A Longitudinal Model of Perspective Making and Perspective Taking Within Fluid Online Collectives

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Abstract

Although considerable research has investigated perspective making and perspective taking processes in existing communities of practice, little research has explored how these processes are manifest in fluid online collectives. Fluid collectives do not share common emotional bonds, shared languages, mental models, or clearly defined boundaries that are common in communities of practices and that aid in the perspective development process. This paper conducts a retrospective case study of a revelatory online collective – the autism article on Wikipedia – to explore how the collective develops a perspective over time with a fluid group of diverse participants surrounding a highly contentious issue. We find that the collective develops a perspective over time through three archetypical challenges – chaotic perspective taking, perspective shaping, and perspective defending. Using this data, we develop a longitudinal model of perspective development. The theoretical implications are discussed and a set of propositions are developed for testing in more generalized settings.

Keywords: Perspective Making, Perspective Taking, Online Collectives, Online Communities, Wikipedia, Theory-building

Introduction and Background

An online collective[1] describes a group of individuals who share a common interest or goal, interacting and voluntarily collaborating over the internet (Jeppesen and Frederiksen 2006; Moon and Sproull 2008; Preece 2000). The collective can serve a variety of purposes including support (e.g., cancer support groups), socialization (e.g., Facebook), and/or information sharing (e.g. business networking groups). While some online collectives consist of a stable group of individuals who repeatedly interact on a topic, such as a community of practice (Jeppesen and Frederiksen 2006), many online collectives consist not of a stable group but rather a fluid set of interchangeable individuals who contribute to a common website to varying extents, starting and stopping at will, and who may not share emotional bonds or agree on their common purpose (Ren et al. 2007).

In some online collectives, the work product of the collective is the development of a common perspective on an issue or topic. According to Boland and Tenkasi (1995), a perspective describes vocabulary, language, assumptions, and knowledge boundaries about the topic. In citizen journalism, for instance, online collectives create common stories about a particular issue or event (Wagner and Majchrzak 2006). In open source software development, previously disconnected developers develop a single functioning product (von Krogh and von Hippel 2006). Wikipedia is likely the most prolific example of perspective development as a work product with over 10M user-generated articles in 40 languages wherein each article represents the perspective of an online collective on a given topic (Kane and Fichman 2009).

Borrowing from Boland and Tenkasi (1995), perspective development involves two complementary processes: perspective *making* and perspective *taking*. Perspective *making* is the process of developing a collective's unique knowledge by refining its vocabulary, methods, theories, values and accepted logics through language and action. Perspective *taking* is the complementary process of engaging the logic and language of multiple domains in order to refine the focal domain. Applied to online collectives focused on creating a work product representing a single perspective, the online collective is likely to engage in both perspective-making and perspective-taking. Most of the research on perspective development has examined perspective development in the context of existing disciplines or communities of practice where shared perspectives already exist on a topic but need to be further refined (Boland and Tenkasi 1995; Brown and Duguid 1991; Carlile 2002; Carlile 2004; Dickey et al. 2007; Dougherty 1992; Thompson 2005). With existing disciplines come common syntactic, semantic and pragmatic platforms (Carlile 2002; Carlile 2004). Meaning, symbols, mental models, and processes that are shared among the members help the members to further refine their common perspective.

With online collectives, however, the fluidity of the membership means that pre-existing syntactical, semantic, and pragmatic language platforms do not exist, creating new challenges for perspective-*making*. Moreover, members of online collectives rarely possess common underlying motivations. For instance, in the Wikipedia article on the Virginia Tech Massacre, some contributors participated in the collective because they wanted to honor the dead, but others wanted to ensure their perspective on gun control was represented (Kane and Fichman 2009). Not only are there likely to be multiple different motivations and mental models in a single online collective, but members of the collective may not even be aware of these differences. Individuals in online collectives participate with identities that are partial at best, ambiguous, anonymous, or deceitful at worst (Sia et al. 2002). *Perspective taking* is difficult as well. Fluidity of membership makes it difficult to identify differences and interdependencies with other perspectives. In sum, there has been virtually no previous research on how online collectives makes and takes perspectives. Therefore, we ask the general research question: *How does an online collective create a work product that requires a common perspective given its fluid context?* We use a case study design to attempt to build a theory of perspective development in these fluid settings.

Research Design

Our research design was an exploratory longitudinal case analysis of perspective development in an online collective. Following Yin (2008), we picked a single rich critical case to examine in order to develop an in-depth

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[1] We prefer to use the word online collective rather than online community. Community has sometimes been used in the literature to refer to a group of individuals that share a common bond (Blanchard and Markus 2004) or whose primary goal is the "the welfare of a group or its members" (Sproull and Aariaga 2004). We use the word online collective to describe that subset of online organizational forms in which the participants contribute to a shared online workspace but do not necessarily know each other or share a common bond.

understanding of how the perspective was developed over the history of the collective. We chose the development of a Wikipedia article as the setting for our critical case for two reasons. First, Wikipedia articles are developed by an open fluid collective, in accordance with our interest. There is substantial fluidity in the collectives on Wikipedia – the nearly 10M identifiable users represents an average of roughly 3500 new accounts that have been added every day since Wikipedia's founding. Second, articles are developed by the collective to represent a perspective on a topic. According to Wikipedia, each article is intended to provide a single perspective on a topic by reflecting an integration of different perspectives, presenting a neutral point of view. Consequently, participants must eventually agree on a single perspective because they cannot establish a competing perspective nor can they develop a perspective that represents the bias of any single individual or group in the collective. As such, then, perspective development is part of the activity of the collective.

Within Wikipedia, we selected one collective focused on developing a perspective on one topic, and analyzed its seven-year history. The specific collective we selected in Wikipedia was chosen to highlight several characteristics. First, the topic should be contentious, since challenges within a collective make the perspective development process particularly salient (Boland and Tenkasi 1995, Lee and Cole 2003). Second, the topic should be one for which there should be substantially different viewpoints that could be legitimately represented in deriving a single perspective. Third, the collective needed to be demonstrably fluid, exhibiting both a high level of visitor traffic and a high level of participant activity, as both represented possible aspects of fluidity. Fourth, the collective needed to have succeeded in developing a perspective at some point in its history. Success in this context is defined in terms of the standards of excellence that Wikipedia itself has established for the articles. Wikipedia has developed a classification known as "Featured Article" that recognizes the best work according to clearly defined standards – well-written, comprehensive, well-researched, neutral, and stable. As of this writing, only 2500 out of 2.8M articles (< 0.1%) have been recognized by Wikipedia as possessing these characteristics. Thus, Featured Articles should represent one aspect of successful perspective development in this context.

Based on these criteria, we selected the article on Autism to study as our critical case. Autism is recognized by Wikipedia as a "controversial topic that may be under dispute."[2] People contributing to the Autism article represent a variety of different viewpoints on the topic, including patients, parents, medical professionals, and advocacy groups. The Autism collective experienced a high level of visitor traffic (with over 200,000 people reading the article each month since the tracking data became available in December 2007) and a high level of participant traffic (over 9000 distinct comments and edits made by over 2500 participants over its seven year history). The Autism collective succeeded in developing a perspective, having been awarded Featured Article status. Further, the Autism article is one of only 31 articles on Wikipedia that had been awarded Featured Article status, had it removed because the quality had eroded, and then later had it re-awarded because the collective successfully restored the article's perspective, providing a unique opportunity to study both sustainable and unsustainable perspective development in a single collective. Thus, while there is a plethora of articles in Wikipedia that could have been selected, we selected Autism because of its controversial topic, the high level of fluidity in the collective, and the success of its perspective development process. As such, this case is not intended to be a representative sample of all Wikipedia articles. It is intended to allow us to examine perspective making and taking in an online fluid context.

