et al, 2023). Fischer et al (2023) applied reflexive and emancipatory elements to narrative to allow for individuals to “explore and find new opportunities and entry points for engaging with complexity of sustainability in their personal or political lives” (p.21).

Sustainable Storytelling or “Sustelling”

“Sustelling”, a method used by Fischer et al (2023), is a method of narrating sustainability through storytelling. Storytelling itself is the process of sharing and using narrative to achieve affective, cognitive, or conative effects in whoever is receiving the narrative (Fischer, et al, 2023). Rather than a tool of persuasion, “sustelling” has the intended goal of engaging reflexivity and emancipation. Reflexivity is the “...ability to take detached perspectives, reflect on oneself, and explore individual and collective development processes” while emancipation refers to “the ability to act freely, distance oneself from negative developments in life, and experience autonomy over one’s own trajectory” (Fischer, et al, 2023, p.17). Sustelling also attempts to present complex issues within sustainability as more tangible and less personal, or existentially threatening by providing story structures and characters that those engaging with the storytelling can see themselves in and relate to. Sustelling is aligning a narrative about a complex issue with attitude structures, as to allow the receiver to navigate the issue with reflexivity. The stories within sustelling literature use a standard narrative structure, a plot, relatable characters, conflict and solution,

chronology, context, style and mood. They then believe the experience of receiving the story should be immersive (Fischer et al, 2023). Rather than propagandist, which pushes an agenda, a cause or directs the individual to specific material, which typically reinforces inflexible attitudes (DeSombre, 2018), emancipatory and reflexive storytelling elucidates a different path. It has the intention of allowing the individual to separate themselves from their held beliefs, attitudes or norms and reflect and adapt to them. And in doing so, it intends to allow individuals to feel empowered to make competent and informed decisions (Fischer et al, 2023). This is not to suggest one right answer, as sustainability literature suggests there is no such thing, but to be adaptable and receptive to different solutions and not be subjected to the inflexible attitudinal structures or feedback loops that inhibit our ability to consider different mitigation strategies. Though this research is recent in this explicit form, this type of storytelling has been utilized to engage in this complexity and shift decision making for millennia.

Indigenous Roots of Storytelling

Many Indigenous stories encourage the listener to understand their existence within a system, a demonstration of emancipatory and reflexive storytelling. These cultures shared these stories intergenerationally and many of them suggested emancipatory and reflexive thought where they reflected on how they functioned as a part of their system (Fernández-Llamazares et al, 2018). Western knowledge systems tend to be less emancipatory and reflexive, they tend to be more linear, curated by Western scientific knowledge (Relva and Jung, 2021). It is important to state that this, emancipatory and reflexive storytelling, is

not a new system of thinking but an adaptation and natural step forward from current and past systems. Indigenous storytelling and ways of knowing have existed as far back as we trace human history. But recently, scholars have begun to engage in different ways of knowing, different systems of knowledge, to navigate the complex problems in front of us (Fernández-Llamazares et al, 2018). Modern storytelling is inspired by Indigenous ways of knowing and, in turn, their storytelling methodologies (Relva & Jung, 2021). Scientists are using these different ways of knowing and storytelling methodologies to “deal with messy and complex situations that cannot be addressed by establishing linear cause and effect relationships using systemic tools” (Relva & Jung, 2021, p.10). Storytelling has routinely been used as propaganda, to prove one, or a collection of points. This method of storytelling, emancipatory and reflexive, does not have the intention of providing a “right answer” but encouraging the listener to think in a more holistic approach, to consider an entire system and engage in other ways of knowing.

This study utilized the cognitive hierarchy to identify where communications should be directed for longitudinal shifts in attitude regarding sustainability. It went on to explore why those shifts are difficult, rigid, and strong attitudinal structures. I then suggested working towards developing more flexible attitudes may be advantageous to celebration and sustainable decision making. In doing so, I identified that direct experience, which includes storytelling, is the greatest leverage point in shifting attitudes and their structures. Though, storytelling can be used to persuade to a point, Sustelling and Indigenous

storytelling methodologies of using reflexivity and emancipation are used to reflect on one's whole cognitive hierarchy rather than just behaviors. Doing so may allow individuals to breakdown their rigid attitudinal structures and assess their functionality and allow for shifts in attitude. When using a story in this study, I need to measure if there are changes to attitude and for that, I will be adapting the tripartite attitude model to measure changes to affective, cognitive and conative attitudes.

CHAPTER 3

STUDY METHODS AND ANALYSIS

Methods and Design

This study is a quasi-experimental design that convened focus groups of student participants where they are surveyed before and after a narrative intervention and then engage in facilitated dialogue. The light rail was chosen as the attitude object for the narrative as it has a defined history in the area, most students interact with it on some level, and it represents a sustainability strategy (alternative transportation). The light rail is not a linear solution, but a mitigation strategy with repercussions, socially, economically, environmentally. It is a complex approach to a wicked problem. The light rail demonstrates a sustainability topic, as it represents the concept of alternative transportation. The light rail located in the greater Phoenix Metro area will be the attitudinal object within this study. The light rail is a 28.2-mile public transportation system in the Phoenix Metro Area (Valley Metro, 2023). It was constructed in 2008 and serves a ridership of approximately 31,000 people per day and goes straight through the main Arizona State University campus (Valley Metro, 2023). The light rail is a complex sustainability mitigation. Though it may alleviate greenhouse gas emissions it comes with other socio-economic and socio-cultural concerns and nuances. In conducting a questionnaire to assess attitudes towards the light rail prior to conducting this study or designing the narrative, students at ASU expressed strong feelings of fear as well as concern about accessibility. This may indicate that they view the light rail through attitude structures not directly

built around sustainability. This aligns with the attitudinal literature that suggests that many sustainability mitigation efforts may be viewed through the lens of stronger attitudinal structures (Van Riper 2019; Heberlein, 2012; Polasky, 2011).

There were four stages to the experiment. In the first stage a pre-story survey was conducted using the tripartite attitude model to measure participants' affective, cognitive and conative judgements regarding our sustainability "attitude object", the light rail. The pre survey also asked questions about use, demographics and engagement with alternative transportation to determine if there were correlations. The second stage was in a focus group setting where a light rail-related story is shared verbally, in person by a narrator who was introduced as a fellow student. The narrator was the same in every focus group. This story was shared as a personal experience about the light rail that relates to common attitudes held by ASU students. The story was structured around the Fischer, et al (2023) concept of "Sustelling" and incorporates emancipatory and reflexive thought. Third, a post-story survey was conducted to measure any changes in attitudinal structure using a tripartite attitude model (affective, cognitive and conative judgements). Fourthly, a discussion was facilitated to record qualitative responses from participants detailing their experience with the storytelling narrative. I then compared the pre survey quantitative data to corresponding post survey data to determine how affective, cognitive and conative judgements were impacted by the narrative. Qualitative data from the facilitated discussion was analyzed to determine reasoning behind shifts, provide

an understanding for the participants' experience, and further elucidate how the narrative impacted them.

Participants

Recruitment was a convenience sample of ASU students who were interested in participating in a "light rail attitudes study". Convenience samples of ASU students are rather common in this field of research (Larson et al, 2010). Methods for recruitment included recruiting through ASU's "Research Plus Me" tool, recruiting through presentations in underclassmen classes and snowball sampling, which occurred through asking registered participants to share the registration link. The invitation and presentation script indicated that this was a study about light rail attitudes, including up to 75 minutes of engagement (15 minutes for the pre-survey and one hour for the focus group that included storytelling, a post survey and discussion), indicated that students who participated in the entire project would be compensated with a $15 dollars Cartel Coffee gift certificate. Times for the study were staggered across weekdays and times to allow for a variety of schedules.

In the five months of recruiting, I recruited 65 students to participate in the pre survey with 29 ASU students participating in the entire study. The link was shared with participating students prior to the study, this contained a consent form, the presurvey and a focus group time selection.

The data for this study was collected from six different focus groups that ranged from 3-7 participants and were facilitated from April-September of 2023 on Arizona State University's Tempe campus. The sample included 29

participants with 51.7% female, 37.9% male, and 6.9% non-binary (with 3.4% selecting “prefer not to answer). 31% were graduate students, 27.5% upperclassmen and 41.4% underclassmen. Almost 80 percent of the sample identified as liberal leaning with 14% identifying moderate and 6.9% identifying as slightly conservative. 90% of the sample reported utilizing some form of alternate transportation on a monthly, or more frequent, basis. 27.6% of the sample reported taking the light rail 50+ times in their life, 13.8% reporting 20-49 times, 17.2% reported 6-19 times and the majority was 41.4% reporting using it only 1-5 times. With a heavy skew towards liberal ideology, students studying sustainability, and familiarity with utilizing the light rail this was not a representative sample of the student population that was intended. This impacted interpretation of results in the discussion section.

