



Elizabeth Hamilton's Scottish Associationism: Early Nineteenth-Century Philosophy of Mind*

ABSTRACT: *This article compares early nineteenth-century English and Scottish theories of the mind and the way that it develops to findings in today's developmental psychology and neuroscience through a close observation of the work of Elizabeth Hamilton (1756–1816). Hamilton was a Scottish writer and philosopher who produced three pedagogical works in her lifetime, consisting of her carefully formulated philosophy of mind and practical suggestions to caretakers and educators. Although Hamilton has received relatively little attention in modern philosophical literature, her understanding of the mind and the way it develops—based on her nuanced understanding of associationism and Scottish faculty psychology—is overwhelmingly supported by empirical findings today. In addition to utilizing Hamilton's work for the sake of understanding early nineteenth-century philosophy of mind, I argue that a large portion of Hamilton's work should be used to inform future research programs, early caregiving guides, and educational methods.*

KEYWORDS: philosophy of mind, history of philosophy, Scottish philosophy

Introduction

In *The Concept of Popular Education*, Harold Silver (1965) states, '[i]n the late eighteenth century and the first two or three decades of the nineteenth century [popular education] hardly existed.' This 'lack' of education is unfortunate considering the fact that many thinkers in the United Kingdom were interested in understanding the 'nature of children' and of the mind more generally, leading to extensive speculation about the conditions, caregiving practices, and educational programs which allow the mind of the child to develop optimally (Simon 1974: 38). Some theories that influenced authors of educational guides at the time are surprisingly accurate when examined in light of today's empirical findings in developmental psychology and neuroscience. This article attempts to link these modern findings to early nineteenth-century theories of mind.

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Many educational and pedagogical works at the time were based on different versions of a cognitive model resting on the doctrine of associationism or the ‘faculties’ posited by Scottish faculty psychology—which would be used to advocate the adoption of new educational methods fostering critical thinking and beneficial learning habits (rather than rote memorization of fact) throughout the nineteenth century (Eddy 2017: 12). The doctrine of associationism was especially pervasive in literature for and about children (Vrettos 2002). Accordingly, I examine the work of Scottish philosopher Elizabeth Hamilton (1756–1816), whose ideas are based on both associationism and faculty psychology.

Elizabeth Hamilton was a Scottish writer and philanthropist who dedicated her life to the education and improvement of humanity. At the age of six, following the death of her father, she was sent to live with her forward-thinking aunt and uncle on their farm near Stirling (Perkins 2004: 1). She attended day school, where she received her formal education until the age of 13, learning to play the piano and dance, and studying French, geography, and drawing—all ‘feminine’ accomplishments (Grogan 2012: 10). Afterward, she was taught music and drawing by a private tutor, while also attending to religious studies at home (Benger 1818: 43–44). An avid reader, she dedicated most of her time to retrieving books secretly and learning from them (Grogan 2012: 10).

Although academics in Scotland were comparably more accepting of the education of girls than those in England, there was still an aversion to the idea of well-educated women leaving their proper domestic sphere (Grogan 2012: 10). Nevertheless, in 1771, Hamilton was sent on a trip to Glasgow and Edinburgh where she met Dr. Moyses (1750–1807), a blind chemist giving a series of lectures on experimental philosophy (Benger 1818, 46). Moyses was educated by Adam Smith, David Hume, and Thomas Reid; Joseph Priestly claimed he was an ‘excellent lecturer in philosophy’ (Priestly 1783). Impressed by Hamilton’s quick and accurate understanding of his lectures, Moyses continued to help her learn more about philosophy through a series of letters guiding her through the works of the popular Scottish and English thinkers of the time. Hamilton’s biographer, Elizabeth Benger (1775–1827), notes that Hamilton regretted the years she ‘unprofitably wasted’ on her previous feminine studies that she could have spent on ‘classical’ and ‘scientific pursuits’ (Benger 1818: 46).

Her religious yet liberal upbringing along with her introduction to the ‘masculine’ subjects of natural philosophy and metaphysics created a solid foundation and persistent motivation for Hamilton, who spent the rest of her life attempting to understand and explain the practical value of philosophy. Her concern for the well-being of all humans, regardless of age, gender, or socioeconomic standing, is apparent throughout her life and work. Hamilton published four fictional pieces, which she cleverly used to make political and philosophical ideas more accessible to women, and two books on religious observation. She also published three educational treatises, which are the main focus of this article.

In her first educational work, *Letters on the Elementary Principles of Education* (1801), Hamilton outlines her philosophy of mind and suggestions for educators, arguing that an understanding of the way the mind works can allow mothers and teachers to help children become more intelligent, virtuous, and benevolent

members of society. In *A Series of Popular Essays* (1813), Hamilton further develops her philosophy of mind and pedagogical suggestions. In her final work, *Hints Addressed to the Patrons and Directors of Schools* (1815), Hamilton criticizes the popular teaching methods of the time that relied on rote learning and memorization; she believed that learning to think was far more important than learning information. Together, these works portray Hamilton's well-thought-out and carefully organized philosophy of mind, which she uses to explain diligently the nature of the mind, how it works, and how it can be properly developed.

