Examining Children's Historical Thinking in Hands-On History Spaces

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Abstract

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To combat the spread of fake news, researchers and academics point to historical thinking as a possible solution. While generally researched in terms of formal education, historical thinking is also being considered in history museums. This research examined the ways in which children engage in historical thinking in history museums' hands-on spaces using Peter Seixas' (2007; 2015) six historical thinking concepts. The researcher video-recorded the interactions of 29 children between 8-12 years old in hands on spaces in three history museums. Results showed that children engaged in multiple instances and various types of historical thinking. Manipulable objects yielded the most instances of historical thinking across the six concepts, suggesting they may provide the structures necessary for children to engage in historical thinking. These findings may be useful to researchers interested in children's historical thinking, museum educators, and exhibit designers who may be considering these spaces for their own institutions.

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Chapter 1: Introduction

In the wake of a politically-turbulent 2016, the buzzword 'fake news' came to the forefront of popular, political, and news culture (Levin, 2016; Turner & Lonsdorf, 2016). Presenting false or misleading information as truth is something that is not a new phenomenon; however, a study conducted by the Stanford History Education Group (2016) brings new importance to combatting this issue. This research found that young people are unable to reason about the information they encounter—particularly on the Internet. Sam Wineburg (2016), a member of the Stanford History Education Group, emphasizes the importance of reasoning with information to determine the facts in terms of what he calls "informed citizenship." To define this, he calls on a quote from founding father James Madison, who said, "A popular government without popular information, or the means of acquiring it, is but a Prologue to a Farce or a Tragedy," underscoring the importance of an informed citizenry in the face of the democratic process.

To tackle this, many academics and scholars turn to history education and history learning. Kevin Levin (2016) argues that learning history is "ideal…to teach students how to search and evaluate online information given the emphasis that is already placed on the careful reading and analysis of historical documents." In a letter in response to the 2016 election, American Association for State and Local History President, John Dichtl (2016) stressed the importance of historical organizations in their role to bring people into the conversation and advocate for the use of historical thinking skills to deal with present issues. Historical thinking skills may provide that solution: these skills—defined in many ways, as will be examined in Chapter 2—in essence identify the ways in which historical content is processed, managed, and used to formulate historical arguments (Burke & Andrews, 2007; Barton & Levstik, 2010;

Seixas, 2007; Seixas, 2015; Wineburg, 2001; Wineburg, 2016). However, the teaching of these concepts is often lost in formal education: teachers of history are tasked with covering broad areas of content and controlling students' behavior, which do not lend themselves to fostering thinking skills (Barton & Levstik, 2010).

Museums are a space in which this thinking can take place and develop (Sundermann, 2013; Marcus, 2007, qtd. in Sundermann). In these spaces, learners can grapple with issues and formulate their own thinking by coming face-to-face with 'the real thing.' Some museums attempt to provide these interactions in hands-on history spaces—spaces set aside from a typical museum exhibit that include objects, interactives, and other materials which visitors can manipulate, learn from, and play with. In the authentic experiences they provide, hands-on history spaces stand as a potential solution to the lack of historical thinking development in the classroom. However, there lacks research that specifically supports whether or not school age children are, in fact, engaging historical thinking in these spaces.

Researchers have identified beliefs that a main purpose of history education is to prepare learners to become participatory citizens in democracy (Levstik & Barton, 2010). They have also defined historical thinking as actively constructing meaning and making claims using prior knowledge and historical evidence, as well as the context of the historical content (Seixas, 2015; Baron, 2012; National Center for History in the Schools, 1996). It is also known in the field that whole-body, active learning is effective in facilitating higher cognitive processes (Berenhaus, Oakhill, & Rusted, 2015). However, there has yet to be a study to understand outcomes that may occur when history learning engages the whole body by using objects intended to be manipulated and explored. Additionally, there are few studies that explore the topic of historical thinking in the context of elementary-age children.

As museums move toward a visitor- and experience-focused approach (Simon, 2016), hands-on spaces in history museums have appeared on the museum educational stage, developed out of constructivist and discovery learning theories. There has been a focus of research into the development of these spaces and what exhibit developers and museum educators hope will be the outcomes of the experience, and any study of these spaces has been formative and literature-review-heavy in nature (Demski, 2009; Villa, 2006). Little research has been done to understand the outcomes of school-age children's interactions in a space like this. I intend to situate my research in this gap, in an attempt to view these spaces as a way in which effective history learning can take place.

Purpose

In an aim to fill the gap proposed above, this study is driven by one main purpose: to examine the ways in which children engage in historical thinking in hands-on spaces in history museums.

Significance

This study will benefit museum educators, specifically those in history institutions. However, all disciplines have practitioner-related thinking that is expected of those who wish to learn from that discipline. In understanding how museums cultivate critical thinking in history, museum educators in other disciplines will be able to understand how higher-level thinking can occur with the school-age children in their own museums, field, and work. This would also benefit institutions that are considering including more hands-on history exploration areas in their spaces, as they will understand the nature of young visitors' interactions in similar venues.

Additionally, according to Mary Ellen Munley (2012), who wrote a literature review regarding early learning in museums, there is a lack of evidence to support claims that museums can lead to advances in learning in child visitors. Munley proposes that this is in part due to studies' focus—studies about early learners in museums tend to focus on adults' perceptions about the learning that could be occurring, rather than examining actual evidence of children's learning. In looking for evidence of historical thinking in children in hands-on history spaces, this study can be part of a larger push toward understanding the learning outcomes that can result in these spaces.

Chapter 2: Review of Literature

An exploration into children's learning in history museums' hands-on spaces requires an in-depth understanding of the literature and previous research that surrounds these concepts. This research covers four main areas, which are discussed in detail below. These areas are: history education, both in schools and in museums; historical thinking, a specific approach to history understanding; embodied cognition, a way of understanding kinesthetic learning; and children's behavior and interactions in museums. Once examined closely, a clearer picture of the learning that may occur in interactive, hands-on museum spaces emerges, ripe for further exploration in this study.

History Education: In School and Museums

Before diving into specifics about historical thinking and theorizing about the potential for history museums, it is important first to understand the state of history education as it exists in this country. This section aims to provide an in-depth understanding of history learning in both formal (school) and informal (museums) spaces, examining the shortcomings and achievements of each.

History education in schools. According to the National Council for the Social Studies (2010), the purpose of social studies education is to teach youth the social skills necessary to be participatory citizens in society. In fact, Lucey, Shifflet, and Weilbarcher (2014) found in their research that elementary and middle school teachers believe that fostering critical-thinking and decision-making skills in their students is a primary goal of social studies education. Barton and Levstik (2010) specify this perspective in the education of history, stating that many advocates for the recent reform of history education believe that students should be engaging in historical

interpretation themselves in their history lessons, analyzing and making meaning from artifacts and primary sources in order to construct their own interpretations. However, many researchers (Levstik, 2000; Barton, 2001; Bolgatz, 2007; Lucey, et al., 2014) believe that formal schooling is failing to achieve these goals because of the content taught, the pedagogical strategies used, and the concerns and purposes of teachers.

Formal history education in United States primarily focuses on the origin and development of the United States as a nation (Barton, 2001). The main priority of content is to tell a national narrative of growth and progress grounded in the individual achievements of a few key historical players. Levstik (2000) and Bolgatz (2007) suggest that a goal of this positive, stable narrative is national identity formation among youth. Barton (2001) suggests that the single story this historical perspective provides is limiting. According to his research, this fails to prepare children to understand the influences that societal institutions have on individual action. It also limits their understanding of the diversity of history. Bolgatz (2007) agrees that the fixed narrative of history in formal education is limiting, suggesting it does not allow for students to understand the discipline of history or how different historical interpretation can tell a multitude of stories from the same objective facts. In sum, there is agreement in the literature that the content that formal education's narrative of history discusses greatly limits the understandings that can be gained through the study of history.

Another reason formal social studies education in elementary schools does not achieve its learning goals beyond mastery of facts is educators' expectations of their students, which leads to a mismatch of goals and teaching strategies (VanSledright, 2004). In order to explore this concept, Lucey et al. (2014) conducted a study of elementary and middle school educators and their pedagogical strategies in social studies education. After surveying teachers in a school

district in Illinois, they discovered that, while most teachers believe that developing critical thinking skills is a primary goal of social studies education, their pedagogical strategies and instructional patterns are not compatible with that goal. Instead of allowing students to participate in self-directed learning, which is known for leading to a deeper understanding of content and higher level thinking, they instead primarily utilize full-class teaching methods, which generally lead to rote learning and fact-based understanding (Lucey et al., 2014). Lucey et al. suggest that this mismatch between goals and pedagogical strategies may be due to elementary teachers' low expectations for young children's critical thinking and their belief that elementary students do not respond well to the types of teaching that facilitate the development of critical thinking.

A third reason for the mismatch between the goals of social studies education and the learning that occurs in the formal realm is the concern that elementary teachers often possess about teaching difficult topics in U.S. history. According to Bolgatz (2007), elementary teachers report often ignoring difficult topics in history entirely, or may discuss only the moral aspects of them with their students, leaving out any discussion of the political or institutional pieces that may alter one's interpretation. She proposes this is due to teachers' beliefs in what is developmentally appropriate for the age they teach. Levstik (2000) agrees: her study of the perception of historical significance among students and teachers shows concern among adults that 'negative' history is developmentally inappropriate for children. The sample of teachers who participated in her research exhibit a clear belief that elementary and middle school children are not mature enough to handle an ambiguous past. As a result of this, these teachers present what Levstik refers to as a history with silences, leaving out the elements and interpretations of history that are deemed developmentally inappropriate. She suggests this is done for three reasons:

adults want children to understand their community as stable and freeing, adults fear that knowing negative elements of history would undermine children's national identity, and teachers are fearful of pushback from administrators in other adults in the community—a view that is echoed by Lucey, et al. (2014).

