Historical Thinking Through Historical Doing:

The Impact of Wearing Armor on Visitor Thinking in Arms and Armor Galleries

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Abstract

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Many museums invite the public to touch, handle, and even wear historical objects from their collections, whether originals or replicas, using these experiences to illustrate the past for their visitors. The purpose of this study was to explore how wearing armor affects people's historical thinking about arms and armor. This was a descriptive survey study, in which twenty adults tried on replica armor before visiting the arms and armor gallery at the Walters Art Museum, Baltimore, MD. After exploring the gallery, participants were interviewed about their thoughts in the gallery and how their experience wearing armor influenced those thoughts. Findings indicate that there is no overarching trend in visitor interest in armor, that visitors most commonly report a deeper understanding of armor as a physical object as a result of trying on armor, and that wearing armor influenced participants' historical thinking by prompting them to take on an historical perspective. These findings will be of most direct application to large art and encyclopedic museums with significant arms and armor collections, and may be of use to any museum offering visitors the chance to handle, wear, or use historical objects.

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Chapter One: Introduction

In the beginning of Chretien de Troyes's twelfth-century romance *Perceval*, the title character is so impressed by the armor of the knights he meets that he concludes they must be God and his angels out for a ride. As steel armor has faded from the battlefield, many examples of it have found their way into museum collections. Where relevant, such artifacts appear in historical museums, but some of the more finely crafted examples are displayed by art museums. Perhaps hoping to foster a sense of wonder like Perceval's in their audiences, some museums have begun inviting the public to touch, hold, and even try on their armor collections. One notable example is the Wallace Collection in London, which hosts a weekly event wherein the public may try on pieces of historical armor as well as replicas. The Art Institute of Chicago, the Metropolitan Museum of Art, and the Worcester Museum of Art have also let visitors try on original and replica armor, more often during controlled demonstrations. The stated purpose of such hands-on interaction varies, ranging from public outreach and community engagement to the explicitly educational.

Museums and heritage institutions frequently employ touchable learning collections to teach the public on their subject of choice. Seattle's MOHAI and Burke Museum, for instance, have historical and cultural objects for learners to touch and examine to complement the museums' exhibits. Others offer reconstructed historical spaces to explore, such as the Field Museum's Pawnee Earth Lodge exhibit and the Royal BC Museum's Becoming BC Galleries. Some living history sites, like Old World Wisconsin, Plimoth Plantation, and Colonial Williamsburg, even invite the public to work and play alongside their first-person interpreters. In all of these cases, touch, immersion, and participation are put to use for educational purposes. The impact that handling and wearing armor has on visitors' learning outcomes as they go on to

explore arms and armor collections in traditional galleries has thus far gone largely unexamined, however. In the absence of literature on the subject and a field-wide agreement on what constitutes best practices, each museum is essentially blazing their own trail when piecing together such programs.

If there is no literal fire, then there is certainly smoke. For one thing, the role of physicality and bodily activity in learning has been studied in other contexts, yielding embodied learning theory. This is the concept that learning and cognition are not necessarily purely abstract processes, but incorporate the sensory and motor information perceived by the learner.[1] Furthermore, interactivity and role-play in history museums have been shown to lead to greater visitor engagement and improved knowledge retention.[2]

If nothing else, the literature suggests that physically *doing* something has some effect on one's thought process. Susan Goldin-Meadow and Sian L. Beilock argue that gesture translates previous action into a mental model that shapes understanding of that action and its object.[3] Similarly, Jessica K. Witt, David Kemmerer, Sally A. Linkenauger and Jody Culham found that the mental simulation of operating a tool- being able to reach out, grasp it, and put it to effective use even if one does not intend to- is valuable in recognizing said tool and its function.[4] Taken together, these studies indicate that having once handled and used an object makes one better able to recognize and understand similar objects in the future. This idea seems to have been recognized by Björn B. de Koning and Huib K. Tabbers, who, in a series of recommendations on

[1] Wim T.J.L. Pouw, Tamara van Gog, and Fred Paas, "An Embedded and Embodied Cognition Review of Instructional Manipulatives," *Educational Psychology Review* 26, no. 1 (March 2014), 59.
[2] John H. Falk, Carol Scott, Lynn Dierking, Leonie Rennie, and Mika Cohen Jones, "Interactives and Visitor Learning," *Curator: The Museum Journal* 47, no. 2 (April 2004), 180-181; 186-187.
[3] Susan Goldin-Meadow and Sian L. Beilock, "Action's Influence on Thought: The Case of Gesture," *Perspectives on Psychological Science* 5, no. 6 (November 2010), 672.
[4] Jessica K. Witt, David Kemmerer, Sally A. Linkenauger, and Jody Culham, "A Functional Role for Motor Simulation in Identifying Tools," *Psychological Science* 21, no. 9 (September 2010), 1217.

the application of embodied learning theory, argue for giving learners the chance to manipulate an object in order to better understand its movement, and go on to suggest that replicating an object's movement with one's own body helps one better understand said movement.[5] Wearing armor, by its nature, is both.

Having a simulated historical experience also helps museumgoers "remember" history. Susan Evans has argued that meeting "historical figures" through roleplay makes for a deeper understanding of the historical subject at hand,[6] and Anthony Jackson and Helen Rees Leahy found that a similarly deeper understanding resulted from hands-on handling of historical objects.[7] Bringing the hands-on and the roleplay together, Charlotte Abilgaard Paulsen found that students' knowledge and understanding of monastic life was deepened by "living as monks" for a few hours at a living history site recreating a medieval monastery.[8] Trying on armor for a moment is not nearly as in-depth as the examples from these studies, but is nevertheless a simulated historical experience.

Getting into the headspace of historical people is the purpose of the historical thinking model now gaining traction. Peter Seixas, one of the luminaries of this model, has argued for six pillars of historical thinking in history education, namely historical significance, primary source evidence, continuity and change, cause and consequence, historical perspective-taking, and the ethical dimension.[9] Observing historians at work, Christine Baron posits five heuristics that characterize their approach to studying historical buildings, which she lists as origination,

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[5] Björn B. de Koning and Huib K. Tabbers, "Facilitating Understanding of Movements in Dynamic Visualizations: An Embodied Perspective," *Educational Psychology Review* 23, no. 4 (December 2011), 517.
[6] Susan Evans, "Personal Beliefs and National Stories: Theater in Museums as a Tool for Exploring Historical Memory," *Curator: The Museum Journal* 56, no. 2 (April 2013), 195.
[7] Anthony Jackson and Helen Rees Leahy, "'Seeing it for real …?'—Authenticity, Theatre and Learning in Museums," *Research in Drama Education* 10, no. 3 (November 2005), 311-312.
[8] Charlotte Abilgaard Paulsen, "Teaching Through Living History – An Educational Role-Play Featuring Life at an Abbey in the Fourteenth to Fifteenth Century," *Journal of Community Archaeology & Heritage* 6, no. 1 (2019), 34.
[9] Peter Seixas, "A Model of Historical Thinking," *Educational Philosophy and Theory* 49, no. 6 (2017), 598-603.

intertectonality, stratification, supposition, and empathetic insight.[10] Seixas's approach is meant for classrooms, whereas Baron's observations are based on professional historians, but Mary Alexander has proposed six similar "Learning Strands for History Museums,"[11] indicating that there is already discussion on how this model might be applied in a museum setting.

The purpose of this study, therefore, is to explore how wearing armor- a physically simulated historical experience- affects how people learn and think about armor in arms and armor galleries. This study is designed to answer three key research questions:

1. What interests art museum visitors about armor?
2. What effect do museum visitors say wearing armor has on their thinking in an arms and armor gallery?
3. How does trying on armor impact art museum visitors' historical thinking in arms and armor galleries?

This study will be of most immediate use to art museums in possession of sizeable arms and armor collections, as the data has been collected at just such an institution. That said, any museum planning to hold hands-on activities with historical clothing and equipment should be able to apply this research. Based on these findings, such museums will be able to more fully understand the educational impact of hands-on activities involving wearing and using historical clothing and equipment, like armor, and can plan their programming accordingly.

[10] Christine Baron, "Understanding Historical Thinking at Historic Sites," *Journal of Educational Psychology* 104, no. 3 (2012), 844.
[11] Mary Alexander, "What are the ''Six Strands'' for History Museums?" *Curator: The Museum Journal* 53, no. 2 (April 2010), 243-244.

Chapter 2: Literature Review

There is not, as yet, literature on the educational impact of handling and trying on armor. Taking a step back, there is not much in the way of literature specifically on the educational impact of handling and trying on the clothing or equipment of any given historical setting or modern profession. Looking at the practice head on, we are in the dark.