A close observation of Hamilton's work can be advantageous and beneficial for three reasons. It is useful in one sense because it encompasses the views of several other prominent thinkers of the time (which she has read and refined), giving the reader access to important theories, doctrines, and authors. While reviewing the work of others, Hamilton is sensitive to the impact of broader societal conditions on the growth of the human mind and humanity more generally, and the struggles faced by traditionally marginalized populations, like those of women and the lower classes, when forming her interpretations—giving the reader a nuanced and intricate understanding of the sources she explores.

Hamilton is also ideal for this investigation because of her moderate and open-minded outlook, which allows her to articulate clearly the popular philosophical and pedagogical theories of the time while also being sensitive to the perceptions of others. At the turn of the nineteenth century, radical change and inadequate public services created a period of dispute and ambiguity. The revolution in France provoked similar effects in Britain. The English 'Jacobins,' supporting reforms and the restructuring of parliament, were pitted against the Loyalists who were unwilling to alter the status quo (Simon 1974: 64–65). Catholics and dissenting communities struggled to attain religious freedom, growing tired of their limited liberties and power.

Particularly relevant to Hamilton's work were debates over the education of poor children. Some argued children needed to be 'rescued from' their appalling living conditions, while others wanted to rescue them 'for' the sake of society; to teach subordination and instill values like 'industry' and 'piety' (Silver 1965: 30). Others rejected the notion all together, scared of the possible effects of 'literate criminals' (Sivasundaram 2005: 69). In spite of the social and political turmoil of the period, Hamilton remained moderate and relatively unbiased, combining her philosophical knowledge and practical experience in genuine concern for the intellectual and moral growth and success of all children and society at large (Hamilton 1801: 90).

Finally, at the time, women were seen as incapable of producing ground-breaking work, and were restricted to writing novels or becoming popularizers (Gates 1998: 36). It was generally accepted that women could not write about 'masculine genres' like philosophy or politics (Grogan 2000: 14). Consequently, her work was neglected in favor of pieces written by more prominent male philosophers. Not only does reviving Hamilton's work make a significant contribution to our understanding of early nineteenth-century philosophy of mind but it also gives her well-formulated ideas the attention they deserve. To my knowledge, there has been no comprehensive investigation of Hamilton's philosophical and pedagogical

work; a review of her philosophy of mind, compiled through a careful reading of her educational treatises, would be a great way to revive Hamilton's views on the developing mind, caregiving practices, and education.

Accordingly, I demonstrate that philosophers in the early nineteenth-century were capable of producing theories of the mind and its development that are accurate in light of today's empirical findings. First, I review Hamilton's philosophy of mind and the doctrines and philosophers that influenced her way of thinking, providing a more general overview of prominent thinkers and theories of the time. I additionally introduce the 'faculties' considered by Hamilton, which she adopted from Scottish faculty psychology. Consequently, I defend Hamilton's understanding of the development of the infant mind as well as the powers of the mind by utilizing modern scientific findings. I briefly discuss the pedagogical suggestions she derives from her philosophy of mind and defend her suggestions in light of recent empirical work.

Finally, I argue that Hamilton's philosophy of mind is largely supported by today's psychological and neuroscientific findings, and I conclude that nineteenth-century philosophers in the United Kingdom were competent in producing accurate theories of the mind and its development. In order to remedy the fact that her work has been overlooked, I make a defense of the utility of Hamilton's suggestions that are based on a more holistic approach to understanding the human experience—taking into account not only her observations of individual infants and children but also the impact of societal pressures and constraints that fundamentally shape the way the mind develops and, ultimately, how humans behave. In addition to being a high-utility way of exploring early nineteenth-century understandings of the developing mind, Hamilton's work is an important and profitable part of history that should be utilized in the development of modern educational guides and our current understanding of the human mind.

I

In order to explain her philosophy of mind, Hamilton proposes that there are two main parts: the 'heart' and the 'intellect' (or 'understanding'). The 'heart' is responsible for the affections and the passions, which Hamilton discusses in a way characteristic of the time—as relatively uncontrollable and in opposition to the 'intellect' or reason (Dixon 2003: 62–64). Passions are the 'affections of human nature,' or the workings of the part of the mind governed not by the will or the intellect, but by the 'animal spirits' (Hamilton 1801: 416). Because Hamilton's understanding of the affections is primarily based on her religious belief and is not as relevant to the education and development of mind today, I do not discuss it here in detail.

Heavily weighing upon Hamilton's understanding of the mind are the views of John Locke (1632–1704), David Hartley (1705–1757), and Dugald Stewart (1753–1828; probably her favorite). Her general explanations of their work alongside discussion of carefully identified singular ideas or assertions demonstrate her intricate knowledge of each writer's metaphysics and

philosophy of mind. Hamilton claims that there are two principles that rule over both the heart and the intellect. The first, and most important, is the principle of association. Associationism, initially proposed by Aristotle, was revived by Locke in his *Essay Concerning Human Understanding*, originally published in 1700 (Warren 1921: 4). Locke argued that all ideas within the mind were acquired from one of two sources, sensation—observing the outside world—or reflection—observing the inner self (Locke 1836: 7). The ideas, once acquired, had ‘natural correspondence and connection[s]’ among themselves (284). Mental content became associated, or connected, creating linked trains of ideas that constituted the mind (Warren 1921: 5). The way ‘associationism’ was understood varied greatly according to the views of the author making use of the concept.

