

Quantum cognition and interpretation of the fantastic in Virginia

Hamilton's *Sweet Whispers, Brother Rush*

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Abstract:

Fantasy requires a probabilistic theory of reasoning to explore how it enables the observer to create mental images from uncertainty. This study proposes a quantum cognitive approach to fantasy used for disclosing mental models of the character in uncertainty. For the uncertain individual, there exists a multiplicity of mentally incompatible but equally valid and complete representations (mental pictures) of the world. Contextualizing fantasy within the quantum cognitive principles, the novel Sweet Whispers, Brother Rush (1982) by Virginia Hamilton has been taken into consideration. In this novel the hesitation between psychological and supernatural explanations interrupts the predictive power about the real and affects mental models or cognitive states of the young character of the novel as the observer. The process of representing fantasy through complementarity, one of the quantum cognitive principles, shows that fantasy is a mixed state with a familiar probabilistic combination of states which reflect incomplete knowledge. The quantum principle of superposition has been used to explain the way an introspective mental experiment is initiated by the observer but not completed. The decision made by the observer is not a deterministic process that converges to a single mental representation. Rather it can evolve forever. To sum up, this article marks how quantum cognition can describe the uncertainty principle both on an emotional-behavioural and structural level when the observer entangles themselves within the irreducible indeterminacy of reality within fantasy.

Introduction

Fantastic fiction creates a framework where reasoning with and about uncertainty suspends the sense of reality. It challenges the observer's mental state by providing an explicit knowledge or an acknowledgment that one does not know. This uncertain state that is

defined as “experience of ignorance” or “conscious awareness of ignorance” (Anderson et.al., 2019, p. 2) engages the observers in a thought experiment to explore how knowledge is formed through hesitation but never to the point of certainty. Thus, the probabilistic basis of cognition and knowledge concerns subjective probability not objective determinism. Uncertainty as a fundamental aspect of fantastic fiction requires a probabilistic theory of reasoning to explore how the mind copes with uncertain information. Quantum cognition as an alternative approach based on quantum probability principles is an emerging field that formalizes a mathematical model for cognitive phenomena such as decision making, conceptual reasoning and perception (Khrennikov, A. (2010); Khrennikov, A. (2010); Pothos, E. M.; Busemeyer, J. R. (2013)). It is crucial to mention that no mathematical model is the concern of this study. This study considers *Sweet Whispers, Brother Rush* by Virginia Hamilton using quantum cognition as a theory of reasoning with uncertainty to elucidate opaque features of states of affairs and the nuances of hesitation upon the appearance of a ghost as a fantastic element that sustains the life of the character of the novel as an observer. A novel understanding of indefinite truth content becomes possible since the notion of contextual probability in cognition is the concern of this study. As Khrennikov (2010) differentiates between event conditioning and context conditioning situations:

(...) the conventional meaning of the conditional probability $\mathbf{P}(B|A)$ is the probability that *event B* occurs under the condition that *event A* has occurred [219]. Thus, conventional conditioning is *event-conditioning*. Our conditioning is a *context-conditioning*: $\mathbf{P}(b = \beta|C)$ is the probability that observable *b* takes the value β in the process of measurement under context *C*. In principle, we are not against the term “conditional probability” if it is used in the contextual sense. (p. 29)

This quantum-like cognitive experiment in the context of fantasy, which includes complexes of physical, mental or social conditions, does not lead to an interpretation of the text, but rather it leads to contextual (conditioning) probability. In fantasy, we are not dealing with two events whose intersection creates a new one. In contrast to such an event-conditioning picture, if one has two contexts, e.g. complexes of physical conditions such as

reality and fantasy, their intersection needs not correspond to any physically meaningful context. It is also noteworthy that the observer is not able to look into both observables (the reality and the fantasy) simultaneously or completely neglect one or the other. In this case, according to Khrennikov “a quantum-like description, namely, represent contexts by complex probability amplitudes...The set of contexts that permit the quantum-like representation consists of all subsets without ignorance of information” (ibid., p. 3). The crucial role is played by what Khrennikov calls “*interference of probabilities for mental observables*”. The mental observables in the context of fantasy refer to the hesitation that characterizes the genre and cannot be situated either in the past or future but in the present. The hesitation as a mental observable that engages and obsesses the observer brings about the interference of probabilities.