Data Collection and Analysis

Wikipedia uses a wiki platform to host its encyclopedia. Anyone can make an edit to any article on Wikipedia. When the contributor makes a change to an article, the platform records the contributor's identity, changes made to the article, a description of the change, and the time of the change. Any contributor can automatically be notified of any changes made to a particular page, as well as undo any set of edits to those of a previous version. Four different sources of data on the collective's perspective development are available in the Wikipedia platform: 1) An article page that retains the complete history of all previous versions of the article, 2) A talk page that includes all of the public discussions between members of the article's collective regarding why particular decisions were made, 3) User pages for each member of the collective that provides insight into the identity of particular contributors and their motivations, and 4) The contribution history of both the article and the talk page that can then be analyzed to provide insight into the contribution history over time using various tools provided by Wikipedia and those developed by researchers. Data analysis tools also enable an analysis of the contribution history of individual users both in the collective and more broadly on Wikipedia. We assembled the entire revision history of the article and the entire archive of discussions on the Talk Pages. We assembled the volume of editorial activity for the collective

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[2] http://en.wikipedia.org/wiki/Talk:Autism

over time on both the article and talk pages, and the editorial activity for each individual contributor over time both in the autism collective specifically and in the Wikipedia collective more generally. We also developed a profile of the top 20 editors by examining their user pages and their contribution history more closely to learn more about who was editing the autism collective.

Our first step in developing a coding scheme was to read the entire archive of 6299 lines of discussion on the article's Talk Page. In total, there were 363 distinct discussion threads that were analyzed, ranging from 1-line entries from 2 people (since we only examined challenges, all threads analyzed involved at least 2 people) to 150-line exchanges from 9 people examined (an average of 17 lines between 4 people). To identify patterns in the challenges, we followed the Constant Comparative Method (Glaser and Strauss 1967; Strauss and Corbin 1990). In this method, incidents (for us, challenges) are identified. The analyst then starts by coding each incident in the data into as many categories of analysis as possible, as categories emerge or as data emergent that fit an existing category. We then coded these archives and reached an agreement among the coders that, of the 363 discussion threads, there were 165 challenges.

We looked at several characteristics of each challenge. First, we examined who and what initiated the challenge. This involved analyzing the first comment in a challenge thread. We coded the topic and type of challenge and then identified the challenge initiator by their identity, the number of contributions they had made to the autism collective and to Wikipedia in general at the time when the challenge occurred. Also, using the time and date stamp recorded on the talk page, we examined the changes that occurred in the article at the time of the challenge. Second, we followed a similar process for each successive comment, examining the logic employed by the responders and their editorial history in the collective and Wikipedia. For the challengers, we examined the actual changes to the article when the challenge text suggested there was a pressing reason to do so. Then, we examined the particular arguments that were used in each challenge, which logic prevailed in the challenge, and what actions the prevailing party took to reach the successful resolution of the challenge. This process resulted in us coding each challenge along 5 characteristics detailed in Table 1. With these definitions, we then coded the complete set of 165 challenges, obtaining an 88% initial interrater reliability. Areas of disagreement were then resolved between coders.

Results

Based on our coding, we found that the elements we coded grouped into patterns. We observed three archetypal patterns. The three patterns are briefly presented in Table 1. In the following sections, we describe each archetype using a rich illustrative example.

Table 1: Three Challenges Archetypes that contribute to a Perspective Making Process			
	Type 1: *Chaotic Perspective Taking*	**Type 2:** *Perspective Shaping*	**Type 3:** *Perspective Defending*
Nature of Challenge	Idea-specific challenges	Structure and style related challenges	Challenges with respect to existing perspective
How challenge is reacted to	Disconnected ideas, multi-lateral disagreements	Preemptive coping	Attempt to restrict changes unless opportunity to improve perspective
Primary criteria used in evaluating arguments	Merit of each individual idea	Contribution to a common, ordered perspective, in addition to merit	If idea fits with existing perspective
Key players	Newcomer initiating idea and Idea champions discussing idea	Shapers	Newcomer initiating ideas and Monitors ensure that perspective is defended.
Key player actions	Accommodate to others' perspective to get one's own perspective included	Pragmatic organization,, integration and logical flow of evolving perspective	Quickly shut down "bad" ideas. Other ideas are selectively discussed and/or adapted by Monitors.
Statistics for Exemplar	12.5 days, 40 posts, 3200 words, 8 contributors	1.59 days, 9 posts, 547 words, 3 contributors.	3.12 days, 35 posts, 2,674 words, 4 contributors.

Type 1: Chaotic Perspective Taking

The first challenge archetype were characterized by idea-specific task and process challenges; were reacted to in a disconnected multi-lateral fashion by others in the collective; were resolved primarily on the merit of the idea; were often initiated by a newcomer but championed by a separate party that argued for the inclusion of a particular idea in the perspective.   An illustration of these characteristics can be observed through an exchange, which we have labeled "Autism and Poverty," that relates to the topic of whether to include the connection between autism and poverty into the collective's perspective.

The Autism and Poverty challenge concerned whether to include a section in the Autism article about a relationship between autism and poverty.   This was controversial because participants disagreed about whether or not there actually was a relationship between the two and then whether the relationship should be part of a medical article. The challenge started when an anonymous user (listed only by IP address) posted a 112-word paragraph that claimed:

> *"[Autism] disorder is the third-ranking leading cause of poverty in the world… Autism is considered to be one of the leading causes of poverty, due to their lack of social capital and often lack of perception of the world normally. Often autistic people in the developing world are often easy targets for government corruption, due to their gullibility and sometimes lack of intelligence. Though there haven't been any studies on autism in the Third World, there has been a common belief that autism is more of a higher percentage in the developing world. Often it is believed that the autistic rate is higher in the Middle East, Balkan Peninsula, and Central Africa."*

A series of posts over the first four hours of the challenge argued, then acted upon this argument that this change to the article should be removed because 1) it was not appropriately referenced and 2) that there was little evidence to suggest that autism causes poverty. The original post was therefore removed. The anonymous initiator did not respond to this removal, nor did s/he ever post to the Talk Page. 'A' explained that one reason for the removal was that autism causes poverty, not poverty causing autism. However, 'B', with no previous experience in the collective but moderate experience in Wikipedia (845 edits over 3 months), puts the disputed paragraph back in, countering that the point is not that poverty causes autism but that autism causes poverty so aspects about the connection between autism and poverty should remain in the article. Despite countering the argument, B shortened the original entry to two sentences removing some extraneous information, and entered into the Talk Page an invitation to others to improve this perspective. 'C' (with no previous experience in the autism collective) entered into the interaction, posted a, disagreement with B's contention that autism causes poverty and suggested removing the statements from the article. Another individual, 'D' agreed that autism causes poverty but that the contention of autism being the third leading cause of poverty should be removed. B accommodated to this point and re-edited the paragraph to remove the specific contention, keeping the more general causal connection between autism and poverty.

