

# Can hype be a force for good? Inviting unexpected engagement with science and technology futures

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## Abstract

Hype, or simplified and sensationalised science, appears to be inescapable in science communication with examples extending from viral social media accounts and 'breakthrough'-themed press releases, to the mediated claims of the celebrity scientist. In science communication, the negative effects of hype are familiar. The question is whether hype is always a distortion and a lie, or can it be redeemed? This essay reviews the contribution of hype to science, specifically in terms of encouraging reflexivity for science and technology. I present three perspectives on hype and invite further conversation on the role of hype in science communication.

## Introduction

Hype is prolific in science with examples extending from celebrity scientists through to 'breakthrough' press releases and excitable media coverage. In science communication, definitions of hype essentially focus on exaggeration. Specifically, researchers argue that hype exaggerates the benefits of emerging research or technology while understating the risks (Caulfield and Condit, 2012). The potential for deception through hype allows for dismissal of this rhetorical trope.

This perspective is supported by an intuitive assumption that hype can precipitate a loss of trust in science. With trust playing an essential role for "every profession and every institution" (O'Neill, 2002: 4) and acting as a strong predictor for attitudes on science, concern over the negative implications of science hype abounds (Evans et al., 2011). Despite these concerns, hype seems inescapable for science and technology (Nerlich, 2013).

In science and technology studies, hype is pragmatically positioned as integral to the research and innovation ecosystem (Brown, 2003). In this ecosystem, success depends on projecting a clear and compelling vision of the future while shortening timeframes for delivery (Brown and Michael, 2003; Geels and Smit, 2000). The futures promised during efforts to secure social and financial are highly uncertain and hype emerges (Aprea et al., 2014; Latour, 1987). Here, hype plays a performative role with 'breakthrough' narratives working as "strategic resources to enrol allies and secure resources" (Samuel et al., 2015: 55). This is an instrumental account of hype, which positions hype as vital for researchers working in science and technology. In this essay, I contend that this contribution of hype to science communication could go further still.

In this essay, I take a unique position on hype in that I make no assumption as to whether hype is good or bad. This position accepts the inevitability of hype within the communicative ecosystem of

science and technology and asks whether hype might sometimes be viewed as an opportunity rather than a problem. This perspective draws on the rhetorical history of hype, which is rich and contentious (Claridge, 2014; Ritter, 2010). As a rhetorical trope, it is used when “expressing the inexpressible” and “stretches and strains facts and language to transcend the ‘ordinary’ and communicate as yet unimagined possibilities (Ritter, 2010: 2). Hype is a common feature in contemporary language that is made visible on through perceived overuse or novelty (Claridge, 2014). Within their study of exaggeration in the English language, Claridge contends that every instance of hype is an intentional linguistic act (2014). Hype allows its users to move beyond standard language and communicate alternative possibilities of meaning and being. The use of hype can be complicated when we are asked to explain what the exaggerations of hype mean (Ritter, 2010). Hype is “a trope that beckons but also warns; it accomplishes an intensification ... [that] brazenly both invites and distances the audience from the height of an apparently unreasonable position” (Webb, 1999: 3). In creating this intensification, hype “encourages active reflection on the different ways in which meaning is constructed and communicated” (Ettenhuber, 2008: 210). This active reflection is the feature which, I argue, means that hype might operate as a force for good.

This essay first considers the role of communication in initiating reflexivity and opening up new discussions for science and technology. Then, I outline three perspectives on hype in science. These perspectives address: first, the drawbacks of hype; second, hype as an instrument for agenda setting; and, third, the link between hype and anticipatory governance. I conclude with a call for further conversation and research on hype in science and technology.

## Disruption and reflexivity for science

Nerlich and McLeod argue that the choice to communicate about controversial science is rife with ethical challenges because the act of communicating “interferes with a media, policy, information and public awareness ecosystem... in ways that are not easy to anticipate” (2016: 485).

Sociologist Mike Michael (2013; 2012) extends on these concerns of disruptive interference with a provocation that focuses on unanticipated interactions in science engagement exercises. Here, Michael considers the role of disruptive people who challenge the standard meaning of things and help a communicative event ‘open out’ to different possibilities.

Michael’s work highlights how deficit and engagement models of science communication restrict the input of publics who are not science and technology experts. These models either employ publics to represent values and ethics (Michael, 2012) or portray relations of trust and identity (Horst and Michael, 2011). In both models, science and society come into contact in a formalised way, which restricts interaction and sometimes entrenches pre-existing divides (Kerr et al., 2007). To break away from these restrictive roles and make sense of unexpected engagements, Horst and Michael (2011) created a third model for science communication: the emergence model. In this model, coming together and exchanging information creates relationships and identities. Communication works as a constitutive force and engagement as a performative process that enables relationships and allows publics, science, and technology to become visible (Horst, 2013).