The ontology of the fantastic suggests if you know something for sure, then you know another thing less. Probability uncertainty indicates the transformation of potentialities to non-localized states of cognition by decomposition of certain reality. Considering the fantastic fiction *Sweet Whispers*, *Brother Rush* from a quantum cognitive perspective extends and bends the observers’ mind to decompose the enduring certainty of the semantic space and gives rise to the unformulated, probable and emergent experiences through which mental states and conceptual frameworks cannot be judged; but based on the complementarity principle, we experience familiar, probabilistic combinations of knowledge about the themes within fantasy. The quantum principle of superposition has been used to explain the way an introspective mental experiment is initiated by the observer but not completed. A quantum cognitive analysis of fantasy can demonstrate how a character’s cognitive embodied engagement with uncertainty contributes to the progression of a text’s plot and themes that are contextualized based on probability. Finally, this study suggests that a representation of fantasy arises as the result of creative interplay between the mind, the context and the processing of incomplete and ambiguous information in the ambiguity of contexts.

Quantum cognition and fantastic fiction

Cognition refers to the ability of an individual to form ideas and knowledge with the use of language, imagination and perception. Quantum cognition can be defined as the

probabilistic description of experimental probabilistic concepts. In other words, it is a scientific way of knowing how uncertainty can be conceptualized and how knowledge can be achieved through probabilistic descriptions and uncertainty. Basic to this notion is contextuality, which according to Khrennikov is “a complex of conditions under which the measurement is performed” (2010, p. 9). Concepts as subjects of probability are contextual or are dependent on context of observation. The observer becomes engaged in the process of the development of the concepts. In other words, cognition becomes an evolutionary, experimental process for the observer through which a probabilistic observable or concept in probabilistic complex conditions become realized. The measured or observed concept and its accuracy is insufficient to determine the outcome with certainty. There is no predictive, determined representations but they are productive. As Goodman et al. put it: “Productive generalization is possible because our knowledge decomposes into concepts—elements of knowledge that are combined and recombined to describe particular situations” (2014, p. 2).

Applying the quantum model of cognition to fantastic fiction that consists of superposition of states of real-physical and fantastic is beyond conventional models of considering fantasy only in structure. The fact that fantasy can be considered as a quantum-like extension of probabilistic description of real phenomena shows that the notion of truth is dependent on a probabilistic model. If the observer processes information by representation of probabilistic data, then there are new, indeterministic, evolutionary understanding of events, emotions and relations.

Quantum cognition, through all its related concepts such as superposition, entanglement, complementarity, interference and nonlocality has provided a novel framework for cognitive modelling of cognitive processes such as fantasy where two different yet interconnected items of knowledge and representations (realistic and the fantastic) spread outward from each point, eventually overlapping to form a more complex pattern. This cognitive system deals with the representation of some conflicting concepts about the truth content of the world (e.g. conflicting wishes, affects, and defensive manoeuvres). Questions posed to such a state can have different outcomes. Such a state is not consistent with any single possible outcome. Rather, there is a potentiality (Isham, 1989, p. 153) for different possible outcomes, and if the cognitive system evolves, so does the

potentiality for each possibility. Superposition, as a fundamental principle in quantum cognition, assumes that possible conceptual states without much interference are considered to be related in an indefinite number of ways and their relation creates an original new state. Superposition appears a way to characterize the fuzziness (the conflict, ambiguity and ambivalence) of a thought experiment and deal with aspects of cognition such as the cognitive dissonance as an internal inconsistency that Eliot Aronson defines as:

a state of tension that occurs whenever an individual simultaneously holds two cognitions (ideas, attitudes, beliefs) that are psychologically inconsistent with each other. Stated differently, two cognitions are dissonant if considering these two cognitions alone, the opposite of one follows from the other... because the experience of cognitive dissonance is unpleasant, people are (more constant) with each other, or by adding more cognitions that help bridge the gap between the original cognitions (2018, p. 92).