Beyond this, many teachers simply do not see facilitating historical interpretation as their purpose in the history classroom (Barton & Levstik, 2010). Instead, teachers believe that their main tasks are what educators call coverage and control: managing students' behavior and covering what are often broad areas of content. These two tasks take up the majority of educators' time in front of the classroom, leaving no time for extra activities like using primary sources, considering multiple historical perspectives, or fostering student interpretation. Especially in the face of high-stakes testing, these extra activities will almost always fall behind coverage of a textbook or curriculum. However, Barton and Levstik (2010) report that some educators take on an alternative purpose besides coverage and control: those who believe that history education is, in essence, teaching citizenship skills do bring historical interpretation facilitation into their classrooms, but there is not much research that highlights how to develop this purpose in teachers.

History education in museums. Not unlike the history classroom, history museum education is struggling to find new ways to make history meaningful (Leftwich, 2016). Leftwich describes this phenomenon in history museums, saying,

> "History can no longer be locked away behind glass cases and out of reach in the corners of historic houses, but must be made accessible to visitors of all ages and abilities if these sites are to become more relevant and embedded as community resources" (Leftwich, 2016, p. 148).

However, unlike the history classroom—which is limited in scope and content by space, standardized testing, and access to primary sources (as highlighted above)—history museums are virtually limitless in pursuit of the opportunity to provide learning possibilities that involve primary sources and artifacts (Marcus & Levine, 2011). Because they do not have to cover content to prepare students for high-stakes testing, they are able to utilize their staff and resources to engage visitors in history learning in different ways than in other realms. Because of the opportunities history museums have to engage in different pedagogical strategies than in the formal classroom, Baron (2010) advocates for the benefits of partnerships between classroom and history museums. She says, "As history teachers attempt to bring student thinking processes in line with that of historians, one of the major recommendations… is the injunction to partner with historic sites and museums to help students 'learn about history'" (p. 605). While these two institutions are beneficial in concert, Marcus and Levine (2011) highlight that museums may step beyond what is accomplished in classroom history learning for another reason: few students will take history classes after high school, but some will visit museums for the rest of their lives, enabling a lifelong learning of history.

Like history classrooms, many history museums aspire to learning goals that guide their work. However, there is no formalized set of goals as put forth by a governing body (like the Six Strands of Science Learning from the Learning Science in Informal Environments 2009 report from the National Research Council, for example) and theorists seem to have varied ideas about what these learning goals should be. As Sundermann (2013) suggests, museums are understood as places where historical artifacts are presented and where visitors may develop historical empathy through their experiences and personal connections that they may form to the people of the past. Others suggest that museums should teach how and why history museums do not

present objective reality and how there is always subjectivity in secondary sources recounting history through providing primary sources of historical knowledge (Levine, 2011; Baron, 2010). Alexander (2010), recognizing a vacuum in policies about learning goals in history museums, proposed her own 'Six Strands of History Learning' akin to that of the Learning Science in Informal Environments Six Strands of Science Learning in Museums (Bell, Lewenstein, Shouse & Feder, 2009). In her proposed strands, she suggests that visitors should be able to use evidence gathered from the artifacts, documents, and setting of the museum to understand abstract concepts.

There is agreement, however, that history museums' objects are significant and provide sensory experiences that may lead to learning. Theorists (Tisdale, 2011; Alexander, 2010) suggest that visitors place importance on the objects, as they provide the authentic experience that visitors expect and desire from their museum visit. Alexander (2010) suggests that this is due to the connection to the past that visitors experience through interactions and encounters with the authentic objects on display. Even young children feel this connection: Wunder (2002), in her research observing pre-service teachers as they engage with elementary children in history museums, noted that the children in the space were so engrossed with the objects that the education students did not need to refer to the questions they prepared to promote the children's engagement.

However, it is important to note that it is not the objects themselves, but the interactions with the objects that is so central in history learning. In history museums, objects are seen as evidence for visitors to use in their inquiry into historical questions and discussions (Wunder, 2002). Researchers often stress that visitors should have a sensory experience with the objects (Tisdale, 2011; Alexander, 2010). This sensory experience often provides the base for more

knowledge: McRainey and Russick (2010) suggest that these sensory experiences with objects enable whole-body learning of history, something that is particularly important to the history learning experiences of children. Shaffer (2010) echoes this sentiment, describing these experiences as particularly meaningful to children because "children naturally seek opportunities to explore and learn through their senses" (p. 43).

Dyson (2010) highlights another important element in history museum learning: play. While many researchers have explored this concept in child visitors to museums in general (i.e. White, 2012; Henderson & Atencio, 2007; Piscetelli & Penfold, 2015), Dyson points out that this form of interaction is essential to history museums, as "history is an exercise of imagination and empathy, and a good historian invariably plays with the past" (p.137). He even highlights three skills necessary to participate in thinking about history, all of which are facilitated in play: imagining, storytelling, and sequencing historical time. Through playing in dynamic, imaginative settings filled with objects that children can use for history-based play, children can develop the skills necessary to take on empathetic historical perspectives, tell stories about history, and make comparisons between different points in time, all things that are necessary to learn more complex concepts in the craft of history. However, Russick (2010) points out there is not much research into the effectiveness of interactive history exhibits designed for children except for the evaluations of individual practices, so this is an area yet to be fully explored by museum and learning researchers.

Evaluation studies in history museums. While there have only been a few history museum evaluation studies, they provide perspective into how visitors interact in history museums. In post-experience interviews of adult visitors as they left an exhibit at the Minnesota History Center, visitors self-reported their behaviors, showing preference toward objects,

personal stories, and topics of their own personal interest in the exhibit (Randi Korn & Associates, 2010). Many interviewees reported talking with others in their visit group, citing objects as a prompt for most conversations. One-third of interviewees reported enjoying the presentation of history through stories and memories, as it made it more interesting and helped them make connections to it personally. Additionally, one-fifth of interviewees reported reading the text of the exhibit (as opposed to looking at objects or engaging in conversations, for example), but they were, at the time of the interview, unable to recall any specific thing that interested them about what they read.

In another study, Randi Korn & Associates (2011) used timing and tracking observations to understand the nature of visitation to the History Gallery at the Oakland Museum of California. In this study, the evaluation team learned that visitors overwhelmingly discuss exhibit content with others, use activities or hands on components, and use visual or audio components (at 71 percent of participants, 58 percent of participants, and 57 percent of participants, respectively) above other exhibition offerings (like using the seating, engaging with gallery staff, or reading the label books). Evaluators also learned that, of the 28 percent of participants that visited with children, 43 percent visited with children between the ages of 9 and 11 years old. This information, combined with theoretical perspectives on history museum learning, indicates that not only is learning possible through the many exhibition components but that these components are being used during visitors' time in the galleries.

Summary. In sum, while formal education may propose that the purpose of social studies learning is to prepare students to be participatory citizens in democracy, it does not necessarily achieve this purpose in practice, focusing instead on covering content and controlling the classroom for many reasons. While informal history education does not have the same barriers to

its learning goals and thus has more potential to achieve thinking-based outcomes, museums still struggle to make history relevant in today's society. However, the sensory and object-based experiences history museums can provide set museums apart from the classroom, making them vital to lifelong history education.

Historical Thinking

Many theorists (i.e. Seixas, 2015; Levstik & Barton, 2010; Wineburg, 2001) view historical thinking as the ideal in history learning, but what does historical thinking mean? And why does it matter? This section explores these questions, as well as attempting to provide an understanding of children's abilities to exhibit the behaviors historical thinking encompasses.

What is Historical Thinking? Many researchers in the field of history education have identified a concept they call historical thinking, which they deem necessary for the development of knowledge in history (i.e. Seixas, 2015; Levstik & Barton, 2010; Wineburg, 2001, among others). However, there exist discrepancies in how historical thinking is conceptualized. VanSledright (2004) suggests these discrepancies exist because of differences in whom the researchers aim to describe as a historical thinker and what context they are attempting to understand.

A large group of researchers describe historical thinking as emulating the behaviors of practitioners and historians, often called the expert-novice paradigm or continuum—the belief that novices in any discipline should become more like experts (Smith Crocco & Livingston, 2017). Seixas (2007; 2015; Ercikan & Seixas, 2015) is a major proponent of this belief, outlining six procedural concepts that he believes exemplify critical thinking. These concepts were developed out of research into how historians think through their craft and are intended to reflect the behaviors of historians while encountering historical evidence and creating historical

arguments. These six concepts are: establishing historical significance; using primary source evidence; identifying continuity and change; determining cause and consequence; taking on historical perspectives; and acknowledging the ethical dimension (Seixas, 2007; 2015; von Heyking, 2004). Seixas adds that, although historical thinking itself is conceptual, it only becomes meaningful with historical content.

