

## Going to school with Madame Curie and Mr. Einstein: gender roles in children’s science biographies

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**Abstract** One of the first places children encounter science and scientists is children’s literature. Children’s books about science and scientists have, however, received limited scholarly attention. By exploring the history of children’s biographies of Marie Curie and Albert Einstein, the two most written about scientist in children’s literature, this paper taps this unutilized resource to cultivate a unique perspective on the history of gender and authority in science and science education. Through analysis of explicit discussions of womanhood and science and implicit gendering of Curie and Einstein’s school experiences within these books, this study demonstrates that while much has changed in how these stories are framed the gender of the scientist is still central to how they are represented in children’s literature.

**Keywords** History · Children’s literature · Gender · Biography

### Children’s books about Curie and Einstein

Every year schools and public libraries purchase biographies of scientists for their students and patrons. For the most part, these books have received little attention from content experts. As educational researchers Dagher and Ford (2005) have noted, in recent years children’s books about scientists have been advanced by both science and literacy specialists as a curricular solution for a number of different problems in elementary science education (see Madrazo 1997; Nordstrom 1992). Before schools focus more energy disseminating these books, it is prudent to study them further. The most popular subjects of these children’s book biographies—Marie Curie and Albert Einstein—offer a natural starting point to explore potential issues in using this kind of literature in science education.

Readers might be surprised to discover, that there are more children’s books about Marie Curie available in the English language than about any other scientist. A search for “Marie Curie” in English language juvenile biographies in the WorldCat Index of libraries

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returns 121 books, while a search for “Albert Einstein” returns only 96. The closest competitor, “Charles Darwin” returns 71 hits. For whatever reason Einstein and Curie are the most written about scientists for children.

Beyond the fact that these two scientists are the most frequent subjects of children’s science biographies, several interesting facets of Einstein’s and Curie’s lives make them intriguing subjects for comparison. Einstein was born 12 years after Curie in the latter half of the nineteenth century, and both became significant international figures. Einstein was born in Germany, spent time in Italy as an adolescent, studied in Switzerland, taught in Prague, Switzerland, and Germany and eventually took a research position in the United States. Curie was born in Poland, studied in France, became a professor at the Sorbonne, and was widely acclaimed in America. Both scientists’ work was influential in the development of the atomic bomb and both have been appropriated as American icons. Curiously, neither of the scientists most written about for American children was American-born. It is also worth noting that both Marie Curie and Albert Einstein harbored ambivalence toward their school experiences. In her autobiography, Curie said of her early education: “What the pupils were taught was of questionable value, and the moral atmosphere was altogether unbearable” (1923, p. 158). Einstein’s Greek professor urged Einstein to leave the school because “Albert’s mere presence in the classroom was disruptive” (Overbye 2000, p. 10). These scientists, now promoted as educational role models, disapproved of their experiences with educational institutions. Children’s biographers of Einstein and Curie have appropriated these foreign, somewhat rebellious figures into institutionalized American educational icons.

Part of the appeal of these books for classroom instruction is the way they expose a broader view of science. By situating the work of scientists within the context of their times, biographies offer a rich view of science’s role within society. Children’s biographies of scientists inherently deal not only with the content of science appropriate to children of different ages, but also the context of scientific practice and its relationship to society; In fact, they focus far more on these wider issues. In addition to this contextual value, biographies have a special significance in educational history. As children’s literature historian Leonard Marcus notes, “Biographies for children... have a secret subject in addition to the one they are obviously *about*” (1980, p. 28, emphasis of the original author). That subject is the books’ implied child reader. The ideas and ideals of science modeled for that reader is the subject of this study. These texts give particularly intimate insight into the ideals of science modeled for future scientists and citizens.

### Searching for patterns in children’s literature

The limited amount of work on children’s science literature leaves an abundance of unanswered questions for exploration. The goal of this paper is to explore ways in which the entire corpus of children’s books about Albert Einstein and Marie Curie has changed overtime in relationship to the, similarly dynamic, history of more scholarly works written for both academic and popular audiences. This study is primarily concerned with the relationship between these different texts and the broader implications of that relationship to discussions of gender and authority in science education.

By zeroing in on the texts this study can explore a much wider breadth of material and a longer range of time than other approaches would allow. This focus brings in significant restrictions and qualifications for what exactly this study can demonstrate. In exploring the entire body of literature this project cannot be deeply concerned with an individual author

or publisher's intentions behind a single work. Because of this, I do not generally intend to ascribe errors, miscommunications, or misrepresentations presented in any specific book as part of the books authors' intentions. In fact, in most cases, these kinds of issues arise in quite the opposite fashion. Children's book authors deal with a different set of constraints than authors writing for an adult audience. There is a constant tension between how much complexity can be incorporated into books that, in some cases, have less than five hundred words. Similarly, children's book authors cannot expect readers to have the same kind of general subject knowledge as authors who write for adults. For these reasons readers of this article should not take criticism and critique of the narrative of these stories as criticism and critique of any individual book's author, but as criticism of systemic issues with the ways science is presented to children.

