

Blending Physics and Literature: Analyzing Quantum Uncertainty Principle and Identity Fluidity of Military Children With Case Report

Dr. M. John Suganya, L. Grashya*, S. Suba Selvi, V. Harish Sachin

Department of English, PSG College of Arts & Science, Coimbatore, India.

* grashya.shirley28@gmail.com

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Abstract

Integrating physics and literature bridges the gap between the sciences and the humanities and accentuates the interconnectedness of knowledge. Blending the two different domains in the study allows the use of scientific principles as metaphors to deepen the understanding of complex human experiences. The study traverses the intersection of physics and literature by applying the quantum uncertainty principle to the analysis of identity fluidity in Rebecca Honig's 'Something Small'. It focuses on the experiences of military children, whose identities are often shaped and altered by the unique challenges of an unpredictable lifestyle. Centered around the concept of quantum uncertainty principle that certain elements of a system cannot be understood with certainty concurrently, the study adds on a case report of an eighteen year old female and focuses on how military children's identities are changeable representations of the uncertainty and unpredictability that dominate their lives. The aim of the study is to examine the identity fluidity of military children in 'Something Small' through the lens of quantum uncertainty principle.

Keywords: Case report, Identity fluidity, Literature, Military children, Physics, Quantum Uncertainty principle.

Introduction

Military children live in a state of perpetual transition, shaped by the frequent relocations and unpredictable environments that come with their parents' military service. This constant change forces them to continually redefine who they are, adapting to new places, cultures and social settings. Rebecca Honig's 'Something Small' offers an exploration of these children's experiences, portraying the complexities of their evolving identities within the context of a life marked by instability. The narrative delves into the psychological and emotional challenges they face, shedding light on how their sense of self is molded by the ever-changing nature of military life.

'Something Small' is a picture story about the protagonist Jesse remembering or trying to remember her dad. It is a story in *Sesame Street for Military Families*, a free website offering families a variety of information and multimedia resources on topics such as military deployments, repeated deployments, homecomings, grief and self-expression. It is a non-profitable educational website with videos, activities for children, games, articles and many more. Among all the other diegesis, 'Something Small' is an appealing material for the study. The story revolves around Jesse, who always tries to recollect things about her dad. Though Rebecca Honig does not point out any particular military element about the father of the story, it is clear that Jesse's father must have been to the army as *Sesame Street for Military Families* is especially for the ones in the military and their families. The author does not reveal if Jesse's dad is alive or not. He might be far away serving the nation or he would have passed away. Jesse keeps asking her mother about her dad in order to recollect his appearance and moments with him. She finds it hard to remember and recollect the moment with her dad. She takes a hat and enjoys wearing it, which her dad used to wear. She thinks of his eyes and at times she cries and then she smiles. She tries to imitate

his style and in all possible ways she longs to retain his presence. She tries various little things, all to retain her dad's image and presence. Somehow, she feels her dad's hands and legs. She pretends that her dad sings along with her and such small things make her happy. Thus the closing lines of the plot justifies the title.

By examining this story in detail, the study introduces a novel approach by merging the principles of physics with literary analysis to explore the identity fluidity of military children in 'Something Small'.

The fluidity of identity among military children is a topic that has been explored in both psychological and sociological studies. Researchers, Huebner and Mancini have highlighted the unique challenges faced by military children, including frequent relocations, parental deployments and the need to constantly adapt to new environments in "Adjustments among Adolescents in Military Families When a Parent is Deployed". These factors contribute to a dynamic and often unstable sense of self, as military children must repeatedly re-establish their identities in response to changing circumstances. Studies have shown that this constant flux can lead to both resilience and vulnerability, making military children a unique group in terms of identity development (Huebner and Mancini 9,13).

In literature, military children's identities are often depicted as fragmented or in a state of flux. Characters are portrayed as navigating complex emotional landscapes, where their sense of self is influenced by the demands of military life. For example, in Kimberly Willis Holts' *When Zachary Beaver Came to Town*, the protagonist's sense of identity is shaped by his father's absence due to military service, illustrating the emotional and psychological impact of such an upbringing.