Wineburg (2007) agrees that historical thinking is related to the practice of history, arguing that historical understanding requires students to engage in what he calls historical questions, which model the approach historians take to historical problems (Wineburg, Martin & Monte-Sano, 2011). He also positions historical thinking as the opposition to presentism, which he defines as viewing the past through the lens of the present (Wineburg, 2001). Wineburg sets himself apart by adding that historical thinking is an unnatural undertaking for humans and does not develop naturally. Walsh (2008) supports this idea, saying, "What [Wineburg] meant by this was that the discipline of historical thinking is unnatural in the sense that humans tend to like stories, to accept them, and to pass them on without criticism or questioning of their provenance" (p. 5). Levisohn (2015) disagrees, identifying a potential flaw in Wineburg's reasoning. He finds Wineburg's belief that historical thinking is unnatural inconsistent with Wineburg's other belief that historical thinking can be a humanizing process.

Baron (2012) also understands historical thinking through the practices of historians. She found, through observation of historians' behaviors in analyzing and learning from historic sites, that historians have five key behaviors when practicing history. According to her research, historians attempt to understand origination; look for things intersubjectively, meaning in relation to each other; aim to stratify findings within the appropriate layer of evidence; hypothesize about the reasons behind the existence of historical evidence; and use empathetic

insight to attempt to understand the factors acting upon a historical agent. Like Seixas' (2007; 2015) historical thinking concepts, Baron's (2012) proposed historical thinking behaviors include consideration of the perspective of historic actors and the understanding of the reasons behind historic events.

Other researchers (i.e. VanSledright, 2004; Monte-Sano & Reisman, 2015; Levisohn, 2015; Symcox, 2004; Brugar, 2016) consider historical thinking not in terms of "doing" history, but in terms of reading and writing history. Levisohn (2015) describes historical thinking as learning to speak and write the language of history, a perspective which Monte-Sano and Reisman (2015) echo. VanSledright (2004) describes historical thinking as understanding the difference between history—the product of historians' investigations or interpretations—and the past—the traces, artifacts, and primary sources that make up historical data. He also identifies the importance of assessing sources in historical thinking, saying good historical thinkers are "careful, critical readers and consumers of the mountains of evidentiary source data that exists in archives and that pours at us every day via the media" (p. 232). Symcox (2004) agrees with this critical reading of sources, proposing that historical thinking requires, to an extent, the questioning of the official narrative of history often offered in textbooks.

Barton and Levstik (2010) offer a perspective in between, not quite focusing extensively on reading and writing and not linking their definition to the practice of historians. In fact, they distance themselves from the expert-novice paradigm regarding history learning, saying "Schools in the US do not exist to reproduce academic disciplines, and there are no convincing arguments for why disciplinary knowledge should be the basis for school subjects," (Barton & Levstik, 2010, p. 39). Instead, they suggest that historical interpretation—which they propose

involves using multiple perspectives and primary sources to construct historical accounts—is good for citizenship, rather than for moving students closer to being history experts.

In sum, historical thinking is defined in multiple ways, ranging from using the exact same skills as practitioners when approaching historical data to a combination of history-specific skills when examining historic evidence. As such, there is yet to be a consensus among those who study history cognition.

Why does historical thinking matter? Besides producing definitions for historical thinking, researchers also argue for its importance, both for the individual and for society. Wineburg (2001) argues for the benefits of historical thinking for the individual. He writes, "my claim in a nutshell is that history holds the potential, only partially realized, of humanizing us in ways offered by few other areas in the school curriculum" (p. 5). To Wineburg, the study of history using historical thinking allows for the exploration of a key tension he believes humans must understand: that between the familiar and the strange in the human experience.

Additionally, individuals can benefit from historical thinking by learning more about history. Discipline-specific practices like historical thinking were found to have a positive impact on students' social studies learning (Brugar, 2016). In her quasi-experimental study, Brugar found that students in a classroom that used historical interpretation and other historical thinking methods to engage in social studies did better on a post-test designed to measure history learning based on Social Studies Grade Level Content Expectations than students in a classroom that used more traditional, fact-based methods to teach social studies. This study's results add to the conversation that historical thinking is an important skill set to learn, as it may lead to increased social studies learning.

Other researchers identify a societal benefit in learning to think historically: it prepares students for participation in democracy (Levstik & Barton, 2010; Lévesque, 2010; Alberta Canada, 2003). People must have experience analyzing and interpreting information and others' interpretations in order to be an effective participant in democracy—historical thinking provides this experience (Levstik & Barton, 2010). It, of course, does not guarantee better informed, more active citizens, but engaging in historical thinking in formative years does lay a foundation for the activities in which good citizens of democracy engage. Walsh (2008) adds that historical thinking helps people make sense of today's increasingly information-filled world. Martin (2008) and her colleagues suggest this is important, pointing out that "students often view the written word, whether from a conventional textbook or a website yielded by a Google search, as undiluted truth" (p. 140). Historical thinking, to these researchers, is important because it teaches people to question and analyze all sources through which they get their information.

Von Heyking (2004), in her review of research on historical thinking, proposes another societal reason for its significance: the development of moral awareness in children (Cooper, 1995; cited in von Heyking, 2004). Historical thinking encourages children to question and discuss motives for others' behavior, attitudes, and values and other times and places. Through this attempt to figure out the past, learners may develop their ability to empathize, allowing them to understand human values across time (Portal, 1987; cited in von Heyking, 2004). Through historical thinking, researchers theorize that people cultivate a better relationship with society through informed citizenship and the development of moral values.

Children and historical thinking. Another important conversation about historical thinking is centered on children and whether or not they can critically think. Some researchers (i.e. Barton, 2004; von Heyking, 2004; Monte-sano & Reisman, 2015) believe that children are

capable of historical thinking due to their prior experiences with history and their levels of cognitive development. Barton (2004) points out that children already have knowledge about history and are motivated to learn more about the subject. Most of this knowledge comes from out-of-school constructs such as conversations with relatives, visits to museums, and exposure to popular media. Von Heyking (2004) agrees that children's early history knowledge is informal; she suggests that family stories and their own personal histories are the first contexts through which they develop early historical thinking concepts.

Monte-sano and Reisman (2015) believe that students as early as fifth grade are able to exhibit historical thinking. At this age, children are able to "work with historical sources, develop interpretations based on these sources, think historically, and articulate the process of historical interpretation" (p. 283). Von Heyking (2004) agrees: upper elementary school students are capable of sophisticated reasoning of historical content when provided the appropriate amount of support (citing Barton 1997b; Foster & Yeager, 1999; Levstik & Smith, 1996; VanSledright, 2002a, 2002b, 2002c; VanSledright & Kelly, 1998).

However, other researchers point out limits to children's historical thinking. While Barton (2004) suggested that children have prior experience with history, he also points out their tendency to view the events of history in one linear narrative as opposed to a complex one with overlapping events. Children, according to Barton, are also likely to consider difficult periods of the past as problems that were solved in a particular time and no longer an issue, struggling to understand the complexity of issues that persist over time. Researchers have also found that, even if children engage in historical thinking and evaluate sources, they may not be able to remember to include them in their retelling of historic events (Foster & Yeager, 1999; Barton, 1997b; cited in von Heyking, 2004). Additionally, Von Heyking (2004) points out that children

are often unable to understand the scale of the historic events they are studying, which is a limitation to their historical thinking. Regardless, Barton (1997b; cited in von Heyking, 2004) is hopeful: instead of limitations to children's historical thinking, he suggests that these are simply early points on what he views as a continuum of historical thinking that will develop with continued engagement and exposure.

Summary. Researchers and theorists alike believe that historical thinking is important—benefitting both the individual and society—but there does not yet exist a consensus on what exactly it means. Children are seen as capable of historical thinking, even though it may take on an abridged, early form with limitations based on their cognitive development, according to the research that exists in the field.

Embodied Cognition

Because of the dynamic movements and hands-on interactions involved in hands-on spaces, it is important to understand the potential for cognitive processing that exists in these behaviors in order to fully appreciate the learning that may be taking place in these spaces. The research area that explores these concepts is centered on the concept of embodied cognition. The subsequent sections will discuss attempts in the research to define embodied cognition, researchers' explorations of embodied cognition in children, and the literature's understanding of embodied cognition as it presents itself in museum settings.

What is embodied cognition? Embodied cognition is the idea that sensorimotor processes facilitate higher cognitive processes (Berenhaus, Oakhill, & Rusted, 2015). In other words, whole-body learning, engaging the entire body in the learning process, may facilitate higher cognitive processes than learning that engages only the mind. This whole-body engagement, to embodied cognition researchers, reflects the natural mind-body connection that is

representative of how human beings think and operate in the world (Henriksen, Good & Mishra, 2015). According to Henriksen et al., researchers at the Deep-Play Research Group at Michigan State University, embodied cognition involves two components: kinesthetic thinking and empathizing. Kinesthetic thinking is defined as thinking with the body, involving the use of movements and physical sense to aid in reasoning and construction of new knowledge. Empathizing, in this sense, involves imagining oneself in another's position to experience the world as they do. This is often done with manipulable objects, which trigger conceptual processing through the motor experiences they provide.

Embodied cognition and children. Children are a natural subject for embodied cognition, as they are often provided toys and other interactive materials to play with and experience hands-on. As such, there have been multiple studies exploring embodied cognition in children (i.e. Glenberg, Gutierrez, Levin, Japuntich & Kaschak, 2004; Kalénine & Bonthoux, 2003; Lozada & Carro, 2016). These studies involve embodied cognition in different contexts, but all measured children's abilities to think with complexity by making connections between objects and their learning and by reaching beyond their Piagetian developmental levels.