If the broad nature of this study means that it cannot consistently engage with the intentions of the books' authors it is all the more evident that this kind of study cannot meaningfully explore the ways in which individual readers interact with these books. Each reader brings his or her own experiences into reading these books and each reads them for distinct purposes. Many of these books could be checked out by a second grader as a fun summer read from their local public library, or a fourth grader working on a book report for class. Both of these types of readers would read the book with different intentions and each would leave with a different understanding of Curie or Einstein. Similarly, each reader has agency in how he or she reacts to the arguments presented in these books. Empirical work exploring how individual children interpret these stories would be quite valuable; however, it is also valuable to explore the broader picture, of how the content and presentation of these stories has changed over time.

The corpus of books explored in this study includes 31 books published between 1939 and 2005. To select the most prominent of popular children's biographies, books were chosen from the catalogs public and school librarians use to guide their purchasing. Nineteen editions of the popular H. W. Wilson company's *Children's Catalog's* (1918–2001) recommendation's for children's books on Curie and Einstein formed the primary list of texts explored in this paper. For the more recent period, from 1973 to the present, I have incorporated recommendations from The National Science Teachers Association and Children's Book Council annual recommendations for "Outstanding Science Trade Books for Children" (1973–2007). To connect these book recommendations to actual library holdings the recommendations from these two catalogs have been complemented with the searches through the WorldCat index of libraries, which indexes the holdings of 69,000 different libraries from around the world. In general, the books most highly recommended in the catalogues are also among the most widely available books in the WorldCat index. For full details on the books consulted see Tables 1 and 2. Through these methods the study attempts to hone in on the books most likely to have come in contact with children through schools and public libraries.

To understand these books in their historical context, it is necessary to compare them to more authoritative works written for adults—from here on referred to as authoritative biographies. The study relies on several key biographies selected from the historiographical entries on Curie and Einstein in *A Reader's Guide to the History of Science* (for Einstein see Staley 2000; for Curie see Malley 2000). Just as children's books about Einstein and Curie have changed in tone and focus over the last 80 years, so have more authoritative accounts. These biographies, written for an adult audience, offer insight into the materials, which children's biographers drew from in different periods. Comparing facets from Curie and Einstein's lives in children's books to the more detailed and authoritative biographies published for an adult audience highlights the subtle way these stories are altered for

**Table 1** Marie Curie children's books consulted

Book title	Author	Date published	Copies in WorldCat <sup>a</sup>	Recommendations <sup>b</sup>
<i>The Value of Learning</i>	Ann Johnson	1978	814	
<i>Marie Curie and Radium</i>	Steve Parker	1992	742	1993: OSBC 1993, 1996: CC
<i>Marie Curie and Her Daughter Irene</i>	Rosalyn Pflaum	1993	670	1996: CC
<i>Marie Curie</i>	Mollie Keller	1982	656	1983: OSBC
<i>Marie Curie</i>	Carol Greene	1984	626	
<i>Marie Curie</i>	Margaret Poynter	1994	621	1995, 1996, 2006: CC
<i>Marie Curie</i>	Lenorad Fisher	1994	607	
<i>Marie Curie</i>	Keith Brandit	1984	559	
<i>The Story of Marie Curie</i>	Alice Thorne	1963	467	
<i>Marie Curie</i>	Beverly Birch	1992	418	
<i>The Mysterious Rays</i>	Nancy Veglahn	1977	361	1978: OSBC 1981: CC
<i>Madame Curie</i>	Eileen Bigland	1957	315	1961: CC
<i>Marie Curie</i>	Elizabeth MacLeod	2004	315	2005: OSBC 2006: CC
<i>Marie Curie</i>	Laura Waxman	2003	174	
<i>Marie Curie</i>	Lorraine Henriod	1970	152	
<i>The Radium Women</i>	Eleanor Doorly	1939	115	1956, 1961, 1966, 1971: CC
<i>Radium Treasures and the Curies</i>	Irmengarde Eberle	1942	109	1946, 1951: CC

<sup>a</sup> These numbers reflect the number of each book available on 9/27/06

<sup>b</sup> This column includes all the recommendations for books about Curie from each of the 19 editions of the Children's Catalog, abbreviated CC, (1918–2006) and the Outstanding Science Books for Children, abbreviated OSBC, (1972–2006) selected by the Children's Book Collaborative and the National Science Teachers Association, published annually in *Science and Children*

children and offer a means to evaluate the significance of particular authorial choices. Through this exploration, this paper illustrates the richness of these children's biographies as a site for developing another vantage point on the history of gender in science education.

One of the primary goals of this study is to expose problems that arise from broadly recommending children's biographies of scientists as a mode for teaching science to children. To this end the scientists' gender is a focal point for comparison. However, it is worth noting that in this project gender itself is not a subject of deep, sustained, analysis. The content of the books explored in this paper offer an interesting space for critical review from experts on gender in science and I hope that this exploration can offer a context for deeper discussion of gender in children's science literature. By tracing the history of exaggerations, fabrications, and stories left untold in these children's books, I will offer evidence that the scientist's gender is central to the shape of the story. To best meet this challenge I first demonstrate how the books have evolved. Contemporary children's books focus much more on Curie's gender and the critical role of Einstein's wife, Meliva, in his life story. Both of those trends work to open scientific identity to young girls. From there, I explore somewhat more implicit stories about school and demonstrate how the changes in gendered language and ideals evident in the first section fail to penetrate into the most directly applicable parts of these books, what they say about boys and girls at school.