Study Process

The study was conducted over the course of five months, hosted in various conference rooms around Arizona State University. The number of participants varied from focus group to focus group from 3-7 participants per group, with a total of 6 groups in the study. The total sample size was 29 participants.

Participants were recruited for the study from underclassmen classes, ASU’s Research Plus Me tool and snowball sampling. Participants were given a URL or QR code linking to the consent form and presurvey. The survey and consent from were conducted through ASU’s Qualtrics. Participants selected

their preferred focus group date and were sent confirmation emails followed by reminders.

Participants were welcomed into the conference room and invited to sit down at a round conference table. The table was set up with recording equipment to record the qualitative discussion session. The study began with an introduction and overview of the study and were then introduced to the narrator who read the 6–7-minute narrative. Upon completion of the narrative all participants were sent an email with a link to the post survey and the narrator left the room. This survey was also conducted through ASU's Qualtrics. Participants were provided 10 minutes to finish the survey. Following completion of the post survey, participants were given instructions for the facilitated discussion. These instructions included requests to share once and then provide opportunities for other participants to respond before offering more responses. Participants were told they were welcome to respond to one another and that responding to prompts was optional. Following this introduction four questions were asked:

1. What did you think of the story?
2. What do you think was the intention of this story?
3. Do you think this story motivated you to reflect on your own attitudes about the light rail or other story elements?
4. Do you think this narrative shifted your attitude regarding the light rail at all? How so?

Following these questions, a final prompt was provided for any extraneous thoughts, opinions, stories, questions or comments, "Do you have anything else

to share about your experience here?" After the conclusion of the dialogue, participants were thanked for their participation and compensated with a $15 dollar Cartel Coffee Gift Card.

Storytelling as an Intervention

"Storytelling is about using narrative structures to achieve certain affective, cognitive and conative effects in readers" (Fischer et al, 2023), and this effect is what was measured in this study. Heberlein (2012) suggests that by engaging in complexity and either being more comfortable in weaker attitudinal structures or building stronger ones around sustainability issues themselves (rather than looking at them through the lens of stronger attitudinal structures) we can better address those issues collectively. I will use the sustelling approach (reflexive and emancipatory narrative) to function as Heberlein's concept of "direct experience". Direct experiences are something one personally experiences in real time. This sustelling narrative functions as a direct experience.

This study observes the impact sustelling's emancipatory and reflexive storytelling approach has on our affective, cognitive and conative judgements around a specific attitude object, the Valley Metro Light Rail. The story that was used as an intervention addresses common attitudes that the target population expressed regarding the light rail. The narrative uses those attitudes as the basis for the story to validate the experience of the participants. The narrative goes on to reflect upon those attitudes and suggest reasons why those attitudes could be questioned by the narrator (reflexivity). The story ends with the narrator separating themselves from their affective, cognitive and conative judgements to

assess their experience more holistically (emancipation). The goal of the narrative was to encourage reflexive and emancipatory thought. This is measured using the tripartite attitudinal model to assess quantitative responses of pre and post surveys and through qualitative analysis of discussion questions and dialogue.

Storytelling is found to be a strong method to receive and retain knowledge (Fischer et al, 2023). However, experiments put forth by Fischer, et al, showed limitations in their study. They reasoned that these limitations included:

1: The information was too familiar, it did not present any new information

2: The information insulted the intelligence of the participants

3: The narratives may have been opposed to their attitudinal structures

4: The narrative had low perceived authenticity

5: Participants became fatigued with reading

I believe the methodology used in Fischer et al. (2023) negates Heberlein's concept of "direct experience", which is regarded as the catalyst to attitude change. Fischer et al. (2023) used pre-existing podcasts and transcripts. To address Fischer et al. (2023) concerns, this narrative contained new information and approaches, attempted to avoid intellectual pandering, was written to be relevant to popular values, beliefs and norms and was told at an in-person event. By addressing these concerns in previous research, this project brings a unique perspective and new research methods to the sustelling literature.

Story Design and Delivery

The narrative contains the elements identified in the sustelling literature, a standard narrative structure, a plot, relatable characters, conflict and solution, chronology, context, style and mood. These narrative elements were produced by conducting a questionnaire with a sample of the target population to design the narrative to be relevant to the attitudes and perspectives of the target population, ASU students. Experiences that were highlighted by these students were utilized to shape the narrative. The attitudinal structures explored in the narrative, resulting from the questionnaire, are based around accessibility and fear. The narrator in the story makes multiple efforts to separate themselves from these attitudinal structures, this separation is an example of emancipation. The narrator then examines and reflects on their held beliefs and compares it to their lived experience, an example of reflexivity. By using these constructs in the story, I utilize the sustelling story method as designed by Fischer et al (2023). This narrative does not have the intention of supporting or not supporting the Phoenix light rail, it simply shares concerns around the light rail and reflects upon them. The story was read in person to engage the concepts of direct experiences, highlighted by Heberlein (2012). Fischer et al (2023), Veland et al (2018) and Heberlein (2012) suggests that listening to a story from a relatable individual, in this case a fellow student, would be more likely to have an impact. The narrator is a female, Tempe resident and undergraduate student. She introduces herself by name and as a student of ASU. This relational element further ties to the concept of direct experiences (Heberlein, 2012). This is a gap in current

sustainability literature as previous studies (Fischer et al, 2023) only conducted this study with pre recordings from an existing story source, a podcast. This study is the first to apply Heberlein's concept of direct experience with sustelling methodologies. This was the main narrative and was utilized in all six of the conducted focus groups. The full narrative can be found in appendix A.

Survey Design

The pre survey had 28 questions including 16 questions regarding experience with the light rail/alternative transportation, self-reported behaviors and demographic questions. It also contained 12 questions assessing attitudes using the tripartite attitude model. The format of tripartite attitude model questions was a seven-point Likert scale with 7 indicating responses conducive to comfort, security, accessibility and support regarding the light rail and 1 indicating a lack of comfort, security, accessibility and support with 4 being neutral. This suggests that individuals who answer closer to seven would have more positively associated attitudes around the light rail, if individuals tended to answer more towards one, they might have more negatively associated attitudes with the light rail. The post survey included these same 12 tripartite attitude model questions. These 12 questions were divided into the three attitudes in the tripartite model, four were associated with affective, cognitive and conative attitudes. This allowed me to see analyze results for each category and individual results to each question from the pre- to post-survey.

The pre and post survey employed the use of the tripartite model and asked questions connected to affective, cognitive, and conative judgements

regarding the light rail. There were four questions for each of these three categories. The affective attitude questions focused on questions about participants' emotional experiences with the light rail. The cognitive attitude questions focused on participants perceived (in)effectiveness of the light rail. Finally, the conative attitudes questions focused on participants' behavioral intentions with the light rail, either voting, utilizing or supporting. The pre survey sets a baseline of participant's existing attitudes and the post survey will ask the exact same questions to determine the impact of the narrative experience on those existing attitudes, as it will be the only observed intervention between the surveys. The post survey did not include the additional 9 questions associated with factual background information, self-reported behavior and demographics. The post survey was recorded following the storytelling intervention and prior to the facilitated discussion. This was done with the purpose of solely measuring the impact of the storytelling exercise on affective, cognitive and conative judgements and attitudes, not the facilitated discussion.

Data Analysis Process

The method I used to measure the impact of the intervention in this study is the tripartite model to measure affective cognitive and conative judgements. The tripartite model is used to evaluate multifaceted affective, cognitive and conative judgements (Larson et al, 2009). It was developed in attitudinal literature ((Dunlap and Jones 2002, Bogozzi et al, 1979)) and adapted for use by Larson et al (2009, 2011) to specifically measure these judgements within the space of environmental attitudes. I utilized those methods by adapting it to a pre and post

survey and shifted its subject/attitude object to the light rail. Quantitative data from the pre and post survey was anonymized and coded and then input to SPSS Statistics and Excel to evaluate results. To assess shifts in attitudes I looked at frequencies, descriptive statistics, means and standard deviation. Then, to assess possible correlations I used Spearman's correlation coefficient to highlight if any preexisting qualities had correlations to responses in the pre and post survey. Those preexisting qualities were from the pre-survey and included gender, ethnicity, status at the university (freshmen to graduate), political ideology, frequency of alternative transportation use, and overall light rail usage. They were compared to observe what trends emerge in positive, negative or neutral shifts from pre survey to post and to observe correlations.