A new entrant to the article, 'E', offered a new reason to delete the connection between autism and poverty. E stated that non-autism disabilities also cause poverty, and thus B's argument is not specific enough. B continued to counter yet this new argument, editing the paragraph to state that only 12% of autistics are able to find employment. This edit was countered by 'F,' who argued that a citation was needed to support B's claim. B found a citation, pointing out that the source found actually indicated that only 2% of autistics are able to find employment. F apparently looked at the source and argued that the statistics are not generalizable since they are only specific to a small U.K. sample. B continued to use the Talk Pages to counter other arguments brought up from different people including the ability to find employment depends on whether the Autism is Asperger Syndrome or not, whether the person has resources, and whether Autistics are vulnerable to deception that causes poverty. Throughout this process, B continued to edit the paragraph in the article each time in response to others' contentions and continued to invite others to fix the section. Several days into the argument, one new entrant, 'G', argued that the whole paragraph should just be removed since it did not represent a neutral point of view. At this point, 'H', a new entrant to the article but an experienced Wikipedian with 4,316 previous edits took ''B''s side, saying that the section should be kept but that a better citation is needed. Upon his own initiative, H found a citation to support the claim, settling the conflict with a "thank you' from B.

This challenge illustrates several distinctive characteristics. A first characteristic was that different participants played different key roles throughout the challenge to keep the interaction moving toward a resolution.   The challenge was initiated by a newcomer, who left the collective after posting and did not return to defend it, but another person stepped in to defend the primary message of the original post. Others played a critical role by

challenging the specific merits of the contribution but making little constructive contributions for how to improve the content. A second characteristic of this challenge was that it exhibited significant membership fluidity since individuals would post a response and leave at various points in the discussion thread. Some stayed throughout the discussion, while others came in, made a statement, and left. In fact, the participant who resolved the controversy only made one other contribution to the collective prior to the resolution. This high level of fluidity led to complex multilateral challenges that involved a variety of participants with divergent points-of-view entering and leaving the argument seemingly at random. A third characteristic of this challenge was that each of the idea discussions progressed as a series of individuals iteratively sharing their own perspective followed by another individual (usually the idea champion) offering accommodations based on the specific merits argued for that idea. Each stage of this iterative process resulted in tweaks to the original idea that reduced challenges by other members of the collective.

Together, these characteristics of Autism and Poverty suggested to us an archetype that we have labeled **"chaotic perspective taking**." In *chaotic perspective taking* challenges, a newcomer shares (but doesn't stay around long enough to defend) an idea with the collective, which stimulates discussion. As graphically depicted in Figure 1 a seemingly random idea (i.e., the relationship between autism and poverty in a medical article on autism) (shown as (1) in the Figure) is picked up by an idea champion who argues for its merits to others in the collective (2). There is much resistance by various others in the collective (3, 5, 7), some focused on process and some focused on task issues. The idea champion responds to each dissension (4, 6, 8) by modifying the idea or blocking the contention.

This formative process results in an addition to the perspective (9) that takes the perspectives of other members of the collective into account. This process suggests that, whether a particular idea eventually becomes part of the collective's evolving perspective is partially a function of who is engaged in the discussion surrounding that idea (both idea champions and challengers) than of any pre-existing framework of or vision for the perspective. Moreover, there seems to be little attempt to integrate across ideas, or use integration as an argument for inclusion or exclusion of an idea. That is, there were never any references in the autism and poverty controversy to other ideas or other parts of the article that had already been written. To assess the prevalence and timing of the Chaotic Perspective-taking challenge type, we coded all 165 Challenges and found 32 challenges to meet these characteristics. Coders obtained an 87% inter-rater reliability here.
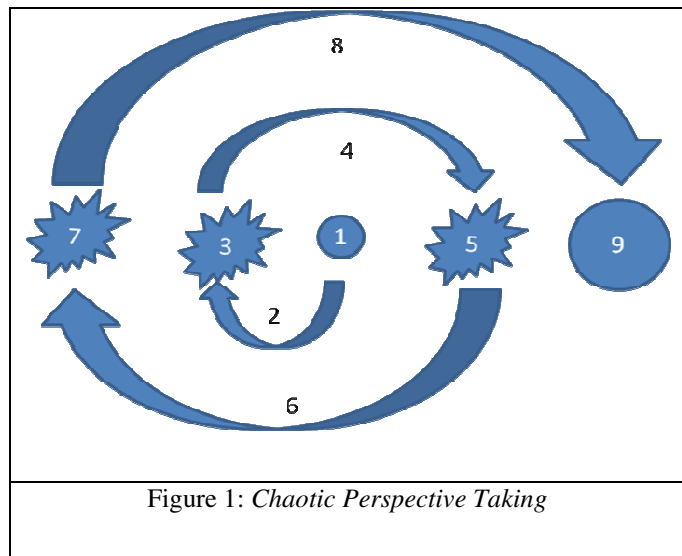

Figure 1: *Chaotic Perspective Taking*

Type 2: Perspective Shaping

A second type of perspective making and taking process that we observed in the Autism collective was substantially different than the first one. One particularly rich example of this type was initiated with a statement made on the Talk Page: *"Any objections if I move the sections around to reflect the suggested order in the [Wikipedia Manual of Style]"?* This statement was made by 'J', a contributor who began editing the Autism article only within the previous few weeks but had been an extremely active Wikipedian with over 15000 edits on 3500 pages. He made the statement not by making any edits to the article, as was the case with the newcomer in chaotic perspective-taking challenges, but simply by noting on the Talk Page that the current structure of the Autism article differs considerably from what is recommended by the norms and standards established by Wikipedia for this type of article (i.e. medical topics). J then adds the following to the Talk Page, essentially preemptively announcing changes he wanted to make to the article:

> *"Basically, …we'd move "History" to just after "Epidemiology". We'd move "Causes" to be just after "Characteristics". We'd then insert new sections "Mechanism" and "Diagnosis" (much of the material already exists). We'd then move "Treatment" to after the new "Diagnosis" section. We'd move "Sociology" to after "Treatment" and rename "Sociology" to be "Prognosis". Then would*

come a new "Screening" section. Then the existing "Epidemiology" (followed by "History" as already mentioned)."

J had not yet made these changes, but was soliciting feedback from the collective before doing so. Approximately 7 hours later, K, a contributor with significant experience in both the Autism article and on Wikipedia indicated that he liked the proposed changes with one exception. He pointed out that that the section in the article on the Sociology of Autism violated Wikipedia norms that said that medical articles should not include non-medical content; however, he felt that, in this case because autism and sociology were so intertwined and because the sociological characteristics of autism could not be appropriately handled in a section on prognosis, the title of the Sociology section should not be changed to Prognosis but be kept Sociology. Another participant, L who was also experienced in Wikipedia (35,000 total edits) but relatively new to the Autism article, disagreed. She countered that the established norms were successfully applied in a different online medical collective (those who developed the featured article on Tourette's syndrome, a condition with similar sociological considerations at Autism). J attempted to moderate the difference between K's and L's perspectives, indicating that they both "sound reasonable," then announcing that he would proceed with restructuring the article by moving , relabeling, and restructuring certain sections to make it fit with the recommended style guidelines but would not, for now, make any substantive changes to the section on Sociology. Approximately 15 minutes later, J then posted that he had made the changes.

L, apparently dissatisfied with this approach suggested a new alternative: that the section on sociology could be reworked into a new section in the article labeled "Cultural References", a section that would be permitted by Wikipedia style guidelines for medical articles. J then noted that he had changed the sociology section in a way that was a "combination of K and L's suggestions". He moved the entire contents of the former sociology section unaltered to a new article entitled: "Sociological and Cultural Aspects of Autism", leaving the sociology section untouched as K requested. He then summarized the contents of this new article in a new section on the Autism page entitled "Cultural References," as L had suggested. L responded that she liked that approach, indicating that the resulting article is "much better."