The role of physicality and bodily activity in learning *has* been studied in other contexts, yielding embodied learning theory. Furthermore, interactivity and role-play in history museums are established as leading to greater visitor engagement and improved knowledge retention. On a more abstract level, a growing body of work on historical thinking has begun to emerge, stressing the importance of fostering historical empathy as a means of learning history. As such, the phenomenon of handling and wearing armor in the course of informal learning- a process which engages the body and creates a lived historical experience for the visitor- merits further study.

This brings us to three major strands of literature informing this study. One is embodied learning through physicality. Another is the role of interactive, hands-on, and simulated experiences in learning. A third, related to the second, is the emerging corpus on historical thinking, a framework for developing a better understanding of history through, in part, historical empathy. Frequently studied independent of one another, the three nevertheless converge in the case of hands-on armor interactives in museum settings.

Embodied Learning

Setting aside any content or deeper historical understanding that may be gleaned from the encounter, at its most basic, the process of wearing a piece of armor is a physical action. As it happens, there has been research done on physicality and learning, often referred to as embodied

learning. This learning theory has yet to see widespread application in museum settings, but it is nevertheless quite relevant to the experience of handling and trying on historical armor.

On its face, this theory shows promise in relation to hands-on programming and education about armor. In their paper on embodied learning's application in helping people understand mechanical diagrams, Bjôrn B. de Koning and Huib K. Tabbers argue that mimicking the movement of a mechanical object with one's own body and handling that mechanical object oneself lead to a better understanding of how such an object functions in learners.[12] Given that one of the most commonly stated misconceptions about historical armor is "you couldn't move in it," de Koning and Tabbers's recommendations suggest that handling and trying on armor will have a discernible effect on museumgoers' understanding of the pieces on display in the galleries.

Susan Goldin-Meadow and Sian L. Beilock, in writing about gestures and thought, argue that gesture shapes one's thinking, replicating a previous action in a sort of metaphor or mnemonic that informs the gesturer's understanding of objects and action.[13] This particular argument deals with gesture largely independent from real actions and physical objects, but it dovetails nicely with work done by Jessica K. Witt, David Kemmerer, Sally A. Linkenauger and Jody Culham on motor simulation and object recognition. Witt and her team had test subjects squeeze a rubber ball and identify tools and animals in pictures they were shown. When the tools in the pictures were oriented with their handles towards the hand squeezing the rubber ball, test subjects were less able to identify them than the animals and those tools oriented with handles towards the test subject's free hand. Witt and her team argue that, since participants were less able to identify tools whose handles were oriented towards a hand already occupied,

[12] De Koning and Tabbers, "Facilitating Understanding of Movements in Dynamic Visualizations," 517.
[13] Goldin-Meadow and Beilock, "Action's Influence on Thought," 672.

the mental simulation of operating a tool, being able to reach out, grasp it, and put it to effective use even if one does not intend to, is valuable in recognizing said tool and its function.[14]

According to Goldin-Meadow and Beilock, gesture translates previous action into an abstract mental model that shapes understanding of that action and its object, and according to Witt et al. the physical ability to operate (that is to say, act upon) an object, independent of any intention to do so, affects one's ability to recognize that object. The average museumgoer has no experience handling armor, as armor (at least of the sort seen in an art museum) is not in common use any longer, and so neither the motor simulation described by Witt et al. nor the gesture as recollection of action described by Goldin-Meadow and Beilock come into play when they browse arms and armor galleries. Visitors who try on armor, however, may learn and subsequently remember the physical actions that go along with wearing armor, which in turn they may incorporate into their understanding of armor through gesture, and which may teach them, through motor simulation, to understand the functionality and use of armor.

Embodied learning theory applies not just to abstracts and hypotheticals like these, but to real world educational goals, with applications both suggested and tested. Robb Lindgren and Mina Johnson-Glenberg, for instance, have recommended the use of "mixed reality" activities in which students can move and act upon a simulated environment to make use of embodied learning in school settings,[15] suggesting that these principles can be put to work for specific learning goals, rather than being some untamable function of the mind. Early adopters of such practices report success, such as in Margaret Branscombe's research on third grader reading comprehension. Students in the study made tableaus of scientific concepts they had learned,

[14] Jessica K. Witt, David Kemmerer, Sally A. Linkenauger and Jody Culham, "A Functional Role for Motor Simulation in Identifying Tools," *Psychological Science* 21, no. 9 (September 2010), 1217.
[15] Robb Lindgren and Mina Johnson-Glenberg, "Emboldened by Embodiment: Six Precepts for Research on Embodied Learning and Mixed Reality," *Educational Researcher* 42, no. 8 (November 2013), 448-450

becoming effectively living illustrations. Having analyzed what students had written about their experience making tableaus, Branscombe reports that students displayed improved comprehension of the material, and that they attributed this directly to their experiences physically acting out the concepts.[16] These examples deal primarily with children's education, but Carly Kontra, working alongside Goldin-Meadow and Beilock, argues convincingly that embodied learning has application in educational experiences for all ages.[17]

Interactives, Hands-On and Simulated Experiences, and Learning

More than simply being physical, as in the case of a gesture, trying on armor and moving about in it is also interactive, and research shows that hands-on participation, learning by doing rather than passive reception of information, benefits learners. Amber M. Bigler and Nikki L. Hanegan found, in a study on biology students' content knowledge, that active, physical participation in carrying out experiments about biotechnology improved students' retention of information and engagement with the material, in comparison with classroom lecture.[18] This lends credence to the impression that active participation, learning by doing, as it were, will yield a deeper and richer understanding of content than passive observation and reception of information.

In another study, Ernest N. Biktimirov and Linda B. Nilson assessed the value of hands-on learning among adult students in a college finance course. A control group was taught using traditional lecture methods, while the instructor of the treatment group used a digital learning object, essentially a computer game in which students could use sliders to observe the effect of

[16] Margaret Branscombe, "Showing, not Telling: Tableau as an Embodied Text," *The Reading Teacher* 69, no. 3 (November/December 2015), 326.
[17] Carly Kontra, Susan Goldin-Meadow, Sian L. Beilock, "Embodied Learning Across the Life Span," *Topics in Cognitive Science* 4, no. 4 (2012), 733-736.
[18] Amber M. Bigler and Nikki L. Hanegan, "Student Content Knowledge Increases After Participation in a Hands-on Biotechnology Intervention," *Journal of Science Education and Technology* 20, no. 3 (June 2011), 252.

the values and amounts of different assets on a stock portfolio. Students with high GPAs- implicitly, students who already had a stronger grasp on the foundational material of the course- saw little benefit from using the digital interactive as opposed to learning in a traditional lecture format. Student with low GPAs, however, finished the class with a much higher grade in the interactive group than in the lecture group.[19]

The benefits of participation and interactivity in learning have been borne out in museums as well as classroom settings. In a 2002 study on the impact of interactives in museums, John Falk and his team found that interactives helped visitors build up content knowledge on the subject of the interactive, shift their perspective, develop deeper interest in the subject, and learn more about others' connections to the subject.[20] In the long term, the study found that these same interactives informed a lasting change in attitudes and perceptions about the subject of the interactive in the vast majority of participants.[21] Although generalized here, Falk's findings clearly indicate that museum visitors who engage with interactives in museums come away with deeper and more lasting lessons than their counterparts who passively observe museum exhibits. It follows, therefore, that people who take part in hands-on arms and armor displays may learn something as well.

Susan Evans has argued that allowing audiences to interact with historical figures and narratives through roleplay makes for a deeper understanding of the historical subject at hand, with museum visitors not just learning facts and dates but integrating simulated historical experiences into their lives and identities.[22] In this case, the roleplay took the form of sitting as a

[19] Ernest N. Biktimirov and Linda B. Nilson, "Adding Animation and Interactivity to Finance Courses with Learning Objects," *Journal of Financial Education* 33 (Summer 2007), 45.
[20] Falk et al., "Interactives and Visitor Learning" 180-181.
[21] Ibid, 186-187.
[22] Evans, "Personal Beliefs and National Stories," 195.

juror in a mock trial of John Brown, a far cry from trying on pieces of armor in a museum gallery or classroom. Nevertheless, it points to the value of a lived experience, even a simulated one, in the construction of historical knowledge, and although arms and armor collections are most often displayed by art museums rather than history museums (at least on this continent), their status as functional objects makes them something of an overlap between the historical and art historical.

