# Effects of Collective Socialization on Newcomers' Response to Feedback in Online Communities

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Collective socialization involves introducing new members to an organization as a group or cohort. In traditional offline organizations, collective socialization is a standard and effective socialization strategy. This article investigates the impact of collective socialization on newcomers' motivation and learning in an online community and the effect it has on newcomers' reaction to feedback from the community. One observational field study and two random-assignment experiments involving editing Wikipedia articles show that collective socialization altered the way newcomers responded to feedback from the community. The observational study of students editing Wikipedia articles as part of a classroom assignment found that those who worked relatively independently without peer support made more edits in response to critical, negative feedback, presumably to fix errors, whereas students who had peer support did not. Two experiments in which Mechanical Turk workers edited Wikipedia articles independently or in a group found that working in a group diffused the impact of both positive and negative feedback. We discuss these findings, which highlight the importance of considering the negative consequences of introducing a new socialization practice to an online community.



CCS Concepts: • **Human-centered computing → Collaborative content creation**; **Social engineering (social sciences)**;

Additional Key Words and Phrases: Collective socialization, Wikipedia, feedback intervention theory, social impact theory

**ACM Reference format:**
Yla Tausczik, Rosta Farzan, John Levine, and Robert Kraut. 2018. Effects of Collective Socialization on Newcomers' Response to Feedback in Online Communities. *ACM Trans. Soc. Comput.* 1, 2, Article 8 (June 2018), 23 pages.
https://doi.org/10.1145/3191834

## 1 INTRODUCTION

Successfully recruiting and integrating new members into an online community ensures the addition of new perspectives and skills, diversifies the user base, and helps to sustain the community. All organizations face the challenge of socializing new members, but this challenge is especially daunting in online communities because so many people leave shortly after joining. Even

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https://doi.org/10.1145/3191834

established online communities, such as Wikipedia, struggle to retain newcomers and to socialize them to participate appropriately. More than 60% of newcomers registering with Wikipedia never log back in after their first editing session [36], and, although initially new editors grew exponentially, growth has since plateaued and is declining [20, 40]. Indeed, Wikipedia's 2011 five-year strategic plan identifies high turnover among newcomers as a major problem that the organization needs to address ([15], p. 6).

Newcomer socialization is more difficult in online communities than in traditional organizations for several reasons. First, many online communities are volunteer organizations in which members are contributing, for example, by editing articles in Wikipedia, writing code in open-source communities, and providing support in technical and health support groups—without monetary compensation. Second, quitting is much easier online than offline, because there are no formal mechanisms, such as employment contracts, to keep newcomers in online communities involved for long periods [9, 11]. Therefore, the arduous training regimes often used by offline organizations might be impractical in online communities. Moreover, computer-mediated communication, especially the asynchronous, text-based communication common in online communities, can make it difficult to establish common ground and trust among people [5, 34]. Finally, online communities typically have decentralized governance structures (e.g., [14, 35]), which inhibit the development of centralized policies and strategies for socializing newcomers. Together, these characteristics mean that online communities are likely to have more difficulty socializing newcomers than do traditional organizations.

Not only do online communities face special challenges in socializing newcomers, but also they typically use ineffective socialization techniques (e.g., [11, 12]). For example, even though thousands of new editors register in Wikipedia in a month, they usually begin their work without any formal orientation. Although Wikipedia offers extensive written instruction for new editors, this tutorial material is impersonal. The few interactions newcomers have with the community are impersonal at best and confrontational at worst. For example, new editors often receive template-generated welcome messages, which do not have the same force as personally written communications [11]. Moreover, almost a third of newcomers have their work deleted by established editors, often without any explanation [20].

Socialization can be conceptualized as a bidirectional process, in which both the newcomers and the communities they are joining play active roles. The prior literature has identified two types of effective socialization processes—information-seeking, which newcomers use to obtain information from organizations to ease their transition, and socialization tactics, which organizations use to shape newcomers' early experiences [3, 38]. The current article examines how the socialization tactics influence newcomers' reactions to the feedback they receive from community members. We focus on one socialization tactic, collective socialization, in which newcomers are brought into the organization in a group and given common experiences. Collective socialization can be contrasted with individual socialization, such as on-the-job-training, in which newcomers receive individualized training isolated from other newcomers [15, 25, 42]. Evidence suggests that collective socialization in traditional organizations is generally more effective than individual socialization, leading to greater role clarity, self-efficacy, job satisfaction, organizational commitment, and intentions to remain [3, 38]. Collective socialization may be effective for various reasons, including helping newcomers' understand the organization's values and work procedures, increasing their access to social support, and leading to a greater sense of belonging in the organization.

Results from several pilot programs on Wikipedia suggest that collective socialization may also be beneficial in online communities. For example, the Wikimedia Foundation built the Teahouse to encourage new editors, by offering a specially designed space to facilitate social and especially informational discussion among new and experienced editors. Results from surveys suggest that new

editors enjoy the environment [32] and from an unpublished experiment suggest that it increases newcomers' retention [17]. Although this environment was initially designed so that newcomers would have the opportunity to interact with each other and adjust to editing Wikipedia together [32], our observation of the interactions in the Teahouse suggests that most discussion is between newcomers, who ask questions, and old-timers, who answer them.