A first characteristic of this second archetype is that, instead of refining disconnected ideas as was done in the first archetype, this type of challenge was characterized by what we refer to as "**perspective shaping.**" That is, the focus of the challenge in this archetype appears to not be on adding new ideas and information but on developing an internal logic for organizing and integrating the disconnected ideas already included in the perspective. Thus, unlike *chaotic perspective taking* challenges, in this challenge existing ideas are discussed with respect to their connection to other ideas. We identify key participants in this archetype as *shapers,* who initiated the changes to the perspective and then stayed with the discussion after the change was initiated. A second characteristic of this archetype was that, instead of simply adding an idea and waiting for participants to disagree, p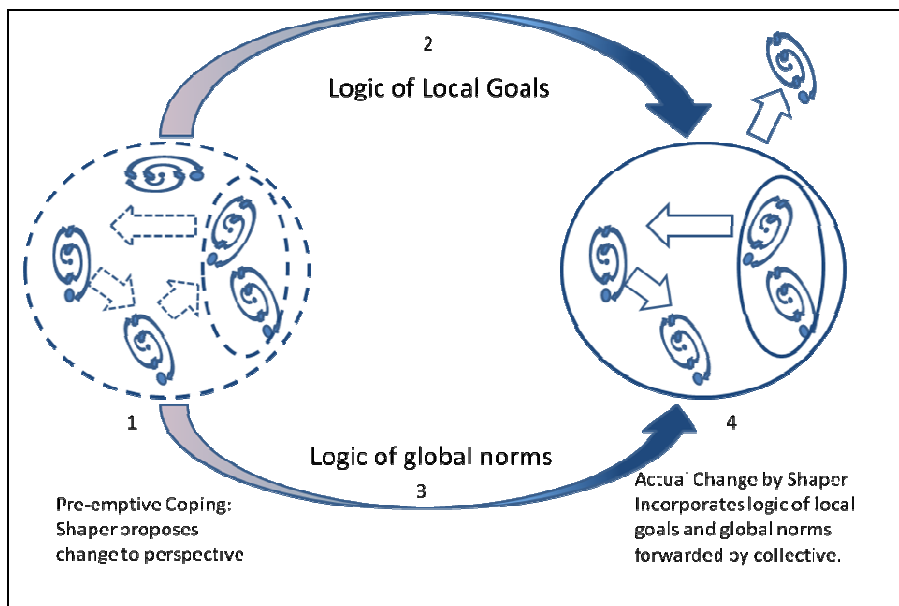articipants here would engage in what we call "preemptive coping." That is, they would generally couple an explanation with the proposed change before (or at the same time as) the change was made to the article; in contrast, in the first archetype, changes were made and then reasons for changes became clearer in the discussion that ensued. A third characteristic was the presence of a shared sense of norms and goals. Goals were focused on making the perspective of the collective surrounding the article of such high quality that it could be considered for featured status, but norms sought to conform to standards developed for articles across the corpus of

Figure 2: *Perspective Shaping*

work on Wikipedia.

The *perspective shaping* archetype exemplified with the Sociology of Autism challenge is illustrated in Figure 2. The perspective development starts not with a newcomer but with a shaper proposing changes to the perspective for how to order the existing ideas already present (1, proposals represented by dashed lines). Other shapers then respond to the proposal, agreeing or disagreeing on the basis of two logics – the logic of goals (2) and the logic of norms (3). This feedback is integrated by the original shaper into the proposal, and the modified changes are then implemented (4, implemented proposals represented by solid lines). It should be noted that sometimes shapers would actually change the text, instead of just offering a proposal, but they offered similar types of preemptive explanations. In these cases, it was clear that the changes were only intended as preliminary until the comments by other members of the collective could be integrated – it was simply easier to make the preliminary changes than attempt to describe them. Of the 165 challenges in the Autism collective, 49 could be coded as having the characteristics associated with the *perspective shaping* archetype.

Type 3: Perspective Defending

This third archetype depicts another qualitatively unique way in which challenges in the perspective making and taking processes were handled by the collective. An example of this archetype was initiated by an anonymous contributor who added a section to the article describing the recent comments of a radio commentator opining that autism was a behavioral rather than medical issue:

> *"Outside of the scientific community some still interpret autism as an unchecked behavioral problem. For example, ardent right-wing commentator Michael Savage characterized autism as 'a fraud' and prescribed tough love for autistic children: 'I'll tell you what autism is. In 99 percent of the cases, it's a brat who hasn't been told to cut the act out. That's what autism is.'"*

J, who had been an active contributor to the autism collective at this point for over a year, responded less than 30 minutes later, removing the material and noting on the Talk Page that he removed it because *"this change counts as original research…and doesn't belong in Wikipedia. Also, the claim is not particularly notable (just as the witchcraft claim wouldn't be notable) for this section."* Another contributor, M, new to the autism collective with comparatively little experience in Wikipedia (approximately 700 total edits to 300 pages), identified himself on the Talk Page at this point as the contributor who added the information about the commentator in order to highlight some of the popular misconceptions regarding autism. J commented that Wikipedia is not supposed to *"rely on guesswork by uninformed commentators."* M replied less than an hour later, indicating that the commentator's claims were used as an illustrative example of biases in popular culture.

Another contributor entered the discussion at this point: N, who had extensive experience in both Wikipedia and in the autism collective. N noted that the *"article is… primarily about the disease, its manifestations, and pathology."* Including the material in question would give *"undue weight"* to the comments made by unreliable sources. M responded 30 minutes later to indicate that he did not include the commentator's comments out of support for the commentator's opinions but because they are still relevant because of their high-profile nature. N responded 5 minutes later indicating that he did not believe M advocated for the commentator or his comments, but that the comments are neither *"notable"* nor *"interesting"* in the context of this perspective. M replied that the commentator's status as a syndicated radio broadcaster makes him notable, to which a new contributor, O, indicated that the commentator's status is precisely why these comments should not be included in the article - he *"may have a large audience but that doesn't mean his opinion counts in the significant circles that debate autism."* N indicated his concurrence 5 minutes later, by noting *"that deduction is the original research."*

M then commented 15 minutes later that *"minor edits to the language can correct [these misunderstandings]."* J returned to the discussion 2 hours later, arguing *"minor edits cannot correct the problems"* because the revised text still supports the notion that Savage's comments are representative of a wider population. M commented that he was simply elaborating on a phrase noted by the Autism Society of America (ASA), that *"Archaic attitudes towards autistics have not disappeared."* J then responded by posting a long comment containing 4 points: 1) that M's ASA paraphrase was not accurately cited, 2) the ASA source does not talk about attitudes, 3) that the issue covered in the ASA phrase is already addressed in the article, and 4) that the references already in the article are better than the Savage citation. J then took action by moving M's material to another page that he argues is more appropriate. M then completed a point-by-point response to J's four comments listed above, and reinserts his perspective on the page. J returned with a point-by-point refutation of M's point-by-point response, arguing that the insertion of the Savage material was not discussed beforehand and that, even if relevant, would give undue weight to a relatively

peripheral aspect of autism and should not be included. N then re-entered the discussion, cutting M's section on the Savage comment to what he referred to as the "*bare minimum*" he finds "*acceptable*" – with no content related to Michael Savage or other central elements of M's original contribution.