Multiple studies have found that children are more able to make connections when they are able to kinesthetically interact with objects in their learning. In a study that allowed children to play with play set pieces while listening to a story that matched the theme of the play pieces, children who manipulated and connected the toys to the story remembered more action sentences than those who had just read the story (Glenberg, Gutierrez, Japuntich, & Kaschak, 2004). These researchers found that externalizing a story with manipulables improved children's memory for that story. Similarly, Kalénine and Bonthoux (2003) found that children were better able to process thematic relations (relating objects and classifying them based on a theme) between

objects when they were able to manipulate them, as opposed to when they had to simply observe them.

Additionally, Lozada and Carro (2016) discovered that children are able to reach beyond their Piagetian developmental level regarding quantity invariance (the conservation of quantity of a substance when the size of the container of the substance changes) when actively participating in the demonstration. Those who conducted the conservation demonstration (the pouring of liquid from a smaller volume container into a larger volume container) themselves were reported as understanding that the amount of liquid had not changed at a higher rate than those who simply observed the demonstration in this study. Lozada and Carro (2016) summarize their results in this statement, which also effectively summarizes the findings of those described in this section: "Active participation during learning, therefore, connects children's experience more closely with cognitive processes, thus enriching educational practices while enhancing learning abilities" (p. 6).

Embodied cognition and the museum. As Henriksen et al. (2015), propose, embodied cognition is a natural fit for children in the museum world, saying, "Children become excited about dinosaurs if they can climb upon a sculpture of one to gain a point of view, touch the 'skin' and physically feel the experience of a dinosaur—pretending to roam and hunt like a Tyrannosaur" (p. 8). As such, multiple researchers have examined children and embodied cognition, but specific to the context of the museum. In a study of students' embodied cognition using digital tools to learn history, Price (2016) and her team of researchers learned that interaction with artifacts (both digital and physical) helped students think about differences between past and present, a complex thinking concept highlighted by historical thinking researchers as higher-order thinking (Seixas, 2015, for example). They write, "A sense of 'place'

is developed through embodied experiences of a place that is imbued with cultural and social associations," highlighting the importance of embodied cognition in museums (p. 345).

Renner (n.d.) took these ideas of embodied cognition and applied them to interactive museum exhibits in her work. In her study of children's behavior and learning in interactive museum experiences, she discovered that children who manipulated objects in these spaces were able to achieve feats of cognitive complexity, such as going beyond naming concrete objects to express representational meanings in both speech and gesture. She proposes that interactive exhibits have the most potential for cognitive complexity in the museum because of the multisensory information they provide, writing, "Touching and manipulating objects compels the allocation of both individual and joint attention, influencing what and how children see, and the ideas they activate through speech and gesture" (Renner, n.d., p. 1965). According to this research, museum objects may allow children to make connections between the concrete objects and the abstract concepts they may represent, especially if they are interactive and manipulable. Museums provide an interesting opportunity for embodied cognition, especially through the interactive components they may provide.

Summary. Embodied cognition theory believes that engaging the whole body in the learning process can enhance one's cognitive capacity for complex thinking. This theory has implications for engaging children in learning and provides museums a unique opportunity to engage their visitors in learning through interactive components.

Children in Museums

Because children are the subjects of this study, it is important to understand how children experience a museum. This section examines literature relevant to children's learning in

museums, including play as a means of learning, hands-on learning, and learning through family talk and interaction.

Play as a means of learning. Play has been highlighted as a strong means through which children learn in museums (Henderson & Atencio, 2007; Piscetelli & Penfold, 2015; White, 2012). While there are varied specificities of play throughout the literature, White (2012) proposes a broad definition of play, describing it as having some or all of these characteristics: pleasurable, intrinsically-motivated, process oriented, freely chosen, actively engaged, and non-literal. Play can take on many forms, but it is a serious form of learning that can lead to concrete outcomes.

White (2012) describes the benefits of play for children as evidenced through research: in play, they can develop their cognitive, emotional, social, and physical skills. Specifically, she cites collaboration and communication between others, critical thinking, and confidence as necessary life skills that can be developed and refined through play. Henderson and Atencio (2007) agree, citing that play-based inquiry is key to exploring, making observations and discoveries, and experimenting with different subjects. It is a multi-sensory experience, through which a child's inquiries can be explored in a socially-mediated space (Piscitelli & Penfold, 2015). As Piscitelli and Penfold (2015) write: when in informal learning spaces, children take charge of their learning "by experimenting with materials and concepts, directing their own imaginative play, collaborating with peers and adults, and discovering new creative processes in a prepared and socially mediated play environment" (p. 279). While some researchers, like White (2012), argue that play is the activity in which learning and development occurs, Piscitelli and Penfold (2015) view play as a catalyst for inquiry and other activities that lead to learning.

Hands-on manipulation of the 'real thing'. Other researchers stress the importance of hands-on interactions for children, but separate it from play, suggesting a more concrete and less imagination-based experience (Crabbe, 2011; Henderson & Atencio, 2007; Jant, Haden, Uttal & Babcock, 2014; Kratz & Merritt, 2011; Melber, 2008; Munley, 2012). This research suggests that firsthand experience with objects is extremely effective in building literacy in science (Melber, 2008) and other disciplines (Kratz & Merritt, 2011). Jant et al. agree, adding that, when this interaction is socially-mediated, it is even more effective. They, along with others (Henderson & Atencio, 2007), suggest that hands-on engagement with objects, when combined with conversations with others, leads to successful transfer of learning to other contexts.

Hands-on experiences are also cited as being enjoyable for children, as they provide them with an opportunity to touch, interact with, and manipulate objects they could not do elsewhere (Crabbe, 2011; Munley, 2012). Munley (2012), in her review of literature regarding early learning in museums, expresses that this multisensory interaction is even more meaningful for children if the objects are authentic, as this increases the special nature of the experience (Dockett, Main & Kelly, 2011; Graham, 2008; McRainey & Russick, 2010: all qtd. in Munley, 2012). This sentiment is echoed by Melber, who states that the authenticity of collections-based institutions is what sets experiences there apart from interactive-based science centers and children's museums (2008). Museums are the providers of the hands-on experiences, contributing to children's learning through their inclusion of objects and interactives that can be manipulated by the visitor.

Family learning and the role of parents and caregivers. Other researchers are concerned less with what children do alone in museums and are instead more interested in how they interact with their parents or caregivers in these spaces. Povis and Crowley (2015) stress the

importance of joint attention in museums. They concluded that it may lead to family learning talk, which, to them, is talk in which parents or caregivers make connections between exhibit content and the family's shared experience. This resulted from a study they conducted in a natural history museum, where they gave families flashlights to use in darkened dioramas as an attempt to focus their attention and potentially force joint attention. This study suggests that, while children may learn on their own in museums, caregivers play an important role in facilitating learning by being attentive and stimulating family learning talk.

Jant et al. (2014) also suggest that parents play an important facilitator role in their child's museum learning experience. They suggest that a combination of hands-on engagement with objects and elaborative conversations may lead to more successful transfer than either of those alone. Conversations, to Jant, et al., help establish intercontextuality and abstractness of knowledge, which can help learners transfer, or use their new knowledge in another context or domain. Through a study of family conversations at The Field Museum in Chicago, Illinois, they discovered that, while children learn a lot on their own in museums, their learning is greatly influenced by conversations they have with their parents during these museum experiences. Nadelson (2013) echoes this sentiment in his work. He observes that parents are likely to significantly influence children's interaction with exhibits and subsequent learning through what they say or do. Parents and caregivers play an influential role in their children's learning in a museum by guiding conversations and helping make connections between museum material and the family's own experiences.

Summary. Children's learning in museums is active, sensory, and conversation-rich. Through engagement of their imagination, interaction with museum objects, and discussion with

their caregivers or parents, children socially construct the world around them in a museum environment.

Chapter 3: Methods

The purpose of this study was to examine the ways in which children engage in historical thinking in hands-on history spaces in history museums. Historical thinking, in this study, is defined through six concepts put forth by Peter Seixas (2015) (as described in Chapter 2), but is, in essence, critical thinking about historical content (Seixas, 2015; Wineburg, 2001). Descriptive methods were employed in this study. Data were collected through video recordings of the behaviors of children in these spaces. This chapter describes the procedures of participant sampling, data collection, and analysis of collected data.

Hands-on History Spaces

A hands-on history space is defined as a space separate from traditional museum exhibits that provides visitors with activities, artifacts, and objects to interact with and learn from (Villa, 2006). These exhibits are often designed for the museum's youngest and most curious visitors, but can be fun and informative for all ages (Danilov, 1986; Villa, 2006). They have also been identified as spaces where family learning may occur (Villa, 2006; Demski, 2009). These spaces have many names, such as discovery rooms, history labs, learning lounges, or even a name specific to the institution or exhibition (Demski, 2009).

Data for this study were collected in three museums' hands-on spaces: *Then, Now, Wow* at the Minnesota History Center in St. Paul, Minnesota; *The Griffin Discovery Room* at Thomas Jefferson's Monticello in Charlottesville, Virginia; and *History Hub* at Oregon Historical Society in Portland, Oregon. These sites were selected from a list created by the researcher of many hands-on history spaces in the country that fit the description above. From the list, the researcher sampled three from different geographic regions of the country, and different sized institutions,

based on the funding they receive. Spread throughout the country, these rooms were selected because they discuss history subject matter through different activities, interactive components, and objects for learners to manipulate and play.

***Then, Now, Wow* at the Minnesota History Center.** *Then, Now, Wow* is an interactive exhibit at the Minnesota History Center. Though it is designed for school-age children, everyone can learn about Minnesota's history and culture through interactive components, photos, and replica artifacts like a prairie sod house and a Twin Cities streetcar. Many periods in history are presented in the same exhibit, encouraging visitors to make comparisons between different time periods.