Wikipedia classroom initiatives are another context in which collective socialization is taking place. The Wikipedia Public Policy (WPP) Initiative, which ran from 2010 to 2011, was designed to encourage university public policy classes to edit Wikipedia articles. Similarly, the Association for Psychological Sciences Wikipedia Initiative (APS-WI) encouraged university classes in psychology and related subjects to edit Wikipedia articles as an educational assignment. The Wiki Educational Foundation now supports these efforts. In these programs, students begin editing Wikipedia articles together and thus can share their experiences and difficulties. A number of studies have evaluated the educational value of such experiences for students as they practice communicating their knowledge for the general public. They find that students are motivated by the potential impact they can have on a broader community by completing their assignments on Wikipedia [28, 33, 39]. Fewer of these studies have evaluated the impact for Wikipedia, particularly in terms of longer-term commitment of students to Wikipedia. Evidence from a few studies evaluating the commitment of students to Wikipedia indicates that a higher percentage of students from both the WPP and APS Initiatives continued to edit Wikipedia after their classes ended compared to other new editors who enter Wikipedia independently [13, 30].

Although both the prior literature in conventional organizations and these Wikipedia initiatives suggest that collective socialization may be beneficial in online communities, results are preliminary, and systematic research is needed to better understand the impact of collective socialization in online communities and possible unanticipated consequences. Here, we focus on its effects on the way new members react to feedback they receive from existing organizational members. An important feature of organizational socialization is the feedback about the adequacy of their performance that newcomers receive from more experienced community members. Although socialization researchers have investigated the effects of newcomers' feedback seeking on their ability to integrate into organizations [1], such research has been focused on the impact of proactive behavior of newcomers in seeking feedback. Little research has examined the nature of the feedback that newcomers actually receive—especially when the feedback was not initiated by the newcomers—its impact on their socialization, and how it interacts with socialization tactics.

Performance feedback has effects in many organizational settings, but the effects are not straightforward (e.g., [22]). For example, in educational contexts, feedback can produce large gains in learning and performance [21], but it can also decrease motivation [21, 27]. This seeming inconsistency can in part be explained by Feedback Intervention Theory [27], which posits that the effect of performance feedback depends on whether recipients interpret it as a reflection of their general competence or an indication of the work needed to improve performance on a specific task. When negative feedback is interpreted in terms of general competence, it can affect students' meta-task processes, such as their sense of self (e.g., self-efficacy), and decrease their overall motivation by causing them to internalize criticism about their abilities. In contrast, when it is interpreted in terms of a specific task, negative feedback can increase students' motivation and performance on the task being criticized (i.e., the focal task) by causing them to try to close the gap between their current performance and an aspirational level. Prior research also suggests that the degree to which recipients accept feedback depends on its valence and whether it addresses individual or group performance. A recent review of the team-feedback literature suggests that feedback to team members about their individual performance has more consistently positive effects on their subsequent performance than does feedback about team performance [16]. Among

other explanations, one reason is that people tend to take credit for good performance but attribute poor feedback to poor performance on the part of teammates [24].

Feedback is commonly used in online communities, such as Wikipedia, to socialize newcomers to the norms and expectations of the community. In Wikipedia, experienced editors frequently provide feedback designed to ensure that newcomers do not damage content [37, 40] and to help them develop better editing skills. Although such feedback could potentially be beneficial in socializing newcomers, it often has detrimental effects. For example, the semiautomated feedback that experienced editors provide to newcomers often involves deleting work that fails to meet Wikipedia's standards. This type of feedback seems to drive newcomers away [19, 20] and may be at least partially responsible for the sharp decline in the number of newcomers who become active Wikipedia contributors [18].

Choi and colleagues [11] found that in general, receiving feedback from old-timers in Wikipedia motivated new editors to contribute more and to participate for longer. Similarly, Burke and Settles [8] found that receiving comments from others increased the number of songs participants wrote in a songwriting community and the money they donated to support the endeavor. These results are consistent with findings that both positive and negative feedback encourages more participation on Wikipedia [45], Slashdot [29], and a variety of online news communities [10]. However, Zhu et al. [45] found that negative feedback was less effective than positive feedback in encouraging general participation. Newcomers who received positive performance feedback, nonevaluative suggestions about tasks to perform, and non-task-oriented social interaction completed more work than those who received negative performance feedback. To follow up, Zhu and colleagues [44] conducted a random-assignment experiment in Wikipedia to better understand the differential effects of positive and negative feedback. This research showed that receiving positive feedback caused newcomers to Wikipedia to increase their general motivation (i.e., to increase editing on tasks that were not explicitly the target of the feedback). In contrast, receiving negative feedback depressed their general motivation. However, the negative feedback increased their motivation to work on the focal task that was explicitly the target of the feedback; when they were given negative feedback on a new article they had written, they made more edits on that article than when they received positive feedback or no feedback.

In this experiment, the increased general motivation that was the result of positive feedback is intuitively plausible and consistent with theories of social reinforcement [7]. The effects of negative feedback are less intuitive, but fit predictions from Feedback Intervention Theory. Zhu and her colleagues argued that negative feedback encouraged effort on tasks that were the target of the feedback because it made these salient areas for improvement. Although this experiment showed that negative feedback can increase work on focal tasks, as suggested previously it can also undermine overall general motivation when it demotivates individuals. This reasoning is consistent with findings that newcomers typically stop participating in Wikipedia when their work was reverted, an extreme form of negative feedback [19, 20].

The present article extends previous research by examining the joint impact of collective socialization and feedback on newcomer motivation and performance in online communities. Although previous research suggests that collective socialization is an effective way to bring new people into an online community and that early feedback can influence their motivation and performance on community-relevant tasks, these two processes may affect each other. One possibility raised by social impact theory [31] is that the mere presence of other newcomers will diffuse the psychological impact of feedback and thereby reduce the effects of both positive and negative feedback on motivation and performance (e.g., [41]). That is, because feedback is directed to a group rather than to an individual, the recipients might be less persuaded by it than if they had received it individually. Another possibility, in line with theories of ego

enhancement and self-serving biases [6] and Johnston and Nawrocki's empirical research [24], is that presence of a group enables recipients to discount negative feedback by attributing it to the group rather than to themselves. The previous predictions focused on how the mere presence of groups influences the way that recipients of feedback interpret it. In addition to these individual, cognitive processes, the social interaction that occurs when people join an online community as a member of a group can influence either their understanding of evaluative feedback or their response to it. For example, supportive exchanges with other newcomers may cause people to ignore negative feedback while paying increased attention to positive feedback.