**Table 2** Albert Einstein children's books consulted

Book title	Author	Date published	Copies in WorldCat <sup>a</sup>	Recommendations <sup>b</sup>
<i>Odd Boy Out</i>	Don Brown	2004	899	2006: CC
<i>Albert Einstein</i>	Elma Levinger	1949	785	1947, 1956, 1961: CC
<i>Ordinary Genius</i>	Stephanie McPherson	1995	728	1996: CC 1996: OSCB
<i>Albert Einstein</i>	Milton Dank	1983	727	
<i>Albert Einstein</i>	Jeremy Bernstein	1996	595	
<i>Who was Albert Einstein?</i>	Jess Brallier	2002	578	
<i>Albert Einstein: A Life of Genius</i>	Elizabeth McLeod	2003	574	2006: CC
<i>Albert Einstein Physicist and Genius</i>	Joyce Goldenstern	1995	551	
<i>Albert Einstein</i>	Fiona MacDonald	2000	511	
<i>Einstein</i>	Nigel Hunter	1987	499	
<i>Albert Einstein</i>	Arthur Beckhard	1959	469	1966, 1976: CC
<i>Albert Einstein Young Thinker</i>	Marie Hammontree	1961	451	
<i>Albert Einstein</i>	Karin Ireland	1989	363	
<i>Albert Einstein</i>	William Wise	1960	180	

<sup>a</sup> These numbers reflect the number of each book available on 9/27/06

<sup>b</sup> This column includes all the recommendations for books about Curie from each of the 19 editions of the Children's Catalog, abbreviated CC, (1918–2006) and the Outstanding Science Books for Children, abbreviated OSBC, (1972–2006) selected by the Children's Book Collaborative and the National Science Teachers Association, published annually in *Science and Children*

### The emerging role of gender in biographies of Curie

In 1939, children's book author Eleanor Doorly noted that Marie “won her *license* in Physics in 1893 and in Mathematics in 1894, being top of the list in Physics and second in Mathematics” (p. 71). Margaret Poyntar's 1994 book, *Marie Curie: Discoverer of Radium*, offers a different emphasis: “Marie had not only passed the test. She had earned the highest grade in the class! Marie was the first woman to receive a degree in physics from the Sorbonne” (p. 25). While both books explain the same event, the 1939 version sees no need to mention it as historic occasion for women, a point similarly omitted from Bigland's 1957 and Thorne's 1959 children's biographies, which note the achievement only as a triumphant accomplishment for Curie herself.

These two presentations are emblematic of a broader transformation. The early biographies of Curie never mention feminism, or the barriers that women faced in science. By ignoring the hurdles Curie overcame, these early books diminish her historic accomplishments. Rather than recognizing women as a group who have been systematically restrained from participation in science these books implicitly suggest that Curie was successful strictly because she worked hard, allowing readers to regard women who did not make it in science as people who simply did not try hard enough.

In the late 1970s, children's books about Curie, starting with the publication of Nancy Veglahan's *Mysterious Rays*, began to engage the double standards women faced in science. Veglahan's 1977 book on Curie starts in a distinctly different manner from previous books. Her book chronicles the discovery of radium and opens with Curie's graduation

from the Sorbonne. She begins, “No Frenchwoman had ever received such a degree. No woman in all of Europe had done it” (1977, p. 9). With that introduction, the book makes Curie’s gender central to the frame of the story. It is no longer simply about a woman’s individual success but also about what that success meant for women around the world.

While Ann Johnson’s book, *The Value of Learning: The Story of Marie Curie*, came just a year after Nancy Veglahan’s book, Johnson’s narrative represents a distinctly less progressive approach to opportunities for women in science. In this book, the young Manya (Marie’s childhood nickname) befriends a talking test tube named Fizz who she consults throughout her life. In their first meeting Fizz offers, “Perhaps one day you’ll be a scientist and have a laboratory of your own.” To which the young Manya responds, “But so many people say that girls can’t be scientists.” Fizz then explains, “If you learn enough, you can do almost anything you want to do,” and finally asserting, “it doesn’t matter whether you’re a girl or a boy” (Johnson 1978, pp. 12–15).

The story intends an empowering message. Fizz declares to young girls and boys that girls can be scientists. However, the story ignores the past and may ultimately have a much less empowering effect than the author intended. As Librarian Wendy Saul argued in her study of children’s biographies of Curie, “Biography is being used as ‘living proof’ that the system can and does work for us all” (1988, p. 218). The book reinvents a past orthogonal to what authoritative histories tell us. Curie’s womanhood prevented her from being cited by Ernst Rutherford for quite some time (Pycior 1993). At first only Pierre was nominated for the Nobel Prize and Marie Curie was never elected a member of the French academy of sciences because she was a woman (Quinn 1995, p. 257). As Saul argues, this passage sets up an equation: hard work equals success. While this equation can be a good motivational tool, by this logic, those who do not succeed must simply not have worked hard enough: there is no room for outside factors. Children’s book authors understandably have a particularly difficult line to walk, to make clear the difficulties Curie faced in her time, while urging students to work hard for success in their own lives. But in this case *The Value of Learning* clearly fails at both historicity and empowerment.