In *Observations on Man* (1749), Hartley utilized the principle of association in order to explain the formation of habits—another view adopted by Hamilton. Hartley claimed that when ideas were associated together more often, their link became stronger and could lead to their combination into a single complex idea (Warren 1921: 56). Not only does Hamilton similarly argue that the permanency of associations are determined by the ‘frequency of [their] repetition’ but she also takes his idea further, claiming that a frequent repetition of an association can form both detrimental and beneficial habits of mind (Hamilton 1801: 32). A child that associates reading with gratitude (as she did, as a young girl who was allowed to read) will find it much easier to focus their attention on a text, while a child who associates it with misery or a cruel schoolmaster will inevitably be impaired in their reading skills.

Hamilton is clearly influenced by what Warren (1921: 10) calls ‘Scottish intuitionism.’ The tenets of associationism—the English psychology of the time, clearly articulated by Locke and Hartley—are the foundation for a philosophical understanding of how the mind acquires knowledge. But associationism alone cannot account for Hamilton’s understanding of mind. In addition, ‘a priori’ psychology—the view that the mind has some innate capabilities or powers allowing it to function—is used to explain the nature of the mind itself (Leahey 2015). This was a view clearly portrayed in the works of Thomas Reid (1710–1796) and the faculty psychologists. ‘Scottish intuitionism’ underlies most (if not all) of Dugald Stewart’s work, which probably accounts for Hamilton’s adherence to this view.

In addition to the principle of association, Hamilton proposes her own ‘active’ principle of mind, ‘the propensity to magnify the idea of self’ (Hamilton 1813a: 272). She argues that this principle, which she later coins the ‘selfish principle,’ is ‘too strong and powerful’ to be prevented by wisdom or courage (275–76). Essentially, the principle refers to the human desire to make the self (me, I) seem exclusive, superior, and ‘worthy of admiration’ (Hamilton 1813a: 333). We want to be known for the things we accomplish, and often times take credit for what we possess, discover, learn, understand, control, and do. The people and places we come from are sources of pride because of this principle. Hamilton uses this principle to explain the failure of colonization, the workings of sexism, and the detrimental effects of national or familial pride (391, 410; Hamilton 1813b: 12, 79).

Hamilton also gives the selfish principle a role in the creation of benevolence. In the same way that people attach their accomplishments to their 'idea of self,' they also attach the people that they are associated with (family, political leaders, friends, academics they agree with) to their idea of self. The more people we attach to our idea of self, the more likely we are to feel empathy for those people (and people like them). A person who can generally see humanity as a part of their idea of self will necessarily feel empathy for any person who is in need of help.

To explain the 'intellect,' or the reasoning and rational part of the mind, Hamilton uses the 'a priori' or innate psychological convictions of faculty psychology. Each faculty is a power, capacity, or ability of the mind. Hamilton adopts the faculties discussed by Stewart (perception, attention, memory, conception, judgment, abstraction, imagination, taste, and reflection), introducing them in an almost identical manner.

According to Hamilton, the first faculty to arise in the infant is the faculty of perception, or 'the power of taking notice' (Hamilton 1818: 28–29). Because information received through the senses is the 'foundation of all our intellectual improvement,' clear and accurate perceptions are crucial to the development of the mind. When we 'take notice' of the things around us, the mind acquires more ideas, which consequently allows for the production of even more ideas during the act of perceiving (28–29). To prove that this faculty is capable of improvement, Hamilton gives the example of a person who is born deaf or blind. Because one of the senses is absent, more attention is given to the perceptions of the other sense. As a result, the other senses become stronger than they would have through the course of normal development (28–29). Today, we know this phenomenon is made possible through neuroplasticity. Although there are no modern studies that directly test her prediction, attention to specific aspects of sensation has been found to increase neural activity in brain regions related to the encoding and processing of that sensation (Veldhuizen et al. 2007).

Hamilton's discussion of the mind's ability to compensate for the absence of one sense is an example of her very basic and indirect engagement with the concept of neuroplasticity. She is clearly aware of the ability of the mind to adapt to its ongoing inputs and outputs and is even confident that these adaptations are most frequent and flexible in the earliest stages of development (Hamilton 1818: 26). This simplified understanding of neuroplasticity is apparent in the work of several philosophers and pedagogues of the time that Hamilton bases her own ideas on.

The faculty of attention, arising at 3–4 months of age, is Hamilton's second faculty, and 'the main spring of all the faculties' (Hamilton 1818: 39, 50, 327). Unlike the other faculties, attention cannot be improved by itself, but through the creation of habit (Hamilton 1813a: 54). The ability of the mind to create the habit of focusing attention on perception to improve the senses is a principle of its own and is not entirely dependent on the 'effect of association' (59, 87). Hamilton further argues that attention to a certain class of objects will inevitably make perceptions of them clearer (Hamilton 1818: 51). In the same manner, the passions can become habitual through the power of attention (Hamilton 1813a: 275). While the passions have the power to influence the faculty of attention,

through sustained efforts of attending to beneficial affections the passions can be controlled (Hamilton 1815: 175).