***The Griffin Discovery Room* at Thomas Jefferson's Monticello.** Designed as an interactive model of the larger house and grounds, this room includes replicas of Monticello's entrance hallway, Thomas Jefferson's Cabinet, a slave dwelling and shops on Mulberry Row, and a parlor in which socializing and game playing occurred. Each of these areas include toys, replica artifacts, and photos which allow visitors to have a hands-on experience before or after their Monticello "hands off" tour. The period represented is the early 1800s, when Thomas Jefferson lived in the house after his years as President.

***History Hub* at Oregon Historical Society.** *History Hub* at Oregon Historical Society is a hands-on history space geared toward families. In it, visitors can find mystery objects they can identify, puzzles of artifacts on display for them to observe, a sampling of artifacts they can touch, and spaces for them to provide their own insight into Oregon's history. The content, like *Then, Now, Wow* at Minnesota History Center, is intended to be a broad stroke of the state's history and thus presents different time periods in the same space. Compared to other two spaces, however, *History Hub* has a smaller proportion of artifacts and replicas that can be touched and

manipulated. Instead, the exhibit has a lot of activities intended to facilitate thinking about history without the manipulation of an object, such as a board game that encourages players to take perspectives of people in Oregon's history and jigsaw puzzles of objects in display cases.

Sampling and Participants

Participants for this study were selected through convenience sampling as they fit the criteria and entered the area of the hands-on space at the site of data collection. The criteria were as follows: children who appeared to be in upper-elementary or early-middle school (approximately 10-12 years old) and who had entered the hands-on history space. There were no restrictions based on gender, race, or ethnicity in this study's subjects. The researcher approached potential participants randomly, and the adult and child were asked for verbal consent and assent, respectively, and then the adult signed a consent form (see Appendix A).

The researcher recorded 29 children over the course of this study, spread across the three sites mentioned above. Eleven children were recorded in *Then, Now, Wow* at Minnesota History Center, 12 were recorded in the *Griffin Discovery Room* at Thomas Jefferson's Monticello, and 6 were recorded in *History Hub* at Oregon Historical Society. While no age verification took place in the recruitment process, all of the children visually appeared to be within the age range of 8-13 years, only slightly outside the targeted 10-12 year old age range. Subjects had an even distribution of gender: 48% of participants (n=29) were girls, and 52% were boys. The majority of participants (n=29) were with at least one parent or guardian and other children: 69% were visiting the museum as part of a multigenerational unit. The other participants (n=29) were either with at least one parent or guardian—28% fell into this category—all of whom had varying levels of involvement in the child's interactions in the exhibit. Only one participant, 3% of the sample, was in the exhibit completely alone.

Data Collection Procedures

Once verbal and written consent had been established, the researcher began video recording their interactions, encouraging them to interact in the space as naturally as possible. This video recording took place in a space separate from their interactions, yet close enough to record their activities, expressions, and conversations. The video recordings focused on the target participant for as long as he or she engages in the room's activities. The video recording followed the participants' movements in the space without being physically invasive or interfering with his or her experience in the space. When the individual left the space, the video recording ceased, and the researcher began this process again after recruiting a new participant.

Data Analysis

The data collected were analyzed using a coding rubric based on Peter Seixas' (2015) six historical thinking concepts. The researcher watched the videos of young visitors' interactions, recording her observations and then coding the observed behaviors and conversations into the categories dictated by the six concepts. These six historical thinking concepts are "historical significance," demonstrated understanding of the importance of history; "primary source evidence," the use of primary sources to answer questions and prompt new inquiries; "continuity and change," a examination of what has changed or stayed the same over time; "cause and consequence," an exploration of what caused other things in the past to occur; "historical perspective-taking," taking on the perspective of different historical groups in the past; and "ethical dimension," understanding the problem of judging actors and actions from the past (Seixas, 2015). The researcher focused on the physical interactions of participants in these spaces as well as the content of anything they verbalized, either to themselves or to others, coding these

behaviors into categories to determine the presence of historical thinking. After coding the raw videos herself, the researcher then tested inter-rater reliability with her advisor, sending a sample of the videos to her advisor to code. This proved an inter-rater reliability of 75%; approximately three-fourths of what the researcher coded was matched by her advisor's coding.

Limitations

This study was limited in scope by examining types of historical thinking in only three museums. These findings cannot be generalized to represent all hands-on history spaces. This study cannot alone indicate Peter Seixas' Historical Thinking Concepts in use in these spaces. It also was limited to a small sample size, and therefore cannot solely describe what children's historical thinking looks like in hands on history exhibits.

Beyond the limited scope of the study, there exists also a limitation in the data analysis method and chosen framework. Because Peter Seixas' Historical Thinking Concepts are generally used to analyze written papers regarding historical topics, some of these concepts are only indicated through a child's verbalization of their thinking. As such, if the child did not verbalize their thoughts, these historical thinking concepts may have gone undetected.

Chapter 4: Results and Discussion

This chapter will summarize the study results as they address the research question on which this study was focused: What are the ways in which children demonstrate evidence of historical thinking in hands-on history spaces within history museums? This question will be addressed in two ways, looking at the frequency of instances of different types of historical thinking, as well as examining the specific nature of each type of historical thinking.

Historical thinking was measured using Seixas' (2015) six historical thinking concepts, adapted to fit the physical and verbal behaviors that children may exhibit in hands-on history spaces in museums. These concepts are as follows:

- **Establish Historical Significance** - Understanding the significance of something in the greater understanding of history;
- **Use Primary Evidence** – Using the source to resolve or drive inquiries;
- **Identify Continuity and Change** – Observing what has changed or remained the same over time;
- **Analyze Cause and Consequence** – Explaining or proposing the cause or result of different historical events, including human motivation and decision-making;
- **Take Historical Perspectives** – Taking on the perspective of the time; given the age of the children involved in this study, the researcher broadens this definition to also include being empathetic to the conditions of the past;
- **Understand Moral Dimension of Historical Perspectives** – Understanding reason and motivation, as well as the moral component of history.

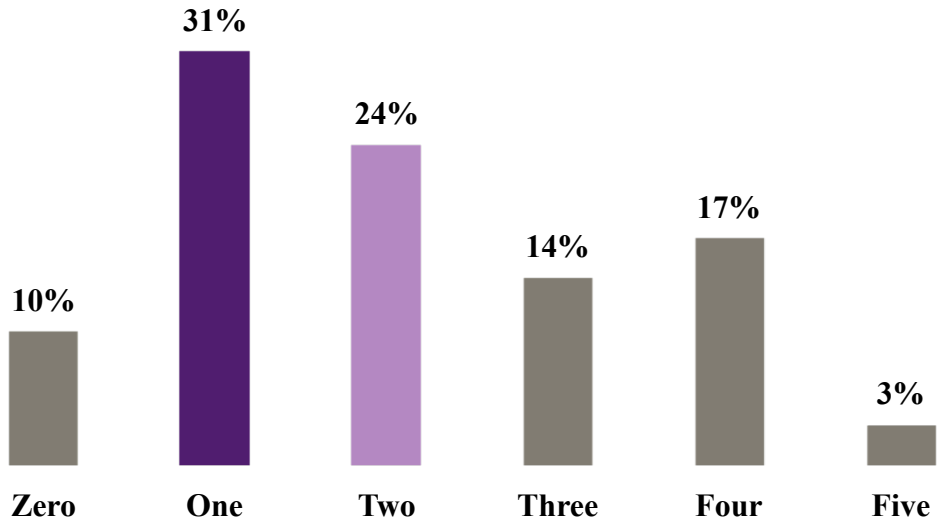
Total Instances of Historical Thinking Across the Sample

Children engaged in historical thinking if at least one of their visible behaviors could be categorized into one of these concepts. Twenty-six out of 29 observed children demonstrated at least one example of historical thinking during their time exploring the hands-on history space. In total, 143 instances of historical thinking were observed across the 29 children, which means on average each child demonstrated 5 instances of historical thinking.

Total Instances of Different Historical Thinking Concepts Evidenced By Each Child

Figure 1 reveals the range of different historical thinking concepts children engaged in during their time in the hands-on history space. Thirty-one percent (n=9) displayed one type of historical thinking concept; twenty-four percent (n=7) engaged in two different historical thinking concepts; and thirty-four percent (n=10) displayed evidence of three or more different historical thinking concepts during their exhibit experience.