While *The Value of Learning* has not received the kind of critical acclaim, or for that matter the recommendation that all the other books considered in this paper received, it is the number one hit for children’s books about Curie in the WorldCat. With over 800 contributing libraries acknowledging that the book is still on their shelves the book underscores the need for more engagement from the history and science education communities in the process of book selection and review. Thankfully Johnson’s approach, has not taken on the same significance as Veglahan’s book, which seems to have become a model for presenting the importance of gender in the life story of Marie Curie to children.

The late 1970s mark the beginning of a trend placing gender clearly at the heart of children’s books about Curie. Mollie Keller’s 1982 biography of Marie Curie is the first to mention Curie as “a victory for Feminism” (1982, p. 72). This and later books have brought feminism into the discussion of Curie’s life story. Steve Parker’s award winning 1992 biography, *Marie Curie and Radium*, pushed this trend further, addressing the woman’s movement itself. Parker expanded the discussion of womanhood around the turn of the century in side bar vignettes on suffragettes and the “Radium Girls” court case in which five women successfully sued their employer for radiation poisoning they received while painting glow-in-the-dark dials (1992, p. 4). Parker mentioned that this discussion of suffragettes had little to do with Curie who “was not actively involved” but whose “achievements and awards were a great encouragement” to them (1992, p. 22).

In the most recent biographies, Curie’s gender has become the central frame for the story. The first page of Laura Waxman’s 2003 biography of Curie notes, “Women in the

early 1900's could be wives and mothers. They could be teachers or tutors. But they were not supposed to be scientists or professors." Yet, "Marie Curie never let those ideas stop her. She made up her mind that she would be a scientist. She devoted her life to the study of radioactivity. Marie Curie was the first woman to win the Nobel Prize and the first person ever to win it twice." Curie's story has become a story of modern womanhood and how, "Her work ...helped change the way people thought about women" (2003, p. 5).

Curie's story is no longer solely the story of an individual women's success, by the late seventies her story became a story of triumph for women around the world and since then the barriers facing women in science have become the central frame for exploring her life. While the Einstein books deal much less with womanhood, discussions of Einstein's wife and collaborator, Mileva Maric offer a meaningful point for comparison.

### **The emergence of Einstein's first wife Mileva Maric**

Although Einstein's life offers several points for discussions of science and gender, the topic has never been approached as directly as in books about Curie. Nevertheless, a counterpart of this trend in the Curie books becomes evident in the way such books have treated Einstein's first wife, Mileva Maric. Before discussing the ways children's books present Maric it is crucial to establish the approaches to her and Einstein's relationship from more authoritative biographies written for a general audience.

In early authoritative biographies of Einstein, little attention was paid to his relationships. Both because of the release of large amounts of personal source material on Einstein—especially his correspondence with Mileva in 1987—and trends in the history of science to consider the personal lives of scientists relevant to the history of science, Einstein's relationships have become much more important in understanding him and his science and thus are much more central in biographies of him.

In his 1948 authoritative biography of Einstein Philip Frank briefly noted that, "Soon after his arrival in Berlin, Einstein separated from his wife, Mileva, with whom in many ways he was no longer in accord" (1948, p. 136). Frank did not offer much detail, but he did make clear that it was Einstein that initiated the separation, which becomes a point of contention in some of the children's books. Albrecht Fölsing's 1994 authoritative biography of Einstein discusses the relationship in much more detail. Einstein and Mileva studied together at the Zurich Polytechnique. They fell in love through their studies and eventually married. When they moved to Berlin, Einstein started an affair with his cousin Elsa. Einstein sent Mileva a list of demands, which she accepted, but he eventually withdrew his offer to continue the marriage. The two met for 3-hours and arranged for their divorce. Albert left Mileva for his cousin Elsa. These two accounts offer context to understand the ways children's books strayed from the available sources.

The early children's books do almost everything in their power to make the divorce appear either mutual or Mileva's fault. For example, Levinger maintains that the divorce was mutual but emphasizes that, "Mileva refused to live anywhere but in Switzerland to which she had become so deeply attached" (1949, p. 61). Rather than according Einstein significant responsibility, the narrative focuses on Mileva's refusal to move to Berlin. Arthur Beckhand takes this fiction even further, making the divorce out to be entirely Mileva's doing. In his 1959 book Mileva states, "Lets face things honestly Albert. We have not been happy these last 3 years. If you will leave the children with me, I will give you a divorce." Einstein agrees but insists he, "Never would have suggested it, of course" (1959, p. 67). These early children's books depart from Frank's judicious brevity, making

Mileva more responsible for their divorce than any evidence will allow. Further, the children's books only mention Mileva as Einstein's wife. They ignore the fact that they studied physics together and fail to acknowledge that Mileva was also a scientist.