One day later, a series of interactions occurred between J and N to redevelop the section in a way that virtually eliminated M's original insertion (i.e., with no reference to the commentator) but preserved M's points (i.e., by improving the language indicating that inappropriate biases about autism still exist in the public).   J noted that the inclusion of material focusing on the "*stigma*" of autism did not fit with an earlier sentence in the section that claimed that autism has been "*destigmatized*." The problem, J noted, was that there is less stigma than in prior times but some still exists. After working back-and-forth about how to phrase this precise language, J and N agreed on the following change to the existing text from

> *"The rise of parent organizations and the destigmatization of childhood [autism] have deeply affected how we view [autism], its boundaries, and its treatments (Wolff 2004)."*

to

> *"Although the rise of parent organizations and the destigmatization of childhood [autism] have deeply affected how we view [autism] (Wolff 2004,) parents continue to feel social stigma in situations where their autistic children's behaviors are perceived negatively by others (Chambres et al. 2008) and many primary care physicians and medical specialists still express some beliefs consistent with outdated autism research (Heidgerken et al. 2005)."*

The contribution now fit with the other aspects of the article (i.e. it no longer said both autism has a stigma and has been destigmatized) and employed a higher informational standard than was the case with M's attempted contribution which didn't use peer-reviewed medical sources, relying instead on a syndicated radio host as a source). Thus, the challenge was settled in a way that eventually led to incorporation of M's points (that autism has not been completely destigmatized) although not M's words or his example from the commentator.

Although this archetypical challenge shares several commonalities with the first archetype of *chaotic perspective taking*, there are several unique characteristics of this archetype. A first characteristic of this archetype is the emergence of an ingroup (Jasperson et al. 2002; Lee and Cole 2003). Like the *chaotic perspective taking* challenges, this challenge was initiated by a newcomer, i.e., a person who had not contributed to the article previously. However, unlike *chaotic perspective taking* challenges in which the newcomer argued against a range of different participants acting independently of each other, in this *perspective defending* challenge the individual newcomer argued against a group of active contributors who had already been active members of the collective and who supported each other in arguing against the newcomer. We refer to this group of active contributors as an *emergent ingroup*. This ingroup supported each other's arguments in resisting the changes made by the newcomer. A second characteristic of this archetype challenge is that this archetype introduced a new logic of inclusive integrative fit with the existing perspective that complemented the logic of merit observed earlier. This new logic of inclusive integrative fit seemed to consist of two considerations: 1) the degree to which the new proposed idea represented a substantial improvement to the existing perspective before the idea would be incorporated (e.g., J's counter-argument that M's idea is "*already covered, much better, in [the current text]*"), and 2) the extent to which the inclusion of the idea would help to counter future similarly suggested changes. This second part of the logic helped the perspective to grow, albeit in relatively conservative and highly incremental steps.   A third unique quality of this archetype is that it involved yet a different set of key players than those observed in the first two archetypes, individuals we refer to as "monitors". The primary focus of the monitor is to champion the existing perspective, protecting it against new ideas that may either contaminate or clutter it.   Finally, the outcome of the challenge was different than in other archetypes. In other types of challenges, the proposed change (new idea or structural change) was accepted, modified, or rejected by the collective. In this phase, however, we find rejection with subsequent changes to the perspective - contributions seemed to inform the perspective even if they were ultimately rejected.

We refer to this archetype as "***perspective defending***." Figure 3 graphically depicts the process we observed in this challenge archetype. Newcomers continue to share their ideas (1, 2, 3). For the ideas to become integrated into the collective's perspective, the idea needs to meet the standards of both merit and integrative fit. Monitors are needed who are able to quickly assess when an idea has little potential to meet both criteria (1, 3), ranging from the obvious case of discarding ideas that deface a page to the less obvious case of discarding ideas about topics that have already
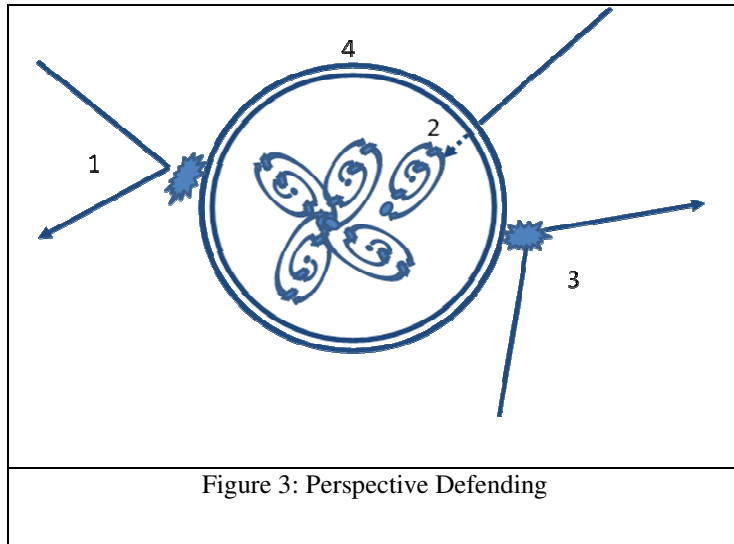
Figure 3: Perspective Defending

been discussed and discarded previously. When an idea appears to have some possibility for meeting both criteria, the ideas become a point of discussion on the Talk Page, often without any further input by the newcomer and without the emergence of an idea champion *per se* (2) – as we saw in the example of N and J changing the article to accommodate M's point without further involvement or input from him. The focus of the discussion is no longer simply the merit of the idea, but how the idea can be molded to conform to the existing perspective or be inserted in a way to preempt similar criticisms from participants in the future (4). Of the 165 challenges, 103 were coded as this archetype. We expect that the prevalence of this type of challenge archetype has more to do with the overall lifespan of the autism collective (being first promoted to Featured Article Status at an early stage), than providing evidence of the importance of this type of challenge archetype.

Examining Perspective Development over Time

The 165 challenges as coded into each of the three archetypes were placed longitudinally along the timeline of article development (See Figure 4). Also included in the figure are key milestones in the collective's development: initially being promoted to Featured Article status (August 2005), demotion from Featured Article Status (December 2006), and then promotion again (August 2007). Apparent from this figure is that the three types of challenges are not equally distributed across the life of the collective. For instance, *chaotic perspective taking* challenges occur from the earliest stages of the collective (Q1 2004), continuing at a moderate level (with some variance) through the first several years of the collective, but almost completely disappear later in the collective's life. In contrast, *perspective shaping* challenges tend to occur at two intervals, both immediately preceding the instances of article promotion.[3] *Perspective defending* challenges tend to begin and continue throughout the period following an article promotion. These findings suggest a longitudinal model in which a perspective is developed by stages over time.
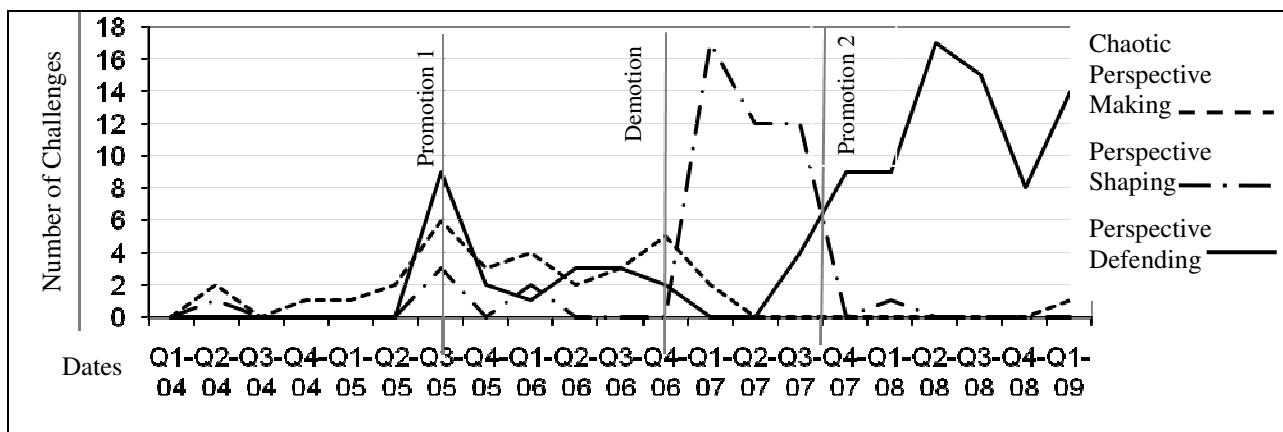

Figure 4: Type of Challenges over Time

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[3] Promotion 1 occurs in the middle of Q3 2005. Perspective making and shaping challenges occur immediately before promotion, whereas perspective defending challenges occur immediately after. The appearance that they occur simultaneously is an artifact of the graph.