Entanglement considers the compositionality of complex cognitive systems. In entangled composite systems, one constituent part of the system is interdependent with another part, especially when the systems do not admit an interpretation in terms of a local realistic theory. In other words, compositionality is equated with a joint probability distribution modelling how the constituent concepts in the combination are interpreted. The constituent concepts within the cognitive process consist of compatible and incompatible semantics within the cognitive system. The compatibility within a cognitive system refers to defining the conjunction between two questions about a system, while incompatibility concerns the fact that if two questions are incompatible, it is impossible to define a single question regarding their conjunction. As Pothos & Busemeyer (2013) discuss:

This is because an answer to question A implies a superposition state regarding question B (e.g., if A is true at a time point, then B can be neither true nor false at the same time point). Instead, quantum theory defines conjunction between incompatible questions in a sequential way, such as “A and then B.” Crucially, the outcome of question A can affect the consideration of question B, so that

interference and order effects can arise. This is a novel way to think of probability, and one that is key to some of the most puzzling predictions of quantum physics (2013, pp. 256-257).

In relation to defining the fantastic genre that is partly realistic and half uncanny or marvellous, interpreting one observable can interfere with conceptual states in another one. While it does not negate the other observable, it implies a superposition state regarding the other observable so that their relative order becomes important. The observer's judgment and preference often display order and context effects. In other words, the observer interprets the same conceptual state in one observable probabilistically to the other one. Thus, it is sensible to approach the analysis of compositionality probabilistically. The question that is going to be dealt with and decided is: does a fantastic element such as a ghost limit cognition or extend it? There is a sense in which it limits cognition and another sense in which it extends it. In each case there is also a sense of uncertainty that leaves the observer to decide and to be attentive in each moment. The relative order is important due to the fact that decision making and cognition about a conceptual state emerge and change throughout the course of development.

When the observers engage in a probabilistic framework they have to "work" with probabilistic superpositions of states carrying cognitive information. The observer's mental state and cognition is affected by information flows from the compositional observables (fantasy and reality) composed of probabilistic concepts and an uncanny element that sustains relations of contiguity with other more or less proximate elements or concepts. The cognition through uncertainty corresponding to these observables substitutes veridical conceptualization with commitment to conceptualization. Thus, cognition through uncertainty is an agentic experience of a thoughtful action. Tim Bayne takes agentic experience to have as its core the experience of a particular movement or mental event as realizing one's own agency (2011, p. 357). This agency means focusing your attention on non-predetermined mental structures and unknowns. This scheme can be called "decision through decoherence of the mental state" (Khrennikov et al., 2020, p. 23). Through decoherence, the once definite relation between perfectly isolated conceptual and psychological states loses its coherence during observation. In this model, there happens a

loss of monopolistic information in favour of probabilistic weights. Thus, the uncertainty in the initial mental state on a conceptual and psychological level is resolved by a summation of probabilities.

The notion of an isolated conceptual and psychological state in the cognitive system becomes meaningless. Interpretation is no more the penetration of certain truth but is considered as an encounter with the duplicitous undecidability of texts. Barthelme in his essay “Not Knowing” delineates the sense of the liberating possibilities in uncertainty. He asserts that “the not-knowing is crucial to art, is what permits art to be made” and complains that some critics display “a rage for final explanations, a refusal to allow a work that mystery which is essential to it” (1985, p. 521). Fantasy appears as an occurrence of uncertainty and dissonance about objective reality and the concepts or events that happen in reality, conveying an awareness or knowledge of what we don’t know about ourselves and our relation to others. The not-knowing allows the observers to use their own agency by considering the dispersion of forgotten things, identifying errors and faulty attitudes and predetermined ideas. To approach a decision within the entangled fantasy-reality frame, the mental states of the observers work in a finite period of time until states’ fluctuations become small with respect to stabilization. According to John Gribbin, “[i]t [conceptualization] consists of multiple alternative worlds neither of which achieves concrete reality until some key action is taken at a crucial time in the past where the courses of the two worlds diverge” (1984, p.239). There happens the mental state differentiation through which observers experience step-by-step state transitions under the influence of various contextual and mental phenomena during the observation (measurement) (Asano et al., 2018). Even the probabilities for the outputs of a cognitive state can be modified.