This article describes three empirical studies. The first is an exploratory field study that studied newcomers to Wikipedia who joined as part of university classes and were organized in classes with strong or weak collective socialization. The study examined the impact of the degree of collective socialization and its interaction with how newcomers reacted when they received positive or negative feedback from existing community members. Students made more edits after they received negative rather than positive feedback, presumably to fix problems identified in the feedback. However, this effect was attenuated for students who were in a strong collective socialization setting. They were less responsive to negative feedback than were those who were in weak collective socialization settings.

To examine causation, we designed Study 2 as a random-assignment experiment in which participants edited Wikipedia in a simulated environment either individually or in a group and received positive or negative feedback or no feedback on their work. Study 2 also showed that collective socialization (i.e., the group work) dampened the effect of negative feedback on participants' effort to fix problems in their work but did not affect their general motivation. Finally, we designed Study 3 as a follow-up to differentiate two possible mechanisms by which collective socialization might dampen the impact of feedback on newcomers' work. Participants again edited Wikipedia articles in a simulated environment and received feedback with a positive or negative tone. To test whether social support was responsible for the dampening effects, participants edited in groups with confederates who either provided them with social support in response to feedback or not. To determine whether diffusion of social impact was responsible, the feedback was addressed to the group as a whole or individual group members. Results indicated that differences in who the feedback was addressed to rather than differences in social support moderated the effect of feedback on task effort. Together, the studies indicate that negative valence of feedback encourages newcomers to fix specific mistakes in their work identified in the feedback, but can depress their overall motivation to contribute to the community. Negative feedback seems to have less impact when people are working in groups because they treat it less seriously when it is addressed to multiple recipients, not because their fellow teammates provide them social support.

In summary, in the following three sections we describe three studies that investigate the impact of using collective socialization as a strategy to introduce newcomers to Wikipedia. Then in the final section, we discuss the broader implications of our results. This article contributes to an understanding of the costs and benefits of using collective socialization in online communities and brings to light the importance of considering negative consequences when introducing a new socialization practice to an online community.

## 2 STUDY 1

This study, in a field setting, explores how collective socialization in an online community and feedback from old-timers jointly influence newcomers' motivation and effort. As noted above, prior research suggests that the effects of feedback can be moderated by whether the feedback is positive or negative and whether newcomers receive the feedback when joining a community jointly with others (collective socialization) or individually (individual socialization). Farzan and

Kraut [13] explored these issues in a study of students in university psychology and related classes who had begun to edit Wikipedia as part of a class assignment.

While instructors in these classes were provided with general guidelines on how to implement the Wikipedia assignment as part of their courses, the specifics of how they designed the assignment varied across different classes. In general, the instructors were advised (1) to introduce Wikipedia in the class and provide the students with some in-class instructions on how to edit Wikipedia, (2) provide instructions on how to assess the quality of a Wikipedia article and discuss the factors contributing to a good-quality article, and (3) encourage students to support each other through group work and peer reviews of each others' work. While we do not have information about the specific instructions provided in each class, the data collected from a sample of classes exhibited a diverse set of instructions and designs of the assignment. In some classes, the instructor followed a very structured design to guide the students step by step through the assignment, while in other classes, the assignment could have been in a more free format.

Overall, because students were editing as members of a class, they all experienced some degree of collective socialization. However, the classes varied in the degree to which they employed collective socialization techniques. For example, some instructors required students to complete their editing in small work groups, whereas other instructors had students work alone. Moreover, some students discussed their editing before or after class and engaged in substantial communication with fellow students, while other students did not. Students who were exposed to more collective socialization experiences made substantially more edits to Wikipedia than did students exposed to fewer such experiences. Moreover, while students who reported receiving more feedback from the Wikipedia community generally edited less than did those who had less feedback, this difference was reliably reduced among students experiencing more collective socialization.

Although this research suggests that the amount of collective socialization moderated the impact of feedback on editing, it did not examine the process through which this effect occurred. Nor did the research differentiate positive and negative feedback, even though previous research indicates that the feedback valence can make a difference. The present study extended this work by obtaining a more detailed picture of the impact of feedback in the context of collective socialization.

## 2.1 Method

*2.1.1 Participants and Data Collection.* During the 2011–2012 and 2012–2013 academic school years, 89 university courses with 1,798 students participated in the APS Wikipedia Initiative, in which editing the English-language version of Wikipedia was a class assignment. We collected both survey data and records of their editing behavior in Wikipedia and their communication with others in Wikipedia. Two hundred and eighty-four students (16% response rate) filled out a survey describing their course experience. This article reports findings from 196 students who both filled out the survey and made at least one edit to a Wikipedia article. Seventy-two percent[1] of participants were female. Participants ranged in age from 18 to 90 (*median* = 21 years old, *SD* = 6 years). Twenty-one percent of students were undergraduates in their first two years, 55% were undergraduates in their last two years, and the remaining 24% were graduate students in master's or PhD programs.

*2.1.2 Variables.*

**Socialization.** The student survey asked whether they had participated in a variety of classroom activities while they edited Wikipedia. A factor analysis of these responses revealed three

[1]Demographic information based on the 2012–2013 academic years only, because these questions were not included in the 2011–2012 academic year survey. Demographic information for the first and second years of the survey is expected to be similar.