The relative occurrence of each archetype seemed to correspond to article milestones. Leading up to the first promotion to Featured Article status, there are initially more *chaotic perspective taking* challenges, which are then replaced by a in a brief period of *perspective shaping* followed by *perspective defending* challenges. Nevertheless, chaotic perspective-taking challenges are not markedly reduced from the collective when compared to the later, successful, perspective defense phase. As a result, the collective did not defend its perspective, and its Featured Article status was revoked. It was demoted for several reasons including not being comprehensive, poorly sourced, exhibited bad writing, and did not conform to style guidelines. After the demotion, chaotic perspective-taking continued with a slight increase, followed by a substantial increase in *perspective shaping* leading up to the subsequent repromotion of Featured Article Status. Unlike the first Featured Article promotion, a substantial increase in p*erspective defending* challenges were observed after this re-promotion, accompanied by a marked decrease in chaotic-perspective taking challenges. As of this writing (21 months after Featured Article repromotion), *perspective defending* challenges seemed to account for most of the challenges observed on the site. Featured Article Status has been maintained since Promotion 2 and the article has not been nominated again for demotion.

This timeline suggests a longitudinal pattern of perspective development, in which *chaotic perspective taking* is followed by *perspective shaping* which is followed by *perspective defending*. When each stage is performed effectively and in this order, the collective's perspective seemed to be recognized by others as a higher quality perspective that is more sustainable over time. If a particular phase is underdeveloped or the phases proceed out of order, the perspective cannot be developed and/or well maintained. These milestones perspective development also appeared to be an important trigger that influenced membership fluidity in the collective, as is apparent in Figure 5.
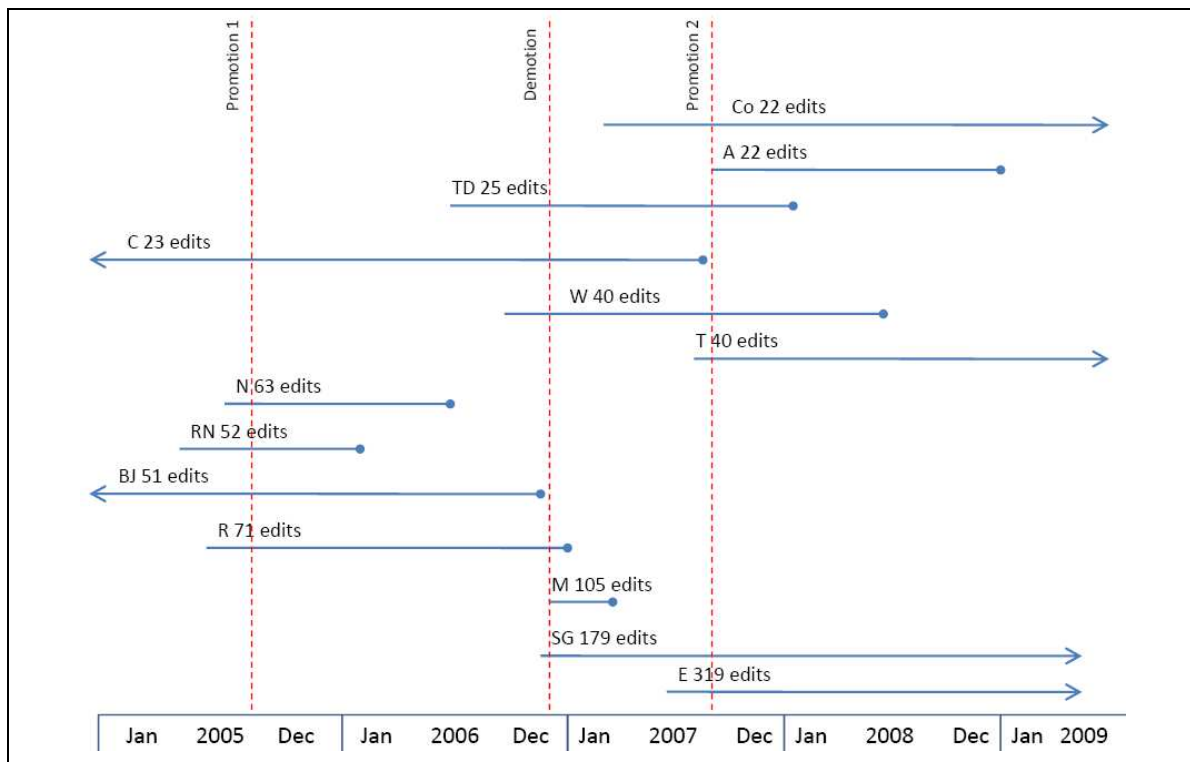

Figure 5: Period of Involvement of Top Contributors to Autism Collective[4]

Many of the contributors with the most contributions to the collective tend to join or leave as the collective transitions to a new phase. For instance, three contributors (N, RN, and R) begin contributing around the first milestone (Promotion 1) but leave the collective around the second (Demotion). Another set of contributors (O, M,

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[4] The initialing convention used here is not the same as the one describing the exemplars, so no connections should be made between the two sets of contributors.

and SG) join the collective around the second milestone. A third set of contributors (N, J, A) join around the time of the third milestone (Promotion 2), and some previous contributors leave here. We expect that the milestones help trigger members to transition in and out of the collective, and that the change in membership helps bring about the next milestone. For instance, some contributors may have left the collective after demotion, but the same event also seems to have attracted key shapers. The prospect of another promotion seems to have attracted another set of editors, but others leave when the goal of Featured Article status has been achieved. This finding suggests that the collective need not establish a stable core group to successfully proceed through the stages of development.
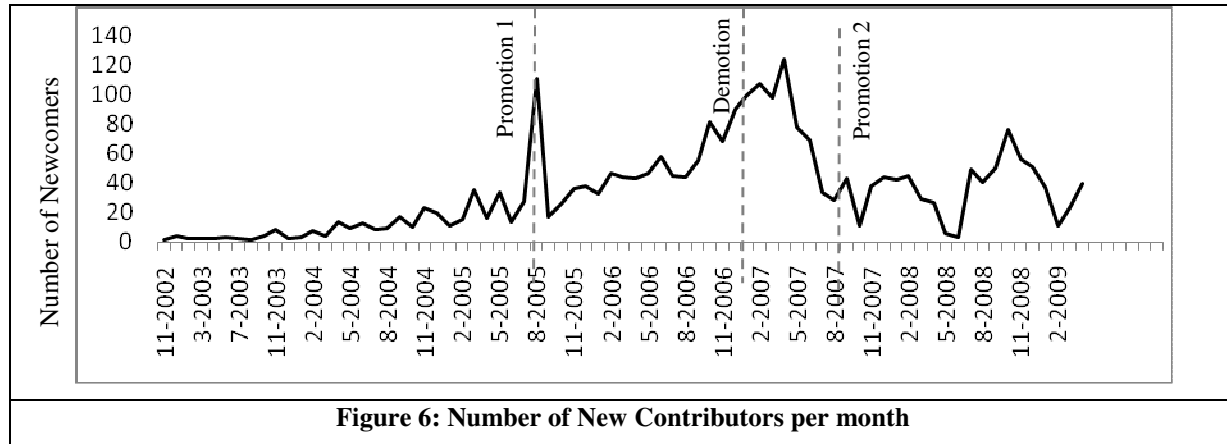