The deviation from a realistic expected pattern can best be described through a double-slit experiment, since there are more than single probability spaces. The deviation gives the same values even over different pairs of concepts to be actualized. Reasoning is the superposition of two simultaneous processes, a “logical (realistic) reasoning” and a “conceptual (fantastic)” or “emergent,” “reasoning.” Logical reasoning combines cognitive entities (concepts, combinations of concepts, propositions, etc.) by applying the rules of logic, though generally in a probabilistic way. Emergent reasoning instead enables the formation of combined cognitive entities as newly emerging entities (new concepts, new

propositions, etc.), carrying new meaning, linked to the meaning of the component cognitive entities, but with a connection not defined by logic (Aerts et al., 2015). It best describes the conjunction and disjunction of two concepts by means of a superposed quantum state and allows for the modelling of quantum interference. Thus, conjunction happens when a new emergent meaning or concept is achieved from the combination of two reasoning and cognitive systems. New concepts – in the case of propositions, new propositions – carrying new meaning are linked to the meaning of the constituent cognitive entities.

The relative prevalence of emergence or logic in a specific cognitive process is measured by the “degree of participation” of observers in fantasy or reality, respectively. Fantasy diverts observers in many ways from logical reasoning in their concrete decisions through creation of paradoxes, fallacies and contradictions and leads them to draw conclusions and make decisions based on the emergent constitutes. The rejection of one cognitive system leads to disjunction in meaning and concept. When a cognitive system is considered separately, a concept is described as a set of simple instances but when the totality is considered each aspect of the concept and truth content becomes potentially true.

Fantasy retains a sense of a (text’s) mystery and conjures up a seductive elusiveness about the relation between language, consciousness and various explorations of concepts and states in mental spaces. The fantastic and reality represent an entangled wholistic system that needs to be decomposed into subsystems that are correlated “non-locally” (i.e. without direct causal interactions). In this sense, the complementarity within the observer’s mind refers to “descriptions that mutually exclude each other, but are jointly necessary to describe a situation exhaustively” (Wang et al., 2013, p. 678).

Fantasy based on quantum cognitive principles can be realized as a genre in which observers attend to a presumably supernatural element; the hesitation and the ambiguity in the significance of important aspects and concepts caused by the scope of the problems they face, even paralysing them from taking action to overcome a problem, is understood to be able to shift the observer’s interpretation to a plurality of mutually exclusive meanings. It refers not merely to a structural feature of the text but also to the state of mind where observers find themselves in an altered state of cognition, where the focus range and clarity of perception (toward self, disease and death) are dramatically changed, reliant on the

decision-making process. It provides a mental-linguistic framework where the distributed, marginalized conceptual states have some potential for being expressed. In the following part, *Sweet Whispers, Brother Rush* has been taken into consideration to examine the problematic nature of perception and how the observer reconciles the possible and impossible.

The puzzle of whispers

A young girl learns of her family's secret past when she and her brother are visited by the ghost of their uncle, Brother Rush. The soul-ghost forms conflicting knowledge about the truth content of life. Some regard him as a phantasm of a young girl while others take him as a representative of the past (O'Keefe, 2004, p. 145). In "*Sweet Whispers, Brother Rush* and the case for a Radical Existential Criticism," the concept of death as an existential issue has been considered. It has been discussed that Brother Rush comes to take Dab with himself and soothe Tree's fear and loneliness (Farrell, 1990). The psychological enhancement of the female adolescent character through confrontation with the apparition has been considered as one way of approaching the novel in "If the Ghost Be There, Then Am I Crazy?" (Sobat, 1995). In *Virginia Hamilton* (1994), Nina Mikkelsen has taken into consideration other social, economic and gender interpretations. A ghost is, put simply, the uncanny and unlocalized element to challenge the observers' dissonant cognition.

Tree's mentation about the truth content of her life (conflicting wishes about meaning of family, experience of emotions such as loneliness and love and defensive manoeuvring towards unavoidable events such as death) is characterized by lack of clarity and ambiguity. Her conceptualization rests on inconsistent experiences and obsessive concern with absence, death and filial relation that cannot be grasped fully in an ordered linear state. The feeling of uncertainty in the ordered state that left her in loneliness, passivity and bafflement intermingles with gaining knowledge through uncertainty when the ghost disrupts the experience of objective certainty and engages her in an unformulated experience to consider the moment-to-moment state of vagueness and the possibility from which emergent concepts and experiences evolve conceptual representations and mental relations. The observer, in their active state, shifts from secure knowledge to uncertainty, a sense of liberating possibilities in uncertainty in which statements of "not knowing" are

crucial. As Richard Feynman puts it, “I cannot define the real problem; therefore, I suspect there’s no real problem, but I’m not sure there’s no real problem” (1982, p. 467).