In a similar vein, Lara Rutherford-Morrison argued, in her analysis of the Blists Hill Victorian Town heritage site, that recreating an historical experience, rather than simply displaying artifacts, helps visitors learn about historical realities by essentially letting them construct memories, and thus knowledge, of them.[23] Speaking of memory and learning, Charlotte Abilgaard Paulsen set forth a similar idea when discussing the Om Abbey Museum's practice of having students take on the roles of novice monks for the duration of their visit, right down to issuing woolen habits. In living as monks, even if only for a few hours, students could incorporate the memories of this experience into their understanding of historical realities, creating both a deeper knowledge and understanding as well as making them more enthusiastic teachers of the subject to others.[24] Anthony Jackson and Helen Rees Leahy agree with this line of thinking in their study of children's experiences with first-person interpreters and hands-on interactions with collections objects at the People's History Museum in Manchester, UK, in which they found that the children studied were better able to recall the content they had learned at the museum because they had acted out and come in very real contact with the history they were meant to be learning.[25] This literature highlights the very real benefits of active participation and interactivity in learning about historical realities, in that doing so lets visitors

[23] Lara Rutherford-Morrison, "Playing Victorian: Heritage, Authenticity, and Make-Believe in Blists Hill Victorian Town, the Ironbridge Gorge," *The Public Historian* 37, No. 3 (August 2015), 100.
[24] Paulsen, "Teaching Through Living History," 34.
[25] Jackson and Leahy. "'Seeing it for real …?'" 311-312.

develop a stronger connection to the content and a deeper understanding of it rooted in lived experience. Jackson and Leahy's study found that it was the construction of historical narratives that included the learners, however, not just the chance to handle historical objects, that accounted for these educational benefits,[26] suggesting a limit to the educational value of hands-on experiences alone. Conversely, Jennifer Wild Czajkowski has reported that the creation of a more "real" feeling context for objects has seen success at the Detroit Institute of Arts in making visitors feel a greater connection with the art on display,[27] suggesting that such interactivity need not be a fully immersive role-playing experience in order to benefit learning.

Historical Thinking

Peter Seixas, one of the luminaries of historical thinking, lays out six pillars of historical thinking, namely historical significance, primary source evidence, continuity and change, cause and consequence, historical perspective-taking, and the ethical dimension. Historical significance, in Seixas's model, refers to the ability to articulate why an historical event, person, or object is of importance in understanding a broader historical narrative, rather than purely as novelties and curios.[28] Primary source evidence refers here to the assessment of a given text or artifact in light of what the learner knows about its context to draw further conclusions about that context and build a fuller understanding of history.[29] The concept of continuity and change is concerned with how developments in the past did and did not alter the course of history, and comparing and contrasting different periods and historical settings, the present included.[30] Cause and consequence, on the other hand, is more concerned with assessing how the context, needs,

[26] Ibid, 313-314.
[27] Jennifer Wild Czajkowski, "Changing the Rules: Making Space for Interactive Learning in the Galleries of the Detroit Institute of Arts," *The Journal of Museum Education* 36, no. 2 (Summer 2011), 175-176.
[28] Seixas, "A Model of Historical Thinking," 598.
[29] Ibid, 599.
[30] Ibid, 600.

and priorities of a given historical agent informed their decisions and actions, and how those decisions and actions in turn led to specific historical outcomes.[31] Historical perspective-taking, in Seixas's view, is not simply empathy for the people of the past, but is instead the use of the evidence and resources available to approximate, as closely as possible, the mindset, values, and experiences of historical people and momentarily adopting them to gain further insight into the past.[32] The ethical dimension refers to grappling with questions of what the relationship of modern people ought to be to the past, whether to neutrally acknowledge, condemn and remedy, memorialize, or some combination thereof.[33] These six concepts are not independent of one another, but are rather interconnected and build on one another. For example, to properly assess cause and consequence one must take on historical perspective, which one cannot do without drawing on primary source evidence.

Looking at arms and armor in a case, the viewer may try and imagine what it must have felt like to have worn such a thing and could draw conclusions about the wearer's life accordingly, but if they themselves have worn armor they may not need to fill in so many gaps with their own imagination. Rather, they might *know* what it is like to wear armor (albeit for a moment in a museum, rather than for hours at Tilbury preparing to repel invaders) and thus be able to more accurately and fully conceptualize an historical reality.

Seixas's proposed model is echoed by Christine Baron, who studied the way that historians "read" historic buildings. Following her observations of historians, Baron posited five heuristics: origination, intertectonality, stratification, supposition, and empathetic insight.[34]

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[31] Ibid, 601.
[32] Ibid, 601-602.
[33] Ibid, 602-603
[34] Christine Baron, "Understanding Historical Thinking at Historic Sites," *Journal of Educational Psychology* 104, no. 3 (2012), 844.

Baron describes origination as the historian's endeavor to understand the sundry needs and motivations that caused a given building to be constructed at a given place. In the process of intertectonality, the historian assesses the building in light of what they have learned from similar historical buildings to get a sense for how this building compares. Stratification refers to the historian identifying the successive layers of additions and modifications to a building and using these to inform their understanding of the building's history. In supposition, the historian uses the available evidence and their preexisting understanding of the subject to set forth a hypothesis to explain some element of the building not immediately accounted for by the evidence at hand. Empathetic insight here refers to the historian coming to a conclusion about how historical people experienced the building, based on the evidence available at the site and their prior knowledge. The two models are not simply mirrors of one another, but both describe the same aim and process, namely building a deeper and richer understanding of history by taking what is known about the past and using that to inform further insights into the past in a virtuous cycle. In short, historical thinking. Museum visitors viewing armor in a gallery are not professional historians examining ruins and historic buildings, but they are, in a very loose sense, amateur historians. As such, it seems probable that giving them a simulated historical experience in the form of wearing armor will allow them to better "read" the armor they view in the galleries and come to what Baron might call empathetic insights.

Kristy Brugar studied elementary school students who had been taught social studies using "disciplinary-specific practices." Put another way, the students had learned historical literacy as if they were historians, which is to say that they were trained to think critically about primary sources and to seek to understand their historical context in a way that built a more comprehensive understanding of the past, as Seixas and Baron recommend. Brugar found that

the students who had been taught in this way performed better than the control group on social studies assessments.[35] This would suggest, then, that Seixas's and Baron's model is indeed an effective means of deepening historical learning. Creating a fuller historical context in the visitors' minds by offering the chance to try on armor could therefore allow said visitors to better adopt historical perspectives, as Seixas might say, and achieve the empathetic insights Baron writes of.

Seixas's model was designed with classroom learning in mind, and Baron's version describes professional historians in the field. That said, Mary Alexander has proposed six strands of learning for history museums in response to similar work applied in science museums.[36] A number of these strands run closely parallel to Seixas's historical thinking concepts. "1. Interact with real objects, documents and settings" and "2. Assess data (written, aural, visual and three-dimensional) to support an argument" essentially describe using primary source evidence, for instance. "3. Use evidence to explicate abstract concepts such as progress, nationalism, manifest destiny," arguably touches upon historical perspective-taking, as it entails developing an understanding of the values, ideals, and foundational assumptions of historical people. Her fourth and fifth strands, "Appreciate the impact of place on human interactions (landscape, architecture, personal and private environments)" and "Sense the consequences of change on individuals and institutions," overlap with Seixas's concept of cause and consequence, with the latter spilling over into continuity and change and historical significance as well. The two sets are not in complete harmony, of course. It is difficult to isolate Seixas's ethical dimension in Alexander's six strands, for example, lest "Be inspired to pursue a new interest and

[35] Kristy A. Brugar, "Teaching Social Studies/History to Elementary School Students Through a Discipline-Specific Approach," *Journal of Education* 196, no. 2 (2016), 107.
[36] Alexander, "What are the ''Six Strands'' for History Museums?" 243-244.

learning adventure" be deemed a moral imperative, and one strand taking on three concepts by mathematical definition precludes a one-to-one comparison. Nevertheless, Alexander's six strands and their overlap with Seixas's model indicates that museum educators are already beginning to apply historical thinking frameworks to foster learning.

Taken as a whole, this literature strongly suggests that the practice of handling and trying on armor has an impact on what museumgoers learn when proceeding through relevant galleries. Physicality has been shown to be valuable in learning, both subconsciously in the way movement and thought interact as well as when knowingly applied in classroom settings. Furthermore, we have seen that interactives are useful in general, and immersive, hands-on interactives even more so. Moreover, models of historical thinking used to develop deeper, fuller understandings of the past stress the value of historical empathy and have shown results. As such, it is worth examining the impact of trying on armor before viewing an arms and armor gallery, a practice that engages visitors in an interactive, physical simulated historical experience which creates a context in the visitor's mind for understanding what they are viewing.

Chapter 3: Methods

So, what do museum visitors who wear armor take from the experience? As outlined in the previous chapter, research on embodied learning and historical thinking indicate that physically taking part in a simulated historical experience, as opposed to passively viewing historical artifacts, is likely to have some impact on what one learns. As such, the purpose of this study was to explore how wearing and using armor affects how people learn and think about armor in arms and armor galleries. This study was a descriptive survey,[37] carried out through semi-unstructured interviews[38] with visitors to museum galleries displaying arms and armor.

