

## ***Portrayals of Mathematicians in Culture***

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In the past 15 years, there has been an unprecedented inclusion of mathematical themes in works of film, television, drama, and literature. Plays such as *Arcadia* and *Copenhagen*, movies like *A Beautiful Mind*, and the television series *Numb3rs* have all featured mathematicians as major characters. As intelligent outsiders, the creators of these works provide an anthropological study of mathematics. How have mathematicians and mathematics been portrayed in these dramatic works?

There are several ways to look at this question which will not be discussed here. The need for positive role models to encourage support and better attitudes toward the discipline has been an ongoing dialogue in the AMS, the MAA, and elsewhere. The plays *Proof* and *Arcadia* feature female mathematical prodigies and should contribute to discussions on the characterizations of women and other underrepresented groups within mathematics. Will these works change or reinforcing gender stereotypes? Others have explored the use of popular culture, such as the TV show *The Simpsons*, to reduce math anxiety and to motivate students [7, 8].

All of these merit consideration, but I am interested in the following elementary statement:

***“It is a good thing, and more should be done like it.”***

It seems when mathematicians (including myself) review these works or anything that presents mathematics in a novel way, they make such a statement. Perhaps we need to be a little more critical in *why* we think such works are good things and what their inherent limitations are.

When the series of plays and movies came out in the 1990's to critical acclaim, there was a sense of excitement among some mathematicians. People were beginning to recognize and appreciate advanced mathematics. These movies and plays could be used as a means for people to comprehend mathematics. If the trend continued, people would understand what mathematicians do and who they are. Finally, our story would be told!

There are several problems here (beyond the exaggerations). The first problem is that there is not much mathematics in these works. Authors of creative works will want to get the mathematics correct, but they cannot sacrifice their work for mathematical completeness. Their purpose is not to teach, but to advance the story in an artistic way. Moreover, a strong understanding of advanced mathematics cannot be boiled down to a couple of scenes and two paragraphs in the theatre program. On the other hand, mathematicians use their own imagery with doughnuts, coffee cups, pigeonholes, and butterflies. These images can convey mathematical ideas but without great depth by themselves.

A second problem which is the main focus here is that the way mathematicians are portrayed may not always be the way mathematicians want to be portrayed. For example, is *A Beautiful Mind* an accurate reflection of research mathematicians? Do solutions to difficult problems come

innately and quickly as in *Good Will Hunting*? Do those with mathematical ability struggle with mental illness as in *Proof*?

Main characters in cultural dramatizations need to be interesting. Life cannot come too easily, or else the audience cannot relate to nor have sympathy for the protagonist. Mathematical ability may be seen as an exceptional human trait so other aspects of a character's makeup must be flawed. Much of the recent cultural work has been mostly sympathetic, but there are still remnants of negative stereotypes.

If one desires to have literary works involving mathematics, one must accept the way the game is played. While writers are looking for new stories and fresh characters, they are influenced by (western) literary tradition. Here are several examples of character types with literary roots:

**The Outsider:** (*Will Hunting--Good Will Hunting*) Particularly in westerns, there is a tendency in American movies for the hero to be outside of mainstream society but understand the real truth or to possess untapped potential. Mathematical manifestations could include being socially awkward or naïve.

**The Humanized Intellectual (sometimes the Bumbling Intellectual):** (Heisenberg—*Copenhagen*) There are two extremes: these characters are intelligent people who cannot get their personal lives in order or have trouble relating to the real world. While certainly not inept or bumbling, the characters Bohr and Heisenberg in *Copenhagen* can figure out the mysteries of quantum physics but cannot reconcile their relationship or even agree on what happened in their 1941 meeting. Within comedy, the intellectual has been lampooned going back to ancient Greek and Roman theatre. In the medieval improvisational theatre *Commedia dell'Arte*, the Doctor professes to know everything, but actually is a self-important windbag who knows nothing. Many stock characters of today have their roots in the *Commedia dell'Arte*. To overcome this tradition is no small matter.

**The Consumed Intellectual:** (John Nash—*A Beautiful Mind*, Robert—*Proof*) Just as Icarus flew too close to the sun, a character's pride and intellectual success lead him to lose his mental faculties. Or, like Dr. Faustus, the deal to gain great success comes at the expense of one's soul or ethics.

**The Tortured Artist:** (*Catherine-Proof*) Similar to "The Outsider," this character has something creative to say, but is either rejected or prevented from being heard. Turning the stereotype around, we could claim that this condition has been common among artists since the Romantic period. The author can project this feeling onto a character whose creative work happens to be mathematical in nature. Perhaps we can see here that some writers portray mathematics as a creative and imaginative endeavor.

While some of these characterizations are literary stretches, character development depends on a variety of things including literary tradition. The "mad scientist" is entrenched and cannot be eliminated. There is room for positive portrayals of mathematicians, but there is a long history of negative portrayals of scientists and intellectuals.

What I am arguing is that we cannot expect the promotion of mathematics to be the primary goal. The artistic work could be compromised. Story telling and literary tradition will often have to take precedence.

Let us take an example from another discipline. I enjoyed the 1984 movie *Amadeus* about Wolfgang Amadeus Mozart and the jealousy felt by his contemporary Antonio Salieri. That said, what did I really learn about classical music? I became interested in Mozart's music but not to a deep extent. The playwright took such artistic liberties that I concluded the play is not Music 101 involving history or a lesson in classical music. To me, the play is about the creative process and God's role in it. Why does God give tremendous talent to some who seemingly do not act righteously? Once its limitations are recognized, this play is open to interpretation and leads to broader philosophical questions.

Rather than an advertisement for mathematics, plays and movies about mathematics initiate reflection upon the nature of the mathematical endeavor. Beyond the mathematics itself, it raises questions for the Christian, the mathematician, and the student as to how and why the pursuit of knowledge is done. These works humanize the mathematician himself by dramatizing the need for worth, for redemption, and for ethics. They exemplify the human desire to be understood, to know, to create and to explore.

These works are a good thing and more should be done with them. Mathematicians just need to recognize the artistic domain and its limitations.

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