Fig. 1. Example of positive and negative feedback from Wikipedia editors to students.

dimensions: cohort support (i.e., collective socialization), classroom feedback, and community acceptance (see [13] for a description of the method). We created a collective socialization scale based on four items: the extent to which students reported that they worked on their editing assignment as a group, peer-reviewed classmates' Wikipedia edits, communicated with other students outside of class, and communicated with classmates about the project through face-to-face communication and computer-mediated communication. This measure was reliable (Cronbach's $\alpha = 0.615$). Based on a median split, students were classified into those who experienced less-than-average or more-than-average collective socialization.

**Feedback Type.** We calculated the amount of positive and negative feedback students received from existing Wikipedians. On Wikipedia, communication between editors happens on what are known as user talk pages, dedicated pages associated with a particular user's profile and designed for editors to leave messages for each other. Communication also occurs on article talk pages, pages associated with a particular Wikipedia encyclopedia article designed to allow editors to discuss the article. We collected all messages posted throughout the duration of the course on each student's Wikipedia user talk page as well as all replies to messages the student posted on a Wikipedia article talk page. Of the messages posted on user talk pages, we excluded automatically generated welcome messages and messages sent by other members of the APS Wikipedia Initiative. We identified replies to messages students left on article talk pages through several steps. We extracted the text of all messages students posted to talk pages of the articles they had edited during the semester. We classified as replies messages with the following characteristics: used a reply symbol (":"), were posted during the duration of the course, were posted in close proximity to the student's message, and were not posted by another member of the APS Wikipedia Initiative. To simplify analysis, we analyzed only the first reply sent by each unique Wikipedian to each student. This procedure minimized bias associated with back-and-forth exchanges between students and Wikipedians that might be shaped by how students responded to Wikipedians. It resulted in 223 replies, i.e., messages that were directed at students, were personalized, and were sent by existing members of the Wikipedia community.

Two independent raters separately rated on 5-point Likert scales the extent to which each reply was positive or negative in tone. Figure 1 shows examples of negative and positive feedback messages. Feedback that was critical but expressed criticism using a positive tone (e.g., constructive criticism, criticism paired with encouragement) was coded as positive by raters. There was high interrater reliability between the raters (intraclass correlations: 0.97 and 0.97, respectively). In addition, positivity and negativity were negatively correlated with each other ($r(221) = -.52, p < 0.001$). Therefore, we averaged the positivity and reverse-coded negativity of each reply as a single measure of message tone (Cronbach's $\alpha = 0.68$). As a behavioral measure of negative feedback, we also recorded whether a student's edits to a Wikipedia article were reverted

by another Wikipedian during the duration of the course. In a revert, an existing editor deletes some or all of a student's work.

Students were divided into three groups based on the type of feedback they received: negative feedback, positive feedback, and no feedback. Students who received messages that were on average more negative than positive or had an edit that was reverted were classified as receiving feedback with a negative tone.[2] A student was considered to have received feedback with a positive tone if he or she received messages that were on average more positive than negative and had no work reverted. A student who received no feedback and had no work reverted was classified as receiving no feedback. Twenty-five percent (48) of the 196 students in the sample received a response from a Wikipedian (negative feedback = 38, positive feedback = 10, no feedback = 148).

**Task Effort.** Task effort was operationalized as the number of edits a student made to Wikipedia article pages after having received feedback or after day 42 if the student received no feedback. The number of edits students made to Wikipedia articles was recorded before and after they received their first feedback. For students who received no feedback, we calculated the number of edits a student made before and after 42 days from their his or her edit, which was the time averaged across all students before they received feedback.

*2.1.3 Data Analysis.* A multilevel, Poisson regression model was used to evaluate the effects of collective socialization, community feedback, and their interaction on students' subsequent participation in Wikipedia. To control for dependencies within the data, students were nested within classes, which were nested within semesters. In addition, several control variables were included in the regression models—the number of edits students made to Wikipedia article pages before receiving feedback controlled for students' task effort before feedback and the number of edits to Wikipedia talk pages before feedback controlled for students' likelihood of initiating communication with the community.

### 2.2 Results

An analysis of the impact of socialization type and feedback type on task effort revealed a significant main effect of feedback type on task effort ($\chi^2(2) = 166.13$, $p < 0.001$): students who received negative feedback made more edits afterward (mean edits = 7.35, $SE = 2.07$) than did students who received no feedback (mean edits = 4.60, $SE = 1.29$) or positive feedback (mean edits = 4.90, $SE = 1.41$). Those who received negative feedback made 2.75 more edits than those who received no feedback, which represents a small effect (Cohen's d = 0.19). One reason that negative feedback led to more editing is that negative feedback was more likely to describe a specific mistake that could have been addressed with concrete actions (e.g., *"I have undone your recent edits to this article — the formatting was inappropriate for the main article space"*) than was the feedback with a positive tone (e.g., *"Thanks for setting this up."*). To examine this relationship empirically, two annotators coded the extent to which each feedback message encouraged further work.[3] The significant correlation between feedback tone and encouraging future work showed that negative messages were more likely to ask for additional work ($r(221) = -0.25$, $p < 0.001$).

Although there was no significant main effect of socialization on task effort ($\chi^2(1) = 0.33$, $p = 0.57$), there was a significant interaction between collective socialization and feedback type ($\chi^2(2) = 76.03$, $p < 0.001$). Experiencing a stronger rather than a weaker collective socialization attenuated the impact of negative feedback on encouraging more edits (see Figure 2). Among

[2]The analyses of the study are robust against various thresholds for negative versus positive tone.

[3]Two coders rated three items, including whether the Wikipedian discussed specific tasks, gave concrete instructions, or implied in any way that more work needed to be done, on a 5-point Likert scale. There was high interrater reliability between the coders (ICC = 0.77–0.82) and the scale items had high internal consistency (Cronbach's $\alpha = 0.94$).