Participants

A total of twenty adults participated in this study, all at the Walters Art Museum in Baltimore, MD. These participants ranged in age from twenty-one to forty-nine years old, with a median age of twenty-six. Six women and fourteen men were interviewed as part of the study.

Data Collection

Participants in this study were adult visitors the Walters Art Museum's arms and armor gallery. Visitors were approached at random and asked whether they had visited the arms and armor gallery in the last year and if they had ever worn armor before. If they answered "no" to both questions, they were invited to participate in the study. The researcher explained to them the purpose of the study, and that the study entailed a short activity in which they would try on armor, followed by a brief interview once they had finished browsing the galleries. Those visitors who declined were thanked for their time and sent along their way. Those that agreed to take part in the study were taken aside to begin the procedure.

[37] Alison Jane Pickard, *Research Methods in Information: 2nd Edition* (Chicago, IL: Neal-Schuman, 2013), 112-113.
[38] Ibid, 199-200.

Willing participants were brought to a table displaying replica sixteenth-century armor to cover the torso and upper thighs. Participants donned the armor, with the researcher assisting when requested, and had the opportunity to stretch and walk around briefly before removing the armor and proceeding into the gallery, having been asked to return afterwards for an interview. During this process, participants were given only "tombstone" information about the armor they wore (its material composition, what it was called, the approximate date and region of the design), but nothing more in-depth. Those with further questions were told to ask them after the interview.

Participants were instructed to view the arms and armor gallery as they normally would and return to the researcher for the interview portion of the study. Participants were asked a series of questions about their experience viewing armor in the gallery and how they believed trying on armor influenced these experiences and the way they thought about the armor on display (see Appendix A for the interview guide). The researcher prompted participants for further information when appropriate. At the end of the interview, the researcher asked participants their age and gender identity, for the purposes of explaining the study's applicability. These interviews were recorded and lasted between three and ten minutes.

Data Analysis

After interviews were conducted, they were transcribed. The researcher analyzed the data by identifying emergent patterns and themes relevant to the research questions. Coding rubrics were developed and reviewed by another researcher who was not involved in the study.

Limitations

Participants in this study were all able-bodied adults, capable of wearing steel armor weighing over twenty pounds. As such, the results of the study can only be said to apply to able-

bodied adults with full certainty. Children or adults with physical disabilities may indeed experience similar effects from trying on armor before viewing armor in museum galleries, and further study of this would be valuable. The findings of this study, however, do not directly apply to them.

Participants in this study were also already planning to visit galleries featuring arms and armor in museums that they were already in. At its most basic, this indicates that the findings of this study apply directly to populations that are already more likely to visit art museums for pleasure (such populations tend to be more white[39] and more affluent[40] than the general population). Furthermore, although visitors who had visited the galleries displaying arms and armor within the last year were filtered out in the screening process, the fact that participants were already planning to visit galleries featuring arms and armor suggests that they already had some interest in, and therefore thoughts about, armor. A person completely uninterested in armor may produce different results.

This study dealt directly with historical European armor. While concepts of historical thinking and embodied cognition are applicable in a range of museum contexts, the findings of this study are specific to the effects of trying on armor before viewing arms and armor galleries. The relatively alien nature of historical European armor to the modern museum visitor may mean that these findings will not bear out in hands-on educational activities with antiquated tools or garments whose function is fulfilled today by a modern version more familiar to the visitor.

The sample size for this study was twenty participants, all interviewed at one museum on a single weekend. Initially, there were plans to collect data at two other research sites. In light

[39] Betty Farrell and Maria Medvedeva, *Demographic Transformation and the Future of Museums* (AAM Press: Washington, DC: AAM Press, 2010), 12.
[40] J. Mark Davidson Schuster, *The Audience for American Art Museums* (Washington, DC: Seven Locks Press, 1991), 5.

of the global COVID-19 pandemic, however, these plans had to be cancelled, and analysis proceeded with the data already collected. Any conclusions drawn must be qualified accordingly, accounting for this relatively small sample set.

In short, this study can only be said to apply directly to able-bodied adults who visit art museums and are interested in viewing arms and armor collections. Its findings may offer future researchers an idea of what they might expect to find from their own studies on other age groups or other historical objects, but it cannot be directly applied to such contexts.

Chapter 4: Results and Discussion

Three questions were at play in this study, each given a section in this chapter. The first question is, simply, what interests art museum visitors about armor? Secondly, what effects do museum visitors say wearing armor has on their thinking in an arms and armor gallery? Third, how does trying on armor impact art museum visitors' historical thinking in arms and armor galleries? The sections of this chapter will detail the relevant responses for each question in turn. The third section, which deals with historical thinking in visitors, is further divided by Peter Seixas's historical thinking concepts.

What Interests Visitors About Armor?

Participants did not overwhelmingly report any one aspect of armor that interested them. Some aspects, such as the diversity of the armor on display in the gallery and its physical characteristics, did attract more attention than others, but there was no consensus. Some participants (n=6) were interested in the diversity of the armor displayed. Most simply, one participant declared that they were interested by "Just the different designs. The variation." One participant noted that there was "a wide selection" of armor represented in the gallery, ranging from the "very functionalist" to the "very ornate." Another participant remarked on the "diversity of style" represented in the armor on view, even though "it's all kind of made for the same thing." Also dwelling on design variation was a participant who "thought the shapes of the helmets was really interesting. The variation in shape and size." One participant cited "the different ways it was made" as leaping out to them, pointing specifically to regional variation. Another participant echoed this, noting that the variation of armor was "a culture question" just as much as "a function question," having described how "two different armors for the same function may vary depending on the individual and how their culture played into how they

designed the armor." These responses dealt with different thread of diversity in the armor viewed, from the purely structural to the cultural and stylistic, but nevertheless all highlight the diversity of armor as the most interesting element of the gallery.

Other participants (n=5) were most struck by physical characteristics, such as the size and probable weight, of the armor they saw in the gallery. One participant described thinking about the weight, speculating about "how much would it be for the legs, plus carrying the sword, plus carrying a shield" in addition to torso armor and remarking that it "was really impressive how these soldiers would have fought in battle for so long with so much gear." "It was usually either much smaller or much larger than I was expecting," one participant explained. Another was likewise fascinated by "some of the different sizes," going on to note that one armor in the gallery "looked like it was sized for a child." The child's armor caught the attention of others as well. "[I was most interested by] how small that one full piece of armor was," one explained, "The child's suit of armor." "There is a tiny kid one, it looked like," another participant remarked, adding "That would have been more my size."

Four participants described being most interested in the ornamental elements of the armor and weapons they saw on display. "I particularly like the nonfunctional elements, especially the inlay," one participant reported, "The raised etchings or whatever." "We can see it's art," another remarked, "because of the work, the ivory, also other parts," noting that the artistic flourishes marked the collection as "selections from a high level armory, because it's from the aristocracy." This was echoed by another participant, who explained that they could tell the arms and armor in the gallery "were from the aristocracy" because they "were really precious." One participant wondered whether the extensive ornamentation precluded the use of the arms and armor in the gallery, speculating "Does it not damage the inlay, the decorations?"

Three participants described feeling a personal connection to the armor in the gallery, although the nature of this connection was different for each respondent. One participant described that armor "honestly brought back good memories of reading books to my two sons about armor- like knights and that whole thing." Another explained that "what I found interesting is that I was able to imagine myself in it, to see what it would be like to be in a war in whatever time I was reading about." A third described considering "the historical significance, how it was used, and why it was used." "That's the stuff I like about it," they explained, expressing a pre-existing interest in the subject. These participants were interested in the armor based on a personal relationship to it, whether academic, imaginative, or nostalgic.

Two participants said that they were most interested in how the armor had been constructed. "The joints were given special care to offer range of mobility while also maintaining some degree of protection," one observed, noting that they were impressed by "the engineering aspect of it." The other also took an interest in the articulated joints, remarking "I assumed with armor there's a lot of extra space like with the joint area, but it's really, really tight there." They added that "it had to work some way because they existed for a while," and that they thought "it's really interesting how detailed [armor is] and how much of the body it actually could cover."

Visitor Perceptions of how Wearing Armor Influenced Their Thinking in the Gallery

After participants had tried on the armor and viewed the arms and armor gallery, they were asked whether they felt that wearing armor before entering the gallery had influenced their thinking, and to either describe how it had or why it had not. Nineteen out of the twenty participants interviewed in the study reported that wearing armor had in fact influenced their thinking in the gallery.