Figure 6: Number of New Contributors per month

Throughout each stage of development, the collective continued to exhibit considerable fluidity as new people continue to join the collective over time (Figure 6). That is, even during periods of high perspective-defending, new people continue to come. We expect that the gradual increase in number of newcomers to the article is explained primarily by the increase in popularity of Wikipedia since 2005.

Discussion

The online collective we studied exhibited a lifecycle of perspective taking, shaping, and defending that is important for the perspective to be developed and sustained over time. Early in the collective, challenges proceed in what we call a *chaotic perspective taking* fashion in which new ideas are added to the perspective by newcomers, picked up by idea champions who then modify the idea as it is attacked by a variety of different parties, in isolation of other challenges that might be occurring to the perspective at the same time. It is through these types of challenges that, in the absence of a shared language or mental model, the collective collects the raw material and base knowledge from which to develop its perspective later. Later in the collective's life, challenges become more oriented toward what we call *perspective shaping* in which participants attempt to the disparate ideas that survived the chaotic perspective-taking process into a coherent narrative. The process of perspective shaping begins to organize the knowledge possessed by a collective into a boundary object that can then define the boundaries of the collective. Those who have contributed to shaping this perspective (or can align themselves with it) become more definitive members of the collective with an ingroup developing as a result of the shaping of this shared perspective. Finally, after this shaping period, the collective seems to settle into a *perspective defending* mode where monitors may reject changes because they do not fit with the existing perspective developed by the collective. Newcomers will join the collective and continue to add ideas or further shape the perspective, but the ingroup actively defends the perspective it has developed against all but contributions that "fit" with the existing perspective.

We have argued that in open online collectives, perspective development is more difficult than in contexts of pre-existing communities of practice. It is more difficult to engage in *perspective making* in fluid collectives because the perspective needs to be built from scratch. With fluid collectives, new perspectives are constantly being offered, running the risk of not allowing any stability to the perspective so that a single perspective cannot be built or made. Any individual in an open collective can add any perspective to a current perspective, creating so much divergence that the boundaries around the refinement of the perspective cannot evolve. Individual ideas can become so disconnected that a single unifying theme cannot be found.

Fluid membership also makes *perspective taking* more difficult. It is difficult to ensure that good ideas from outside the collective are integrated and bad ideas are avoided. Norms and criteria for deciding what to include and what to exclude are easily changed as new people join the collective and existing members leave. Agendas can be so

different that it becomes difficult for the collective to agree on a purpose around which the perspective is formed. Further, in fluid collectives, challenges are not resolved as they are in stable environments: a challenge is not with a set of known parties, nor is a challenge likely to be resolved in this context as is assumed in the conflict literature (Hinds and Mortensen 2005; Jehn 1995; Kankanhalli et al. 2006). Rather, challenges once resolved can be easily undone as new individuals reopen an issue that was thought resolved.

We have identified three processes that describe how one successful online collective coped with these difficulties. In the first *chaotic perspective taking* phase, fluidity is not only tolerated but embraced. Membership fluidity brings new ideas. Any individual who visits the collective can share his or her idea. These ideas are shared either to the documented perspective (i.e., the article) or in the discussion about what changes to the perspective might be made. Some ideas fall well within the prevue of the visibly growing perspective documented on the collective's main site (i.e., the article). Other ideas might be quickly discarded as inappropriate (e.g., a pornographic picture). Still other ideas offer new perspectives that had not been considered previously (e.g., should names of famous people who are autistics be included?). New ideas often generate disagreements as they clash with others' perspectives, as would be expected within a fluid collective. The challenges, played out on the Talk Page, become the fodder for the hermeneutic inquiry, as assumptions are challenged, different representations are offered, different forms of evidence and criteria for evaluating the evidence are discussed, and different languages and meanings are sorted out. What is unusual about this hermeneutic inquiry process is that it is not with a stable set of players. Rather, different people engage in different parts of the hermeneutic inquiry process; one person might tackle the specific issue of whether an idea applies to all autistic people or just those with severe autism while another person might tackle the issue of whether there is reliable evidence to support the perspective. The idea continues to evolve in response to these different foci of different individuals. The fact that any individual can help the idea evolve by taking on only one aspect of the hermeneutic inquiry process allows the perspective-building process to continue in spite of – or because of – the fluidity.

There are two key players in the early phases of a collective's life when chaotic perspective-taking predominates: the idea initiator and the idea champion. The idea initiator is often what we call a "newcomer", someone who rarely continues to participate with the collective after adding their perspective to the collective's article narrative. Newcomers appear to serve an important function because, by inserting their perspective and then leaving, they provide a neutral boundary object (Boland and Tenkasi 1995; Carlile 2002; Star and Ruhleder 1996; Thompson 2005) to which others can react. Also, by not staying around to argue their point, the boundary object becomes highly malleable, allowing those who participate in the discussion about the idea to find "gems among the rubbish." That is, as in our Autism and Poverty example, when the newcomer added a clearly inaccurate perspective that "autism is the fourth leading cause of poverty" to the article narrative and then left, others were able, through an intense hermeneutic inquiry process, to eventually come to an agreement that some statement about the relationship between autism and poverty should be part of the collective's perspective, even though accounts about how important of a cause of poverty could not be substantiated.

Idea champions are key players in this early chaotic process. Idea champions stay involved to argue the idea through to its inclusion in the perspective. The idea champions are specific to each idea. Since there may be dozens of ideas being discussed in a collective at any point in time, there may be dozens of idea champions and any single idea may have more than one champion. The idea champions are key to this process because they are willing to keep the idea "alive" by ensuring that at least some aspect of the idea is kept in the perspective even when others want it completely discarded, keeping the discussions focused on the idea, offering ways of modifying the idea to take others' perspectives, and encouraging others to take ownership over the idea by inviting others to modify (rather than completely discard) the idea. The role of these key players suggests a proposition for future research on collective perspective-making:

P1: The ratio of newcomers and idea champions to the size of the collective's population at any point in time, provided that the collective is in the chaotic perspective-taking phase, will determine the speed with which the perspective is developed.

Fluidity is managed during the chaotic perspective-taking period by a focus on individual ideas, not on how multiple ideas fit together into a coherent narrative. Perspective-making and taking is carried out but only in a limited idea-specific sense of the term. There is no attempt to connect these ideas together by imposing an overarching knowledge structure. The perspective making and taking that occurs at the idea-level creates an initial clustering of different perspectives around an idea. In the Autism and Poverty challenge, for example, issues around resources that autistic people need, which forms of autism is poverty most likely to be experienced, percentage of people with

autism in poverty, and in which countries is autism and poverty related were all raised by different individuals and eventually coalesced into a single idea for the collective but not related during this discussion with any of the other ideas that were being discussed at the time (such as autism treatments or prognosis).