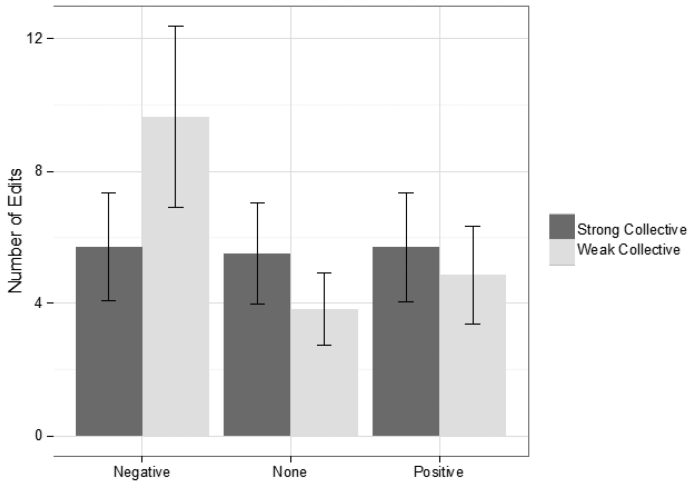



Fig. 2. Mean number of edits to Wikipedia articles and standard error bars after receiving feedback separated by socialization type and feedback type.

students with weaker collective socialization, receiving negative feedback was associated with more editing (mean = 9.64, SE = 2.74). They edited more than did students who received no feedback (mean = 3.83, SE = 1.08, $p < .0001$). In contrast, among students with stronger collective socialization, feedback did not influence subsequent edits, regardless of the type of feedback they received. Those who received positive feedback did not differ either from those who received negative feedback or who received no feedback ($mean = 4.86$, $SE = 1.47$).

### 2.3 Discussion

The results of this research are consistent with an interpretation that negative feedback can cause newcomers to Wikipedia to work more to fix problems, but also that the impact of feedback is lower when newcomers experienced collective socialization rather than individual socialization. More specifically, students who experienced strong collective socialization were less responsive to negative feedback than those who experienced weak collective socialization. Although this conclusion is based on correlational data in a classroom environment, where many unmeasured factors could covary with the type of socialization experiences offered, and where only 25% of participants received any feedback, we speculate below about mechanisms that can cause collective socialization to attenuate the effects of feedback on motivation. Studies 2 and 3 were controlled experiments designed to overcome problems of the correlational nature of the data and to test these explanations by randomly assigning participants to the type of feedback and socialization experiences they encountered.

## 3 STUDY 2

Study 2 had two primary goals. The first was to replicate the robustness of Study 1 finding that newcomers who experienced strong collective socialization were less responsive to negative feedback and to identify some of the boundary conditions. The second was to go beyond the correlational nature of Study 1 to assess causation. To do so, we conducted a random-assignment experiment within Amazon's Mechanical Turk (MTurk) to simulate the socialization and editing activities new editors experience in Wikipedia. Participants edited Wikipedia articles either by themselves or with a group of newcomers. They received positive, negative, or no feedback from others whom they believed to be more experienced Wikipedia editors.

Table 1. Predictions from Feedback Intervention Theory on the Impact of Feedback on General Motivation and Focal Effort

| | General Motivation | Focal Effort |
|---|---|---|
| Positive feedback | Prediction: Increase motivation | Prediction: Weak increase |
| Negative feedback | Prediction: Decrease motivation | Prediction: Strong increase |

Prior research on Feedback Intervention Theory [27] suggests that negative feedback could motivate focal effort by encouraging recipients to fix problems highlighted by the feedback. At the same time, it could reduce general motivation, by demotivating people or decreasing their feelings of competence. Study 2 distinguishes *focal effort* and *general motivation* by separately measuring the work participants did to fix errors identified in the feedback they received (focal effort) versus work they performed on other aspects of the article (general motivation). In this experiment, both the positive and negative feedback gave participants suggestions about improving their work, but did so with a positive or negative tone. Based on Feedback Intervention Theory [27], we predicted that positive feedback would encourage both general motivation and focal effort, because it identified problems. In contrast, negative feedback would discourage general motivation, while encouraging focal effort even more by identifying problems with more rhetorical force (see Table 1).

If results from Study 1 replicate, we expect that collective socialization will moderate the effects of feedback. Although an exact replication would lead one to expect that collective socialization would diminish only the effects of negative feedback on focal effort, results are likely to depend on the nature of the interaction between people who are in the group and the type of feedback they received. Therefore, we designed this experiment to understand conditions under which collective socialization moderates the effects of feedback on motivation. Does it do so for both positive and negative feedback and for general motivation and repairs of errors identified by the feedback (e.g., focal effort), or are the effects more limited?

To test these predictions, we conducted an experiment, in which participants with no Wikipedia editing experience were recruited from Mechanical Turk and given Wikipedia editing tasks. They were randomly assigned to edit an article either with a group of two other newcomers (collective socialization) or by themselves (individualistic socialization). They received either positive, negative, or no feedback from confederates whom they believed to be more experienced Wikipedia editors. To eliminate the confound between feedback tone and specificity of critique in Study 1, in Study 2 both positive and negative feedback made specific critiques about the editors' performance, with the only difference being the tone of the feedback.

### 3.1 Method

*3.1.1 Participants.* Four hundred and sixty-two participants with no experience editing Wikipedia were recruited from Mechanical Turk and told that they would have the opportunity to become a part of a group of workers, called Turkers for Wikipedia, dedicated to editing English-language Wikipedia articles for payment. Participants ranged in age from 18 to 66 years old ($median = 29$, $SD = 9.7$); 48% of participants were women. Eighty-one percent of participants were from the United States and 16% came from India. Participants were paid $2.00 for the completion of the task. The study was conducted in compliance with the human subjects review board.