With these reviews on literature about identity fluidity of military children, the quantum uncertainty principle with literary analysis also has an existing research history. The quantum uncertainty principle, first articulated by Werner Heisenberg, posits that certain pairs of physical properties, such as position and momentum, cannot be simultaneously measured with absolute precision. This concept has been metaphorically applied in various literary studies to explore themes of indeterminacy, ambiguity and the instability of meaning. Scholars like N. Katherine Hayles have explored how scientific concepts, particularly from quantum physics, can provide new frameworks for literary analysis, offering insights into character development, narrative structure and thematic exploration in "We need a more comprehensive view of cognition" (Hayles).

Similarly, the integration of physics into literary analysis is also a growing field, with researchers like Andrew Reynolds advocating for the use of scientific concepts to enhance literary interpretation. This interdisciplinary approach not only broadens the scope of literary studies but also allows for a more nuanced understanding of complex themes such as identity, reality and existence. By applying the quantum uncertainty principle to the study of identity fluidity in military children, this research contributes to the ongoing dialogue between science and literature, offering a unique perspective on how scientific theories can inform and deepen our understanding of literary texts (Reynolds). These reviews on literature serve as a foundation for the study and aids in framing the objective of the study as to analyze the representation of identity fluidity in military children with 'Something Small', to apply the quantum uncertainty principle as a metaphorical framework and find how this scientific concept can enhance the literary analysis of the military children's experiences and to contribute to the broader field of interdisciplinary studies by blending physics and literature together.

Quantum Uncertainty Principle

The uncertainty principle is a key concept in quantum physics that states, it is impossible to know both the exact position and exact momentum (speed and direction) of a particle concurrently (Heisenberg). This was formulated by Werner Heisenberg in the year 1927. In simpler terms, If a person is trying to follow a tiny, super-fast ball bouncing around a room. Pinpointing exactly where the ball is or to determine precisely how fast it's moving or in which direction it is moving will not be possible. Also, if the person focuses on measuring its speed and direction, he will lose track of its exact position.

This principle states that at the quantum level (in the world of very small particles like electrons), there is a natural limit to how precisely one can measure certain properties. The more accurately an individual knows one aspect (like the particle's location), the less accurately he will know another (like its speed). This introduces a built-in uncertainty in the understanding of tiny particles.

Therefore, the uncertainty principle shows that at the smallest scales, there is always an element of unpredictability. Things don't behave in a completely predictable way and some level of uncertainty is always present (Heisenberg). In addition to this, identity fluidity is to be understood and examined in order to blend the

principle with the literary analysis of the study.

Identity Fluidity

A fluid identity refers to an identity that is continuously changing or evolving. Cultural identity and cultural experiences both influence how individuals perceive the world around them, as well as shape their beliefs and values (Nijsten). When it is said that one's identity is fluid, it means that it is not in a solid state. It is flowy and not stable. This is directly interpreted as changing identity or evolving identity.

Identity Fluidity is simply a person's sense of self that is not fixed, but is constantly changing and evolving. This ongoing transformation is influenced by various factors. As individuals encounter different environments, relationships and experiences, their identity adapts, shifting to reflect new roles and perspectives. Rather than being a singular, unchanging concept, identity is seen as dynamic and flexible, continuously shaped by the experiences and contexts of one's life. This perspective recognizes that one's identity can transform over time, capturing the complexity and richness of human experience. This is evidently observed in the lives of military children as they go through various social, geographical and cultural changes in their lives.

Military Children's Fluid Identities through the Lens of Uncertainty Principle

The quantum uncertainty principle mirrors the identity fluidity experienced by military children by highlighting the parallels of constant change and unpredictability. Just as this principle asserts that one cannot simultaneously know a particle's exact position and momentum, military children face a similarly uncertain and shifting sense of identity. Their frequent relocations and environmental changes cause their sense of self to constantly change and evolve. Like particles that exist in varying quantum states, military children exhibit different aspects of their identity depending on their surroundings and experiences. Their fluid identities are shaped by the ever-changing and unpredictable nature of their lives, reflecting the indeterminacy described by the quantum uncertainty principle.

Jesse's attempts to reconstruct and preserve the memories of her father are analyzed through the quantum uncertainty principle, which marks the limitations inherent in simultaneously knowing certain attributes of a system. This principle offers a metaphorical framework for understanding Jesse's challenges with memory and identity. In quantum mechanics, the principle asserts that the precise determination of both a particle's position and momentum is impossible. Similarly, Jesse is unable to fully capture or retain the complete details of her father's appearance and presence. ".....And she finds that she just can't remember some things" (Honig 3). Her recollections are inherently fragmented and incomplete, reflecting the indeterminate nature of quantum states.