This view of Mileva was not the only one developing. In 1967, the BBC published a series of broadcast talks entitled *Einstein: The Man and his Achievement*. In these talks Einstein's son, Hans Albert, discussed his mother as a scientist and offered a much more sympathetic and complete picture of her. "She was proud of him, but that is as far as it went. It was very hard to understand, because she originally had studied with him and had been a scientist herself" (Whitrow 1967, p. 19). When Hans is asked if his mother's lack of interest in his father's work led to the separation he responds, "I doubt it...it seems that he had the impression that the family was taking a bit too much of his time, and that he had the duty to concentrate completely on his work" (Whitrow 1967, p. 19). Later Hans mentions that his mother took the separation "very hard." In opposition to the simplistic presentation of Einstein and Mileva's relationship offered in children's books this broadcast offered a nuanced view, one that was more sympathetic to Mileva and which acknowledged her as a scientist.

In Milton Dank's 1983 children's biography Mileva is portrayed in considerably less sympathetic light. When the reader first encounters Mileva they are told, "It was not a happy marriage despite the birth of two sons." He continues, "Four years older than her husband, the gloomy, suspicious young wife was unable to provide the quiet home life that Einstein needed for his work." The case for Mileva's eventual fault in the divorce emerges from the reader's first encounter with her. Though Dank does refer to Mileva's scientific capacities, he does so in a negative light, "Perhaps as a physicist, Mileva felt that she should share in her husband's triumphs (like the Curies), but she could not grasp his theories" (p. 25). Dank ended the section by declaring, "It was an unfortunate marriage and in time the Einsteins realized it was a mistake. Like most unhappy couples, they struggled along together, trying to hide their failure from others" (p. 25). All of these quotes come from Dank's presentation of Mileva and Einstein's first meeting. Thus, some pages later when Dank explains that Einstein "had arranged a divorce by mutual consent with his wife, Mileva" readers are led to understand that Mileva's inadequacies were critical, a point underlined by Dank's description of Einstein's new wife Elsa, who "would be the caring wife that he needed" (pp. 60–61).

Since the 1990s, Mileva has received much more sympathetic treatment in children's literature. Stephanie McPherson's 1995 *Ordinary Genius: The Story of Albert Einstein* marks the beginning of this trend. Here, Mileva is portrayed as a fellow student who "listened to Albert's ideas and double-checked the arithmetic in his equations." Yet, "Although she was happy with her husband sometimes she wished he had more time to simply relax with her and the baby." When McPherson notes that, "Albert was so absentminded when he worked that he did not always notice Mileva's feelings," she acknowledges Einstein's role in the deterioration of their relationship (1995, p. 29). This theme is further established when she notes that Albert "often ignored Mileva... because his head was bursting with new ideas and theories to explain how the universe works" (p. 29). McPherson then points to Mileva's frustration with Einstein's ideas about her role in the family, noting that, "Life was not happy in the Einstein home. Mileva wanted more time with Albert and wanted to help with his work. She was good at physics and math, too. Albert saw things differently; he wanted Mileva to take over the jobs around the house. After all, he had thinking to do" (1995, p. 14). This story culminates in their divorce: "About a year latter, he took yet another new job, this time at the University of Berlin in Germany. But Mileva was very unhappy there and she decided to move back to Zurich

with their two sons. Albert cried as their train chugged away. He never lived with his family again” (1995, p. 11). McPherson’s sad story is the first tale to present Mileva as a sympathetic character. McPherson managed to do so without making Albert into a ‘bad guy’. As the train rolls away and Albert cries, young readers are left with insight into a deeply conflicted and flawed Einstein.

Jess Brallier’s 2002 book *Who Was Albert Einstein?* makes a more complex series of claims. Brallier claims that Mileva did not want to move to Berlin, but also notes, “Mileva was also jealous of Albert’s success. She was a brilliant scientist.” Here, Mileva does not seem so compassionate but nonetheless is recognized as brilliant. “Now Albert had to make a decision: Would he go off to Berlin to think, or stay in Zurich and be a good husband and father? Albert needed brilliant people around him who could help him think about his ideas... He decided to go to Berlin” (2002, p. 51). With that Brallier continues the trend initiated by McPherson. Einstein made a choice between his family and his work and he chose his work. This is a very different story from the first set of children’s books about Einstein. Brallier then offers a view unimaginable in the earlier periods. Noting first that “Albert’s very best scientific thinking was done during his marriage to Mileva,” Brallier went on to suggest that “perhaps, as some critics say, ‘his’ great theories might really be ‘their’ great theories? Or even ‘her’ great theories?” (2002, p. 57). None of the authoritative accounts of Einstein’s life give any credence to the thought that Einstein’s great ideas were actually Mileva’s. Thus where the earliest children’s books about Einstein presented Mileva as less sympathetic and important than the authoritative works, by 2002 the situation had been reversed. Once overwhelmingly represented as a gloomy and suspicious woman, responsible for their divorce, by the mid-nineties she has become a sympathetic character and a scientist, potentially responsible for Einstein’s greatest scientific achievements.