After the survey and storytelling exercise there was a facilitated discussion to gather qualitative data regarding the participants experience in the exercise. These questions were designed to examine how participants felt about the story, their perceived intention of the story, whether the story encouraged them to emancipate or reflect in relation to their held attitudes and whether they thought the story shifted their attitudes. This data was used to assess impact of storytelling as a tool in sustainability communication and to model future research and assess limitations and reception of the experiment. This dialogue was facilitated by the researcher. Instructions requested that participants raise their hands to answer questions, to hold additional responses until all participants have had a chance to speak and were told that responding to prompts was an option and not mandatory. Participants were allowed to comment on other's

statements. Follow up questions were asked to provide clarity to participant responses and the final prompt welcomed comments, questions and stories related to the study process and topic. These sessions were recorded in full on Audacity, transcribed in OtterAI and reviewed for accuracy by reviewing and editing transcripts to fully match dialogue. This dialogue was then analyzed by assessing transcriptions and audio and extracting trends and individual statements. Trends were identified and recorded while listening and reading to recorded and transcribed material and quantified into a spreadsheet for record. The trends and individual statements were then used to contextualize quantitative data results, provide insight to how the narrative sharing impacted attitudinal structures and examine how facilitated dialogue regarding the narrative may have influenced attitudinal structures. Figure 4 is a key summarizing what was measured in this study, how it was measured and why it matters.

Table of Measurement for Attitude Shift		What does this mean?
Affective Measured Shifts		Affective means you emotional interaction with a subject
Shifts in mean response	Shifts in standard deviation	
Cognitive Measured Shifts		Cognitive means your personally held beleifs based off your own knowledge
Shifts in mean response	Shifts in standard deviation	
Conative Measured Shifts		Conative means how you intend to act
Shifts in mean response	Shifts in standard deviation	
Measured shift in overall attitude towards light rail		Shifts in mean suggest changing attitudes
Overall shift in mean		
Measured shift in overall relation to one another		Reduction in std. deviation suggests responses are more akin to one another
Overall shift in standard deviation		
Frequency of statements of reflection of held attitudes		Higher frequencies indicate a common trend
Trends in statements in dialogue during facilitated discussion		
Frequency of statements of emancipation from held attitudes		Statements of emancipation suggest a seperation from original attitudes
Trends in statements in dialogue during facilitated discussion		

Figure 4 - Table of Measurement for Attitude Shift

CHAPTER 4

RESULTS

In this results section, I will first compile results from how affective, cognitive and conative attitudes shifted from the pre-survey to the post-survey, then address correlations observed and finally, review common trends that emerged from the qualitative focus group discussions.

Pre-Post Survey Results

Quantitative results suggested marginal shifts in affective, cognitive and cognitive judgements, a small overall reduction in standard deviation and mean, and minimal correlation to preexisting qualities (figure 7 and 8) overall. Nine out of the twelve tripartite variables resulted in a lower standard deviation in the post survey compared to the presurvey.

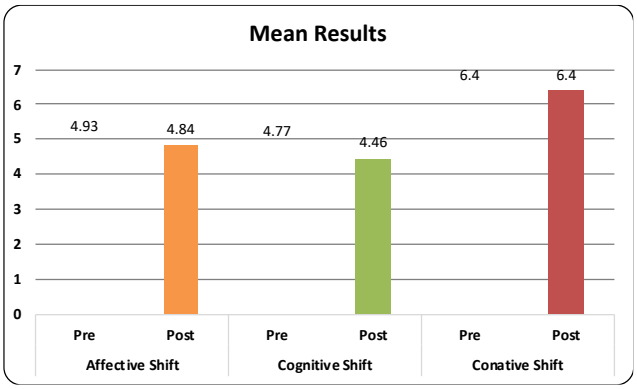

Figure 5 - Overall mean of tripartite groups pre to post

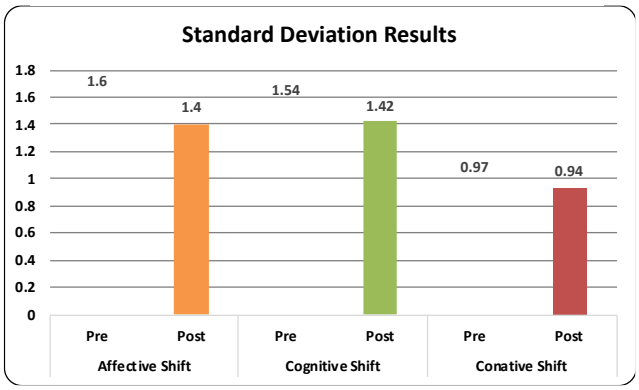

Figure 6 - Overall standard deviation of tripartite groups pre to post

Only three question responses resulted in greater standard deviation from pre to post survey. Two of those increased standard deviations were in conative judgements with the final standard deviation increase being in affective

judgements. This reduction in standard deviation (figure 6 and 7) suggests a depolarization effect. Participant responses were closer to one another on the Likert scale than further away in the post survey as opposed to the pre-survey. When evaluating the mean of the twelve individual tripartite responses, eight out of twelve means decreased from pre to post survey with one maintaining the same number and three being more than the pre-survey. These shifts, when broken down into their tripartite attitude groups, had more observable impact to cognitive and affective attitudes (figure 5 and 6). This shows that there was more impact to overall question responses and attitudes in the cognitive and affective spaces, but less so in the conative space. With reflexivity and emancipation targeting shared cultural values, beliefs and norms, this result is expected and indicates that cognitive and affective attitudes are more malleable than conative. A shift in the mean with a skewed sample size whose attitude heavily favored the light rail in the pre-survey suggests those with strong, rigid attitudes in support of the light rail changed their answers collectively to be less rigid. Even though the mean stayed stable for the conative, this does not indicate that conative attitudes didn’t change. When looking at the correlations section below, there is evidence of changing answers. This suggests that changing responses and attitudes may have shifted equally, leaving a stable mean, though conative attitudes still would have changed less than cognitive and affective.

Figure 7 - Mean and standard deviation results for pre to post survey. Grouped into affective, cognitive and conative questions.

Focus Group Discussion Results

Qualitative results came from 136 minutes of dialogue over the course of six focus groups, averaging out at 22.6 minutes per discussion. The qualitative results indicated a high level of reflection, familiarity with the story, acknowledgement of held attitudes, desire to share personal stories and a desire to make suggestions for enhancing the experience on the light rail in spaces of comfort, safety and general use. The number one trend, though it was encouraged through prompts, was a reflection on a held attitude and an

acknowledgement and understanding of opposing attitudes. The most common trend was statements of reflection/reflexivity and statements of concerns for others safety. Statements on reflection and reflexivity included statements that recognized that the narrator reflected on their held beliefs or commented on the importance or a necessity to do so. Statements regarding concern for others included acknowledgement that women are disproportionately impacted by discomfort on the light rail and other more vulnerable or inexperienced populations may experience the light rail differently. Over the 6 focus groups these were each mentioned in 27 different instances.

The second most common trend was participants reflecting on their own held attitudes. This included statements where participants acknowledged that they held one judgment, position or attitude and recognized that there were other judgments, positions or attitudes that may not align with theirs. These statements occurred in 26 unique instances. The third most prevalent trends were statements of familiarity with the story and suggestions for improvement, both occurring in 23 different statements. Trends that occurred 10-20 times over the course of the focus groups included acknowledging individuals experiencing homelessness (14), statements that the narrative intervention did not change held attitudes (11), that this experience encouraged them to consider riding the light rail more (11) and a sharing of stories participants had on public transportation (10).

Emancipating Attitudinal Constructs of Fear and Safety and Engaging in Reflexivity

These two most popular trends seemed to contextualize and reflect on experiences and existing attitudes that participants had pertaining to alternative transportation and the light rail. Many participants shared similar experiences and feelings as the shared narrative but stated that they assessed those experiences in new light due to the perspective shared by the narrator. This suggests that participants were emancipating themselves from the direct experiences they have had, separating themselves from the attitudinal structures (fear) they approached a situation with and reassessed it. Below are some excerpts from the transcripts that provide examples of these trends.

> *"I'm glad that you pointed that out, that my attitude towards the light rail is not necessarily in line with my attitude towards the world." (Focus Group #3)*

> *"...I'd have never formally been like, why am I feeling uncomfortable with this right now? Like the main character did, but yeah, definitely, in a more, like, structured like, weigh in made me like, reflect on my experiences." (Focus Group #4)*
> *"I'd say yes. I kind of mentioned that, when I first spoke that just thinking about how this person had a certain attitude towards being on the light rail, I thought about my first time being on a light rail, and I kind of reflected on my attitude towards it. And then even further, like, how I thought about it the next time, and I want to continue to think about it. So, I think you've definitely ended up giving me some space to reflect." (Focus Group #5)*

> *"Yes, again, you mentioned this earlier, just like my biases in terms of safety, but that is also very limited in itself, of what I consider safe and unsafe." (Focus Group #6)*

Each of these quotes suggest that the participants stating them held one belief or attitude and separated themselves from that held belief or attitude and

reflected or questioned it. Participants not only shared that they may have beliefs and learned social norms that do not accurately reflect their direct experience on the light rail, but tried to determine why and made suggestions for how they can individually, and collectively address this self-described dissonance.