The emergence model speaks to a push for science communication to ensure reflexivity and self-criticism in science (Bandelli, 2015). It emphasises that sustaining a link between science and democracy requires open and critical discussion between science and citizens (Irwin, 2001). In this process, science communication can consider how best to build a meaningful relationship between science and society (Horst, 2007). This relationship requires trust and maintaining trust “between

experts and publics requires us to think of democracy as a performance whose scripts call for contact and critical reflection and oversight” (Jasanoff, 2007).

Who participates in this performance of democracy? Marres (2005) contends that being affected by an issue calls a public into being. Hype helps draw these publics out. However, if this involvement is to be more than an exercise in gaining endorsement or consensus (Raman et al., 2018), publics must have the ability to co-create and negotiate meaning (Heath, 2014). Engagement in this manner is an opportunity to open up alternative options and build new understandings of what futures are desired. The potential for hype to contribute to this work is reviewed in the remainder of this essay.

## The drawbacks of science hype

What are chief drawbacks of science hype? This first view on hype considers the consequences of hyped up promises in science and technology.

Science hype involves the exaggeration or sensationalisation of ‘pure’ research. Hype appears to be an inevitable element of science communication (Brown, 2003; Brown and Michael, 2003; Nerlich and McLeod, 2016) because of the constant dilemma faced by science and technology actors in which they must gain support and attention in the short term for their work. To achieve this, researchers make promises for the future, while in the present, to engage politicians, grant organisations, and other publics (Brown, 2003; Latour, 1987). In response to this dilemma, Caulfield and Condit discuss the concept of ‘science hype’ in terms of messages that “exaggerate the benefits of research and underplay the costs and risks” (2012: 209). The development of stem cell research and the subsequent rise of stem cell tourism after years of promises for the future provides an example of this definition.

Petersen et al. (2017) provide a detailed account of these promises and the aftermath in a discussion that highlights the discourses of technological promise, hope, and expectation used in the stem cell tourism market. These discourses began with stem cell research ‘breakthroughs’ – as hyped by scientists, media, and the wider community in the 1990s and 2000s – which created optimism among stakeholders. The dilemma came when the promises foundered within the complexities of clinical trials and the uncertainties inherent to medical research.

This example speaks back to the reservations towards hype expressed in science communication literature. When hype is used to highlight the benefits and avoid discussion of the risks and costs of research, fields may be overinvested in and stakeholders may be led to believe in unlikely outcomes. This situation is compounded when discourses of hope and promise are sustained by multiple parties. This not only raises the potential for increasing cynicism when new technologies and treatments do not eventuate within promised timelines, but also makes people vulnerable to false hopes created by less responsible actors.

Criticisms of hype focus on this neglect of limitations and risk. This lack of balance is often linked to the potential for a loss of public trust in specific research fields (Caulfield and Condit, 2012; Caulfield et al., 2010). However, the limited literature around this topic shows early signs that public trust may be more forgiving than anticipated (Gauchat, 2012; Gauchat, 2011; Master and Resnik, 2011) and that non-expert audiences are discerning when it comes to identifying sensationalised science content (Peddie et al., 2009).

## An instrumental take on hype

What advantages does hype provide for science and technology actors? This perspective on hype is instrumental and focuses on hype's agenda setting properties. Here, hype can drive political and social support for science and technology agendas and allow advocates to gain access to vital resources.

In my research on NASA's campaign for human exploration of Mars hype played a crucial role in fostering expectations and a vision of how the agency would operate on the red planet (Roberson, 2020). This reflected the vital role of advocacy for a field that is highly risky and expensive (McCurdy, 2011; National Press Club, 2015; Starr, 2008). My research into NASA's campaign for human exploration of Mars included metaphor analysis of 129 press releases as well as resulting media coverage and related lobbying documents. These press releases primed media coverage with messaging that emphasised the human face of space exploration through popular culture, astronaut spokespersons, and consistently linking smaller, more robotic-focused 'steps' (for example, launching the Mars 2020 rover) with achieving an ongoing human presence in space.

At this time, human exploration of Mars was being actively "imagined, fought for, ... and embraced in the present" (Brown, 2003: 17) by NASA and private organisations. The agenda setting work represented here culminated in discussion at a space subcommittee meeting, which deliberated over whether NASA would send astronauts to Mars and an editorial written by then US President Barack Obama (2016) entitled "America will take the giant leap to Mars."

This example from NASA demonstrates how hype can be used as a tactic for advocating on the behalf of science and technology through the creation of desirable futures. This is an instrumental account where hype is used to grab public attention for science and technology and to define how science and technology should be thought about. This approach implicitly shuts down alternative pathways for research and innovation.