The changes in presentation of Mileva and Curie follow a general trend. Children’s books on Curie have changed in emphasis. Now, instead of simply describing Curie’s accomplishments without context, children’s books have adapted to explain the gender-biased world of science and thus demonstrate the further greatness of those accomplishments. Alongside this transition, books on Einstein have begun to offer much more sympathetic portrayal of Mileva, both as a wife and in most cases as a physicist. Interestingly, the changes in tone in the Curie books began in the late seventies while the change in portrayal of Mileva did not occur until the mid nineties. Despite the increasingly conscious and explicit treatment of gender relations in such children’s books, subtle attitudes towards gender emerge in other contexts, sometimes with much less reformatory potential; in particular, in persistently stereotypical—and gendered—treatments of both Curie’s and Einstein’s relations to authority in school.

### **Gender stereotypes follow Einstein to school**

“Why do I have to go to school, Papa?” asks the young Albert on the first page of Arthur Beckhard’s 1959 biography for children. After Albert affirms his commitment to acquiring knowledge, his father asks, “If you really mean that, Albert, how is it that you could ask why you must go to school? School is the place where questions should be answered.” Here, the young Albert “cried out, ‘They don’t even let anybody ask questions, and they’d never think of answering them. I hate school. It’s like being in prison. The teachers are like prison guards marching up and down between the rows of desks’” (1959, p. 11).

In the first section I documented the explicit change in focus and tone around womanhood and science found in the children's biographies of Einstein and Curie, but there are much more interesting avenues of thought to be found in the implicit messages. Because these books are written for school children, the stories about school are especially significant. Instead of existing strictly as historical tales of great scientists, discussions of school in these books engage with children's direct experience as students. Tragically, these school stories are filled with stock characters and stereotypical gender roles. Points of Einstein's story are systematically exaggerated and others ignored to leave readers with an inaccurate perception of him as a passionately rebellious student. In contrast, stories of Curie's schooling that point toward her rebelliousness are nearly universally ignored.

Almost every children's book on Einstein focuses on his alleged hatred of school. These books highlight the significance of Einstein's dislike of school by placing it prominently in the text, exaggerating the parts of his story which fit this view, and downplaying or ignoring aspects that do not fit an anti-school-authority theme.

The authoritative texts dispute any simplistic account of Einstein's views on school. Albrecht Fölsing notes, "Albert Einstein would later remember his time at school as an almost traumatic experience." But he goes on to add that, "While still a student he suffered in silence; he never voiced any criticism of the school and, presumably, without any comparable experience, was unaware of its shortcomings at the time" (1997, p. 19). Fölsing claims that Albert never told his parents about his dislike of school primarily because that dislike of school developed later in life.

In her 1989 children's biography of Einstein, Karin Ireland recognizes that, "Albert never complained to his parents." But she still insists, "He began to hate school. He hated the teachers who frustrated him so" (1989, p. 15). The 2003 book *Albert Einstein: A Life of Genius*, somewhat uniquely acknowledges, "School—especially math—was a breeze" still, "he hated it. It was too strict" (MacLeod 2003, p. 1). While there are subtle differences, children's books consistently insist that Einstein hated school while he was a student.

Not only do the children's books make adamant and explicit statements about hating school, they often extend that clash with school, treating it as symbolic of Einstein's character—and sometimes, as indicative of central features of scientific thinking. In William Wise's 1960 book, *Albert Einstein: Citizen of the World*, readers are told rather explicitly why his hatred of school is significant. The young Albert, "Felt a deep, instinctive resentment against the cruelty of his teachers" (p. 8). Albert's schooling had begun a lifelong struggle against authority. "Against the kind of blind authority, which says, 'We know what is true, what is right. What is best for you. We are your teachers, your rulers. You must think as we tell you to think. You must obey.'" Wise insists that, "Even as a child, Albert could never readily submit to this kind of authority. He had to think his own thoughts, to try to see the world through his own eyes" (1960, p. 8). The story is not merely about school but also about the more abstract idea of authority in general, setting Einstein as a rebel.

This rebellious, anti-authority, Einstein appears again in a 1983 children's biography by Milton Dank. Dank insists that a clash with authority is indicative of Einstein's character as a scientist. He begins in a similar mood, "Being forced to learn without questioning made him suspicious of all authority. He would criticize and doubt what his fellow students took on faith." He then projects this onto the identity of a scientist. For Dank this experience gave Einstein "the inquiring mind that would not accept something because some great name in the past had said it was so. Dank tells his readers that this "attitude is the sign of a true scientific mind" (1960, p. 8).

Eventually all stories of Einstein's education offer an account of why he left school in Munich. According to the authoritative biographies, several months after his family had left him behind in the city and moved to Italy, Albert was called to meet with his Greek professor who asked him to leave the school (Overbye 2000, p. 21). However, while authoritative sources disagree about minor details, all agree that Einstein was not expelled, and that instead he left of his own accord. Children's books generally take the opposite perspective.