One of the more common of these shared individual experiences focused on affective, cognitive and conative judgements around homelessness and other vulnerable populations that utilize the light rail. Participants frequently stated that they felt threatened, and felt validated in that feeling, but upon reanalyzing it, these members of a more vulnerable population may not have been a threat. Multiple participants suggested that those judgements may impede their decision making around the light rail and could be wrong. This is an example of reflecting on a strong attitudinal construct that was targeted in this narrative, fear. Participants routinely asked themselves “why do I fear….” Multiple people commented on navigating bias with houseless individuals and how they make decisions to ride the light rail in relation to perceived safety and comfort. Three participants stated they had been taught by family members (social norms and shared beliefs) that the light rail is an unsafe place, and that, upon reflecting, maybe those judgements are inaccurate. Multiple participants questioned whether the light rail is safer than their personal vehicles, something they stated they hadn’t questioned prior. These same participants suggested that their perceived safety versus actual safety may not be cognitively accurate, and that the light rail may, ultimately, be safer. Collectively, these responses display an intention to view held attitudes more holistically. It suggests the emancipatory

and reflexive methods applied from the sustelling literature were effective. These statements are brief and are intentions, without measuring longitudinally or actual resulting behaviors it is difficult to draw firm conclusions.

Exploring Positionality of Self and Others

There was a trend of male participants acknowledging their positionality as men. They recognized that their experience on the light rail that informs how they perceive the light rail differs from women.

> *"Being a dude, I haven't had anything to worry about in public. Like, I really have so much less than someone who's like female or more vulnerable has, you know, like in this scenario they're female, I haven't, you know, had any reason to have that kind of concern. It's never struck me like that. So, it really made me reflect on…how the other riders' experiences are going to differ from mine." (Focus Group #2)*

Similarly, there were many statements acknowledging positionality of social status. That beliefs, norms and attitudes regarding the light rail and alternative transportation may have formed as a result of economic status.

> *"...it just narrows it down to a group of people who some individuals hold bias against as well, which is then creating the stigma that it's unsafe." (Focus Group #6).*

There were also participants who reflected on their positive attitudes towards the light rail. They reflected on why others might feel unsafe or unwilling to utilize the light rail.

> *"It shifted my awareness a lot of why people wouldn't want to ride the light rail. More the reasons why someone will choose to drive and pay for parking versus stopping at a park and ride. You can park in areas that are safe, maybe it's out of the way. And that wasn't like in the story. But the story made me realize some of the safety concerns people might have…" (Focus Group #2)*

They acknowledged that though they have developed strong beliefs and attitudes around the light rail, others might not have those same experiences. Comments on positionality were frequent and convey that the participants' attitudes are built on unique experiences and the narrative allowed them to understand alternative attitudes due to exposure to different experiences. This may be supported from the quantitative data; it is possible that the standard deviation of answers occurred due to this occurrence of recognizing other held attitudes and beliefs. These statements portray emancipation from a held position and an embracing of a more holistic perspective.

11 participants stated that they would be more inclined to utilize the light rail. Many of those stated that the narrative allowed them to address beliefs they held regarding the light rail, like accessibility problems (not knowing how to use the light rail), some stated the story provided context that made them feel more comfortable to engage with the light rail. The goal of emancipatory and reflexive storytelling is to attempt to reflect on our cognitive hierarchy and the attitudes we hold, recognizing we have deeper commitments to some values, beliefs and norms than others. By engaging in this reflexive and emancipatory storytelling there are hints that individuals explore superficially developed beliefs and norms that they either do not hold or are open to navigating. This indicates that this exercise in sustelling may have had the intended effect of reflexivity and emancipation, resulting in more flexibility in held attitudes.

There were 11 remarks stating that the story did not change their attitudes, of those 11, a few of them, at some point, suggested that the story did

make them reflect and shifted their answer upon reflecting. This may be due to comprehension of what participants consider attitude to mean, as they made statements to suggest behavioral intention and belief change, which are contained with attitudinal structure. For this reason and considering that the goal of emancipatory and reflexive storytelling is not to persuade a point, but instead, engage the individual receiving the story in emancipation from their held attitudes and an exercise to reflect, I believe this trend did not detract from the findings.

Below, in figure 7, I compile the results from the study using the Table of Measurement Attitude Shift from the Data Analysis Process section of the paper. It displays what was measured, how it was measured and what it means.

Table of Measurement for Attitude Shift		**What does this mean?**
Affective Measured Shifts		There was a slight impact to emotional interaction with a the light rail
Shifts in mean response	Shifts in standard deviation	
Minimal shift	Slight shift	
Cognitive Measured Shifts		There was a slight impact to personally held beleifs regarding the light rail
Shifts in mean response	Shifts in standard deviation	
Slight Shift	Slight shift	
Conative Measured Shifts		There was not a significant shift in how participants intended to interact with the light rail
Shifts in mean response	Shifts in standard deviation	
No shift	Minimal shift	
Measured shift in overall attitude towards light rail		A minimal shift in mean suggest minor overall changes in attitude
Overall shift in mean		
Minimal shift		
Measured shift in overall relation to one another		A slight reduction in std. deviation suggests responses trended toward other participant answers
Overall shift in standard deviation		
Slight Shift		
Frequency of statements of reflection of held attitudes		Higher frequencies indicate a common trend in reflecting on attitudes
Trends in statements in dialogue during facilitated discussion		
High frequency		
Frequency of statements of emancipation from held attitudes		Higher frequency in statements of emancipation suggest a seperation from original attitudes
Trends in statements in dialogue during facilitated discussion		
High frequency		

Figure 8 - Table of Measurement for Attitude Shift - Results

Correlations

The Spearman correlation coefficient was used to observe if any preexisting factors impacted how the narrative impacted participants. Variables used were gender, ethnicity, status at the university (freshmen to graduate), political ideology, frequency of alternative transportation use, and overall light rail usage and were compared to the tripartite attitude variables. Results indicated that political identity had the most frequent correlations in answering in correlation to a preexisting attitude (9 significant correlations, 2 at a value of P<.01), and minimal correlations to previous light rail use (5 significant correlation, 1 at a value of P<.01).

Spearman's rho Correlations Coefficient

		Ethnicity	SchoolYear	Polidea	AltUseFreq	LRUseAll
Intended Use	Pre	-0.212	0.087	-0.148	0.039	0.135
	Post	-0.117	0.001	-0.221	-0.118	**0.337
Use if more accessible	Pre	-0.303	0.162	**-.419	-0.124	0.148
	Post	-0.194	0.078	**-.378	0.224	0.132
Voting Support	Pre	-0.233	0.242	***-0.629	0.062	0.099
	Post	*-0.260	-0.084	**-.431	0.057	0.079
Support Enhancing safety	Pre	-0.187	-0.026	**-.378	-0.018	-0.059
	Post	-0.132	0.126	**-0.353	0.106	-0.059
Safer than alternative	Pre	-0.088	0.091	0.004	-0.222	0.048
	Post	0.067	0.211	-0.002	0.028	**0.322
General Safety	Pre	-0.200	0.089	-0.053	-0.232	-0.033
	Post	0.032	*0.245	0.021	-0.079	0.063
Perceived Crime Freq	Pre	0.076	0.144	0.097	-0.094	-0.094
	Post	-0.022	0.167	**0.324	-0.236	-0.226
Ease of Use	Pre	0.197	-0.038	*0.288	**-0.326	*0.251
	Post	0.105	0.143	***.450	-0.008	-0.017
Safety at Night	Pre	-0.231	0.115	0.057	-0.228	0.149
	Post	-0.185	0.060	-0.088	-0.019	-0.019
Safety during Day	Pre	0.242	-0.005	0.095	-0.127	0.229
	Post	0.223	0.028	-0.063	0.106	0.266
Comfort w/ Light Rail	Pre	0.036	-0.032	-0.190	-0.199	-0.071
	Post	-0.121	0.121	-0.209	0.198	-0.030
Confidence in Use	Pre	0.063	0.159	-0.117	**-0.326	**0.331
	Post	0.156	**0.322	-0.083	-0.181	***.416

orrelation is significant at the .10 le
orrelation is significant at the 0.05 l
Correlation is significant at the 0.01

Figure 9 - Spearman Correlation Results

Due to the limited sample size, it is difficult to draw firm conclusions with the resulting correlations. With these correlations we see that strong individual

political ideology is apt to result in more rigid, strong attitude structures in relation to the light rail, and more specifically in conative attitudes. Considering conative attitudes pertain to voting, intention to use and other support, political predispositions impacted responses. This included the most significant correlation, “voting support” and “political ideology”. Voting being an expression of political ideology, this result was expected.