Her efforts to recall her father through the hat he wore, mimicking his style, or remembering his eyes embody the concept of indeterminacy. Each action represents an attempt to capture a partial aspect of her father's presence, yet she struggles to synthesize a coherent and complete representation (Honig). This is akin to the quantum particles whose properties cannot be fully known at once, revealing only certain facets at different times (Heisenberg).

The variability in Jesse's emotions, oscillating between sorrow and joy, feeling his hands and legs, or imagining him singing with her "Then Jesse heads in as she hums a small song And pretends that her daddy is singing along" (Honig 12) parallels the uncertainty and instability inherent in her memories. It is like quantum states that exhibit unpredictable changes, Jesse's emotional responses fluctuate as she endeavors to retain her father's memory.

Her small actions, like wearing her father's hat, singing or imagining him with her, help her make sense of her incomplete and changing memories (Honig 6). These activities are her way of dealing with the uncertainty and gaps in her recollections of her father, even though it's hard to fully capture his presence.

Jesse's fluctuating emotional responses, alternating between tears and smiles when recalling her father (Honig 7) is elucidated through the principle, highlighting the inherent fluidity and unpredictability of her emotional state. Her memories of her father evoke a spectrum of emotions that are contingent upon her current psychological state and contextual factors. This variability mirrors the indeterminacy observed at the quantum level, wherein the state of a particle is not fixed but subject to change. Thus, Jesse's shifting emotional responses mark the uncertain nature of human emotions, similar to the principles governing quantum mechanics.

"Then she tosses a ball, and she draws with some chalk

And pretends she's a bear, and skips a small rock

And she follows an ant, and she sits and she swings

Even though all of these seem like small things..." (Honig 10)

Her playful activities like tossing a ball, drawing with chalk, pretending to be a bear, skipping a rock, following an ant, sitting and swinging mirror the quantum uncertainty principle by illustrating the fluidity and unpredictability of her experiences and identity. Just as the principle highlights the inherent unpredictability of quantum systems where certain properties cannot be precisely measured simultaneously, Jesse's actions reveal different facets of her personality and interests, showing that her engagement with the world is dynamic and adaptable. Her spontaneous transitions between activities demonstrate how her identity, like a quantum particle, is not fixed but shifts based on her environment and experiences, embodying multiple states of play and exploration. Thus, Jesse's ever-changing activities reflect the concept of identity fluidity, which in turn is compared to the indeterminacy found in quantum mechanics. "...And then Jesse snuggles because that's the small way That Daddy and she ended each single day" (Honig 12). In the context of the principle, the act of Jesse snuggling with Daddy is seen as a metaphor for how seemingly small, everyday moments contribute to the fluidity and complexity of personal relationships and identity. Applying the concept of uncertainty principle to Jesse and Daddy's routine of snuggling, it is vivid that, although the act of snuggling might seem like a minor or routine event, it plays a crucial role in their relationship. Much like how small, seemingly insignificant quantum interactions can influence the overall behavior of a particle, these small moments of affection and connection help shape their bond and individual identities.

The daily activity of snuggling represents a small but important component of a larger, evolving relationship. These small interactions contribute to the development and fluidity of their emotional connection and sense of self. The principle shows that even the tiniest quantum changes can have a significant impact on a particle's state. Similarly, Jesse and Daddy's night snuggling, while seemingly small, has a substantial impact on their emotional well-being and the stability of their relationship. It outspeaks how small, everyday actions can contribute to the larger, often imperceptible changes in personal identity and emotional bonds.

Despite the inherent limitations and uncertainties in Jesse's recollections, she derives solace and meaning from these partial, imperfect memories. This mirrors the notion in quantum mechanics that, despite fundamental unpredictability, meaningful patterns and phenomena can still emerge. Jesse's struggle to retain and accurately recall her father's presence aligns with the principle, demonstrating how fragmented and shifting memories reflect the principle's assertion that certain aspects of a system cannot be precisely known simultaneously. Through her efforts and emotional experiences, Jesse navigates and finds comfort in the inherent uncertainty of her memories. Just as particles are in a state of constant change and indeterminacy, human relationships and personal identities are also fluid and subject to change.

The quantum uncertainty principle helps illustrate how small, insignificant moments can have a profound effect on relationships and personal identity, emphasizing the importance of these seemingly minor actions in the larger context of emotional and relational dynamics.