Spanning from 1959 to 2002, Beckhard, Dank, McPherson's and Brallier all insist that Albert was expelled. For example, Jess Brailer's 2002 book, *Who Was Albert Einstein*, puts it in this way:

Albert had never looked up to his teachers. Now he grew openly disrespectful of them. "Unthinking respect for authority," he explained, "is the greatest enemy of the truth." One of his teachers called him "a lazy dog." Others said that he was a bad influence on his classmates because he was always asking questions the teachers could not answer. The end result was that Albert was expelled from school (2002, p. 20).

Here readers see the culmination of Einstein's clash and disrespect for authority as his expulsion from school. These stories signify Einstein's lifelong struggle with authority in a search for truth, implicitly making this clash with authority part of Einstein's character as a scientist.

Such accounts generally ignore a significant part of Einstein's school life. After leaving Munich to live with his parents in Milan, Albert applied to study at the Zurich Polytechnic. He was rejected from the college and advised to finish his studies at a Swiss secondary school for a year. Only one of the children's books consulted in this study mentioned this part of Einstein's education. Stephanie McPherson states in her 1995 children's biography, "Albert loved his new high school. To his delight, the teachers were friendly and welcomed his questions" (1995, p. 14). These sentiments agree with that of the authoritative literature. It is generally accepted that Einstein enjoyed his studies at the Aargan Canton School in Zurich. Some have even advanced that it was during this more positive experience with school that Albert really pieced together his dislike of his previous school experiences. However as previously noted, this part of Albert's schooling is, with one exception, completely absent from the picture of Einstein presented to children. By leaving these positive school experiences out, children's books offer an exaggerated distortion of Einstein's rebelliousness.

### **Manya in school: more stereotypes about school and gender**

In composing a biography it is natural to choose the most exciting and telling stories to include. But in Curie's case children's biographers have systematically chosen to tell only one of several exciting and engaging stories from her childhood school experiences. Examining both the most prominent story of Curie at school and stories almost completely left out will once again offer insight into a pattern of selective retelling, one that places Curie in the opposite relationship to authority found in stories about Einstein.

Almost all the books address the following story, originally presented Eva Curie in her 1938 biography of her mother. In this story Manya Skłodowska was the youngest and smartest student in her class. The occupying Russian forces forbid teaching children in Polish and teaching Polish history. Instead, schools were required to have children

memorize Russian history and learn the Russian language. The school that Manya attended disobeyed these rules. When Russian school inspectors came to check on the school a look-out in the hallway would warn the class and the class would hide their Polish books. Once the inspector came in, the teacher would call on Manya to answer his questions. In the story, Manya succeeds by answering all of the Russian inspector's questions in Russian to his liking. After he leaves, apparently exhausted, she cries and is comforted by her teacher.

In this story it becomes apparent that while Manya is very smart and strong she still has a kind of frailty. In this situation readers see that Manya's knowledge gives her a kind of importance. She is called on in class because of her impressive memory, and saves the class from the inspector. While there is a clash with the authority of the inspector the story places Manya in a much more traditional relationship with the authority of her teacher, who comforts her once the inspector leaves. While the stories of Einstein were marked by an exaggeration that stressed his clashes with authority, the story of the Russian inspector is usually treated in a way that is much more consistent with the authoritative texts. However, Eva Curie tells several other stories about Manya that only make it into one of the children's books, and thus the picture of the young Manya is shaped more by exclusion of these other school stories than by exaggeration.

The following anecdotes come from Eleanor Doorly's 1939 book, *The Radium Women: Madame Curie*. Doorly's book went through many printings and was highly acclaimed, recommended in three consecutive editions of the *Children's Catalogue*. This book stays very close to Eva's biography (Curie 1986) and offers insight into a different trajectory which school stories about Curie could have developed along. These selections come from the second chapter of her book, appropriately entitled "Rebels."

In the Russian-run high school Manya and her friend Kazia "took delight in inventing witticisms against their Russian professors, their German master, and especially against Miss Mayer who detested Manya only a little less than Manya detested her." Their teacher Miss Mayer stated, "It's no more use speaking to that Sklodovska girl than throwing green peas at a wall!" On one occasion Doorly tells us of a time in which Manya was openly disrespectful, and witty.

'I won't have you look at me like that!' Miss Mayer would shout. 'You have no right to look down on me!' 'I can't help it,' said Manya truthfully, for she was a head taller than Miss Mayer. No doubt she was glad that words sometimes have two meanings (1939, pp. 21–22).

In all of these other school stories the young Manya is openly disrespectful of her teachers. While the story of her encounter with the Russian inspector is interesting it should be just one of several stories about Manya's school experience. Importantly, it is the only story that puts her in a position of weakness against the authority of both the teacher and the inspector. Other stories show the potential of portraying a Manya who is similar to the exaggerated Einstein, openly disrespectful of a rather hostile teacher.

Unlike the Einstein books the Curie biographies do not make explicit comments about her connection to authority in general and in science. However, Lorraine Henriod's 1970 biography offers an implicit message which underlines this 'good girl' Curie. In Henriod's introduction she states, "In school, Marie Curie always answered correctly. When she grew up, she knew the right answers, too - to questions no one had ever asked before" (1970, inside cover). Where Einstein's success in science was connected to his clash with authority, Curie's is associated with her compliance with the authority of the school. Young readers of this Curie biography are misled to believe, that Curie succeeded in science by always knowing the right answers.

