Face Morphing as a Bridge from Self-Salience to Historical Understanding: A Pilot with Adolescents Viewing a Nagasaki Atomic Bomb Film

Designing Context Bridges for Memory Transmission in Museum-style Exhibitions

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Abstract

As living memory of World War II recedes, designers of memory work must foster empathic engagement among non-witnesses. Immersive media is a promising tool for perspective-taking[1, 2], yet its mechanisms require further study. In this pilot study, we investigated the effect of face-morphing technology on historical empathy. We held a workshop with 12 female high school students (ages 15-17), where their faces were morphed into pre- and post-bombing scenes from the film NagasakiIn the Shadow of the Flash using the AVATARIUM Portable system[3]. Participants engaged in a think-aloud protocol and provided post-experience ratings. Our findings indicate that while the experience was rated positively (M=6.15/7, SD=0.90), it primarily focused attention on the self (69% of comments), with participants frequently mentioning their "face" and the "fun" aspect. Expressions of historically grounded empathy were rare. However, a few participants adopted an "as-protagonist" perspective, consistent with identity-continuum account[4]s. These results highlight a tension between self-focused engagement and historical empathy. We propose the concept of "progressive de-selfing" to bridge this gap and discuss the integrity of AI-generated historical content. Future research should involve diverse demographics and explore manipulations of morphing to better measure and enhance embodiment and presence.

Keywords: War memory, digital archives, face morphing, selfother identity, Immersion, empathy

1 Introduction

Around the world, war-related traditions and exhibitions have emerged, sustaining collective memory and bear witness across generations. For instance, institutions such as the Hiroshima Peace Memorial Museum and the Nagasaki Atomic Bomb Museum strive to *communicate the reality* of atomic bombings through artifacts, documents, and survivor testimonies. Beyond physical exhibitions, Hidenori Watanave et al, has developed the *Hiroshima Archive* and *Nagasaki Archive*, digital-earth platforms that overlay hibakusha(people who are the victims of atomic bomb) testimonies onto city maps, enabling users to visualize where survivors were during the bombings and how the geography has transformed since then [5, 6]. Nevertheless, temporal distance from World War II has reduced younger generations emotional engagementattendance surveys and analyses of news reports in connection with the wars 80th anniversary illustrate a diminishing personal connection to wartime experience.

On the other side, researchers in Human-Computer Interaction(HCI) are exploring embodied techniques that blur the boundary between self and other. Kasahara et al. employed real-time and stepwise facial morphing system, and explored identity as a perceptual continuum; public exhibition data revealed structured self-identification windows across the morphing process [4].

We aim to addresses two critical questions. First, we explore how face morphing technology can close the experiential gap between modern audiences and historical events. Second, we critically examine the integrity and risks of situating generative AI, including deepfakes, within educational and commemorative contexts. Ultimately, our goal is to establish meaningful principles for the responsible and effective use of AI in shaping future historical narratives. Our pilot study investigates whether embedding interpersonal face-morphing in a war memory workshop can enhance immersion and empathy among non-witness participants. By integrating a portable avatar-generation/morphing system into archival content, we explore participants real-time subjective shiftssuch as felt closeness, emotional impact, and ethical reflections.

2 Method

We conducted a pilot workshop to examine whether interpersonal face morphing embedded in war-related moving-image content can enhance immersion and empathic engagement among non-witness audiences. The study was carried out within Hi-

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roshima Jogakuin High Schools Thinking about War and Peace program, with sessions hosted in a quiet classroom configured as a small laboratory space. Twelve students participated (all female; $N=12$; $M_{age}=15.83$, $SD=0.72$, range 15 to 17). Four participants were fifteen years old, six were sixteen, and two were seventeen. All participants (and guardians, as required) provided informed consent in accordance with institutional guidelines.

Participants interacted with a compact, stand-alone avatargeneration and compositing device, *AVATARIUM Portable*, developed by POCKET RD[3]. After capturing their own facial image, the system automatically inserted their face into designated areas of a pre-authored video, outputting the final composite content for them to view. With permission from the production team, we incorporated selected excerpts from the feature film *NagasakiIn the Shadow of the Flash* as historicaldramatic backdrops for our morphing scenes. The film dramatizes the relief efforts of young Japanese Red Cross student nurses in the immediate aftermath of the 9 August 1945 atomic bombing of Nagasaki and was released nationally in 2025,[7, 8, 9].