Two correlations that are significant are the post-responses to “ease of use” for “political ideology and “confidence in use” for “overall LR use”. They are the only post-survey responses with a correlation significant at the .001 level. Both results may have resulted from the methodologies of reflexivity and emancipation in storytelling and making the light rail more tangible through narrative. The full results of Spearman’s rho can be found in Appendix B.

Some of the results could be attributed to the sample being initially heavily in favor of the light rail and alternate transportation (72% stating in the pre-survey that they are extremely likely to vote in favor of light rail), heavily liberal (80%) and a majority of the participants being enrolled in degree programs related to sustainability (72%). This could be an example of strong, horizontal attitudes as support for the light rail showed a correlation to identities around sustainability backgrounds and liberal ideology.

CHAPTER 5

DISCUSSION

"The listening exercise that comes from engaging with others' narratives can put in motion an internal process of self-reflection" (Relva and Jung, 2021, p.3)

The results indicate that there was a shift in attitudes and commentary from participants suggested that this shift was due to engaging with the narrative in reflexively and emancipatory ways. This was evident from comparing individual attitudes, a measured narrowing of the standard deviation across all metrics, a shift in attitudes regarding the light rail (most significant in affective and conative), statements of reflexivity and emancipation from held attitudes and intent to collaborate to support the narrator and other participants in their differing experiences.

Recognizing the limitations of this study, the survey results were modest and marginal and are contextualized through the recorded group discussions. I do not see this as an invalidation of reflexive and emancipatory communication, but rather a suggestion that more research be conducted to assess the method.

Minimal Shifts in Attitude

This study saw changes in attitude both qualitatively and quantitatively. These changes were minimal and statistically insignificant, as expected from research conducted by Fischer et al (2023) and Vaske and Donnelly (1999). It is important to remember that attitudes are typically slow to change and profound shifts in attitude would not be observed when engaging in a single intervention (Heberlein, 2012). Minimal shifts in attitude are not necessarily indicative of failed

methodology. More research, especially longitudinal, must be conducted to draw more conclusions on impact to long term decision making, behaviors and attitude change.

The reduction in mean that constitutes less favorability with the light rail should not be misconstrued as a negative result. The goal of reflexivity and emancipation methodologies is to reassess held attitudes. Focus group dialogue may point to this result emerging from empathizing with other participants and the narrator. This is evident when looking at which means went down, primarily comfort and safety-oriented questions, while means when up in access and use areas. This could be interpreted as participants feeling more comfortable using the light rail but more aware of the concerns of others. Additionally, most participants held more extreme attitudes in favor of the light rail. By having a reduced overall mean, it suggests those individuals shifted to having a less rigid attitudes. Though this may seem counterintuitive to developing a shared norm of public transportation. I believe it is possible that it may lead to better understanding of others' beliefs and has the potential for allowing more communication, understanding and collaboration when approaching problem solving.

What this study did find is that reflexivity and emancipation may be another tool in the toolbox to cognitively approach the climate crisis. By using tripartite attitude model, qualitative and quantitative analysis this paper determines that reflexive and emancipatory storytelling changed cognitive and affective attitudinal structures and depolarized affective, cognitive and conative

attitudes. The most impacted attitudes, and thus more malleable attitudes, were affective and cognitive. This is in line with the methodologies utilized as emancipatory and reflexive storytelling are targeting the values, beliefs and norms of the cognitive hierarchy. The change in mean was marginal in the survey response, though the shift indicated a narrowing of their responses towards one another, as described by a reduced standard deviation across all three tripartite attitudes. This is indicative of participants subscribing to emancipation and reflexivity of their held attitudes. In the dialogue portion, it was heavily evident from qualitative responses that participants engaged in emancipating themselves from their held attitudes and reflected upon them. These findings do not suggest that sustelling methodologies cannot impact conative attitudes, but in a brief, one-intervention study it is less effective at shifting conative over short period of time.

The light rail was used to represent an example of a complex sustainability mitigation effort and as stated before, it has socio-economic and socio-cultural ramifications. This study provided a holistic approach to contextualizing these ramifications. This method aimed to impact shared values, beliefs and norms, it approached participants with validation, expanded understanding of complexity and opened eyes to unintended consequences. Participants viewed the light rail through an attitude construct of fear, often reinforced through friend groups, family, personal experiences and other societal norms. Through validating that fear in the narrative, participants were more open to consider other attitudes while openly sharing their own, which was an expected phenomena described by

Fischer et al (2023). Participants shifted in their perspective and understanding of others' experiences which was reflected in both the quantitative and qualitative data. Participants stated, multiple times, that they held one attitude, but expressed understanding of others, demonstrated in the quote below.

> "*“It shifted my awareness a lot of why people wouldn't want to ride the light rail. More the reasons why someone will choose to drive and pay for parking versus stopping at a park and ride. You can park in areas that are safe, maybe it's out of the way. And that wasn't like in the story. But the story made me realize some of the safety concerns people might have…” (Focus Group #2)*

Furthermore, they made suggestions and attempted to problem solve around the fear and inaccessibility that others may feel and attempted to imagine a light rail system that addressed others’ issues. Moreover, staunch light rail supporters who viewed the issue through attitudes akin to advocacy and identity expressed understanding of more vulnerable participants and the narrator. This is an example of working towards shared common values, beliefs and norms, which multiple researchers describe as necessary for the transformational change that is necessary and was the intention of sustelling’s reflexive and emancipatory methodologies.

How Can this be Used in the Field of Sustainability?

Heberlein (2012) comments on the lack of resources and work being put into exploring the cognitive fix. He highlights that there is an overwhelming emphasis put on structural and technological fixes. Of the cognitive approaches being researched, persuasion has been a prominent method of communicating sustainability (Brynjarsdóttir et al, 2012). This method is shown to impact short

term behaviors, engrain people in held beliefs, create crisis fatigue and narrow our understanding of sustainability (Relva and Jung, 2021; DeSombre, 2019; Brynjarsdóttir et al, 2012). These approaches are linear, they impact in the short term through behaviors and create polarization on issues and policies, the opposite of their intended effect. This thesis elucidates a different tool in the cognitive toolbox. Emancipatory and reflexive methods may be able to navigate the deeper down the cognitive hierarchy than persuasion and allow for a more effective path for building shared cultural values, beliefs and norms. The potential application for these methods could be considered for science or sustainability communications, political dialogue or in classrooms. It has the potential to be applied to private and public organizations to work through nuance, misunderstanding, misinformation and polarization.

CHAPTER 6

LIMITATIONS AND FURTHER RESEARCH

There are many limitations within this research including size and diversity of sample population, topic, representation, measurement and briefness. The sample for this study was N=29, which resulted in limiting the statistical robustness of my findings as they did not meet the threshold of being reliable for margin of error. Additionally, this study highlighted the mean, but if attitudes shift towards one another, which they did as represented by the reduction in standard deviation, the mean will stay relatively stable. This indicates that the mean is not a suitable determinate for attitude shifts and suggests more comprehensive analysis is required to indicate shifts in attitude. I did not have enough participants to engage in this more complex analysis as the marginal sample size would not provide robust findings in this space, but in future research it will be necessary. The light rail was chosen as a more neutral concept to observe shifts in attitude; however, recruitment had an abnormal number of students with a major relating to sustainability, that is not an accurate representation of the student population. This may have contributed to the results of the study as this population may be more predisposed to hold strong supportive attitudes for the light rail. A more diverse sample may convey clearer findings. Another methodology to be aware of was the gender, ethnicity and performance of the narrator. Many females within the study had stronger qualitative responses of identifying with the narrator than male subjects. Attitudinal research supports this as individuals tend to be more empathetic and open to those they more identify

with (Fischer et al, 2023; Heberlein, 2012). Another limitation is the variation that sometimes exists between behavior and behavioral intentions. This is well documented in attitudinal literature. It is much more conclusive to measure actual observed behavior, but such a longitudinal study is outside of the scope of this study. Further research will have to be conducted to observe the accuracy of conative judgment/attitude measurement in this regard. The final limitation identified is briefness of the study. Attitudes, especially values followed by beliefs and norms do not typically change drastically in short periods of time. The small shifts I documented in this study may be insignificant, but they may be a starting point for a greater trend. Again, a longitudinal study would allow for this limitation to be addressed.

This research should be further explored through facilitation, longitudinal studies, and observing actual resulting behavior. Many statements were made in the qualitative portion of this study that the facilitated discussion may have had more of an impact on responses to the post survey. By engaging with the story and discussing it, multiple participants suggested their responses may have changed more significantly. This study intended to observe how the narrative intervention shifted attitudes, but future research should consider conducting the post survey after the facilitated discussion. This expands outside of the sustelling literature by adding the facilitated discussion. Secondly, scholars in sustainability routinely suggest that engaging in shared values, beliefs and social norms is necessary for longitudinal and transformative change (Van Riper et al, 2019; DeSombre, 2018).