Hamilton examines the faculty of memory within her discussion of perception and attention. Adopting the views of Hartley, Hamilton claims that association is the basis of memory (Hartley 1749; Hamilton 1818: 142). Once one idea was recalled, all of the associated ideas were also brought forward, allowing the mind to retrieve ideas from the past (Warren 1921: 53). Using Hartley to support her, Hamilton argues that old ideas are like 'pegs,' that new ideas can be hung on (Hamilton 1818: 142). Accordingly, young children should be encouraged to observe and learn as much as possible, so they have a wide foundation for later learning (Hamilton 1818: 29). As clear perceptions are acquired through the focusing of attention, the ideas derived from them are arranged into a succession (by association), so they can be recalled later on (Hamilton 1818: 280). Hamilton contends that because attention is so important to all of the faculties (especially memory), the ability to submit attention 'to the control of the will' is one of the most beneficial practices for the mind.

Hamilton's convictions are substantially confirmed by our present understanding of attention and memory. Generally, what is attended to is more likely to be encoded in memory (Chun and Turk-Browne 2007). Research with 5-, 7-, and 12-month-old infants shows that the speed and accuracy of recognition memory and information processing is regulated by attention (Rose, Feldman, and Jankowski 2001). The ability of an individual to direct and sustain attention at the age of four can be used to predict math and reading competency at the age of 21, and the probability the individual has completed an undergraduate degree by the age of 25 (McClelland et al. 2013).

The next faculty, conception, gives the mind the ability to form 'ideas of absent objects' and subsequently combine them (Hamilton 1818: 87). Like perceptions, Hamilton claims, conceptions must be clear and accurate for them to be able to inform our understanding and reasoning abilities correctly (159). This faculty is involved in the formation of concepts and mental representations not directly created by experience. Hamilton separates conception from memory, arguing that memory is about the past, but conception has no restriction by time (89).

She also argues that our conceptions are heavily influenced by the passions (Hamilton 1818: 91). Modern research shows that emotions do have an influence on the way we think and form mental representations in the mind. Our mood or feelings can influence the content and style of our conceptions through changes in vision, methods of information processing, and selectivity in memory (Clare and Huntsinger 2007). Unsurprisingly, it also has a significant effect on judgment.

Hamilton's faculty of judgment, the ability to make rational decisions and true conclusions, is necessary for the ability to reason (Hamilton 1818: 13). At first, infants judge the objects presented to them through perception; they judge distances and depth by examining the perceptions afforded to them by vision (36–37). However, as the mind develops, the faculty of judgment extends to ideas and propositions (193). If children are constantly told what is right and wrong by authority, with no opportunity to exercise their own judgments—they will be unable to reason rationally as adults (243).

The first four (or five) faculties Hamilton identifies can broadly be fitted to the modern understanding of ‘executive function’—the skills necessary for the regulation of attention and behavior (Bindman et al. 2013). Hamilton herself maintains that ‘the operations’ of these faculties are ‘blended’—working together to form the foundation of the intellect. Modern analysis shows, when other factors are controlled for, executive function ability is capable of predicting both math and reading achievement in kindergarten and the subsequent growth of these skills until the age of 12 (McClelland, Accock, and Morrison 2006).

In her discussion of the faculty of abstraction, Hamilton borrows Locke’s definition: ‘that power which the mind has of separating an idea from all other ideas that accompany it in its real existence’ (Hamilton 1818: 311). She argues that abstraction is essential for sound reasoning and the ability to overcome prejudice (Hamilton 1818: 314, 317). She also maintains that it is extremely important for the ability to correctly classify scientific information—as it requires us to break the associations between ideas and ‘particulars’ (312–13).

The next faculty, imagination, is the power of the mind to form ‘new combinations of ideas’ (Hamilton 1818: 274). The faculty of imagination is important in providing the individual with a ‘lively flow of ideas,’ which can aid in the cultivation of the other faculties (276). Taste—another faculty—is a ‘complex’ power that uses all of the other faculties as its basis and is therefore not vital to the cultivation of the other faculties. The other ‘faculties’ are commonly discussed in contemporary psychological literature, but the faculty of ‘taste’ does not have a modern equivalent. Hamilton’s final faculty, the faculty of reflection refers to the ability to introspect or observe one’s own mind (1818: 360). Reflection requires the cultivation of all of the other faculties and allows individuals to understand themselves which can subsequently be used to understand others better (361–63, 374). When we spend time observing ourselves we are less likely to make harsh judgments about others, allowing us to feel empathy and a connection to other human beings and the world.