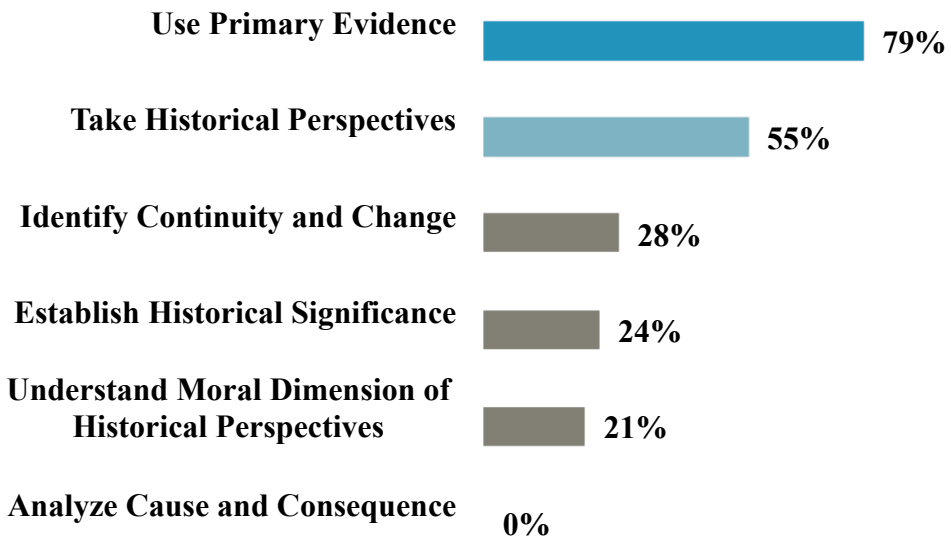
Figure 1: Frequency of Different Historical Thinking Concepts Among Children (n=29)



Frequency of Each Historical Thinking Concept Across The Sample

Not only did the majority of children demonstrate historical thinking during their visit to hands-on history spaces, but they exhibited multiple historical thinking concepts during their experience. Figure 2 illustrates the distribution of demonstrated historical thinking concepts across children studied. It suggests that more than half of the children (N=29) used primary evidence (79%, n=23) or took historical perspectives (55%, n=16).

Figure 2: Percent of Children Who Engaged in Each Historical Thinking Concept (n=29)



Nature of Each Historical Thinking Concept

i) Use primary evidence. The use of primary evidence is described by Seixas (2015) as involving a primary source to answer or drive an inquiry. In the case of hands-on history exhibits, these primary sources include objects in the education collection, such as replicas, photographs, primary source videos, maps, and quotations from people in history—in essence,

all original source materials. In total, 79% of participants were observed using a primary source at least once during their time in the exhibit. Of the 143 total instances of historical thinking observed, 49% (n=70) of them involved using primary evidence. These instances involved children closely examining a primary source and encouraging others in their group to do the same, interpreting or explaining a primary source, or using a source to ask or answer questions (See Appendix A).

Of the instances in which primary evidence was used (n=70), 46% (n=32) were ones in which children engaged with the object in conversation with an adult. Seventy-nine percent (n=55) of children engaged in the use of primary evidence without first being prompted by an adult to do so. Twenty-four percent (n=17) of children read an accompanying label when using primary evidence; 76% (n=53) engaged in primary evidence use without the prompting or assistance of a label.

Those who used primary sources engaged with a variety of different types of exhibit features to develop their historical understanding, as indicated in Figure 3. These primary sources could be the objects themselves (for example, a rotary dial telephone or skins from a beaver), a photograph or newspaper clipping displayed next to the object, a map, or a quotation from someone from the time period represented.

Figure 3: Type of Primary Source Engaged For Each Instance of Primary Source Use (n= 70)

Primary sources were used in two major ways in these spaces. Forty-six percent (n=32) of the 70 interactions involved children identifying the source they were using, answering questions about what the source is or what it does. One child exclaimed, *"It looks like a puzzle. What is this?!"* after approaching Thomas Jefferson's cipher wheel at Monticello. He then used the labels and the object itself to identify the object, saying, "*Thomas Jefferson designed a cipher wheel for creating secret messages!"* and set to work decoding the secret message included in the label text - "I like eating vanilla ice cream." Another child approached a topsy-turvy doll on display and questioned, *"Is this a double sided doll?"* Her mother then responded, *"Well, it looks like it has two faces, but I don't know that it's double sided…"* The child then read the label: *"Oh! It's an upside down doll."*

Twenty-nine percent of children (n=20) used primary sources to answer other inquiries, such as those related to the location of a place or the answer to a code. When presented with an interactive map, a father and child used it to locate a place near to their heart: the airport, where the father works. He said, *"What do you think that is right there?"* pointing to an area on the

map. After the child posed an incorrect guess, the dad pointed to his jacket, which displayed the name of his workplace. The child then said, *"Ohh, the airport,"* and looked closely at the map. She then switched the map from a filter from an earlier decade to the "today" filter, and identified the airport again.

ii) Take historical perspectives. Taking a historical perspective is described by Seixas (2015) as taking on the perspective of the time, immersing oneself emotionally and physically into the period being represented. Fifty-five percent (n=16) of children observed in this study were observed taking a historical perspective at least once during their visit. Of the 143 instances of historical thinking observed during this study, 23% (n=33) involved children taking historical perspectives. These instances involved children providing an emotional response to the conditions of history, immersing themselves fully in a replica environment, or identifying with the period represented (see Appendix A).

When taking a historical perspective, 76% of children did so without prompting or initiation from the adult. The same percentage (76%) spontaneously took historical perspectives without reading labels to prompt them to do so. It is important to note that, while the frequencies of these conditions were the same, only in two instances in which adults facilitated historical perspective taking in their children did the group also consult a label to prompt the perspectives the child took.

Children largely took historical perspectives when interacting with two types of museum objects, as illustrated in Figure 4. Sixty-one percent were centered on a tangible object—something they could pick up, examine, and manipulate in their exploration of the exhibit. For example, there was a rotary dial phone in one of the exhibits that children could touch, dial, and make pretend calls. Exhibit interactives—things that represent history in concept rather than

physicality: not actual objects but instead games, puzzles, blocks, and other means of engagement—were also frequently utilized to take on a historical perspective, at 24% (n=33). Display objects, photographs, and videos—things that could not be manipulated—were not utilized as frequently, at 9%, 6%, and 0% respectively.

Figure 4: Type of Object Engaged For Each Instance of Taking Historical Perspectives (n=33)

The historic perspectives taken by participants can be summarized in three categories: immersion, assessment, and emotional response. Thirty-six percent of historical perspectives taken by participants were immersive in nature—the child took on the historical perspective as part of their identity for that moment, imagining that they were an actor in the past. One child read a label in a model sod house: *"[reading] If you were moving to a new home, what would you take from the old place?"* She then responded, *"Um. Probably cooking stuff… probably food and clothing. That's what I would bring."* Another child took on the perspective of a shop owner by entering a nail shop and immediately writing "We are open" on the chalkboard by the counter.

Thirty-three percent of instances of historical perspective taking involved an assessment of the past—the child determined whether or not they personally would enjoy the conditions of history or discussed the ease or difficulty of those conditions. One child, after struggling with being an Ox plowing the fields in an interactive, declared, *"I like this side a lot better"* when referring to pushing the plow as a farmer. Another child assessed the difficulty of history's conditions after looking at a dirt road by stating, *"That'd be very bumpy!"*

The final 31% of the observed instances of historical perspective taking involved a child producing an emotional response to the conditions and events of history. After reading a quote about the grasshopper plague in the sod house area of the exhibit which detailed how the grasshoppers ate settlers' laundry, one child proclaimed: *"Oh gosh!... That's disgusting. They ate your LAUNDRY!"* Another child was stopped in a model slave dwelling by her mother, who pointed at the fire and pot where they cooked and said, *"So that was the stove […] could you imagine helping me cook there?"* The child's eyes grew wide and she said, *"No… I could never imagine that… [whispers] oh my gosh…"*

iii) Identify Continuity and Change. According to Seixas (2015), identifying continuity and change involves recognizing similarities and differences between different periods of time. Twenty-eight percent (n= 8) of the 29 children observed in this study engaged in this historical thinking concept during their visit, producing 11 total instances. Unlike using primary sources or taking a historical perspective—which tended to occur outside of conversations with adults—nine out of the 11 total instances of identifying continuity and change emerged in conversation with adult; most were actually initiated by an adult (6 of 9). Only two of 11 instances involved reading a label.

As Figure 5 shows, 46% (n=5) of the 11 instances involved tangible objects. Twenty-seven percent (n=3) instances involved engaging with an interactive, and 2 (12%) instances involved engagement with an object on display. Nine percent of instances involved the child identifying continuity and change while watching a video. In zero instances did a child exemplify an identification of continuity and change while engaging with a photo.

Figure 5: Types of Object Engaged for Each Instance of Identifying Continuity and Change (n=11)

Three themes emerged in children's discussions of continuity and change. These were: discussions that related past and present, discussions that related the past with something specific in their own lives, and discussions that related one historical time period to another. Forty-five percent (n=5) of children who demonstrated this type of historical thinking did so by relating the time periods represented in the hands on history spaces to the present, commenting on change or sameness between these times. One child and father, standing inside a model trolley car reflected on the similarity between a prior time and today:

Dad: "It's kinda weird. We used to have these [trains] and then they tore them out."

Kid: "Yeah?"

Dad: "And now what did they put back in?"

Kid: "Trains."

Another child, at a different site, sat down to play with a polygraph. A docent came over and explained to the child that the polygraph was used to make copies of handwritten letters. The child then replied, *"That's kind of cool,"* before acknowledging the change between then and today: *"We have better things nowadays."*

Thirty-six percent (n=4) of instances identifying continuity and change involved relating something in the past to something personal in their lives. While exploring in a model sod house, a child came across an object that was familiar to her: "*Mommy, this is the same bin we have at _____ and _____'s house!"* she exclaimed, pointing to the contents of a steam trunk. Only two of the 11 instances (approximately 18 percent) involved comparisons between two time periods that were not the present or related to the child's own life. One mother and son duo spent some time recognizing differences between different time periods at a digital map interactive, with different layers for what the area looked like at different times:

Mom: "1945… This is going to have a lot less. So, look, see how this is all undeveloped? [points to area on 1945 map] Now look at 1967 [Mom changes map] 22 years later, look at all the houses that have gone up.

Kid: [closely examines map] Hmmm.