The literature regarding cognitive hierarchies and attitude suggests that these three elements from the cognitive hierarchy are slow to change and transcend situations. This study was one situation. To more aptly determine whether sustelling can foster shared values, beliefs and social norms and shift attitudes, future research should be conducted as a longitudinal study rather than a single intervention. Finally, future studies should measure actual resulting attitudes. This study only measured intended conative actions. Due to the value-action/intention-action gap, measuring conative responses in intention only might obscure actual results. By measuring actual behavior longitudinally this research can embrace the entire cognitive hierarchy rather than just intentions. This would better measure the capabilities of sustelling to measure impact.

Lastly, scientists in the field of sustainability routinely claim that mitigation strategies to global climate change and its repercussions are always changing, require a local focus and no mitigation strategy is a panacea, as the problem is always changing. Similarly, stories must change, require a local focus and no story is a panacea.

CHAPTER 7

CONCLUSION

This study set out to answer the question *"How does emancipatory and reflexive storytelling impact affective, cognitive and conative attitudes regarding local alternative transportation?"* What I found is that storytelling does have an impact on attitudes; although the effect is marginal, sustelling fosters emancipatory and reflexive thinking in participants. Though inconclusive, this adds to the current literature by merging direct experience into storytelling methodologies, applying the tripartite method to measuring change and facilitating dialogue to expound on the narrative experience.

Society is actively grappling with pressing environmental issues that threaten current cultural, economic, and societal norms on global and local scales and we struggle to address these issues in a socially cohesive and productive manner. That has profound ramifications that first impact vulnerable populations, then less vulnerable populations and then future populations. It threatens the existence of ecosystems, flora and fauna. It is necessary to use all the tools in the toolbox to approach global climate change. Currently, we heavily rely on structural and technological tools, we have yet to firmly yield or understand cognitive tools.

This study explores the innate ability of individuals to build strong attitudes, and the incompatibility those strong attitudes have in the face of sustainability issues. Even when strong attitudes are built around sustainability issues, they can still inhibit how we collectively respond to climate change.

Rather than using persuasion or building strong attitudes around sustainability, this study explored how storytelling could be used to elicit reflexivity and emancipation from and of held attitudes. This was done with the intention of allowing individuals to unbind their rationality and approach sustainability attitude objects with more perspective.

The quantitative results suggest a marginal shift in attitudes. The qualitative results bolster the survey findings and suggest that student participants acknowledge other viewpoints and may take them into consideration. They also indicated that by stepping outside of their attitudes, they felt more encouraged to approach the attitude object (the light rail). Though alternative transportation in a car dependent city is a microcosm of the sustainability mitigation strategies society must employ to navigate the impact of climate change, the results suggest that this approach may lessen the strength of strongly held hierarchical attitudes. This may allow for individuals to approach problem solving more holistically and outside the lens of other stronger attitudes.

Reflexivity and emancipation through storytelling may provide a higher likelihood of collaboration, a necessary element in collective problem solving. Moreover, multiple comments in the focus group sessions indicated that when introduced to other attitudes, participants not only recognized other attitudes and experiences, but were motivated to interactively problem solve and make suggestions to improve the others situation, hinting at shared values, beliefs and norms when reflexivity and emancipation are engaged. Researchers in the field of environmental attitudes suggest that developing shared values, beliefs and

norms is critical in eliciting the transformative change necessary to address global climate change (Relva and Jung, 2021; Van Riper et al, 2019; DeSombre, 2018). Students exhibited not only a shift but a clear process of emancipating themselves from held attitudes and reflecting on them, proceeding to problem solve for those who experience the light rail differently from themselves. This demonstrated a weakening of strong, rigid attitudes for collaboration and better sustainable decision making. Additionally, the light rail is not a linear solution, it is a mitigation tool with repercussions. Recorded participant discussion and problem solving suggested they contextualized this complexity and attempted to navigate forward. These are demonstrations of contextualizing complex problems, emancipation and reflexivity.

Though this research does not go far enough and has little statistical significance, it furthers previous research in sustelling methodologies and functions as a steppingstone to future research. In a time, ripe with politicization and general polarization, this method should be further tested and researched to further clarify results and measure the impact of sustelling methodology.

> *"…it's like a fable almost about writing a letter of moral damages, be aware of yourself, but also be aware of everyone else, I guess." (Focus Group #2)*

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APPENDIX A

NARRATIVE

Sometimes, life surprises you. For example, it was surprising to me that my car wouldn't start this morning. I don't live too far from the light rail and I'd taken it a few times, but only for fun stuff, like when my family was in town and we used it to get to a baseball game and for bar-hopping between Mill and Downtown Phoenix. In those settings, it was more of an adventure than a mode of transportation. Safe to say, I am not stoked to take the light rail. I don't want my everyday commute to be an "adventure". What I really want is to just get to Downtown in fifteen minutes and sit through my required class that's only offered in Phoenix. But I don't want to try to communicate with loads of people and try to find a carpool nor do I want to pay for an Uber three times a week. So, the light rail it is.

I get to the station and it's like I remembered it from the few times I took it. There's a whole lot of folks seemingly taking refuge at the stop, possibly houseless and looking for a spot to rest. Then there seems to be a few students and even fewer professional looking people, probably headed to office jobs in the same direction I am going. I feel a little uncomfortable as some of the folks taking refuge occupy multiple waiting seats. I find one seat on the corner, but as I go to sit down the occupant in the seat next to it mumbles towards me….I'll just stand, so I just lean against the structure, awkwardly waiting for my train. The person who mumbled toward me keeps looking at me, I start to feel very uncomfortable. What I thought was mumbling seems to just be how they talk, and talk they do. I am not sure if they are talking to the world, to me, or both, but I just look forward, hoping the train comes soon. I realize there is a chance this person may be having a mental health crisis. I feel for them, but it is still a little concerning. I cannot fully make out what they are trying to communicate and feel like they are not happy with my avoidance. Then their arm rises in my direction, and they're about twice my size, okay, I get a little scared and I take a step back. In their hand I see a bottle wrapped in a brown bag…I realize they are trying to offer me a swig of some kind of booze. I politely decline and they turn away. I feel less concerned and threatened, but I walk to the other side of the platform, the mumbler still talking to me….or the world…I still don't know. What an adventure the light rail is.

I find a new spot in a group of people that seem more like students. I feel a little more secure already, though my last interaction has my pulse running a little high but I tell myself that there seems to be enough people that I don't feel as vulnerable. If something happens, surely someone here would intervene. I look back at the mumbling person, they're looking at the ground, talking still, but more quietly, as people pass them they offer the brown bag to them as well. I do a double check of the compass on my phone, I only know I need the westbound train and I didn't catch the announcement. It seems to be going West, so I jump on. Luckily, I jumped on the right one. Cool. But it is pretty busy, and I am concerned I'll have another uncomfortable encounter. I am all "peopled" out so I decide to engage in the universal "don't talk to me" signal, I slide my headphones in, put my sunglasses on and pull out my laptop to wrap up some homework. On the ride over I think back on my interactions. Why did I feel uncomfortable, why did I feel so threatened? We start getting close to my stop, I file those thoughts away to revisit in the future when I have the time. I jump off the train in front of campus and make the brief walk over to class.

After class I feel more emboldened. I know I have the right ticket, I know which direction is home and I seem to know how to avoid unwanted dialogue. It is getting dark now, which puts me a little on edge. The train comes and I pick the train with the most people, I toss my headphones in and stare off into space. I feel someone tap me on the shoulder, I get all anxious again, I turn and it is a person about my age. They're somewhat familiar, I think I saw them walking to the class next to mine. They ask me if

the train we are on is going to Tempe, I nod and tell them I am going the same direction. We realize we both have vehicle problems, did not know where we were going and are, in fact, going the right way thanks to my phone's compass. They happen to have a class on the Downtown Campus as well, around the same time as mine. They seem nice and ask if we could exchange Instagram handles, maybe we can coordinate and take the light rail together. I settle back in and slide my headphones back in.

For the next 30 minutes back to Tempe I think back on my question from the ride over, why did I feel uncomfortable, why did I feel vulnerable? Furthermore, why didn't I want to take the light rail? I pride myself on being open minded, but sometimes, I just don't think about why I make the decisions I make or why I feel comfortable or uncomfortable. I take this commute time to reflect on all that. I felt uncomfortable and vulnerable because there are so many unknowns when communicating with people, especially when those people are a little less predictable than I am used to. It doesn't help that I didn't know where I was going. I perceived the person offering me booze as threatening, from their size and communication. I think my feelings are valid, I think they could have been a threat, but I also acknowledge they could have authentically just wanted to share a drink and have some of their own problems they're working through. I think that maybe I misjudged, but out of concern for my own safety, I decide that both can be true. More than that, there are good interactions on the light rail as well. Interactions that might buffer me against uncomfortable ones in the future. Now that I've used it for a commute, it's pretty straightforward. About as straightforward and safe as driving on the 10, finding parking around Tempe or Downtown Phoenix, and having to walk to my end location…..which is not straightforward nor does it always feel safe. It was nice to have some time to think and just sit, and I suppose I have some new skills for avoiding uncomfortable situations, and for interpreting that discomfort. My light rail stop comes up. I recognized it this time, not from the map, but intuition from starting my day there that morning. Life surprises you sometimes, for example, it was an adventurous time getting to class, but it was a regular commute getting home. When my car gets out of the shop, I will probably switch back. But now? Well, I have a new tool in my toolbox, and sometimes, I might use that tool and take the light rail instead.