This focus on individual ideas enables perspective development in spite of the fluidity since the discussions around an idea lasts for a relatively short amount of time compared to the development of the entire article.   Thus a temporary resolution can be reached during that short period of time, allowing individuals who want only to engage in the collective for short periods of time to rapidly obtain some sense of engagement, closure and accomplishment and closure from their short-lived involvement in the collective. This feeling of accomplishment may then help to encourage participants to return (Roberts et al. 2006). Moreover, this idea-focus at this point in the collective allows people to become engaged only in the idea, without having to have a complete knowledge of the whole evolving perspective of the entire collective – knowledge that would require more commitment than many in a collective might be willing to give. This suggests another proposition about how collectives build perspectives:

P2: Avoiding imposing an overarching framework or structure early in a collective's lifecycle may help the perspective-making process.

In the second phase of a collective's perspective development process, we see a shift away from a chaotic focus on disconnected individual ideas toward an integrative message. Participant contributions become increasingly focused less on new disconnected ideas and more on ways to integrate, re-factor, recombine and standardize to create logic of order to the ideas. The ideas created in the first phase become the raw materials for the ordering logic in this phase. This logical ordering helps to support the fluidity because participants can see that ideas offered earlier are not simply discarded arbitrarily but instead become part of a logical framework. Comments about the logical framework are still encouraged at this juncture, at least in the early part of this phase.   Moreover, as the logical framework evolves with inputs from others, gaps in the collective's perspective (such as inadequate development of a topic or a citation) become visibly identified. The fluidity among collective participants can then be managed by encouraging participants to help collective perspective development by adopting and filling a gap, no matter how small.

Critical to this process of developing a logical framework from disparate ideas despite the fluidity in the collective are the willingness of participants to shift their contribution style from the one used during chaotic perspective-taking to one that we call "preemptive coping." Instead of making changes to the collective's perspective and then justifying them as need be in the Talk Page as was done in the chaotic phase, contributors during this shaping phase start first in describing on the Talk Page the changes they plan to make and why. These changes are discussed and then made, with consensus achieved among those in attendance at the time.   Given the permanence of the Talk Page, future criticisms about the changes can be met with referral back to that point in the Talk Page. This allows for gradual integration-building efforts, such that no one's single vision of the proper knowledge structure is imposed. Consequently, individuals who fluidity join and leave can participate at various points in this integration-building effort, reviewing the Talk Pages to determine what aspects of the structure have been already decided upon and which ones are still evolving.

Key players in this phase are what we call the shapers, because they focus their contributions on ways of integrating, refactoring, recombining, standardizing, and generally forming a logic of order to the ideas.   Knowledge of the stylistic nuances of the collective can help provide a shared set of norms about how to integrate, standardize, and stylize the collective's perspective at this point. Thus, the fluid involvement for those who contribute to the shaping process is made possible in part by the shared norms within which the collective operates.

P3: Perspective-making in an open fluid collective requires the creation of a knowledge structure after disconnected ideas have been offered. Key players in this phase are shapers employing preemptive coping strategies, resulting in a temporary period of stability.

Finally, in the phase of the collective focused on perspective-defending, we see another shift in the way in which fluidity is handled. In this third phase, a vetted perspective has been developed by the collective. As a result, the collective now has another paradox to cope with: If it only defends the established perspective with no effort to allow in new ideas, the interest of the collective and replacement of participants as they leave will suffer (Butler 2001). On the other hand, if it completely allows new ideas from newcomers who have no knowledge of how the particular perspective was formed, then it is likely that the perspective will deteriorate in the presence of ongoing fluidity.   Therefore, the collective must strike a balance between allowing in new ideas and defending the perspective against ideas that harm the perspective. To strike the right balance requires a strategy of evaluating new

ideas based on two criteria: fit with the established perspective while simultaneously improving the perspective. This enforced incrementalism ensures that the collective will evolve, but only with ideas that take it in the same direction into which it is going.

Key players in this perspective-defending process are the monitors. The monitor uses technology to be instantly and automatically notified of any changes to the perspective. This feature allows near constant screening of the perspective with a minimum of conscious effort on behalf of the monitors. As they observe the changes that are occurring to their perspective, they decide whether or not to allow a particular contribution to remain in the perspective. Frequently, the monitor will simply "undo" the changes made by a particular editor and explain on the Talk Page why they did so. Newcomers who simply drop ideas and leave may never know that their changes were instantly removed. Others may object to their contributions being summarily rejected and argue for inclusion of their point on the Talk Page. When this occurs, it may quickly become apparent that more than one person is monitoring the perspective. As other monitors are notified that a series of exchanges are occurring between a recognized monitor and an outsider, they often provide support for the monitor. Thus, the technology not only allows a quick response to undesired changes but also a unified one among monitors who are largely familiar with the history of the article and agree on how to handle particular issues. People who attempt to make significant changes to the perspective during this phase without soliciting input from the monitors before doing so often meet with swift and organized response. At the same time, the monitors also use these opportunities as a chance to further improve the perspective in one of two ways - by re-forming the new idea in such a way that it does fit with the existing perspective and may be included or by using the proposed change as an indication that the existing perspective needs to be strengthened to justify better the rejection of the idea. In this way, newcomers continue to attempt to improve the perspective, despite the presence of an organized ingroup. Thus, we propose:

P4: Collective perspectives will deteriorate over time if participants either fail to restrict suggested improvements to those that fit with the existing framework or fail to allow incremental improvements to the perspective.

Limitations and Conclusion

There are several limitations to this study, which should be considered when evaluating the contribution of this work. First, we have conducted a rich case study on a single collective with the justification that it represents a critical case for the phenomena in which we are interested. An inherent limitation of case study research is the ability to generalize beyond the focal case, and further research would be necessary to generalize the results here to other settings. Further, although this study examines seven years of data to develop a lifecycle model of perspective making and taking, collaboration in the autism collective continues even as this paper is being written. Therefore, it may be necessary to revise this model to account for developments that have not yet occurred.

Despite these limitations, this study makes a number of important contributions. This paper argues that perspective making and perspective taking occurred in a way that allows for perspective development in spite of and because of the fluidity in the collective – a fluidity that previous research has not examined yet is increasingly common in peer-production settings. We examined how the collective developed its perspective over time and in the face of collaborative challenges introduced by this fluidity, leading to several key contributions.

First, we identify a new phase of perspective development in collectives that we call *perspective defending*. As people join and leave the collective, the developed perspective may or may not be shared by the current members of the collective. More established members must defend, justify, and interpret the perspective to new members of the collective.

Second, we find that perspective making and perspective taking occurs in a process somewhat different than identified in more established communities. In online communities, perspective making precedes perspective taking because the community already shares a common perspective. In online collectives, perspective taking precedes perspective making as members of the collective first identify the perspectives held by individual members. In the absence of a formal process for doing so, this initial process of perspective taking can be quite chaotic.

Third, this paper identifies a three-phase lifecycle for perspective development in fluid collectives, a collaborative environment that is becoming more influential and important in today's world: *chaotic perspective taking*, *perspective shaping*, and *perspective defending*. Our analysis yielded detailed descriptions of each phase leading to seven testable propositions for future research. Further research into these collectives is clearly warranted, and we hope that this paper is only the first step in a more robust stream of research conducted by a variety of researchers from many epistemological perspectives.

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