*3.1.2 Procedure.*

**Collective versus Individual Socialization.** Participants were randomly assigned to a three-person group, and groups were then randomly assigned to conditions in a 2 × 3 design:

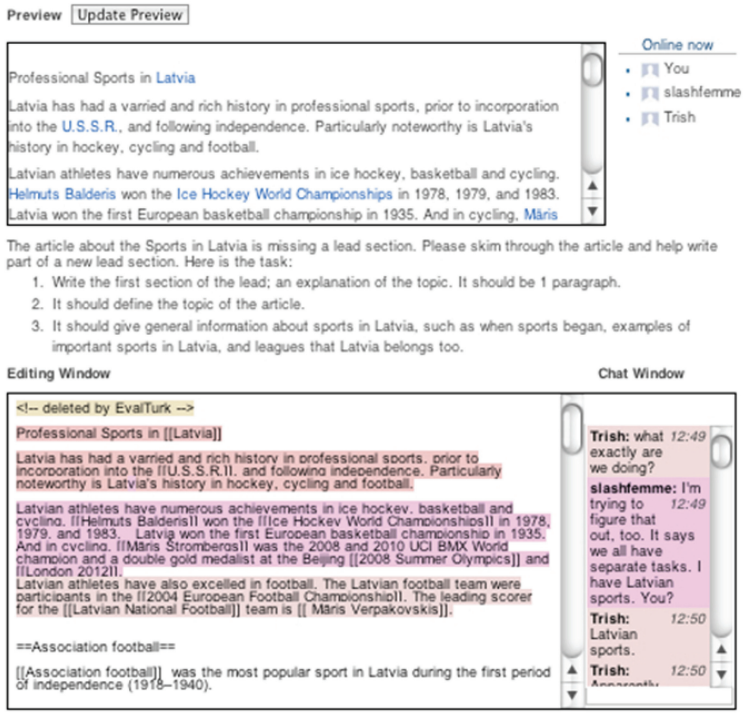



Fig. 3. Example of the user interface for the collective socialization condition.

Socialization Type (Collective, Individual) × Feedback Type (Negative, None, Positive). In the individual condition, participants were in pseudo-groups. They were never made aware of the other people in their group or their group assignment, and they completed the training and task individually. In contrast, in the collective condition, participants completed the training and task with the other members of an interacting group. To simulate a socialization experience, participants were told that they were being recruited to join a pilot program, *Turkers for Wikipedia*, to build a workforce of MTurk workers to edit Wikipedia. In the cover story, participants were told that they would be invited back to work on editing Wikipedia in the future and that a more senior worker, EvalTurk, who had experience with the program, would provide feedback to help them integrate into the program. In reality, EvalTurk was a confederate trained to interact with participants in prescribed ways.

Participants completed the training and main editing task using an interface that simulated Wikipedia's editing interface but was enhanced to allow collaborative editing and communication (see Figure 3). Participants made edits to forked versions of Wikipedia articles in the simulated environment. The interface included a window to collaboratively edit Wikipedia syntax, a window to preview the Wikipedia syntax, a chat box to send and receive messages, and a window that displayed active group members. The interface was built by integrating Etherpad Lite's editing and communication tools; Wikipedia's API and CSS to render Wikipedia syntax; and AJAX calls to create social awareness. The interfaces for the independent and collective conditions were identical. The only difference was that in the collective condition, individuals could see that other group members were present, could see the edits these members were making, and could communicate with them. In both conditions, the participants could see and communicate with EvalTurk during predetermined periods when EvalTurk joined their session.

Participants first completed a 5-minute training task, which included basic information about Wikipedia rules, style, and syntax as well as short editing exercises. At the beginning of the training session, EvalTurk introduced herself using the chat box. Participants in the individual condition did the tutorial alone; participants in the collective conditions did the tutorial together and were encouraged to talk to each other via chat. In addition, in the collective condition, the exercises were selected to enhance the collective identity of the three-person group (e.g., *"Write a few sentences with your group members about your group, and add links to relevant articles by putting words in brackets."*).

Following the training, participants completed a 10-minute editing task. Groups were randomly assigned to one of three types of editing tasks that were created for the experiment: (1) writing a short introduction to a Wikipedia article (lead section), (2) adding citations to an article, or (3) integrating new content into a section of an article. Individuals were randomly assigned to a subtask (or specific instance) of the task type for a given article. The subtasks were designed so that they could be completed independently. For example, in the add-citations task, participants chose among four references, two of which would be appropriate per Wikipedia's guidelines and two of which would be inappropriate. Individuals working on different subtasks within the add-citations task had to choose among a different set of four references, which were relevant to different points in the same article.

**Feedback.** Midway through the editing task, during a predefined 2-minute window, EvalTurk gave feedback to participants based on the condition to which their group had been assigned. In the no-feedback condition, the confederate gave no feedback but still appeared for 2 minutes. In the negative and positive feedback conditions, the confederate appeared for 2 minutes, edited each individual's work, and gave a feedback message using the chat box.

By the time EvalTurk arrived, 31 participants (6.7% of the original 462), in 11 of 154 groups, had already dropped out of the study. Participants' dropout rate was unrelated to the experimental condition ($z = 0.39$, $p = 0.69$). Groups in which a participant had dropped out before receiving feedback were excluded from the analyses, leaving 143 groups containing 431 participants.

All the feedback messages were specific to an individual and provided a specific critique based on a problem in that individual's work as identified by the confederate. In the negative feedback condition, the confederate deleted part of an individual's work that had been identified as problematic and provided a critique using a negative framing (e.g., *"You are not doing a great job. I deleted part of your work that wasn't quite cited correctly. You could make it better if you add <ref> tags. There is more work to be done."*). In the positive feedback condition, the confederate also modified work identified as problematic but provided the critique using a positive framing (e.g., *"You are doing a great job! I modified part of your work that wasn't quite cited correctly. You could make it even better if you add <ref> tags. Keep up the good work, there is more to be done."*). In some cases, participants had done no work, and in these cases the messages pointed out their lack of work rather than identifying a specific problem. In the collective socialization condition, critique was given to the group as a whole even though the problems were based on work that individuals had done (e.g., *"You all are doing a great job! I modified two parts of your work that weren't quite cited correctly and one part that used an unreliable reference. You could make it even better if you add <ref> tags and check whether a source is good before adding it. Keep up the good work, there is more to be done."* In this example, each part refers to a different individual's work).