APPENDIX B

SPEARMAN CORRELATIONS IN FULL

Spearman's rho Correlations							
		Gender	Ethnicity	SchoolYear	Polidea	AltUseFreq	LRUseAll
PercUsePRE	Correlation Coefficient	0.204	-0.212	0.087	-0.148	0.039	0.135
	Sig. (2-tailed)	0.289	0.269	0.655	0.444	0.840	0.487
	N	29	29	29	29	29	29
PercUsePOST	Correlation Coefficient	0.273	-0.117	0.001	-0.221	-0.118	0.337
	Sig. (2-tailed)	0.152	0.544	0.997	0.250	0.542	0.074
	N	29	29	29	29	29	29
AccessUsePRE	Correlation Coefficient	.439*	-0.303	0.162	-.419*	-0.124	0.148
	Sig. (2-tailed)	0.017	0.111	0.402	0.024	0.521	0.443
	N	29	29	29	29	29	29
AccessUsePOST	Correlation Coefficient	0.247	-0.194	0.078	-.378*	0.224	0.132
	Sig. (2-tailed)	0.197	0.313	0.688	0.043	0.244	0.494
	N	29	29	29	29	29	29
VoteSuppPRE	Correlation Coefficient	0.307	-0.233	0.242	-.629**	0.062	0.099
	Sig. (2-tailed)	0.106	0.225	0.206	0.000	0.750	0.609
	N	29	29	29	29	29	29
VoteSuppPOST	Correlation Coefficient	-0.006	-0.260	-0.084	-.431*	0.057	0.079
	Sig. (2-tailed)	0.974	0.173	0.664	0.020	0.769	0.682
	N	29	29	29	29	29	29
SafeSuppPRE	Correlation Coefficient	-0.137	-0.187	-0.026	-.378*	-0.018	-0.059
	Sig. (2-tailed)	0.477	0.332	0.895	0.043	0.928	0.761
	N	29	29	29	29	29	29
SafeSuppPOST	Correlation Coefficient	0.154	-0.132	0.126	-0.353	0.106	-0.059
	Sig. (2-tailed)	0.424	0.494	0.515	0.060	0.585	0.760
	N	29	29	29	29	29	29
SaferAltPRE	Correlation Coefficient	0.051	-0.088	0.091	0.004	-0.222	0.048
	Sig. (2-tailed)	0.791	0.650	0.639	0.983	0.248	0.804
	N	29	29	29	29	29	29
SaferAltPOST	Correlation Coefficient	0.191	0.067	0.211	-0.002	0.028	0.322
	Sig. (2-tailed)	0.320	0.730	0.271	0.990	0.886	0.089
	N	29	29	29	29	29	29
GenSafePRE	Correlation Coefficient	0.055	-0.200	0.089	-0.053	-0.232	-0.033
	Sig. (2-tailed)	0.776	0.298	0.648	0.785	0.225	0.866
	N	29	29	29	29	29	29
GenSafePOST	Correlation Coefficient	0.105	0.032	0.245	0.021	-0.079	0.063
	Sig. (2-tailed)	0.587	0.867	0.201	0.912	0.686	0.747
	N	29	29	29	29	29	29

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Spearman's rho Correlations							
		Gender	Ethnicity	SchoolYear	Polidea	AltUseFreq	LRUseAll
PercCrimePRE	Correlation Coefficient	0.252	0.076	0.144	0.097	-0.094	-0.094
	Sig. (2-tailed)	0.187	0.696	0.456	0.618	0.628	0.628
	N	29	29	29	29	29	29
PercCrimePOST	Correlation Coefficient	0.129	-0.022	0.167	0.324	-0.236	-0.226
	Sig. (2-tailed)	0.506	0.911	0.388	0.086	0.218	0.238
	N	29	29	29	29	29	29
EaseUsePRE	Correlation Coefficient	0.170	0.197	-0.038	0.288	-0.326	0.251
	Sig. (2-tailed)	0.378	0.306	0.846	0.130	0.085	0.190
	N	29	29	29	29	29	29
EaseUsePOST	Correlation Coefficient	0.186	0.105	0.143	.450*	-0.008	-0.017
	Sig. (2-tailed)	0.333	0.586	0.458	0.014	0.967	0.932
	N	29	29	29	29	29	29
PercSafeNPRE	Correlation Coefficient	0.037	-0.231	0.115	0.057	-0.228	0.149
	Sig. (2-tailed)	0.850	0.229	0.553	0.769	0.235	0.440
	N	29	29	29	29	29	29
PercSafeNPOST	Correlation Coefficient	-0.040	-0.185	0.060	-0.088	-0.019	-0.019
	Sig. (2-tailed)	0.838	0.338	0.758	0.651	0.923	0.923
	N	29	29	29	29	29	29
PercSafeDPRE	Correlation Coefficient	0.011	0.242	-0.005	0.095	-0.127	0.229
	Sig. (2-tailed)	0.955	0.207	0.977	0.622	0.512	0.232
	N	29	29	29	29	29	29
PercSafeDPOST	Correlation Coefficient	0.121	0.223	0.028	-0.063	0.106	0.266
	Sig. (2-tailed)	0.532	0.245	0.884	0.744	0.584	0.164
	N	29	29	29	29	29	29
ComfortPRE	Correlation Coefficient	0.288	0.036	-0.032	-0.190	-0.199	-0.071
	Sig. (2-tailed)	0.130	0.854	0.868	0.325	0.300	0.714
	N	29	29	29	29	29	29
ComfortPOST	Correlation Coefficient	0.332	-0.121	0.121	-0.209	0.198	-0.030
	Sig. (2-tailed)	0.078	0.531	0.533	0.277	0.304	0.879
	N	29	29	29	29	29	29
UseConfPRE	Correlation Coefficient	-.382*	0.063	0.159	-0.117	-0.326	0.331
	Sig. (2-tailed)	0.041	0.744	0.410	0.545	0.084	0.079
	N	29	29	29	29	29	29
UseConfPOST	Correlation Coefficient	-0.128	0.156	0.322	-0.083	-0.181	.416*
	Sig. (2-tailed)	0.508	0.418	0.089	0.667	0.346	0.025
	N	29	29	29	29	29	29

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

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APPENDIX C

FREQUENCIES

Ethnicity	Freq.	%	Valid %	Cumulative %
White	22	75.9	75.9	75.9
Black or African American	1	3.4	3.4	79.3
Asian	1	3.4	3.4	82.8
Hispanic or Latin American	5	17.2	17.2	100.0
Total	29	100.0	100.0	
Gender	**Freq.**	**%**	**Valid %**	**Cumulative %**
Male	11	37.9	37.9	37.9
Female	15	51.7	51.7	89.7
Non-binary	2	6.9	6.9	96.6
Prefer not to answer	1	3.4	3.4	100.0
Total	29	100.0	100.0	
Year in School	**Freq.**	**%**	**Valid %**	**Cumulative %**
Freshman	4	13.8	13.8	13.8
Sophmore	8	27.6	27.6	41.4
Junior	5	17.2	17.2	58.6
Senior	2	6.9	6.9	65.5
Super Senior	1	3.4	3.4	69.0
Graduate	9	31.0	31.0	100.0
Total	29	100.0	100.0	
Political Ideology	**Freq.**	**%**	**Valid %**	**Cumulative %**
Very liberal	15	51.7	51.7	51.7
Somewhat liberal	6	20.7	20.7	72.4
Slightly liberal	2	6.9	6.9	79.3
Moderate	4	13.8	13.8	93.1
Slightly conservative	2	6.9	6.9	100.0
Total	29	100.0	100.0	
Frequency of Use	**Freq.**	**%**	**Valid %**	**Cumulative %**
Daily	19	65.5	65.5	65.5
Weekly	6	20.7	20.7	86.2
Monthly	1	3.4	3.4	89.7
1-2 times a year	1	3.4	3.4	93.1
Never	2	6.9	6.9	100.0
Total	29	100.0	100.0	
Overall Use of LR	**Freq.**	**%**	**Valid %**	**Cumulative %**
1-5 times	12	41.4	41.4	41.4
6-19 times	5	17.2	17.2	58.6
20-49 times	4	13.8	13.8	72.4
50+ times	8	27.6	27.6	100.0
Total	29	100.0	100.0	

APPENDIX D

PRE-SURVEY QUESTIONS

1: How often do you use transportation options that are not a car (e.g., light rail, bus, cycling, scooters etc.)?