Tree’s mother has tried hard to make a convincing reality based on objective knowledge to sustain the availability of a self without relational exchange and emotions that increase a specific dissonance. In her certain context, there’s nothing dynamic such as the possibility of encountering something outside the objective experience, some unknowable alterity. The traces of suffering in reality when Dab and Tree are lonely does not confirm their selfhood and reality, but breaks this certainty: “When she [Tree] felt something was missing and she didn’t know what it was, she’d go by Dab where he sat to lean on his shoulder... There they’d be in the house, so quiet. She’d take a deep breath and feel Dab breathe out in short bursts, like gasps of hurt” (p. 14). While feeling that having a family is more important, M’Vy is absent, not supplying her children’s emotional sustenance on which their selfhood depends “She [Tree] was used to the way things were and knew they were the way they had to be...She accepted M’Vy as the mood and background of her life. Muh was the color and shade of shadows that were always in the house. Tree could depend on the background. It was she and Dab who were alone together” (p.17). The sustainability of the relational exchange is generated within a closed system between Tree and Dab that later will be confronted with death and disease as uncertainty factors that disrupt M’Vy’s consolidated system. Discipline is the holder of their relation not knowledge and mutual understanding “M’Vy had to make sure no ragtag had crept into her house. She pronounced the word discipline and she told Tree often enough that discipline was kept the three of them together. ‘you cain’t touch it. But it what keep you safe in here. It holds me working away and coming back to care for yo’w’” (p. 90).

M’Vy tries to pre-empt her children’s questions by adding a disclaimer to her work. Everything is presented as the result of some knowable process, which in turn leads to a secure interpretation. She stabilizes her authority by providing a certain knowledge of the here and now: “The few hours of having M’Vy with them on her short weekends at home were precious. They would let M’Vy give them all she had to give, and they let her talk about what she cared to talk about, Tree and Dab never had time to find out about the past; they had so little of the present” (p. 50). M’Vy believes that her way, including her language and formulating assertions about reality, is transparent and trustworthy. According to

Thomas, “[d]isregard, neglect and the shameful breaking of a child’s will are likely to be experienced as traumatic and the shamed individual loses the ability for self reflection, or what she refers to as ‘the loss of the unifying *I*’” (2005, p. 168).

Lack of confident expectation of engaging with others in relationships in which self-object experiences can be shared, causes disruption and uncertainty in endurance of selfhood. She questions the orthodox position since the situation gets emotionally threatening and uncontrollable: “It came to her all of a sudden: If M’Vy get runned down by the bus, if there be some mugger, nobody to brang us nothin! Where are the relations? The relatives were dead [...] Why come me and Dab never hear nothin about them. And the ghost! Who the ghost?” (p. 50). The method of questioning the nature of observed reality indicates that Tree discovers the failure of patterns traditionally held to produce fulfilment and stability. Everything about her and Dab remains uncertain and the detachment from others generates depersonalization and derealization. This feeling is intensified when she sees Dab suffering both retardation and an unknown disease. The logic is crippled and life cannot be wrapped up as Tree says “How come nothin ever get fixed get broken in this house, Tree wondered. And thought of Dab. Who gone fix him?” (p. 63). Accidental accretions, such as Dab’s pain and undirected reality as well as the appearance of the ghost, bring about an inability to impose a restorative discipline on the concept of self and truth content of life. The certain relational patterns confronted with death and disease lead to an understanding of fear because of lack of control since she cannot predict or change the outcome: “She felt sad for him, for his lonesome self, inside the small amount of mind he seemed to have. How had it happened, she wondered, that he was born with trouble in his brain? Or did it happen later? ... Am I losin my mind?” (p. 79). Tree starts a thought experiment to challenge the coherent, objective, reliable and discipline-based reality. The superposed obligation to her sick and later dead brother extends to an extreme form of ridding herself of that which differentiates her from Dab, her mother and the dominant, identified reality.