## Could hype be a force for good?

Advocates in science and technology foster expectations and visions of the future (hype) to build support and resources. The promises made through these narratives of scientific and technological progress are "by definition, a projection into the future of a desired state of affairs, [and are] associated with a commitment to deliver this state" (Aprea et al., 2014: 370). Committing to visions of the future continues to be a central part of the communicative ecosystem of science and technology. This third view on hype asks: What other role might hype play in science communication? Could hype be a force for good?

In an exploration of the relationship between science policy and public opinion, Irwin argues that "the relationship between science and democracy should... [be about] the development of an open and critical discussion between researchers, policy makers, and citizens" (2001: 16). The role of science communication in this context is in constructing, reviewing, critiquing, and challenging such processes. However, science communication approaches themselves can be an obstacle when they confine the contribution of publics (Michael, 2012; Horst and Michael, 2011).

How might open and critical discussions be provoked or made real? Rhetoric plays a distinct role in science by creating theory for analysing public understanding of science and shaping the activities capable of sparking it (Gross, 1994). I argue that, combined with Bandelli's (2015) contention that science communication should play a central role in ensuring reflexivity and self-criticism in science,

this role of rhetoric in science aligns with the contemporary push for anticipatory governance and a convening role for hype in science.

Anticipatory governance encourages social responsiveness in science and technology research and development. “Anticipation of the outcomes of research [and] engagement with the public over research as it is being done” are two vital aspects of anticipatory governance (Guston, 2012: 12). A framework of anticipatory governance applied to hype suggests that rather than using hype to bring people along to a predefined agenda, hype might be used to draw attention to imagined outcomes and the assumptions that inform them.

For anticipatory governance to be participative and productive, publics in these debates must possess a meaningful ability to comment on benefits, risks, ownership and regulation (Nisbet and Scheufele, 2009; Stilgoe and Guston, 2017; Brown, 2014). This can be supported by re-framing of the role of individuals participating in public debate as active, informed citizens who are joining discussions that affect their daily lives (Russell and Lamme, 2016; Taylor and Kent, 2014). In this frame, individuals and communities can co-create and negotiate identity, interest, and socially relevant meaning (Heath, 2014; Mead, 1934; Nichols, 1963).

How do the publics for these discussions form? Barnett (2008) and Marres (2005) argue that issues call publics into being when other actors make a claim to speak on their behalf. These publics are convened when they are spoken for, if they choose to pay attention and respond. Barnett stresses that the convening of publics is risky and hazardous because it “only works by risking the chance of misfires and infelicitous outcomes” (2008: 23). Here, a communicative act or event invites the contribution of different perspectives, the establishment of other publics, and allows science and technology actors to learn from responses made (Nisbet and Scheufele, 2009). Hype is the invitation that opens up a dialogue for response, new framings, and the contribution of additional knowledges to the design and re-design of science and technology futures.

In a recent example from quantum science, a conversation has been convened around the use of the term ‘quantum supremacy’. Quantum supremacy refers to a tipping point for quantum computation in which a quantum computer, in the course of completing a set task, outperforms a classical computer (Aaronson, 2019). This is a significant milestone for the field of quantum computing with the first claim to quantum supremacy was made by Google in October 2019 (Arute et al., 2019). The wave of hype surrounding this claim a challenging discussion around the implicit problems of the word ‘supremacy’ and its ties to racism. In December 2019, an open letter calling for the quantum community to change the term was published in *Nature* (Palacios-Berraquero et al., 2019). In the moment of writing this essay, the debate continues between a growing number of signatories to the open letter and those who believe the term should continue to be used.

This case of quantum hype demonstrates the hazardous nature of speaking for and to publics. “Speaking for others is not a zero-sum game of silencing or exclusion, but an invitation, an opening up of a scene of claims and counter-claims” (Barnett, 2008: 23). Here, Google’s claim of quantum supremacy created a conversation around the language commonly used by the quantum community.

Engagement with anticipatory practices helps “to raise awareness about the types of futures mankind (sic) may encounter and sensitize society to the consequences of choices and actions of individuals and societies” (Boyd et al., 2015: S149). Raising awareness requires communication to make visible issues that might otherwise go undiscussed. Here, hype works to convene a new conversation. It invites response, agreeable and otherwise.

## Conclusion

Hype speaks to the underlying work of imagination in science and technology (Fujimura, 2003). Not just in the sense of how researchers envision new developments in the laboratory or in the way engineers determine how research translates to a prototype, but also in the imagining of how new developments fit into the world and how the world might change to incorporate them.

In this essay, I have presented an argument for reconsidering the role of hype in science communication. Hype works – intentionally or not – as an invitation for the contribution of alternative views from publics.

Hype represents an opportunity to call out to others by attracting their attention. In the spirit of this argument, this essay aims to convene a conversation around hype in science communication, the role of performative expectations and futures, and the settings in which this role for hype might become visible.

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