Daily, Weekly, Monthly, 3 times or more a year, 1-2 times a year, never

2: In this last year, with what frequency did you take the light rail in the Phoenix/Tempe metro area?

Daily, Weekly, Monthly, 3 times or more a year, 1-2 times a year, never

3: When was the last time you utilized the light rail?

In the last few days, in the last week, in the last month, in the last year, more than a year ago, never

4: Do you believe you will use the light rail in the future?

Yes, No, Maybe

4a: Why or why not? _____

5: If you had to guess, how many times have you used the light rail in the last year?

1-5 times, 6-19 times, 20-49 times, 50+ times

6: How many times have you used the light rail overall?

1-5 times, 6-19 times, 20-49 times, 50+ times

7: Which method of transportation do you utilize to get around in the Tempe/Phoenix area?

Personal vehicle, public transportation, cycling, walking, other

8: Do you have access to a personal vehicle here in the Tempe/Phoenix area at ASU?

Yes, No, Sometimes

9: In the next year, how likely or not are you to utilize the light rail if it aligns with where you are going?

Very likely, somewhat likely, slightly likely, neutral, slightly unlikely, somewhat unlikely, very unlikely

10: If the light rail was more accessible to you (i.e., based on where you live), how likely or unlikely would you be to increase your use of the light rail?

Very likely, somewhat likely, slightly likely, neutral, slightly unlikely, somewhat unlikely, very unlikely

11: How likely or not would you be to vote for investment for further light rail development?

Very likely, somewhat likely, slightly likely, neutral, slightly unlikely, somewhat unlikely, very unlikely

12: To what extent do you support or oppose enhancing measures to ensure riders are safe on the light rail?

Very likely to support, somewhat likely to support, slightly likely to support, neutral, slightly likely to oppose, somewhat likely to oppose, very likely to oppose

13: Do you think the light rail is more safe or less safe than other modes of transportation?

Much more unsafe, somewhat more unsafe, slightly more unsafe, neutral, slightly more safe, somewhat more safe, much more safe

14: How safe or unsafe do you believe riding the light rail is for people generally?

Very unsafe, somewhat unsafe, slightly unsafe, neither, slightly safe, somewhat safe, very safe

15: How frequently or not do you think crimes happen or not on the light rail?

Very frequently, somewhat frequently, slightly frequently, neutral, slightly infrequently, somewhat infrequently, very infrequently

16: How easy or not do you think the light rail is for getting around the Tempe/Phoenix area?

Very easy, somewhat easy, slightly easy, neutral, slightly difficult, somewhat difficult, very difficult

The next three questions (17-19) are about how you think and feel about the light rail, regardless of whether you have ridden the light rail.

17: How safe or unsafe would you feel riding it at night?

Very unsafe, somewhat unsafe, slightly unsafe, neutral, slightly safe, somewhat safe, very safe

17a: What about during the day?

Very unsafe, somewhat unsafe, slightly unsafe, neutral, slightly safe, somewhat safe, very safe

18: How comfortable or uncomfortable do you feel with the people who ride the light rail?

Very unsafe, somewhat unsafe, slightly unsafe, neutral, slightly safe, somewhat safe, very safe

19: How confident or not are you about knowing how to use it (e.g., getting tickets, reading the map, navigating)?

Very confidant, somewhat confidant, slightly confidant, neither, slightly not confidant, somewhat not confidant, very not confidant

20: Which of the following best describes your race/ethnicity? Check all that apply.

White, Hispanic or Latin American, Black, Native American, Asian/Pacific Islander, Other

21: Which of the following best describes your gender?

Male, Female, Non-binary, Other _____

22: In what year were you born?

23: How long have you lived in the Tempe/Phoenix area (this includes towns like Gilbert, Glendale, etc.)? Round to a half year.

24: I identify as liberal/ liberal leaning/conservative/conservative leaning/independent/other

Very conservative, somewhat conservative, slightly conservative, moderate, slightly liberal, somewhat liberal, very liberal

25: I am a:

Freshmen, Sophomore, Junior, Senior, Super Senior, Grad Student

APPENDIX E

POST-SURVEY QUESTIONS

1: In the next year, how likely or not are you to utilize the light rail if it aligns with where you are going?

Very likely, somewhat likely, slightly likely, neutral, slightly unlikely, somewhat unlikely, very unlikely

2: If the light rail was more accessible to you (i.e., based on where you live), how likely or unlikely would you be to increase your use of the light rail?

Very likely, somewhat likely, slightly likely, neutral, slightly unlikely, somewhat unlikely, very unlikely

3: How likely or not would you be to vote for investment for further light rail development?

Very likely, somewhat likely, slightly likely, neutral, slightly unlikely, somewhat unlikely, very unlikely

4: To what extent do you support or oppose enhancing measures to ensure riders are safe on the light rail?

Very likely to support, somewhat likely to support, slightly likely to support, neutral, slightly likely to oppose, somewhat likely to oppose, very likely to oppose

5: Do you think the light rail is more safe or less safe than other modes of transportation?

Much more unsafe, somewhat more unsafe, slightly more unsafe, neutral, slightly more safe, somewhat more safe, much more safe

6: How safe or unsafe do you believe riding the light rail is for people generally?

Very unsafe, somewhat unsafe, slightly unsafe, neither, slightly safe, somewhat safe, very safe

7: How frequently or not do you think crimes happen or not on the light rail?

Very frequently, somewhat frequently, slightly frequently, neutral, slightly infrequently, somewhat infrequently, very infrequently

8: How easy or not do you think the light rail is for getting around the Tempe/Phoenix area?

Very easy, somewhat easy, slightly easy, neutral, slightly difficult, somewhat difficult, very difficult

The next three questions (17-19) are about how you think and feel about the light rail, regardless of whether you have ridden the light rail.

9: How safe or unsafe would you feel riding it at night?

Very unsafe, somewhat unsafe, slightly unsafe, neutral, slightly safe, somewhat safe, very safe

9a: What about during the day?

Very unsafe, somewhat unsafe, slightly unsafe, neutral, slightly safe, somewhat safe, very safe

10: How comfortable or uncomfortable do you feel with the people who ride the light rail?

Very unsafe, somewhat unsafe, slightly unsafe, neutral, slightly safe, somewhat safe, very safe

11: How confident or not are you about knowing how to use it (e.g., getting tickets, reading the map, navigating)?

Very confidant, somewhat confidant, slightly confidant, neither, slightly unconfident, somewhat not confidant, very not confidant

APPENDIX F

IRB EXEMPTION

EXEMPTION GRANTED

Mark Roseland
WATTS-CRD: Community Resources and Development, School of
602/496-0160
Mark.Roseland@asu.edu

Dear Mark Roseland:

On 4/14/2023 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	The impact of emancipatory and reflexive storytelling on attitudes regarding the light rail in Tempe, Arizona
Investigator:	Mark Roseland
IRB ID:	STUDY00017783
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	• consentdocument_03_27_2023.pdf, Category: Consent Form; • FocusGroupProtocol_03-27-2023.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • IRB Social Behavioral Protocol.docx, Category: IRB Protocol; • NarrativeIntervention_03-27-2023.pdf, Category: Technical materials/diagrams; • PostSurveyQuestions_03-27-2023.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • PrepEmail_03-27-2023.pdf, Category: Recruitment Materials; • PreSurveyQuestions_03-27-2023.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • recruitment_methods_email_flyer_advertisement_03-

ASU Knowledge Enterprise Development

EXEMPTION GRANTED

Mark Roseland
WATTS-CRD: Community Resources and Development, School of
602/496-0160
Mark.Roseland@asu.edu

Dear Mark Roseland:

On 8/15/2023 the ASU IRB reviewed the following protocol:

Type of Review:	Modification / Update
Title:	The impact of emancipatory and reflexive storytelling on attitudes regarding the light rail in Tempe, Arizona
Investigator:	Mark Roseland
IRB ID:	STUDY00017783
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	• consentdocument_08_11_2023.pdf, Category: Consent Form; • FocusGroupProtocol_08-15-2023.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • IRB Social Behavioral Protocol - updated, Category: IRB Protocol; • recruitment_methods_email_flyer_advertisement_08-15-2023 (1).pdf, Category: Recruitment Materials; • ResearchPlusMe-Swanson-2023-08-15 16_05_40Z.pdf, Category: Recruitment Materials;

The IRB determined that the protocol is considered exempt pursuant to Federal Regulations 45CFR46 (2)(ii) Tests, surveys, interviews, or observation (low risk) on 8/15/2023.