As made apparent by her adoption of his faculties, it was the work of Dugald Stewart that weighed most heavily on Hamilton’s understanding of mind; she claims being supported by his ideas causes her ‘inexpressible satisfaction’ (Hamilton 1813a: 178). Stewart was a strong defender of the practical value of metaphysics (or what we consider to be philosophy of mind), arguing that people have a ‘prejudice’ against metaphysical ideas because of the common belief that they have ‘no relation to the business of life’ (Stewart 1971: 2). But this was not at all true, and Stewart highlights the practical necessity and importance of metaphysics, particularly in the fields of education and moral development (Hamilton 1801: 29). Echoing Stewart, Hamilton claims that the ultimate goal of education should be the improvement of the faculties of the mind to the ‘highest perfection of which they are capable’ (Hamilton 1818: 2). However, if caregivers and educators have no notion of how the mind works and develops, they will never be capable of genuinely improving the child’s mind (Hamilton 1815: 88). Hamilton relies on Stewart to explain why infancy is so important to the development of the mind, borrowing his claim that most of what we believe and see is based on ‘opinions . . . adopted implicitly in infancy and youth, upon the

authority of others' (Hamilton 1801: 238). Because of this, Hamilton argues that rather than instructing children on what to think, read, write, or believe, the best teachers will instead teach children *how* to use and improve their minds in order to enjoy their own lives, better understand the world, and create a more rational and virtuous society.

It is important to note the influence of Lord Kaimes (1696–1782). Almost every introduction of Hamilton includes an anecdote (from her journal, later printed by her biographer) about how she would hide Lord Kaimes's *Elements of Criticism* under her chair whenever she heard footsteps approaching (Benger 1818: 203). However, Kaimes's thought is not central to her philosophy, making only brief appearances in her discussions of passions (Hamilton 1801: 182). She goes on to criticize Kaimes, politely rejecting his assertion that girls have the 'original instinct' to dress and undress dolls (and themselves) and arguing against his claims that women care only about what other people may think of them (1801: 382).

As made apparent by her comments on Kaimes, Hamilton remains critical of her sources, arguing that her 'freedom of investigation' should be conserved regardless of how 'respectable' an authority is (Hamilton 1801: 89). This readiness to challenge and reconsider the ideas of others is reflective of Hamilton's insistence on the importance of teaching children how to think for themselves, rather than teaching them specific ideas or any given subject matter. She claims that being taught conclusions without going through a reasoning process will lead to bias and prejudice, encouraging caretakers and educators to allow infants and young children to observe the world carefully with a clear mind so that they can create their own ideas about how the world works—rather than reluctantly accepting what authority tells them to believe.

Hamilton claimed that infancy is a time of natural joy and curiosity. The early trains of ideas 'flow' more easily, allowing the individual to acquire more concepts and views to support their learning and experiences later in life (Hamilton 1818: 42). The associations created in this period will be long-lasting, and unconsciously alter the individual's outlook and understanding of reality. Without an adequate 'first link of the chain,' we cannot improve (1818: 33). Because adults have no memory of their infancy, they may be disposed to dismiss the importance of this time period (34). However, the ability to perceive clearly and understand what is experienced throughout adulthood is determined by the way the individual is raised in the early years. Hamilton maintains that infancy is the 'most important period of [our] existence' (301).

2

We can verify Hamilton's overall understanding of the mind and its development—which rests on the theories of eighteenth- and nineteenth-century philosophers—through today's empirical findings. Like the other parts of the body, the brain develops in utero. However, at birth, the brain is still relatively small, approximately one quarter the size of an adult's brain. Furthermore, the development that has occurred is extremely uneven (Lenroot and Giedd 2006). Lower portions of the nervous system, such as the spinal cord and brain stem

(which are vital for the control of basic bodily functions) are far more developed than the higher regions. In contrast, the forebrain (containing most of the cerebral cortex and the limbic system) is still in a very primitive state. The frontal cortex, which gives us the capabilities of planning and control, is almost completely undeveloped.

Most of the neurons necessary for the functioning of the adult brain are already present at birth, but the connections between them are not in place. Furthermore, the part of the neuron that sends out information (the axon) is not ‘myelinated.’ Myelination is a process that electrically insulates nerve fibers by building up a fatty sheath (myelin) around them, allowing for quicker ‘signaling’ throughout the brain (Deoni et al. 2011). Because the axons are not myelinated, signaling at birth is about sixteen times slower than it is in the adult brain.

Myelination begins around birth, but its speed and efficiency is not uniform throughout the brain (Courchesne et al. 2000). Myelination in the frontal lobe (responsible for many cognitive skills—especially memory, problem solving, and judgment) does not begin until 6 months (Welker and Patton 2012). In addition to this myelination, the infant’s experiences allow for the creation of new connections between neurons facilitated through increased contact between the cells (Slater and Bremner 2011: 115). Furthermore, unnecessary synapses (connections) are ‘pruned’ for more efficient wiring (Paolicelli et al. 2011). More broadly, different areas of the brain attain functional connectivity, in order to become specialized for particular tasks.

Myelination, synaptic growth, and synaptic pruning, are all most prevalent in the first years of life, and are sensitive to environmental inputs, i.e., what the baby experiences and observes (Knudsen 2004). Synapses within the cortex increase by 70–80 percent over the first two years of life (Huttenlocher and Dabholkar 1997). This period of ‘neuroplasticity’ allows the infant brain to adapt preferentially to the infant’s environment. Our understanding of development during this period is in line with Hamilton’s insistence on the importance of the baby’s experiences during this early period in life. As Currie (2009) argues, the experiences of the infant determine the development of the brain’s architecture, and establishes the brain’s foundation, not only for learning and behavior, but also for overall mental and physical health in adulthood.