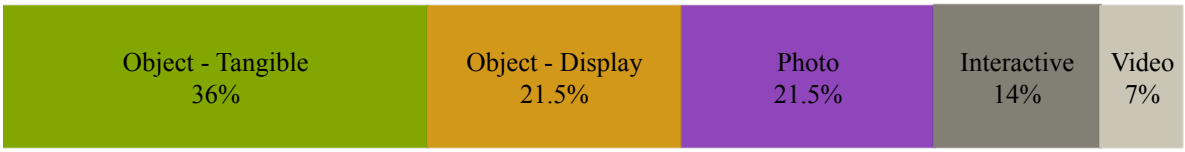
Mom: "And then you'll start to see all the roads, and then now [changes the map to 1980s] see all the roads?

Kid: "That's a lot of roads." [changes map to 2010] "2010… oh, gosh, that's a big building!"

iv) Establish Historical Significance. Establishing historical significance is defined by Seixas (2015) as recognizing the importance or relevance of something in the larger picture of history. Twenty-four percent of the 29 children observed displayed evidence of establishing historical significance at least once in their visit, producing 14 total instances. Of those 14, only five instances (36%) took place in a conversation with an adult. Even fewer, only three instances (21%) were initiated by an adult and only two instances (14%) involved reading a label.

As Figure 6 shows, children engaged with a variety of objects and exhibit features while establishing historical significance. Tangible objects were again engaged most frequently at 36%, closely followed by display objects and photos (both at 21.5%). Two children (14%) established historical significance while engaging with exhibit interactives. Only 1 child (7%) engaged in video while displaying this historical thinking concept.

Figure 6: Types of Objects Engaged For Each Instance of Establishing Historical Significance (n=14)



Children established historical significance in two major ways. Fifty percent (n=7) of the instances involved the child connecting two historical ideas together to establish the significance of what was being presented in the museum exhibit. One child, after looking at a row of desks

and watching a video about Native American schools in the past in Minnesota, declared "*This is like a one-room school house!"* drawing the connection between this representation of school and the idea of schooling in the past that they were familiar with. Another child, after reading a label about Thomas Jefferson's bedspread, was asked by his father, "*Where do you think he got the silk?"* The child thought about it for a second and then replied, "*I don't know, Paris?"* indicating his awareness of the possible origins of silk fabric.

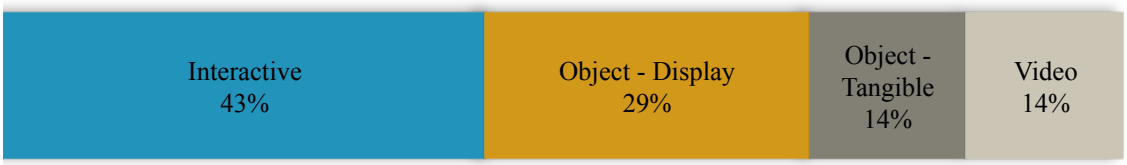
The other 50% (n=7) of instances of establishing historical significance involved the child linking a specific object to a historical idea. One child paused to consider a topsy-turvy doll on display. She then drew her grandpa's attention to it and stated*, "You know what it represents? A white girl and a black girl,"* pointing to the two characters that doll could play with a quick flip upside down. Another child, walking through the exhibit with her younger brother, pointed to a chalkboard that children can play with in the replica nail shop and declared, "*The chalkboard is how they would write*," connecting the object to a different time where writing technology was not the same as today.

v) Understand Moral Dimensions of Historical Perspectives. According to Seixas (2015), understanding moral dimensions of historical perspectives means possessing an understanding of the problems related to judging those of the past, as well as understanding the reasoning and motivation of historic actors and actions. Of the 29 children observed in this study, 21% (n=6) engaged in this type of historical thinking, yielding seven total instances of understanding the moral dimensions of historical perspectives. Of these seven instances, five of them (71%) happened in a conversation between a child and an adult. Three of the seven (43%) involved adult facilitation, and three of the seven (43%) involved reading a label. Children who exhibited this historical thinking concept asked questions about the moral implications of

historical themes, ideas, or objects; provided an evaluative statement about the actions or ideas of the past; or provided an emotional or moral response to the actions of the past.

Figure 7 illustrates the spread of objects children engaged with while exhibiting this historical thinking concept. Forty-three percent (n=3) discussed the moral dimension of history while using an interactive exhibit component. Twenty-nine percent (n=2) engaged with a display object. Both tangible objects and videos were engaged with at a rate of 14% (n=1) of all instances of understanding the moral dimension of history. Zero instances involved engagement with a photo.

Figure 7: Types of Objects Engaged While Understanding the Moral Dimension of Historical Perspectives (n=7)



Children demonstrated understanding the moral dimensions of historical perspectives in three ways in this study. Three of the seven instances involved the child providing a statement evaluating the actions or decisions made by actors in history. One child scanned a QR code on a model bison heart to learn what the body part was, and what the Dakota used it for. The interactive informed the child: *"The heart was used as a sack to carry dried meat!"* The child considered that for a second, looking at the model heart in his hands, and then declared, *"Smart!"* to express his thinking. Two children asked or answered questions of 'why,'

understanding or seeking to understand the motivations behind the history they were exploring. For example, a child and her grandfather were reading through the text of an interactive about civil rights when the following conversation occurred:

> *Grandpa: [after reading aloud about refusing to serve based on race discrimination] "That means, if you were black and you came into my shop, I wouldn't have to serve you."*
>
> *Child: "Yeah."*
>
> *Grandpa: "Do you think that's fair?"*
>
> *Child: "No."*
>
> *Grandpa: "I don't think so either."*
>
> *Child: "Because […]well, if it were a food place then you could make somebody starve to death."*
>
> *Grandpa: "That's not the point. The point is just because you're black or white or yellow or green doesn't mean someone should be able to not serve you."*

Another two children expressed an emotional reaction to the actions of history. In the replica mine, a father and child situated themselves around an interactive that showed how mules were lowered into the mines so they could move heavy loads of iron ore. As they turned the knob that showed the mule being lowered into the mineshaft, the dad explained:

> *Dad: "That's how they would get the donkeys [sic] down there to pull the coal [sic] cars around."*
>
> *Kid: "That's rude!"*

Dad: "How else do you think they would get them down there? There wasn't [sic] elevators. This was their elevator."

Chapter 5: Conclusions and Implications

As the world looks for ways to engage youth in historical thinking, hands-on spaces in history museums exist as a potential method. The purpose of this study was to understand more about this through an examination of children's historical thinking while interacting in these spaces. It observed 29 children as they engaged with the space, and analyzed their behavior using Seixas' (2007; 2015) six historical thinking concepts. With few studies about how children may engage in historical thinking—both in history museums and in classrooms—this study contributes to discussions regarding the importance of hands-on history spaces in museums and the ability of children to engage in historical thinking.

Conclusions

Children engaged in multiple instances of historical thinking in hands-on history spaces. Almost all of the children observed in hands-on history spaces demonstrated evidence of at least one of Peter Seixas' (2007; 2015) six historical thinking concepts. They used primary sources, they took historical perspectives, they identified continuity and change, they established historical significance, and they engaged with the moral dimension of historical perspectives.

This is in line with work by von Heyking (2004), who argues that upper elementary students can think historically given the appropriate amount of support. This finding is, however, in stark contrast to the beliefs of many elementary teachers: research shows that elementary teachers have low expectations for their young students' critical thinking abilities and capabilities to understand abstract or complex historical concepts and therefore do not employ methods that may develop historical thinking (Bolgatz, 2007; Levstik, 2000; Lucey, et al., 2014). This study suggests that the support von Hekying identifies in her work may come from the

hands-on experiences children have in these spaces, the labels they read, and the conversations they have with accompanying adults.

Similar to findings in studies by Barton (2004), von Heyking (2004), and Monte-sano and Reisman (2015), children engaged in historical thinking through conversations with their families about personal and family history. Many of the observed children displayed evidence of historical thinking through conversations with the adults visiting the museum with them while they engaged with the hands-on objects and activities in these spaces. The conversations they had often centered around family experiences or histories, in which the historical concept presented by the object, activity, or exhibit was linked to something familiar to the child—either a family story or something they may remember from their own life. This finding is also consistent with findings of Povis and Crowley (2015) who linked family learning talk—talk in which families explain, connect, and relate the material they are experiencing in the exhibit—to deeper engagement and better understanding of the material. Additionally, research has shown that the combination of conversation and the hands-on engagement that hands-on history spaces allow may help children establish context to what they are doing, lead them to move beyond the concrete object to more abstract knowledge or concepts, and assist children in drawing connections between prior knowledge and new learning (Jant, Haden, Uttal & Babcock, 2014).

While many studies exist that articulate the ways in which children may engage in historical thinking (Barton, 2004; von Heyking, 2004; Monte-Sano and Reisman, 2015), there are not many studies that examine this in a hands-on capacity—despite plenty of research about hands-on experiences and how they relate to embodied cognition (Lozada & Carro, 2016; Renner, n.d.) and multiple discussions of hands-on spaces in museums that theorize about the learning value of these spaces—if it is mentioned at all (Danilov, 1989; Demski, 2009; Villa,

2006). This research, on a broad level, fit into that gap, providing much-needed evidence about the learning value of these hands-on spaces in history museums. This study suggests that children in these spaces engaged in historical thinking, which indicates that these spaces may have learning value.