The majority of participants (n=12) reported that wearing armor had given them a better understanding of the physical elements (weight, mobility, etc.) of the armor in the gallery. "I'm a tactile learner, so for me it was an avenue to more curiosity," one participant explained, going on to speculate about how historical people could move and fight in equipment so heavy. In fact, several participants expressed that they thought back to feeling the weight of armor while examining the pieces in the gallery. Other participants described developing a better understanding of how armor moved from wearing some themselves. Some participants in this group took a more general approach, describing understanding the weight, the mobility, and even the thickness of the metal of the armor they wore as interrelated elements that helped them understand the armor they saw in the gallery. This group was primarily focused on how their experience wearing armor gave them a better understanding of armor as a physical object.

Six participants described feeling a deeper understanding of historical experience from wearing armor. "It gets you understanding what you're seeing," one participant said, "Feeling the weight and what soldiers used to wear, how it feels . . . It gets you in the mood of visiting the exhibition." Another participant described feeling discomfort wearing the armor for a few moments and speculated on what it would have been like for historical people. "That would have had to have killed them," they remarked. Reacting to the same problem, one participant noted that they had observed that the armor in the gallery was padded in the areas they had felt physical discomfort, which they said made them appreciate the foresight of historical armorers. One participant described feeling that the armor they wore was too large and used this as a starting point to consider the size of the people who would have worn armor in the past. Another participant explained that wearing armor themselves "kind of quantified what [historical people] may have experienced in battle." This group of participants was also concerned with the

physical experience of wearing armor, but described drawing on this experience to understand people in the past and what they went through, rather than the armor itself.

Only one participant reported that trying on armor had not influenced their thinking going into the gallery. This participant explained that they had already thought a great deal about armor, and so while they enjoyed wearing some, they did not "think it affected the way I've already thought about it." Conversely, one participant remarked that, having worn armor, they spent their time in the gallery "imagining what it would be like if I were wearing the piece of armor, or holding that gun, and trying to just put myself in the scenario that I'm reading about." They added that this is "something I wouldn't have done otherwise," having previously been "not generally interested in [armor]" because they didn't "really have any personal connection to it" before wearing some.

How Wearing Armor Influenced Visitors' Historical Thinking in the Gallery

Peter Seixas has proposed six interconnected "historical thinking concepts," which refer to the thought processes of a learner studying history and approaching the subject as an historian might. These concepts are historical significance, primary source evidence, continuity and change, cause and consequence, historical perspective taking, and the ethical dimension. The manifestation of the ethical dimension was not measured in this study. Participant responses are discussed below under the heading of their corresponding historical thinking concept, first the general responses and then the responses drawing a link between historical thinking and the experience of wearing armor.

Historical Significance

In discussing his six strands of historical thinking, Peter Seixas describes understanding historical significance as the ability "to articulate the narratives that may be legitimately

constructed around a particular event, resonating in a larger community."[41] In the case of armor displayed in museum galleries, this looks like thinking about how this armor relates to history more broadly, beyond its immediate context and application.

Only three responses showed signs of considering the historical significance of the armor on view independent of the experience of wearing some. Two of these responses were concerned with how the armor the participants viewed compared to the armor of other cultures in roughly the same timeframe. One participant compared Italian armor to "the Japan[ese] armor," remarking that they had thought about "how they were made, the materials that were different, and everything else." Another looked at the armor in the gallery and speculated on how it compared to "the great Mali Empire . . . like what style of armor was it[?]" Both of these responses placed the armor not so much in the broader historical context of its culture, but rather in the broader historical context of armor worldwide.

Echoing this perception of the universal martial quality of humanity, another participant responded that they observed the armor in the gallery and related it back to history more broadly on the grounds that "if you think about the world, *everything* comes down to armor" (emphasis added by researcher). "There's been wars since the beginning of time," they added.

Four responses displayed consideration of historical significance based on the experience of having worn armor. In two of these responses, participants indicated that trying on the armor had made them think about how armor fits into history more broadly based on who it represents. "Could women wear armor?" one participant wondered aloud before noting that, based on their experience wearing armor, "it wouldn't matter if you're a man or a woman, there's space in there either way." Another speculated that trying on armor from other regions might be a means to

[41] Seixas, "A Model of Historical Thinking," 598.

interest learners from diverse ethnic backgrounds in history. In both cases, trying on armor was cited as a catalyst for thinking critically about armor and what historical experiences it does and does not reflect.

Another two responses hearkened back to the comparison of armors across regions. One participant summarized their thinking as, "I felt like this one is European. But what will it be like to wear Japanese armor?" Another noted that because they could try armor in-person, even though it was regionally specific to "our part of the world," it helped them think about worldwide armor in general. These responses reflect a consideration of how specific armor relates to all other armor, rather than how armor relates to all other history.

Primary Source Evidence

With regards to primary source evidence, Seixas describes the process of closely examining a text, object, or other remnant of the past with an understanding of its historical context to draw further conclusions or uncover new questions about that context.[42] As it relates to armor in a museum gallery, this might manifest as speculation on what needs and concerns informed a certain design choice, for instance.

Six responses were focused primarily on the manufacturing process itself. One participant remarked that "the craftsmanship, the hours, just the time put into it, [and] the thought process" all elevated the armor as "a work of art," and another noting that "the material was really refined in some cases" and expressing that they were "interested to know how that came to be." Another was curious about the engraving and inlay seen in the gallery, remarking "I did wonder how they laid all that fine- I don't know what it was. Maybe it was ivory or something. How they did that. I mean, how did they?" "I was curious if it was common masons [sic.

[42] Ibid, 599.

Possibly meant to refer to smiths] that made it, or who would make that," one participant said in response to the craftsmanship, going on to wonder "How long would it take to make?" These were not unique questions. "I thought about who made it, how it was made, and how much it cost, and what went into making it," another participant explained, noting that these questions led them to further speculation on "how long it took, and stuff like that, to prepare for battle." "How did they fit them?" another wondered aloud, "Each soldier, was it one generic [size] or did they fit them per body type?" Whether questions or stated conclusions, these responses reflected the thought process of assessing a primary source, in this case armor, to propel further inquiry into the needs and context that created it.

Four responses discussed the aesthetic and artistic qualities of the armor. Two of these described using design elements of the armor to infer its places of origin. "The Turkish [armor] looks nothing like the European one," one participant noted, going on to discuss how armor can be inspected for evidence of cultural exchange in "border regions." Another tried to determine the nation of origin of pieces of armor based on stylistic differences, referring specifically to features they thought of as indicating a "Spanish conquistador helmet." "It was intended to be artwork before it was intended to be armor," another participant mused, "Someone in charge was like, 'I like pretty armor.' So that's pretty armor." In a similar vein, one participant expressed that "I feel like they were all commissioned by very wealthy individuals who had the time to one: have it produced to their size, and two: have the details engraved on the outside." In these cases, participants used the design of the armor to make inferences about the aesthetic and cultural sensibilities of the societies that had produced it.

Two responses were concerned primarily with the armor's functional elements. "[The comb of a helmet] was apparently made to somewhat deflect blows," one participant explained,

"So blows atop the head don't just land squarely on your head and affect your neck." Another described how "you had to think about the bigger picture . . . it was about how would that armor work in a defense system?" This participant went on to speculate on what the armor they observed suggested about the tactics of its period, explaining that "a vulnerability in the armor would be patched up by being put next to two guys with similar [armor], you know, kind of like a phalanx." These two responses express conclusions about what practical concerns on the battlefield informed armor's design.

Ten responses drew a link between trying on armor and consideration of primary source evidence in the gallery. Eight responses described a straightforward line of causation, namely that trying on armor let them experience in first-person the concerns around weight ("It was not as heavy as I expected") and construction ("I was very curious as to why the bottom was so disconnected from the top, how that would help you in battle.") that informed the design of armor. "I look at it now, and I'm thinking that would be poking me," one participant explained, using their recent experience to assess where armor would put pressure on its wearer and how the designers would have to compensate. A similar reaction was voiced by a participant who had noted cloth lining in the armor in the gallery, which they said they now appreciated as being useful to "take the edge off a little." Another remarked that wearing the armor helped them conclude that armor would be fitted to individuals, noting that the armor they had worn "was too big for me. I wouldn't be able to weave a sword around or walk for long distances." "You experience how it works," one participant explained, noting that they had a better understanding of "how you can move your shoulders and your arms" in armor, but that they thought it would be "quite an effort to do anything" in it. This was echoed by another participant, who concluded that armor was "for ceremonies or if you need a portrait done" on account of being so

uncomfortable. On the subject of the mechanics of armor movement, one participant summarized that, "because I could feel it, I could see it." These responses show participants drawing on their experience of wearing armor to deepen their understanding of the physical context that informed the design and intended use of historical armor.