The conceptualization of the mind as ideas linked together through the process of association can be seen as a parallel to the way that connected neurons create the neural networks of today’s ‘connectionism’ (Pinker 1999). First introduced by psychologist Donald Hebb (1904–1985), connectionism assumes that complex neural networks (groups of interconnected neurons) in the brain are built through connections acquired through experience. The notion that ‘neurons that fire together, wire together’ has become a popular principle in psychology. It is easy to see how this logic can apply to Hamilton’s views—the presentation of two ideas together would simultaneously activate brain activity from the neurons conveying information about those ideas, creating an association. Subsequently, when one idea is recalled, the other would follow—again causing the relevant neurons to fire together. Presumably, they would ‘wire together’ as well. These experiences, particularly during infancy, shape the way our neurons are connected within the brain.

The principle of association and Hamilton's views more generally are further confirmed by modern insights into the role of associative learning. Associative learning refers to relatively stable changes in behavior caused by the repeated experience of pairing things (events, ideas, objects) together. It has been demonstrated in humans and non-human animals and is believed to underlie conditioning (which is what allows you, for example, to train your dog). Research in the past decade has revealed that infants demonstrate spontaneous associative learning—as Hamilton suggested. Infants as young as 3 months can form associations between objects initially experienced together and are able to use their knowledge of this association 3 months later, in a completely new context (Campanella and Rovee-Collier 2005).

Furthermore, associations can be made between objects that are never physically presented together. For example, 6-month-old infants initially exposed to objects A and B formed an association between the two objects (Cuevas, Rovee-Collier, and Learmonth 2006). Similarly, by being trained to do action C in context D, the infants associated the two together. When the infants were later exposed to object A in context D, the action C and object B were also associated together (Cuevas, Rovee-Collier, and Learmonth 2006). This demonstrates the susceptibility of infants to learning new associations.

Further experience with infant associative learning has led some experimenters to propose the phenomenon of 'associative potentiation,' the heightened ability of initial learning of associations in conjunction with previously learned associations in infants as an adaptive mechanism for their un-developed memory capacity (Rovee-Collier, Mitchell, and Hsu-Yang 2013). Hamilton's insistence upon the importance of associations formed in infancy, and the flexibility of the mind in terms of the capacity for improvement of the intellectual faculties is easily supported by our modern findings. As she suggests, infants form associations rapidly, and sometimes in seemingly discrete ways.

In an effort to show the sensitivity of the infant mind to forming and sustaining new associations and connections, Hamilton tells the story of a 'darling little girl' who collects 'pebbles' in her skirt (Hamilton 1801: 74). Approaching Hamilton, she shares the 'beautiful creatures' she has collected on Hamilton's lap. Hamilton is shocked to find that the 'pebbles' were actually black beetles but remains calm for the sake of the child. She claims that the girl, 'preserved from the early dominion of prejudice,' has no problem with the beetles. Hamilton is scared of the beetles because of the associations she had made in her own childhood that defy the 'control of reason.' Had Hamilton shown her fear when the girl presented her with the beetles (as many caregivers might), the girl would be prone to the same false associations for the rest of her life.

The infant's predisposition to associate adults' (especially caregivers') expressions with the context or object they are simultaneously exposed to has been confirmed by extensive behavioral and event-related potential (ERP) evidence. The effect was first investigated by psychologist Mary D. Klinnert and colleagues in the 1980s (Klinnert et al. 1986). In conducting her doctoral research, Klinnert discovered that 12- and 18-month-old infants used their caregiver's facial expressions to guide their own behavior (Klinnert 1984). More recent studies have demonstrated that

infants show more fearful behaviors and greater avoidance of objects associated with a negative reaction from their mother (Dubi et al. 2008). Studies using electroencephalograms (EEG) show that infants pay closer attention to objects associated with a negative facial expression, regardless of what the object is (Carver and Vaccaro 2007; Leventon and Bauer 2013). Additionally, infants seem to form an association between direct eye contact from their caregiver and salience. Objects presented to infants during sustained and direct eye contact elicit far greater attention from the infant, than objects presented during indirect eye contact (Parise et al. 2008). It seems that infants are able to condition their social and behavioral responses quickly according to the associations they have acquired.

The experiences that infants have are directly implicated in alterations of the brain at many different levels, including changes in neurotransmitters, ‘receptors, epigenetics, brain structure, the microbiome, immune system, and homeostasis maintenance’ (Opendak, Gould, and Sullivan 2017: 146). What we understand to be the course of development for the infant brain, through the constant creation of new physical connections and psychological associations, is largely supportive of Hamilton’s philosophy of mind and understanding of development—which depends on Scottish intuitionism and the views of several prominent philosophers of her time.

What is more admirable is Hamilton’s use of this basis to develop further her analysis of the individual faculties, their relationship with the associative principle, and the most efficient and sensible way to cultivate them to perfection. Her suggestions for caretakers and educators can be fitted into three broad categories: teaching the infant to direct and sustain attention, repeating important experiences and allowing the child to learn independently through trial and error, and making sure that the heart and intellect are cultivated together. More generally, Hamilton’s suggestions are meant to arouse curiosity within the child, and instill a long-lasting, genuine love of learning.