Two trained research assistants blind to hypotheses acted as confederates. They used a specially designed interface to access the participants' work at the appropriate times, to edit the work, and to generate prewritten messages. Confederates selected a specific problem for each participant from a list of common errors, and then the system automatically constructed a message based on the selection. This method ensured that consistent language was used across individuals and

conditions. If participants responded to EvalTurk, the confederate informed participants that she had to leave and to figure it out on their own (in the individual condition) or with their group (in the collective condition) (e.g., *"I'm sorry I have to go now. Try to figure it out together."*).

After completing the task, participants filled out a questionnaire about their experience and reported their demographic information. Those participants who dropped out of the experiment during the task were still asked to complete a questionnaire about their experience (20% of the participants who dropped out completed the questionnaire).

*3.1.3 Dependent Variables.*

**General Motivation.** Two independent coders rated how much work each participant had accomplished before feedback and after feedback.[4] The coders rated the degree to which the assigned subtask had been completed on a 10-point scale. There was high interrater agreement between the coders (ICC = 0.79) and the average of their judgments was used as a measure of task completion. Task completion was operationalized as a measure of general motivation and was highly correlated with number of edits made ($r(425) = 0.71$, $p < 0.001$).

**Focal Effort.** The same coders rated the degree to which the participants followed Wikipedia's rules and guidelines (e.g., used good sources, had no copyright violations, used neutral point of view). These rules were specific to assigned tasks, had been taught in the tutorial, and were used by the confederates to provide individualized feedback to participants. Coders rated each participant's work on five to six relevant rules per task on 10-point scales. No score was given to participants whose work could not be judged with respect to a specific rule, or when a participant had not yet completed any work. There was high interrater agreement on the rating of each of these individual rules (ICC = 0.71–0.96), Thus, the average of the two coders was taken as a participant's score for a given rule, and the average across the rules was taken as a measure of overall rule following. Rule following was operationalized as a measure of focal effort and was moderately correlated with number of edits made ($r(248) = 0.37$, $p < 0.001$). Although task completion and rule following were conceptually distinct, they were highly correlated ($r(248) = 0.71$, $p < 0.001$).

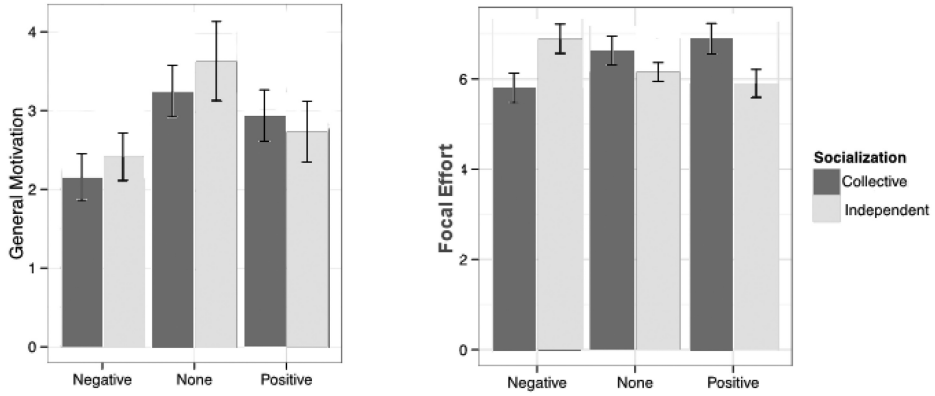
*3.1.4 Statistical Analyses.* Analyses used multilevel regression models to control for dependencies in the data. Individuals were nested within groups (or pseudo-groups in the case of those in the individual socialization condition). For models examining general motivation and focal effort after feedback, general motivation and focal effort (respectively) before feedback were included to control for participants' baseline level of motivation and effort on task. Degrees of freedom in the models are based on 427 individuals nested in 143 groups, except for outcomes with missing values.

### 3.2 Results

*3.2.1 Manipulation Check.* As a manipulation check, participants described the degree to which feedback from EvalTurk was positive or negative in tone on two 7-point Likert scales (Cronbach's $\alpha = 0.78$). As expected, feedback with a negative tone was perceived to be more negative than no feedback ($t(140) = 7.73$, $p < 0.001$) and feedback with a positive tone ($t(140) = 12.4$, $p < 0.001$), and no feedback was perceived to be more negative than feedback with a positive tone ($t(140) = 4.65$, $p < 0.001$).

*3.2.2 General Motivation.* An analysis of the impact of socialization type and feedback type on general motivation after feedback revealed a significant main effect of feedback on general

[4]Messages were classified as pre- or postfeedback based on the exact time of the feedback message for the positive and negative feedback conditions and by the average time feedback was given in the other conditions for the no-feedback condition. The same technique was used for all measures that differentiated behavior before and after feedback.




(a) General motivation (SE) in response to feedback, controlling for motivation before feedback.

(b) Focal effort (SE) in response to feedback, controlling for effort before feedback.