Two responses expressed that trying on armor made participants feel a personal connection that helped them understand why the armor they saw was designed in a certain way. "It certainly develops empathy for, you know, what people had to go through to protect themselves," one explained. Another described wondering about armor they thought looked too small until they considered their experience wearing the armor provided in the study. "I would fit in that," they remarked, "It's just for normal sized people."

Continuity and Change

In historical thinking terms, continuity and change refers to the learner assessing what evolves and what remains the same over time, even as momentous historical events and shifts take place.[43] As it relates to armor, this can manifest in considerations of what needs historical armor addressed that we still have and fill by other means, what needs it addressed that we do not have and what needs we have that it does not address, and what might account for these differences and similarities.

Five responses compared the armor in the gallery to modern military equipment. "They've created modern versions of that," one participant noted of a breastplate, while another reported remembering an associate in the military and thinking "Oh, I wonder what he would think about this." Others felt that the historical armor they saw was much more complex and extensive than modern armor. "You do see some armor today more or less, but it's a lot more

[43] Ibid, 600.

simplistic," one remarked, "It's just a plate that covers something up." This was echoed in another response in which the participant compared "being head to toe in metal" with modern armor, which they characterized as "mostly fabric with a little bit of reinforcement." "The armor back there covered pretty much everything," noted one participant, "From the little I know about modern day armor, it's mostly just the torso area." These responses compared and contrasted armors to see continuity (armor is still used) and change (it is made of different materials and covers different parts of the body).

Four responses characterized early modern armor as not just different from modern protective equipment but inferior. "Our soldiers now don't need that," said one about the steel armor they had worn and seen in the galleries, "Everything's more technologically advanced." Another pointed to "the failure of traditional armor to keep up with modern weapons." One participant described modern armor as an evolution from the steel armor they saw, noting that "now you have all these super light materials, super technological things." In a mixed response, another participant explicitly described the objects in the gallery as "kind of obsolete as far as armor goes" but compared the detail and decoration favorably to modern works of art. These responses defined the relationship between the armor in the gallery and the modern day in terms of a progression from less to more advanced.

Another four responses addressed how armor relates to modern people, rather than to modern protective equipment. One participant felt that the armor they viewed set historical people apart from modern people, remarking that "people don't really wear armor that much nowadays" and concluding that historical people must have been more physically fit than their modern counterparts. A larger subset of this group took the opposite position, perceiving a stronger continuity from the past to the present after looking at the armor. "I am familiar with

Japanese art, how they do like illustrated faces and things like that, so I had that little connection," one participant noted in regards to the face-guard on a suit of Japanese armor in the gallery. Another pointed out that "some of the same processes are still used" and that although modern combat gear may differ from the armor in the gallery, on a deeper level "we're still savages, beating each other with swords and clubs." Although less evocative, another participant echoed this sense of shared human experience across time, noting that although "it's called just a part of history, it's a part of us." The responses in this cluster, whether they felt a kinship or a distance from historical people, used the armor in the gallery to illustrate their relationship with historical people.

Six responses drew on participants' experience wearing armor to consider continuity and change, describing a comparison to the experience of wearing modern protective gear, although they varied on the nature of the comparison. "We do kind of think of medieval armor as being heavier," one participant explained, "In reality, it's almost as heavy as the bulletproof vests we use." Some participants took the opposite view, with one contending that modern protective equipment is made of "lighter materials" than the steel armor of the sixteenth and seventeenth centuries, which in turn "gets you to move more." One participant noted that they had "worn AR-500 plates and modern stuff. That was definitely very different from this. This felt kind of loose, sort of just hanging off." They considered whether the difference was on account of expediency, suggesting that the necessity of stopping blows took precedence over comfort. Once again taking an opposite view, another participant considered the armor they had tried on to be superior to modern gear, wondering "what they're doing currently to mimic that [early modern armor]," and remarking that early modern armor "seems like it would protect you more than whatever they have now." One participant described comparing the weight of the armor to "the

packs or whatever" that a military acquaintance carried, and another compared their experience of "wearing a little bit of armor from an older time period" to the military equipment they saw used today. Despite disparate conclusions, all participants who described wearing armor themselves as influencing their thoughts on the relationship between historical armor and the modern day grounded it specifically in comparisons to modern protective equipment.

Cause and Consequence

As opposed to the historical thinking concept of continuity and change, which deals with how life and the world did or did not change in response to an historical development, cause and consequence deals with how history developed in response to life and the world. Put another way, it refers to a learner's ability to identify the motivation for an historical decision or action and how subsequent developments resulted from those decisions and actions.[44] Looking at armor, this might take the form of observing the interplay between historical armor technology and weapons technology and how this impacted the evolution of both.

Eleven responses expressed the perception that weapons and armor continuously evolved to counter one another, and that this accounts of changes over time in armor. "If you had a weapon that rendered this particular armor obsolete, you had to evolve to meet those standards," one participant explained. "You kind of look at how the military was in a time period," another remarked while discussing the types of weapons pre-modern soldiers had to defend against, "How it evolved to deal with that time period's warfare." Other participants described the process with various terms, such as "dialogue" and "arms race," but the back and forth of weapons and armor and change as a constant remained a through-line.

[44] Ibid, 601.

A few of these responses also touched on the trend of more advanced weaponry (namely firearms) ultimately leading to the phasing out of armor. "The two developed with each other until the weaponry became too advanced," one participant explained, "And they stopped manufacturing [armor]." "They kind of got away from [armor] because of guns," another pointed out. One participant articulated the dilemma as "whether or not they should even wear armor or bear the weight of armor that can handle modern weapon technology [firearms]." This particular subset thought not only about arms and armor developing in opposition to one another, but of the longer-term consequence that firearms ultimately rendered steel armor obsolete in most cases.

In a related vein, four responses described armor becoming more symbolic than functional as time went on. "Armor had evolved from being more useful in battle to being more a statement piece," one participant explained. Another referred back to a child-sized armor, which they cited as evidence that, by that time, "I guess opulence mattered more than functionality." One participant described the armor they saw as being more "refined," "intimidating," and "dignified" than practical, while another described the armor in the gallery as far more "artistic" than the replica they had worn. In all cases, these responses indicated that participants saw armor as increasingly projecting an image rather than protecting the body as time wore on.

Two responses pointed to the general needs of soldiers or of an age, rather than a specific cause like defending against a novel threat or projecting a particular image, as accounting for the changes in the armor they saw. One participant stated they could easily imagine armorers "innovating throughout time" in response to "soldiers' and warriors' needs." Another remarked that "we can think about the difference between soldiers" when considering the differences between armors of different time periods. Both responses accepted that armor changed over

time, but unlike their counterparts in the previous two groupings they did not point to a single driving cause or overarching historical narrative to account for those changes.

Observing differences in armor, three responses speculated on whether time period or culture could claim more responsibility. "It changed, so when I look at the samurai [armor] that was from a different time period than the other one I was looking at," one participant pointed out, "And it was made differently. But it's also a culture thing." "There are different timeframes in different regions," another noted, "How Japan adopted the same concept of the suit of armor is different than how Turkey adopted is different than how Russia adopted it." A third participant in this group mentioned country of origin alongside fashion, functionality, weather, and, echoing the arms race group, the weapons of the enemy when speculating about how armor changed over time. In all cases, these participants viewed the progress of time as only one factor in accounting for difference, citing region and culture as other possible causes.

Seven responses directly cited the experience of wearing armor in considerations of cause and consequence. Three responses discussed balancing defense against mobility and armor weight. "I just started thinking about what it would be good at defending against when I was wearing it because it restricted my movement a good bit," one participant explained, "So I figured there's probably a really good tradeoff there." Another credited wearing armor themselves, thus gaining an understanding of its weight, thickness, and material, with giving them a deeper insight into the design process in response to specific weapons and threats, using the word "dialogue" which had appeared elsewhere. "It affects you and your ability to move," a third said, going on to note that "in an age of firearms when you have to be able to move quickly" such armor would be "less desirable." All three responses pointed to wearing armor as

valuable in understanding the tradeoffs entailed in wearing steel plates to defend against a threat and weighing those against the benefits of going without as soldiers ultimately did.

Two responses indicated that, having worn armor, participants thought that comfort and ease of movement informed the design changes over time. "I imagine that people's desire to be more or less mobile is what influenced their requests for design alterations or evolutions and style over time," one participant stated. "You're not going to be able to fight if something's digging into your shoulder," another explained, "So you would have to change over time and improve because that's what technology does." In both responses, participants were most interested in the user experience of armor.

Two participants reported that wearing armor made them think about how historical armor would be designed or redesigned over time to cover different parts of the body. "I was thinking maybe people were thinking differently about how to set up their armor," one participant explained, pointing out that some armor in the gallery stopped at the waist in contrast to the armor they had worn which extended halfway down the thigh, "Not all of them had the extension." Another participant wondered whether armor was fine tuned to "figure out better ways to protect different parts of the body," their torso and thighs having been defended by the armor but not their shoulders, arms, or head. In both responses, participants drew on their experience wearing armor to consider how the need to cover vulnerable parts of the body informed the development of armor.