Because she claims that the faculty of attention can only be improved through the formation of habit, Hamilton stresses the importance of aiding children in controlling their attention in early life. She argues that mothers can help their children observe what they are attending to more carefully by encouraging them to observe, describe, and think about it (Hamilton 1818: 66–69). Even just showing interest in what the child is observing, rather than taking their attention away from it, can have positive effects. Modern findings support her view. EEG studies with 4-month-old infants demonstrate that caregivers’ eye gaze modulates the amount of neural resources employed when attending to an object (Hoehl et al. 2012). When a caregiver is attending to an object that the infant is already interested in, the infant’s attention will be more focused and sustained. This is also supported by studies that look at hemodynamic responses (regarding blood flow—indicative of which neurons are using energy) in the brain of 5-month-olds (Grossman, Lloyd-Fox, and Johnson 2013). These infants could detect instances when their caretaker was following their gaze and used this information to direct and coordinate their attention. At the early age of 10 months, the ability to attend to objects, events, and caregiver speech is predictive of learning abilities (Yoshida et al. 2010).

Hamilton also stresses the importance of repetition, careful observations, and the process of trial and error in developing the child's ability to understand things accurately (Hamilton 1818: 100). Although adults may find the repetition of ideas 'tiresome and insipid,' she argues, infants and children need frequent repetition in order to have clear conceptions. 'Repetition suppression,' a phenomenon posited by modern psychology, refers to the way neural activity in the adult brain decreases when one stimulus is repeatedly presented (Emberson et al. 2017). However, using functional near-infrared spectroscopy (fNIRS), hemodynamic activity in 5–7-month-old infants reveals that both auditory and visual stimuli are attended to with sustained neural activity (Emberson et al. 2017). Rather than losing interest or decreasing the strength of their attention, infants continue to be receptive to repeated information. In another study with older children, researchers found that 10- and 11-year-old children were more likely to utilize vocabulary they had learned in a story they read multiple times, rather than similar language present in several different stories they read only once; they conclude that throughout childhood, the integration of recently learned information will be most successful when it is repeatedly presented (Henderson and James 2018).

As Hamilton also correctly predicts, allowing the child to observe *critically* and experience the environment and their relationship to it is important to the improvement of perceptual, learning, and reasoning abilities. Studies show that 3- and 4-year old children who receive more commands of 'suggestion,' questions, or comments allowing them to make choices or form their own opinions regarding the situation at hand, have higher executive function skills than do those who receive mostly 'direction,' which includes parenting with no child input (Bindman et al. 2013). This directly supports Hamilton's insistence on allowing children to reason for themselves and learn not through explicit directions but through experience. In another study observing preschoolers of low-income families, the researchers found that content-specific discussion during book-reading increased the attention and engagement of the child (Son and Tineo 2016). However, none of the low-income mothers in the study displayed 'decontextualized talk,' which refers to discussion going beyond the immediate meaning of the book to relate content to the child's own experiences. This lends support to Hamilton's view that even the most well-meaning and caring mothers can benefit from being educated on the way that their infant's mind works, in order to further aid their child's development and reasoning abilities.

Finally, throughout her works, Hamilton emphasizes the importance of developing both moral and intellectual qualities simultaneously, as each one acts as a foundation for the other (Hamilton 1801: 219). Several modern studies reveal that attention processes and emotional regulation processes have common neurophysiological bases, and attention orientation has been shown to have an important role in early emotion regulation (Calkins 2004; Rothbart et al. 2011; Perry et al. 2016: 246). Emotion regulation in infancy is often defined in relation to attentional control mechanisms that are utilized to 'reduce, inhibit, amplify, or balance' affective responses. Specifically, the 'executive action network,' which relates to the use of executive function and particularly the control of attention, overlaps with the

anterior cingulate cortex and parts of the prefrontal cortex responsible for emotional control (Posner and Fan 2008). By learning to orient attention towards or away from objects or events that create an emotional reaction, children can develop better self-regulatory strategies to assist them in dealing with emotional situations reasonably (Calkins 2011). Furthermore, if these self-regulatory mechanisms are repeated and used often, this will form a habit of automatically initiating those mechanisms and will subsequently necessitate less cognitive resources, making it easier for individuals to control their own arousal and behavior in social and emotional settings (Calkins and Marcovitch 2010). Hamilton's insistence on the connection of processes that govern both emotions and reason is now a robust and important part of our understanding of the developing mind.

In addition to the themes discussed, Hamilton's suggestions for an optimal development of the mind entail establishing the foundations of curiosity and wonder. Hamilton emphasizes not only the importance of teaching children how to think and understand the world around them, but also of acquiring a natural motivation and desire to learn new things (Hamilton 1818: 42). As Hamilton identifies, infants and children seem to have a natural propensity to play and explore. She suggests that retaining this curiosity throughout development will have beneficial effects in terms of academic achievement and critical thinking skills (1818: 67). Modern research has shown that higher levels of curiosity are correlated with enhanced neural activity in brain areas associated with memory (Kang et al. 2009). Behaviorally, higher curiosity in the initial learning of information lead to better recall two weeks later.