Fantasy in the form of a ghost intrudes upon observers’ cognition presenting further sets of alternative outcomes to see the vast and dissimilar realm of knowledge against the standard. Life is not a series of linear connections to inevitable death. The ghost of Brother Rush through the mirror he is holding exhibits an untrivialized conceptual framework:

“Brother Rush stood his ground. The hand that had been cupped around his ear now held something. It looked like an oval mirror, but it was not a mirror. What Rush held was an oval space shaped like a mirror, and it glinted at her. In it was a scene of life going on” (pp. 25-26). The ghost creates a feeling of disorientation and dread rather than feelings of comfort, prediction and security. It brings Tree in contact with isolation, hereditary disease and association with death to explore experiences of creepiness and dread. Through the mirror space held by the ghost, life is multiple, fragmented and so big that it cannot be wrapped up. It confronts Tree with her limited information, an instability which would impair her ability to deal with an emergent threat. The fantasy visualizes combination/superposition of conceptual states in fragmented moments and spaces to reconstruct each fleeting moment in the hope of discovering the “not knowing”.

Description of life as a superposition of states, based on the quantum system, means that both fantasy and reality are properties of these states that need to lose their individualities and turn into a new set of properties with developmental options. This process provides a possibility of mental interchange. Through entering the mirror-like space, Tree identifies mental deviations from self to other that create a new set of shared feelings about their life. The cognitive regulatory process is viewed in terms of relationships among characters and their experiences: “She saw her eyes in the space. She was looking down into the space and seeing herself. But it was not herself, not really... Tree didn’t feel much like herself” (p. 27). Discovering the truth does not entail finding one essential truth, rather it depends on divergent, marginal and multiple repetitious or complementary episodes that suggest a probabilistic rather than causally necessary approach to narrative forms. Hamilton presents events in all their singularity while exposing multiple accidents that shape them. The order is subverted when Tree goes into the oval space. She is no longer Tree “She was in a house. She had a plump child in her arms. Tree didn’t feel much like herself. For one thing, she was too tall and plump, too, as though she’d had the baby-child maybe two years ago and hadn’t taken off the weight” (pp. 27-28). The fantasy exhibits abstract evolutionary relevant features that explain the almost quality of the feelings evoked by memories of childhood and richness of details.

The predicted reality decoheres and finds probabilistic weight as Tree observes them; “After that, Tree separated from the woman. She felt she was looking down on the

scene. All at one, she saw the baby girl, the woman, and the poor sad boy” (p. 33). Brother Rush twisting Tree’s mind to vindicate the mystery implies that more information can be seen at the moment. Generous creation of moments evokes feelings of being creeped out since the once definite relation between isolated conceptual states loses its coherence during the observation. Her mother’s isolated, unresponsive conceptual state is revealed: “Bless it! Thought Vy. Thank thee for the worthy [Tree] and good. Take that boy out of my life. She thought of her first-born wretched son, her cross to bear through life” (p. 32). The unpleasant state of vigilance makes Tree grapple with the ambiguity on two levels: first, she is not sure if her brother (Dab) is an actual source of harm or threat to be wary of through her mother’s reaction. Secondly, the growing awareness that she is facing some sort of threat, although she may not yet exactly understand the nature of it, is also important.

The superposed states and feelings in each moment transform Tree’s feeling and knowing by becoming engaged in fragmented narratives of Brother Rush’s death, the inherited disease of the family and her mother’s death-obsessed and death-denying efforts. The mystery creates states that, according to Aerts, “cannot be in a very concrete state – a state close to being a localized state – and in a very abstract state – a state close to being a state of definite momentum – at once” (2013, p. 2). What is not concrete is the threat of ambiguity that is associated with concrete people in a state. This emotion shed lights on why some people such as Dab appear intimidating to her mother. For instance, Tree witnesses how her mother punished Dab while they were in Brother Rush’s car:

Tree was there, seeing, but felt herself fading. She was the woman, her gorge rising. She was the girl child, seeing pictures, shapes. She became frightened as the woman holding her stiffened and let go one reassuring hand. The woman bent down and came up with a stick. She struck the boy’s legs back and forth, whipping, back and forth. The boy’s scream rang out. She saw his thin legs in short pants tremble and kick (p. 69).