Historical Perspective Taking

Historical perspective-taking is the process in which the learner strives to inhabit the mind of an historical person to gain insight into the past. In its purest form this is not simply projecting the modern self on the historical subject but rather reconstructing an understanding of

the historical subject's worldview and context based on the resources available and then using that to imagine their thoughts and reactions in a given situation.[45] For the purposes of this study, in which the participants are not history students learning in a classroom but museum visitors browsing unaccompanied and at their leisure, attempts to get into an historical headspace and consider the lives and experiences of historical people are considered evidence of nascent historical perspective-taking.

Eight responses described speculation on what sort of person might wear the armor in the gallery. One participant remarked that they thought "different suits would reflect the personality of the wearer," citing religious motifs on some armors as giving insight into the wearer. Two others explained that they imagined the armor they saw being worn "for ceremonies and such" by wealthy individuals, one pointing to the quality of the armor and another noting a child-sized armor as certainly "a ceremonial piece." In a related vein, one participant remarked that the armors they saw "weren't covered in scars or anything," leading them to speculate "how often was it used?" This thinking was repeated in another response, in which a participant explained that "the more intricate the armor, the less likely it would have been to have actually ever been used," going on to add that they saw "more use" shown on simpler pieces of armor. Two responses in this set alluded to the experience of foot soldiers wearing armor, "someone who was on the front lines," as one put it. One described thinking about which armor would be worn by which combatants, explaining that they had "thought about the soldiers, about the commanders, and things like this." In all cases, these responses describe viewing the armor in the galleries and trying to imagine historical people as reflected in said armor.

[45] Ibid, 602

Four responses discussed armor as a part of warfare, rather than a reflection of the personal. "To them [armor] was a necessity," one participant described, concluding that "It was a rough life." This sentiment was shared by another participant, who noted that "Obviously you're preparing for battle, so there was a lot of fighting going on." "I thought about why they would be wearing it," one participant stated before listing martial applications, "It could be for battle. Maybe they were just staking out somewhere . . . they're protecting everybody and they're wearing these." "I just thought about the different uses certain kinds of armor could have based on how they look, what kinds of weapons they would be good at defending against, or how it would have restricted movement," a participant explained, dwelling on the application of armor as being most important to its wearers. These responses did not consider the identity of the people who had worn the armor so much as what they did in the armor (namely, war).

Three responses focused primarily on how historical people had reacted to the weight of their armor. "It must have been hard to wear that," one participant remarked, "They were wearing that armor every day for days, weeks, months, years!" "I can't even imagine how hot and miserable they were," said another, adding that "they would have to have been really physically fit, I would imagine." One participant described imagining "how much time they spent with all this weight on them." This group of responses was less concerned with the internal lives or combat experiences of historical subjects than the day-to-day frustration and discomfort incurred by wearing extra weight.

Ten responses expressed that wearing armor helped them get into the headspace of an historical person wearing similar armor. "I think because I tried it on and I had that experience, it got the gears going," one participant described, juxtaposing that against "just walking in blindly" if they had not worn armor. Another participant explained that, "When you see armor

or any sort of defense mechanism, you don't really understand it until you've had to use it and suffer through it." They added, "When you touch it, you understand it." "Putting on the armor made it possible to imagine someone else in the armor," a participant remarked before describing imagining wearing each armor in the gallery "just because I put on this suit of armor." This was reiterated in another response explaining that wearing armor "definitely put into perspective" the process of donning armor and proceeding to move in it, which the participant credited with a deeper understanding of the experience of historical combatants wearing armor. Similarly, one participant described how their own experience wearing armor that was too big for them helped them understand "how important it is to get it sized to yourself." These responses described drawing on the experience of wearing armor to better understand multiple aspects of the historical experience of wearing armor.

Six responses specifically cited participants' own discomfort or difficulty moving in armor in making them empathize with historical people, to whom they attributed the same struggles. "It's not very comfortable to wear," one participant declared, "If you were a guard somewhere that's not under a threat you wouldn't be wearing it at all!" "I thought, 'How could they do it?'" another participant explained, "Because it's hard. It was hard for me, see. And it's just a part [of a full armor]." "Standing without moving, it's not that heavy," one participant granted, "but imagine then going to battle with this thing on and trying to run, trying to fight, trying to move. . . . They could not move very well." Another participant remarked that they "had no idea how much you would weight, how you would walk in [armor] and move in it, much less fight a battle with it." One participant went on to explicitly state that they imagined that experiencing battle encased in armor would be "just kind of terrifying, honestly." These

participants considered the discomfort or constriction they had experienced in armor and projected it on historical people, accurately or not.

Four responses simply focused on the weight of the armor. "Just the sheer weight of it," one participant replied when asked how wearing armor informed their thoughts, another reiterating that "definitely the weight factor" was their takeaway from the experience. Two participants considered the weight of the armor in relation to the size of the wearer, with one concluding that armor would feel less heavy to an historical soldier (on the grounds that the participant felt that the armor was too big for themselves, citing "the different size of the people it was probably intended for"), and another speculating that armor "would be significantly heavier to" historical combatants (arguing that people in the past were "much smaller than modern humans"). These responses drew on participants' experiences of wearing armor to speculate on how historical people experienced wearing their own armor, but only insofar as participants had developed a deeper understanding of armor as an object, rather than drawing parallels between their own experience and that of historical actors.

Chapter 5: Conclusions and Recommendations

Conclusions

What interests art museum visitors about armor?

No single aspect of armor captured the interest of an overwhelming majority of participants in this study. The diversity of armor captured the most responses, but this accounts for just over a quarter of the total. The size and probable weight of armor drew nearly as many responses, while observations on the decoration of the armor displayed accounted for the next most responses. A pair of responses were concerned with the mechanical elements of the armor viewed, while a few participants reported some personal connection to the armor they saw. While it is difficult to draw any firm conclusions from a sample size of twenty, these initial findings indicate that there is no single narrative about or element of armor that universally stands out to visitors.

What effects do museum visitors say wearing armor has on their thinking in arms and armor galleries?

Wearing armor itself, without significant commentary from the facilitator, is more a physical than historical experience to museum visitors, it appears. A majority of respondents credited wearing armor with helping them better understand its physical qualities and the mechanics of its movement. This comports with de Koning and Tabbers's findings that personally manipulating an object helps learners understand that object's movement.[46] This also fits with the observation of Witt et al. that the ability to mentally simulate the use of an object helps viewers recognize functional objects.[47] If nothing else, these findings bear out what the

[46] De Koning and Tabbers, "Facilitating Understanding of Movements in Dynamic Visualizations: An Embodied Perspective," 517.
[47] Witt et al., "A Functional Role for Motor Simulation in Identifying Tools," 1217.

embodied theory of learning would suggest, that tactile familiarity with an object and its motion translates to a greater understanding of the mechanical and physical qualities of similar objects.

Just over a quarter of respondents described feeling a deeper understanding of what it would be like for historical people to wear armor as a result of their experience with armor. This is in keeping with Branscombe's finding that students who acted out tableaus of concepts they had learned exhibited improved comprehension of what they had read,[48] as well as Bigler and Hanegan's finding that active participation in a class activity- a science experiment, in the case of their study- led to greater engagement with the material.[49] This also follows Paulsen's observations at the Om Abbey Museum, in which learners who took part in simulated historical life drew on this "remembered" history to inform their understanding of real history.[50]

Even the one participant who reported that they did not feel that trying on armor informed their thoughts in the gallery connects to the literature. Biktimirov and Nilson note in their study on learning objects in college classes that finance students who started the course with low GPAs- so, students who were struggling with finance principles- saw an improvement in their grade from taking the class with the learning object, whereas students who began with high GPAs- that is, students who already had a firm grasp of finance principles- displayed little apparent difference between the control group and the treatment group.[51] The participant reporting no effect also reported that they had already thought a great deal about armor on their own. The participant who described imagining themselves in armor and taking a greater interest

[48] Branscombe, "Showing, not Telling: Tableau as an Embodied Text," 326.
[49] Bigler and Hanegan, "Student Content Knowledge Increases After Participation in a Hands-on Biotechnology Intervention," 252.
[50] Paulsen, "Teaching Through Living History," 34.
[51] Biktimirov and Nilson, "Adding Animation and Interactivity to Finance Courses with Learning Objects," 45.

in it because of their newly formed personal connection echoes Evans's description of audiences integrating simulated historical experiences into their identities.[52]

How does trying on armor impact historical thinking in art museum visitors viewing arms and armor galleries?