To highlight the extent to which current portrayals in children's books have departed from Doorly's 1939 children's biography of Curie and Eva Curie's depiction of her mother, consider the following two discussions of Manya's curls. According to Keith Brandit's 1983 picture book about Marie Curie,

Manya was the picture of the perfect pupil. She stood straight, her face calm and serious. Her hair was neatly braided and tied with a dark ribbon. She wore the school uniform: a navy-blue wool dress with steel buttons and a starched white collar. On her feet were dark stockings and polished, black, high laced shoes (1983, p. 35).

Here, not only is she the perfectly upright pupil, she is also the picture of the perfect student. Compare this with Doorly's 1939 Manya.

'Look at your ridiculous, frizzy, disorderly head, Manya Sklodovska! How often have you been told to confine your curls? Come here and let me brush them down and make you look like a decent school girl.' 'Like a German Gretchen!' thought Manya, but she said nothing. So with the brush that brushed everybody's hair, she set on Manya's head with good hard blows. But however hard she brushed, the curls were rebels, still those light, capricious, exquisite curls that framed Manya's round rebellious face (p. 25).

Putting these two texts in parallel it is hard to see them as discussions of the same individual. In the 1939 piece from Doorly, we see a witty and rebellious student far more exciting than Brandit's 1984 "picture of the perfect pupil." Both the story of the inspector and the other stories originate in Eva Curie's biography of her mother. However the only story included in practically all books after 1939 depicts Manya's power as something subject to the authority of the teacher. Far from simply an intriguing anomaly, when set against the trend of the Einstein books a pattern emerges. The Einstein books do everything they can to exaggerate his rebelliousness. They put words of confrontation into the young Einstein's mouth which authoritative biographers like Fölsing warn against. Furthermore the books ignore the point in Einstein's life when he did enjoy school, thus exaggerating his conflict with school authority. In contrast, the Curie books ignore parts of her story to emphasize just the opposite point. All of the incidents between Curie and her teachers at the Russian school are ignored and young readers are left with only the incident with the Russian inspector. While Curie does exercise a kind of power in the incident with the inspector, it is subdued. These books reflect the school stories into the nature of science, and offer gendered ideas about scientific success. The idea implicit in Curie books that 'doing what your told' will lead toward scientific discovery is very misleading, while the constant disdain of school and continuous clash with all authority presented in Einstein books is equally misleading.

### **Implications for the place of biographies of scientists in science education**

The history of children's books about Curie and Einstein offers unique insight into social attitudes towards gender and authority in twentieth century American science education. The place and role of womanhood has changed significantly in these texts. Children's books on Curie now explicitly engage with the importance of her accomplishments to all women, and children's books about Einstein now offer more sympathetic portrayals of Mileva as a scientist. Nevertheless, this research demonstrates that the benefits to be gained

in the changes in these explicit discussions of womanhood are mitigated by the stereotypically gendered themes in which Einstein and Curie's relations to authority are treated.

The appropriation of these figures as role models follows a distinctly gendered trajectory. School stories of Einstein overemphasize and exaggerate his disillusionment with school. These stories offer young children, and boys specifically, a somewhat false sense of solace that school is not the final route to success in science. In contrast, the appropriation of Curie as an educational role model comes by glossing over her rebelliousness, making it seem that she was a 'perfect pupil,' when in fact she talked back to teachers and stood up for herself. This situation may well leave young children, and especially girls, believing that school is the sole route to success in science, and that success in science is strictly about following rules. In short, Curie is made into a 'good girl' who plays by the rules and Einstein into a rebellious boy who makes his own. As students both Curie and Einstein's reactions to educational authority may have been very similar, but through selective retelling and exaggeration they have become polar opposites.

My analysis of these books focused primarily on relationships in this network of texts. Specifically, the trends with which children's books about Curie and Einstein depart from their more authoritative counterparts. Because of this emphasis this study has not significantly explored the social contexts involved in both the creation of these texts and the ways students make meaning with them. As I suggested in the beginning of this paper, there is a need for more empirical research exploring the ways individual students interact with these books, and the ways that teachers co-construct the meaning of these texts with their students. These kinds of questions may well be a compelling point to consider in this forum.

As educators increasingly turn to biographies of scientists as tools for teaching science to children it is crucial that those books come under stricter scrutiny from content experts. At least in this case, these biographies perpetuate misunderstandings about both Einstein and Curie as well as the nature of science. If the findings of this study are at all indicative of other children's science literature it would seem that these books are far from a panacea for issues in early childhood science education. In this case, because of the ways these stories are gendered, books written with the objective of encouraging women to become scientists could potentially have the opposite effect. Beyond this broader purpose this study calls for children's book writers to return to the lost stories of Curie's youth, give children the rebellious young Curie. Her story is both more historically accurate and offers an empowering message to challenge gendered assumptions about girls in school, in science, and in society.

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