Tree as an observer and participant in the fantasy is going to find a response to the creepiness of her brother or her mother through their non-normative, nonverbal and emotional behaviours, unusual characteristics or suspect relations. This state presents her

with an ambiguity as to whether or not they are someone to fear, and this ambiguity makes her uncomfortable.

In quantum cognition, a localized state of a concept is complementary to an abstract state. The realization and decision on abstract concepts require a context to be localized in. According to Aerts, it means that “the more abstract the form of a concept, the more it is incompatible with a very concrete form of the same concept” (2013, p. 3). The conceptual incompatibility happens for the observer each time observing the concept of creepiness as a response to ambiguity of threat from concrete examples (mother and brother) who are her loved ones. Thus, Tree must adopt a different mental model through which she can resolve her emotional reasoning and evolve her cognition. The concept of creepiness as a result of a threat ambiguity in fantasy, incompatible with her previous preconceptions about her mother and brother in reality forms a familiar probabilistic combination of states which reflect incomplete knowledge. What creeps her out is not because her mother and brother pose a clear threat to her, but rather it is the unclear reason of death, retardation and disease that made mother and son momentarily paralysed and it is their reaction that has made them an ambiguity threat.

The ghost and its mirror become a triggering observable or conceptual state with nonlocal relation to objective truth that conceptualizes fluid, context-sensitive, nonlinear and contingent mindsets. Hamilton represents this relative and nonlocal concept formation through disjunction and conjunction: disjunction represents the typical example of the failure of the mother generating misleading affirmation of a closed, causal and certain world and conjunction is an emergent, conceptual combination that will put them on the trail of identifying the equivalence for cognition of a mother-daughter or mother-retarded-son relation. Co-regulation transforms the existential certainty which according to Alan Fogel is “a social process by which individuals dynamically alter their actions with respect to the ongoing and anticipated actions of their partners” (1993, p. 34)

Tree engages in a cognitive experiment to form an emergent reasoning from ambiguities. The cognitive system of the observer is not going to choose one mode or the other as two separate domains. Tree’s mind fluctuates between two domains to merge meaningful connections: “Her mind felt blank, and she had the sensation that she was evaporating in the silence. But then, suddenly, she was completely herself...And there was

no other place that was also another time and beyond her understanding” (p. 76). The ghost helps Tree to take an action against the self-perpetuating ambiguity threat in relation between mother and child through decomposition of the obsessed intentions and reactions. The ghost transforms Tree’s limited semantic space and enlarges her conception of the range of possible experience. The anxiety aroused by the ambiguity of whether there is something to fear or not and/or by the ambiguity of the threat lead her to decomposition of unknown semantic space in reality. Tree tries to interact with her mother, Vy, to resolve the ambivalence that left her in uneasiness. Tree uses “I know” as accusing language to show social distance between herself and individuals who display inappropriate or non-normative expression of emotion: “Yeah, I know. We got to have manners and discipline’ she gave a wicked look. ‘I know lots of things... you wouldn’t think I know, too’” (p. 96). Faced with Tree’s indignation, the mother is unarmed: “‘I know lots’ Tree shot back at her. She felt as evil as she’d ever dared. Something hard and sharp raced through her, bursting forth with a killing speed. “You beat my brother good when he little, didn’t you?” she said. “You whumped him and tied him up to the bedpost. Vy. Shi. You sure some mother” (p. 96). The anger as a response to a perception of threat to self or important other due to physical conflict, negligence and betrayal gives rise to a reasoning and conceptual change in relations. She asks her mother to join and improve her knowledge. The entangled knowledge allows both sides to unsettle their attitudes about the repression and break the bonds of threatening relations and language. The conceptual combination suggests the existence of incompatible mental variables whose values cannot be judged and decided before complementary measurement. The conceptual correlation creates the spirit of open and unselfish cooperation. M’Vy hesitates about her emotions and her cognitive state and decides to start a constructive and appropriate relationship with her children and stretch repressed concepts such as liberation, active hope, victimization and death.