In responses that did not cite the experience of wearing armor, the historical thinking concept most represented was cause and consequence, followed in turn by historical perspective taking, continuity and change, primary source evidence, and historical significance. Responses that *did* draw on the experience of wearing armor were most represented in historical perspective taking. These findings also reflect Paulsen's observations of students at the Om Abbey Museum. Just like those students, participants in this study expressed deeper and more extensive thinking on the lived experience of historical people based on their own memories of a simulated historical experience.[53] Similarly, these data bear out Evans's findings on how historical roleplay helps learners integrate those simulated experiences into their understanding of history.[54]

Only half as many responses cited the experience of wearing armor in relation to primary source evidence, followed by cause and consequence, continuity and change, and historical significance. In the case of primary source evidence, the stated impact of wearing the armor was that it helped participants imagine themselves in an historical scenario and better assess the displayed armor accordingly ("I'm thinking that would be poking me," "I wouldn't be able to weave a sword around or walk for long distances," etc.). This itself recalls Seixas's statements

[52] Evans, "Personal Beliefs and National Stories," 195.
[53] Paulsen, "Teaching Through Living History," 34.
[54] Evans, "Person Beliefs and National Stories," 195.

that "the problem of perspective-taking is woven with each of the other concepts," and that his historical thinking concepts are "deeply interwoven with each other."[55]

That relatively few responses linked wearing armor to continuity and change, cause and consequence, or historical significance suggests that while participants *did* take lessons about the physical properties of the armor from their experience of wearing it (see "What effect do museum visitors say wearing armor has on their thinking in arms and armor galleries?" above), this experience in and of itself was not enough to give participants the sort of simulated context that would facilitate such strides in historical understanding, a la Rutherford-Morrison's recommendations.[56] This is also in line with Jackson and Leahy's study from the People's History Museum in Manchester, UK, in which the key to improved understanding and retention of historical content was not simply visitor involvement, but facilitated narratives that include the visitor.[57]

Implications

Further Study

These results are, admittedly, narrow. As such, they represent an early step on the road to understanding hands-on armor activities in museum settings, rather than the culmination of such a journey. The most readily apparent next step would be to replicate the study with a larger sample size across more museums. Such a follow up study, or a battery of such follow up studies, would account for outliers and the peculiarities of any given art museum's arms and armor galleries, ultimately serving to isolate how wearing armor impacts visitors' thinking and what interests the general public about armor in art museums.

[55] Seixas, "A Model of Historical Thinking," 601; 603.
[56] Rutherford-Morrison, "Playing Victorian," 100.
[57] Jackson and Leahy, "'Seeing it for real …?'" 313-314.

This study was carried out at an art museum. Although the distinctions between the artistic, the historical, and the art historical often blur in art museums on account of the diverse nature of their collections (paintings, sculptures, furniture, ritual objects, ornate practical objects and practical ornaments, etc.), art museums are still most geared towards presenting collection objects and their histories in terms of the artistic. Carrying out essentially the same study but in history or encyclopedic museums that feature arms and armor galleries (The Tower of London, for instance, or the Glenbow or Royal Ontario Museum if one is limiting scope to North America) could shed light whether the interpretive approach and goals of a given museum have an effect on how wearing armor impacts visitors' thinking in arms and armor galleries.

This study brought participants in contact with a replica historical object and examined the conclusions they drew about that object's relationship to similar objects and its broader historical context. In essence, they were given a solution and asked what sorts of problems and concerns informed its design and use. This seemed to prompt them to think more deeply about what it was like to use such an object, but it did less to make them think about its place in history and the factors that informed its creation. It would be interesting, therefore, to conduct a study examining some inversion of this process, giving participants information on an historical context and problem and seeing how that informed their thoughts on how the objects in a gallery addressed that problem. To hold to the theme of armor, this could look like participants being told about the function of early modern weapons and then, after having browsed the gallery, asking them questions about how they thought the armor they saw defended against such threats. Would such participants express more thoughts about cause and consequence and change and continuity in relation to the armor and what they had been told? Would the absence of the lived

experience with the historical object itself reduce historical thinking across the board? It would be interesting to find out.

Recommendations for Practice

This study suggests that there is no single overarching impression audiences take from arms and armor galleries. The objects speak for themselves, but they say something different to every viewer. In many contexts, this is desirable. It is exciting to draw one's own conclusions and guide one's own exploration, and museums often want to facilitate just such an experience. It is important to keep in mind, however, when designing a gallery space or exhibit in hopes of imparting a specific message or concept. What is self-evident to the exhibit designer may not come across to the audience, and so armor, just like any other object displayed in a museum, must be interpreted with care.

This study's findings suggest that trying on armor, independent of commentary or guidance from a facilitator, helps visitors understand how armor feels and moves and creates a personal connection that can serve as a point of entry for further historical inquiry. As such, the researcher recommends integrating armor handling and wearing activities into museum programs for two educational purposes. The first is to illustrate armor's range of motion. Armor on a static mount behind a pane of glass can look ponderous and constricting to the observer, but having the chance to manipulate a replica and experience its articulation firsthand can add a great deal to the viewer's understanding of how such armor might move when worn by a living user. Even a digital model of armor that visitors may manipulate through a computer interface, as is already in use at the Art Institute of Chicago, may enrich museumgoers' understanding of the armor they see. The second application is in setting up a simulated historical experience for visitors, allowing them to wear replica armor under the guidance of a facilitator, to help them

develop the personal connection and lived experience to begin the process of historical perspective-taking. Offered in conjunction with interpretive materials and active facilitation that provide historical context, this may give them the tools to engage more deeply in historical inquiry and knowledge-building in arms and armor galleries.

Stepping away from European armor specifically, similar recommendations may be offered for a broader array of hands-on, object-based historical programming in museums. Handling and manipulating an object appears to lead to a greater understanding of that object's motor functions and physical characteristics. The opportunity to physically examine a replica or facsimile of an otherwise alien historical object may be offered to help visitors make sense of the use of such objects on display in the galleries. Likewise, briefly using an object as it might have been used by its original historical users helps form a connection between the visitor and the historical subject, prompting them to draw on an experience they now share to imagine more about historical life and experience. As tools in a museum's educational belt, these phenomena may be used to supplement the artifacts and interpretive materials in a gallery to make the world of the past more real to the museum visitor.

All on its own, the chance to handle, wear, and use historical objects, whether originals or replicas, can be an exciting and novel experience, the sort of opportunity that only a museum or other such heritage organization can offer the public. This alone may attract an audience. The experience will inevitably inform that audience's thoughts and understanding of the rest of a museum's offerings, however. It is therefore crucial to get a sense of what they are taking from the experience and how that may be harnessed to further a museum's educational aims. More research is needed, as indeed it always is. It is impossible to know too much, or even enough. This study gives some sense of what impact wearing armor has on museum visitors' thoughts in

arms and armor galleries, however, and like those same visitors one must take what one *does* know and use it to learn more.

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Appendix A: Instrument
Historical Thinking Through Historical Doing:
The Impact of Wearing Armor on Visitor Thinking in Arms and Armor Galleries
Michael Lowry Lamble

- Have you visited this gallery in the last year?
- Have you ever tried on armor?

Interview Guide

1. What was most interesting to you about the armor in this gallery?
2. What I really want to know is how trying on the armor before you went into the gallery influenced your thinking about the armor that you saw afterwards. Do you think it did? **(Yes/No).** If yes, tell me how. If not, why do you think it didn't?
3. In the gallery, did you think about who made the armor and how it was made?
   a. **(If a one-word answer)** Can you tell me more about what you thought?
   b. How do you think trying on the armor influenced your thinking in the gallery about who made this armor, and how they made it?
4. In the gallery, did you think about who wore the armor you saw, and what that experience was like for them?
   a. **(If a one-word answer)** Can you tell me more about what you thought?
   b. How do you think trying on the armor influenced your thinking in the gallery about who wore armor like this and what their experiences were like?
5. In the gallery, did you think about how armor relates to history more broadly?
   a. **(If a one-word answer)** Can you tell me more about what you thought?
   b. How do you think trying on the armor influenced your thinking in the gallery about how armor relates to history more broadly?
6. In the gallery, did you think about how armor relates to the modern day?
   a. **(If a one-word answer)** Can you tell me more about what you thought?
   b. How do you think trying on the armor influenced your thinking in the gallery about how armor like this relates to the modern day?
7. In the gallery, did you think about how the armor did or did not change over time?
   a. **(If a one-word answer)** Can you tell me more about what you thought?
   b. How do you think trying on the armor influenced your thinking in the gallery about how armor did or did not change over time?
8. **(If they did not think about any of the things suggested)** Can you tell me a bit about what you *did* think about?

Demographic Questions

What is your age?
What is your gender?