Each participant experienced two scene conditions derived from an atomic-bomb-themed filmic content set. In the *pre-bombing scene*, two participants stood together before the device and their faces were composited simultaneously onto characters situated in a depiction of the city prior to the bombing (pair condition). In the *post-bombing scene*, each participant experienced a solo presentation in which a single composited human face appeared within an aftermath tableau (solo condition). The pair-versussolo contrast allowed us to probe interpersonal co-embodiment alongside temporal framing (pre- vs. post-event). Due to scheduling constraints, one participant (ID 13) completed the pair condition twice with different partners; all other participants completed both conditions once.

Sessions were run in dyads. After a brief orientation and consent, each dyad first completed the pre-bombing pair scene, followed by individual viewings of the post-bombing scene. During each viewing, participants were instructed to verbalize their thoughts continuously using a think-aloud procedure; they were reminded that chronological order was not important and to voice any perceptions or associations that arose. Immediately after each condition, participants completed a short questionnaire. First, we collected valenced affect on Likert-type items covering positive and negative feelings to capture coarse affective direction and intensity [10]. Second, we elicited *metaphorical sensory descriptors* by asking participants to render the experience in terms of color, temperature, and texture (e.g., dull gray, chilly air, rough wall), in order to externalize tacit impressions in a compact, comparable form. Third, we measured *attentional allocation* by asking whether attention was drawn primarily to the overall scene versus ones own composited face. Fourth, we probed *felt spatial perspective* with categorical self-reports (as a direct witness, standing beside someone, observing from afar, or unable to occupy a perspective). Finally, we gathered an *application appraisal* in which participants reflected on how such experiences might contribute to intergenerational memory transmission (for whom, in what settings, for what duration and intensity), given their immediate impressions of the two scenes.

3 Results

Across the twelve participants, the morphing-based, "pure" self-insertion experience elicited a high positive affect (mean valence $M=6.15$ on a 7-point scale, $SD=0.90$). Think-aloud transcripts and short free descriptions were dominated by lexical items denoting amusement and social relatedness (e.g., *fun*, *interesting*, *together*, *friend*, *movie*), with the token *face* emerging as a central node in participants spontaneous vocabulary, indicating a strong self-referential focus. In contrast, historically anchored terms and empathy-related lexemes (e.g., *wartime*, *as a protagonist*) appeared only sparsely. This pattern coheres with the interpretation that the current morphing manipulation, when presented in isolation, tends to foreground self-salience and novelty enjoyment rather than sustained historical perspective-taking.

Attention reports corroborated this picture. On average, participants allocated 69% of their attention to their own face or its composite within the scene, relative to the surrounding narrative content. Qualitative markers of representational mismatch—*unnatural*, *does not fit*, and references to *gender* incongruence—were also noted, suggesting that even brief face-substitution may amplify appearance-driven dissonance and thereby anchor attention on the self. The observation aligns with prior work showing that avatar appearance mismatches and uncanny-valleylike appraisals can reduce resemblance and likability and thereby hinder identification [2].

Notably, a minority of participants who described experiencing the scene "as a protagonist" or "as if blended in" also displayed higher curiosity for narrative context: their verbalizations included more references to timeline and film structure (e.g., *before/after*, *main story*) and affinity markers (e.g., *familiarity*, *blending*), consistent with the broader literature that emphasizes the role of presence, embodiment, and perspective-taking as facilitators for empathic engagement [1]. Taken together, these results suggest that while the pre/post-bomb scenes drawn from *NagasakiIn the Shadow of the Flash* effectively scaffold an emotional response, the morphing component by itself primarily drives self-referential amusement and visual curiosity, with limited spontaneous carryover to historically grounded empathy unless additional contextual cues are introduced.

4 Future Work

We plan to fuse qualitative traces with biosignals (e.g., arousal indices) to model temporal dynamics of attention and immersion. Future experiments will counterbalance morphing and non-morphing conditions and test the causal efficacy of scripted bridges on historical understanding.

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