Children engaged in various types of historical thinking in hands-on history spaces. The most-commonly exhibited historical thinking concept among children in this study was the use of primary sources as a prompt or an answer for inquiries. Overwhelmingly, this was exhibited by children in concert with an object—either a tangible object, such as a replica cipher for children to explore or a display object, such as a cradleboard in a glass case. This finding is consistent with literature about learning in history museums, which states that people mostly engage and learn from objects, as they provide evidence for their inquiries and an authentic experience to explore historical concepts (Alexander, 2010; Tisdale, 2011). According to Wunder (2002), this trend extends from adult visitors to children.

Taking historical perspectives was the second-most common historical thinking concept exemplified by the children in this sample: more than half of the children displayed evidence of this concept through immersing themselves in the time period or event, assessing their response to the conditions of history, or providing an emotional or empathetic response. According to Dyson (2010), this is an essential skill necessary for thinking about history that is facilitated by play. It is unsurprising, then, that the majority of children who took historical perspectives did so with an exhibit component they could manipulate and interact with—either a tangible object or an exhibit interactive. Dyson argues that through play—in this case, play with objects—the taking on of historical perspectives can occur through an exercise of imagination.

Analyzing cause and consequence was not observed amongst children in this study. This is consistent with Barton (2004) and von Heyking (2004), who both highlighted limitations of children's historical thinking. To Barton, children have the tendency to view the events of history as one linear narrative, without understanding the complexity of the events and how events may overlap. Von Heyking adds that children may also be unable to understand the scale or magnitude of historical events, which suggests that they may be unable to understand the ability for one event to cause or be the consequence of another. However, this does not mean that it is not possible for children to engage in analysis of cause and consequence—it simply means that the children in this study did not exemplify analysis of cause and consequence in their engagement in the exhibit, possibly due to the design or content of the space.

Hands-on experiences with objects may provide the structures necessary for children to engage in historical thinking. Children in this study most commonly demonstrated historical thinking when interacting with objects they could manipulate or touch. This is consistent with Renner (n.d.) who wrote, "When children manipulated interactive exhibits in the museum—opportunities they actively sought—they achieved feats of complexity," (p. 1964). Findings from this study are consistent with those of Lozada and Carro (2016) and Renner (n.d.) who found that when children actively manipulate materials, they are more likely to engage in higher cognitive processes. Additionally, researchers who examined visitors' interactions with objects in museums stressed that sensory experiences with objects is critical (Tisdale, 2011; Alexander, 2010). Research on embodied cognition indicates that children are more capable of complex thinking—like historical thinking—when they manipulate objects, which is consistent with the results of this study (Alexander, 2010; Lozada and Carro, 2016; Renner, n.d.; Tisdale, 2011;).

Children observed in this study displayed types of historical thinking while having hands-on experiences that are consistent with the literature, as well. Henriksen, Good, Mishra, and the Deep-Play Research Group at Michigan State University (2015) identify empathizing—imagining oneself in another's position to experience they world as they do—as a key component of embodied cognition. This definition of empathizing is consistent with historical perspective taking, one of the historical thinking concepts observed in this study. In this sample, historical perspective taking was overwhelmingly observed when a child was interacting with a tangible object. Taking on these perspectives was also the second-most common historical thinking concept; more than half of children engaged in this historical thinking concept by either indicating immersing themselves in the context of the time, assessed the conditions and how they would feel about the context of the time, or had an emotional or empathetic response to the time period represented.

Implications

The results of this study have numerous implications for both history learning research and museum practice. The children observed in this study engaged in almost all of Seixas' (2007; 2015) six historical thinking concepts. Only analyzing cause and consequence was not exhibited by any children in this study. This could be a function of the exhibit contents or design, the context provided by conversations with others in the group, or the child's cognitive developmental level. However, the sample size is too small to make a clear indication of the reasons behind this deficiency. Further research would be necessary in order to understand this finding.

What this study does show is that children are capable of displaying evidence of historical thinking in hands-on history spaces. Future researchers could take the rubric utilized by

this study and use it to understand the behaviors of children in other exhibits of this nature. For example, researchers could examine differences in behaviors in exhibits with different elements (those that provide immersive environments versus those that do not, those that provide costumes versus those that do not, and others), or they could conduct this study with an experimental design, where the same information is presented in a traditional museum exhibit (displays and labels) and in a hands-on exhibit (with objects and interactive components), to more concretely understand if the hands-on experiences are what leads to historical thinking in these spaces, or if children are capable of historical thinking independent of hands-on experiences.

This study indicates that hands-on experiences with objects may be influential in children's thinking and learning in history museums, which is consistent with literature on embodied cognition and history learning in museums (i.e. Alexander, 2010; Lozada and Carro, 2016; Renner, n.d.; Tisdale, 2011). As such, history institutions should consider the inclusion of hands-on experiences with objects as part of their interpretation of historical concepts. Both literature and the findings of this study indicate that these experiences provide opportunities for historical thinking in young visitors, something they may not be yet afforded the opportunity to do in a formal education realm (Bolgatz, 2007; Levstik, 2000; Lucey, et al., 2014).

Final Thoughts

This study indicates that children in hands-on history spaces are capable of employing historical thinking as they explore and make sense of the environments that surround them in museum exhibits. These skills are viewed as essential to an informed democracy: the same skills used to make sense of and contextualize a rotary dial phone in a museum exhibit, for example, are the same used to think about the information presented in an article on social media (Wineburg, 2016). Because these skills are generally not being developed in formal education

venues (per Bolgatz, 2007; Levstik, 2000; Lucey et al., 2014), museums have the unique opportunity to fill this void and facilitate the development of these essential skills in their young visitors. History museums should embrace this opportunity, as it bolsters their relevance in the development of their communities. As history museums continue to identify and argue for their relevance in this changing world, they should consider their potential impact on their young visitors.

It is my hope that, through further research and pursuit of historical thinking and hands-on history learning in children, the conversation surrounding children's cognitive abilities and aptitude to think abstractly will change, in the subject of history and beyond. As this study begins to indicate, the capabilities for children to engage in practitioner-related thinking are there—with the potential to be solidified by further research and exploration.

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Appendix A
Data Coding Indicators

Establish Historical Significance

Seixas ' Definition:
Understanding what is historically significant, beyond what is simply interesting to them

Indicators:
Verbal:
Recognizing the importance or relevance of the object in the larger picture of history
For example: "This is part of (x phenomenon/period in history)"; "This is important because _____"; "This relates to (x historical event)"; "This is what the (pioneers) did!";

Referencing period-specific object/event
For example: "where is the outhouse?!" (understanding that indoor plumbing was not present at that time;

Physical:
There are no physical indicators of this concept.

Use Primary Evidence

Seixas' Definition
Involving the source itself, the context of the source, and the questions that drive the inquiry which make up this primary source evidence

Primary Sources are all materials that have not been interpreted; these can be: objects (both artifacts and reproductions), photographs, quotations, maps, etc. They are **not** exhibit text, interactive games that do not involve exhibition objects, secondary account books, etc.

Indicators:
Verbal:
"Reading"/Interpreting/Explaining Primary Source
For example: "This (primary source) says…"; Verbally guessing what an object is, even if they are wrong

Using the source/object to ask or answer questions
For example: "What is this (primary source)?" (followed by close examination); "What is it used for?"

Calling attention to an aspect of the object/source
For example: "Look at the color of this!"

Physical
Close examination of object/artifact/source
For example: leaning in and closely looking at the source; handling or touching the source

Using Primary Source/Evidence as context to understand other objects in the area
For example: reading an excerpt from a letter to understand an object

Reading a primary source
NOTE: not exhibit text, unless exhibit text is a direct quotation

Gesturing at or referencing object/source when providing an explanation for historical event/idea

Trial and error about what a source might be or do

Identify Continuity and Change

Seixas' Definition:
What changed and what stayed the same over time?

Indicators:

Verbal
Recognizing what is similar or different to another period or today
For example: "This different from ____ that we use today!"; "This isn't how it is anymore." "This is the same trunk we have at grandma's house!" "They didn't have electricity during this time like they do today;" "This fridge wouldn't have bananas at this time."

Physical
There are no identified physical indicators of this concept.

Analyze Cause and Consequence

Seixas' Definition
Explaining cause (including structures and conditions inherited from the past and the choice available at any particular moment); Human decision-making examined in terms of choice and intention.

Indicators:

Verbal
Recognizing what caused or was a result of certain historical objects or events
For example: "_____ caused _____ to happen."; "This happened because of _____."

Physical
There are no identified physical indicators of this concept.

Take Historical Perspectives

Seixas' Definition:
Contextualizing; taking on the perspective of the time;

Verbal
Identifying with person or period represented
For example: "Look, Mom! I'm a Pioneer!"
Verbalizing a personal emotional response to the conditions of history
For example: "I would be so scared."; "I wouldn't want to be a miner"; "This is hard."

Physical
Acting out the period displayed through role play or dress up
This includes pretend play using historical or history-representing objects
Immersing themselves fully in a replica environment
For example: showing concern for safety in the Mine interactive at Minnesota History Center

Understand Moral Dimension of Historical Perspectives

Seixas' Definition
Understanding the problem of judging actors and actions from the past; Understanding reason and motivation

Verbal
Asking questions about moral implications of historical themes/ideas/objects
For example: Asking parents/guardians "Why was this ok then?"; "Why didn't they (offers different suggestion)?"
Providing an evaluative statement about the actions/ideas of the past
For example: "That'd be a dumb place to put it then."
Providing an emotional/moral response to the actions of the past
For example: "That's sad!"