Furthermore, the presence of curiosity may help to remedy factors exacerbating social inequality. A lack of curiosity about the true nature of others can lead individuals to infer missing information through the use of social stereotypes rather than seeking out true information; this allows for the perpetuation of these stereotypes and the prejudices resulting from them (Loewenstein 1994: 94). As Hamilton suggests, curiosity, or a genuine motivation to understand how and why things are the way they are, seems to be an important factor in terms of the development of intellectual and moral qualities.

Overall, Hamilton's pedagogical recommendations, which rest on her understanding of the infant mind, are largely confirmed by developmental psychology and neuroscience today.

Conclusion

Elizabeth Hamilton's understanding of the mind and its development allowed her to formulate a clear and accurate guide that could help every individual to prosper and grow maximally. Her philosophy of mind, stemming from the works of the English associationists and Scottish a priori psychologists, and the practical pedagogical suggestions she derives from them are overwhelmingly supported by today's psychological and neuroscientific findings. It seems, more generally, nineteenth-century English and Scottish philosophers had a surprisingly accurate understanding of some aspects of the mind and its development—considering their lack of access to the methods and technology we have today.

Needless to say, this investigation is not without limitations. Of course, a single philosopher's understanding of the mind cannot encompass the views of *all* of her contemporaries. Although Hamilton has a relatively wide philosophical foundation, her adherence to associationism and faculty psychology is most pronounced. Still, her work does provide evidence to support the idea that philosophers at the time were *capable* of coming up with empirically accurate explanations of the mind and the way that it develops. Additionally, the religious aspects of Hamilton's work are not examined, leaving out a large portion of her beliefs. It is my hope that this article will encourage and support others to undertake a more detailed and holistic study of Hamilton's fiction, nonfiction, and religious work.

After analyzing Hamilton's work, it becomes clear that her understanding of the mind has the potential to aid not only in future empirical work investigating the nature of the mind and brain, but also in the creation of manuals and programs that educate parents and caregivers on ways to help their children develop and flourish. Unfortunately, Hamilton's work has not received the acclaim or attention that it deserves. Although Hamilton was awarded a Royal Pension in 1804, it was to acknowledge her as a novelist with literary contributions in 'the cause of religion and virtue,' undermining Hamilton's contributions to philosophy and the understanding of the mind, both in the context of education and more generally (Benger 1818: 177). As a woman who wrote in a period of male-dominated philosophy, Hamilton herself and especially her nonfiction work has been generally overlooked.


Considering the factuality of a majority of her thoughts, Hamilton's work can be used as a guide to empirical investigation in several fields. More specifically, her suggestions for enhancing the infant's perceptual and cognitive abilities could be explicitly tested through longitudinal, empirical studies that follow infant development in relation to home environment and caregiver behavior. Research could identify individual differences in caregiving behavior that map onto what Hamilton suggests. These caregivers and their infants could be observed over time, and predictions could be made concerning the correlation between certain caregiver behaviors and the later intellectual achievements and moral qualities of the individual.

Alternatively, experimental manipulations could be utilized; some caregivers could be given explicit instructions on aiding their children in developing a specific 'faculty,' like attention, over a certain period of time. The ability of the child to deploy and sustain attention at the end of this period could be behaviorally measured and compared to a control group. The effect of this treatment could be analyzed over time. This research could be made more reliable by including objective measures that use brain-imaging techniques to look at the growth and size of particular brain structures, and the electrical activity occurring within the brain during the completion of relevant tasks.

In addition to the possibility of future empirical work based on Hamilton's views, her pedagogical suggestions could also be immediately adopted. For example, Hamilton argues that exposing young children to other animals at an early age is important to the development of empathy and the child's understanding of the

fragility of life (Hamilton 1818: 47–48). If children are not exposed to animals early in life, they will not have a clear understanding of the difference between ‘inanimate objects which are put in motion, and sensitive nature’ (1818: 48). An inability to recognize this difference could lead to cruel behaviors and a tendency to feel superior to other beings. Several modern studies have shown the beneficial effects of exposure to animals in early life, which has been linked to increases in empathy, self-esteem, self-concept, and prosocial behavior (Covert et al. 1985; Bailey 1987; Vidovic Stetic, and Bratko 1999; Hergovich et al. 2002; Katcher and Wilkins 2006). Having a class pet or taking regular trips to a setting with animals (farm, national park) could be an easy way to foster empathy and positive social interaction in young children.

Despite being written more than two hundred years ago, Elizabeth Hamilton’s work is filled with accurate, valuable, and useful information that has the potential to inform empirical research and substantially improve caregiving practices today. Future work that explicitly tests Hamilton’s assertions can help us gain further insights into the development of the infant mind and brain, and the most efficient and successful ways to raise healthy, intelligent, and moral children. Hamilton’s main goal was to promote the practical application of philosophy, to benefit society and improve humanity. It would be foolish and regrettable to let her carefully formulated and empirically supported suggestions go to waste.

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