Tree and Vy engage to interfere in one another’s conceptual framework, which according to Aerts, “accounts for the values measured with respect to the disjunction of the concepts” (2009, p. 45). The interference pattern will result in constructive and destructive concepts in the conceptual domain of mother and daughter and creation of a third conceptual framework that is open for interpretation. When Tree tells her mother about the ghost, Vy admits the strangeness of the space between the undecidable threat ambiguity of the past

and incomprehensible, creepy present, instead of calling her crazy: “I don’t think you crazy, Tree. And we can argue about what it (ghost) is all night, and whether, and how come it is. So okay, I don’t disbelieve nothin. Let’s go see the little room” (p. 99). When conceptual frameworks combine, they provide new and surprising clarification of their observations. A relational world represents uncertainty and acknowledgment of what one does not know. Tree, Vy and SilverSmith, her mother’s friend, take part in an experiment of mixed state, which is a superposition of all possible states and concepts to resolve the ambiguity threat of the past, and help Dab. One decision becomes the actual, measured state of a moment and state. The emergent reasoning provides momentary, newly emerging mental reasonings and decisions that may mutually exclude each other but are joined to describe the situation: “Look, I ain’t got the time now. Dab’s so sick. You know it. It’s my fault, dint want to face up to it” (p. 128) and she adds, “My honey, my Sweet Tree, you don’t know what going on. I don’t either, not all of it” (p. 129). When the emotions change, it leads to superposition of states in which characters share their combined sets of probabilities about death, disease and loneliness.

Decoherence of a certain state bends observers’ minds to reconsider their decisions and emotions in relation to the actual situation by making choices and assuming responsibility as a way of reconciliation and empathetical behaviour. The uncertainty principle within the fantasy introduces observers to the disruptive image of reality to make new and improved explanations, decisions and relations. This brings together Tree and M’Vy as new emergent participants who personalize all superposed states. The circular re-evaluation of events with the conceptual combination of two generations originates renewed meanings and decisions such as joy of a new emergent family and relations that end the loneliness. “She wondered. We all like a family—is it what a family’s like? Talkin, being close and laughin, always knowin they there?” (p.208) Tree also finds agency to make decisions about each moment although her decisions about the future remain unclear and uncertain “She thought about Dab and M’Vy’s love, and about porphyria. Last, she thought about being out on her own. She didn’t know, yet, about that. Maybe I will, maybe I won’t, she thought” (p. 214).

Hamilton intends to confront us with the marginalized, isolated, confused and erratic evaluation of African-American families. Tree’s dynamic and enabling observation breaks

the disastrous cycle of filial passivity and paternal ruthlessness that had left her uncertain about death, self and her relation to others. In other words, the ghost of Brother Rush becomes the ego-dissolving factor that disempowers threats. M'Vy and Tree, instead of mere acceptance of linear, single reality, engage in the act of problem solving and creating new relations and definitions based on fluidity, openness and tolerance.

Conclusion

The undecidability and uncertainty in reality was represented as an ambiguity threat caused by Tree's obsession with her family and the creepy experience of death, loneliness and disease that affects her relation with her mother and brother. The ghost of Brother Rush cannot be merely discussed as a necessary structure and element of the genre of fantasy. The experience of fantasy, the ghost, changes the observer's attitude from a knowable, linear one to "not-knowing".

Quantum cognition has come to help us improve our understanding of uncertainty represented in the dual level of reality and fantasy. Based on quantum cognition within the conceptual context, each particle concept finds the possibility of being observed and superposed. A cognitive definition of fantasy is not based on the binary that it creates between real and unreal, but it focuses on the productive tension at the core of the fantastic. It provided a third understanding of uncertainty within Fantasy as a way to agentic and responsive knowledge. Fantasy leaves us in an uncertain balance to see all possibilities and all existing levels of evidence at different contexts.

The emergent reasoning caused by this model of cognition dissolves the unpleasant feeling of uncertainty in reality and uses uncertainty as a way of creating new knowledge that brings into account all possible historical, emotional and psychological concepts within the novel *Sweet Whispers, Brother Rush*. The characters through the fantastic element engage in productive tension that enables them to see all possibilities about each other and how they can correlate to one another without one negating the other.

The very nature of quantum cognition discussed within this paper described the truth content whose meaning cannot be singly or completely determined. Because it contains complementary and paradoxical states in fiction with intricate patterns of the fantastic and reality, discontinuity and uncertainty extend observers' cognition by providing exclusive

choices and combinations of knowledge and emotions that gives them the opportunity to be responsive, attentive and responsible.

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