Case Report

An eighteen year old student named L. Jinsha from Chennai, Tamil Nadu, India was interviewed via telephone call on August 31, 2024. The telephonic interview helped in investigating the interviewee's family and cultural background. The response to various questions pertaining to the study aids in proving the aim of the study. The female interviewee is a child of a retired military officer. Her father has been serving the Indian army for about 31 years. She has gone through parental deployments, transfers and relocations. Her experience shows beyond doubt that the state of mind and personal identity of military children keep changing. She reported that her mood often swings. She feels happy thinking of her father's memories, the chocolates and sweets he brings, wearing his army cap, funny pictures and family time with him. In the age when she did not even know to discern the difference between weeks and months, she kept counting the days of her father's next arrival.

The telephonic interview with the eighteen year old aimed to explore the fluid nature of her identity and relationships within her military family context. The questions focused on understanding the impact of her father's frequent absences and occasional visits on her emotional and relational experiences. The questions included are as follows,

1. How do your feelings about your dad change when he's home compared to when he's away?
2. Can you share a small moment during one of your dad's visits that made a big difference in how you feel about him or your family?
3. How does your relationship with your dad feel different when he's here versus when he's not?
4. Do you feel different about yourself when your dad is home? If so, how?
5. How do the little things your dad does when he visits influence the way you think about him?

These questions sought to uncover the subtle ways in which her father's presence or absence shapes her self-identity and their overall relationship. The interview, which lasted for about 15 minutes. When asked how her feelings about her father change when he's home versus when he's away, she shared that she feels closer and more connected when he's present, but experiences a sense of emptiness during his absence, though she gradually adapts to life without him (Jinsha). This highlights the fluctuating emotional bond between them, dependent on his physical presence. She also recounted a small moment when her father surprised her by picking up from school, replaced by a school bus or mom, which made her feel proud (Jinsha). This demonstrates how minor gestures can have a significant impact on her perception of their relationship, underscoring the importance of small actions in emotional dynamics.

The girl noted that their relationship feels closer when her father is home, whereas it becomes more distant when maintained through rare calls, reflecting the adaptive nature of their bond. Her sense of self is also influenced by her father's presence. She feels more secure and confident when he is home, but more independent when he is away, indicating that her identity fluctuates based on external factors. Additionally, she expressed that her father's small gestures during his visits, like bringing her favorite chocolates or spending time with her, deepen her appreciation for him, illustrating the impact of seemingly insignificant actions on their relationship (Jinsha).

Collectively, these responses reveal the dynamic nature of her identity and relationship with her father, mirroring the principles of quantum uncertainty where small, everyday moments can have a lasting effect on personal and relational development.

The justification for this study lies in the need to understand the nuanced and often complex emotional and relational dynamics experienced by children in military families, particularly those who, like the 18-year-old girl from Chennai, do not relocate but are still deeply affected by a parent's frequent absences due to military duty. The application of the quantum uncertainty principle as a metaphor serves to illustrate the fluidity and variability in personal identity and relationships within this unique context. By examining how small, seemingly minor interactions during a parent's visits can significantly impact the child's emotional state and sense of self, the study centers the idea that small gestures and acts shape an individual in many better ways.

Conclusion

The analysis of the quantum uncertainty principle in relation to identity fluidity in *Something Small* reveals a meaningful analogy for understanding personal and emotional growth, especially for military children. Just as the principle highlights the inherent unpredictability and fluidity of quantum particles, Jesse's experiences illustrate how her identity continually evolves in response to her ever-changing circumstances.

Her efforts to preserve her father's memory, her shifting emotions and her varied playful activities reflect the concept of fluidity and unpredictability. Everyday tiny moments like snuggling, drawing and playing demonstrate how even the smallest interactions can significantly influence personal identity and relationships. By using the quantum uncertainty principle as a metaphor, the study aids in gaining valuable insights into the ways military children cope with their unique lives and the emotional complexities they face.

The case report highlights an important societal message, recognizing and valuing the fluid and multifaceted nature of personal identities, particularly for those living in unpredictable and transient situations. It

emphasizes the impact that small, everyday interactions can have on shaping our sense of self and our relationships. By bridging connections between scientific principles and human experiences, it is possible to cultivate greater empathy and support for military families and others in similar circumstances. Embracing the interplay between stability and change enriches our understanding of individual journeys and fosters a more compassionate and inclusive society. This perspective encourages everyone to appreciate the significance of each small moment in shaping our collective human experience.

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