Fig. 4. Study 2.

motivation (*likelihood ratio* = 7.68, $p = 0.02$), no significant main effect of socialization type ($t(139) = 0.51$, $p = 0.61$), and no significant interaction between socialization type and feedback type (*likelihood ratio* = 1.26, $p = 0.53$). Participants receiving feedback with a negative tone completed less of the task ($M = 2.21$, $SD = 3.15$) than those receiving no feedback ($M = 3.42$, $SD = 4.06$; $t(140) = 3.05$, $p = 0.003$). There was no difference in general motivation between those in the positive feedback condition ($M = 2.96$, $SD = 3.53$) and the other conditions (see Figure 4(a)).

*3.2.3 Focal Effort.* An analysis of the impact of socialization type and feedback type on focal effort after feedback revealed a significant interaction between socialization type and feedback type on focal effort (*likelihood ratio* = 6.04, $p < .05$, see Figure 4(b)), but no significant main effect of type of feedback (*likelihood ratio* = 0.27, $p = 0.88$) or socialization type ($t(119) = 0.68$, $p = 0.50$). Pairwise comparisons revealed that participants in the collective socialization condition exerted less focal effort to improve the quality of their work in response to negative feedback ($t(113) = -2.13$, $p = 0.04$) but exerted more focal effort in response to positive feedback ($t(113) = 2.16$, $p = 0.03$); compared to those in the individual socialization condition, there was no socialization difference in response to no feedback (see Figure 4(b)).

In summary, this experiment found that socialization type did not moderate the effect of feedback on general motivation. Feedback with a negative tone was associated with less general motivation, regardless of socialization type. However, socialization type did moderate the effect of feedback on focal effort. Feedback with a negative tone was associated with less focal effort for individuals socialized collectively compared to those socialized individually, whereas feedback with a positive tone was associated with greater focal effort for individuals socialized collectively compared to those socialized individually.

### 3.3 Discussion

Based on findings in Study 1, we predicted that newcomers who experienced collective socialization would be less responsive to negative feedback, compared to those who experienced individual socialization. Study 2 extended Study 1 by examining whether these effects varied by type of feedback and type of motivation. This experiment provided a partial replication of Study 1. As in Study 1, collective socialization dampened the effect of negative feedback on stimulating focal effort.

However, it also enhanced the effects of positive feedback on stimulating focal effort. Although negative feedback depressed general motivation, socialization type did not moderate this effect.

These results suggest that collective socialization (i.e., being part of a group of newcomers) can diffuse the impact of negative feedback. However, the mechanisms are unclear. The results are only partially consistent with Latané's social impact theory, which predicts an inverse relationship between the impact of a persuasive message and the number of people the message targets [31]. Predictions from social impact theory can account for why collective socialization reduces the effects of negative feedback on focal effort, but not why it enhances the effects of positive feedback. Nor can it explain why collective socialization did not dampen the effects of negative feedback on general motivation.

The results are also ambiguous about whether social support can account for the results. A social support mechanism is consistent with the results for focal effort—dampening the impact of negative feedback and enhancing the impact of positive feedback; in that case we would have expected the positive effects of positive feedback in general. However, we would also expect a similar pattern for general motivation, which did not occur. Yet, limitations of Study 2 may have prevented group members from providing each other the support that is typical of standard collective socialization experiences. First, participants did not strongly identify with their group; on average, they neither agreed nor disagreed with the statement that they identified with their group ($M = 4.15$ on a 7-point Likert scale, $SD = 1.90$). Moreover, the collective socialization period was short, only 15 minutes, and MTurk workers, who are used to working alone, may not have adopted the norm of helping coworkers common in the classrooms observed in Study 1 and in conventional work organizations. In line with this observation, we found that groups did not send many messages to each other; on average, the three participants sent 4.5 chat messages over the 15-minute period ($median = 1$, $SD = 7.6$) or fewer than 0.1 messages per person per minute. Thus, a major limitation of Study 2 is that collective socialization experiences may not have been designed to engender group support. Study 3 was designed to bolster support among newcomers and explicitly evaluate the two mechanisms by experimentally manipulating the collective socialization experience and the target of the feedback.

## 4 STUDY 3

Study 3 varied aspects of the collective socialization experience to differentiate more precisely the two mechanisms by which collective socialization might dampen the impact of feedback on newcomers' work. The experiment manipulated the number of people who received the feedback messages to test the diffusion of the social impact mechanism and the amount of support the group provided to test the support mechanism. Study 3 used the same environment as Study 2 to simulate the socialization process and editing experience of Wikipedia. In contrast to Study 2, different levels of social support were artificially created by grouping participants with confederates who acted as other newcomers. This allowed us to directly manipulate social support and to ensure social support was high in the appropriate condition. As in Study 2, participants received feedback messages critiquing their work that were presented with either a negative or positive tone. In contrast to Study 2, feedback messages were designed to target either the newcomers individually or the group as a whole.

We predict that negative feedback encourages newcomers to address problems, while depressing motivation in general. Thus, negative feedback compared to positive feedback would encourage greater focal effort but depress general motivation. If social support is an important mechanism through which collective socialization moderates these effects, then social support from other newcomers should dampen the effects of negative feedback on both focal effort and general motivation. If diffusion of social impact, however, is the important mechanism, then

feedback messages targeting the group as a whole rather than individuals should dampen the effects of negative feedback on both focal effort and general motivation.

### 4.1 Method

*4.1.1 Participants.* Participants who had no experience editing Wikipedia and had not participated in Study 2 were recruited from Mechanical Turk. They ranged in age from 18 to 68 years old (*median* = 32 years old, *SD* = 11 years); 51% were women. Eighty-nine percent were from the United States, with the remaining participants from other countries including India, Macedonia, and Italy. Participants were paid $2.00 for the completion of the task.

To ensure that participants experienced the same experimental conditions, participants were excluded if they dropped out before receiving feedback from the confederate or experienced technical problems, such as loss of connectivity, during the experiment. They were also excluded if the confederates made errors, by giving participants incorrect feedback or feedback that failed to match the assigned experimental condition. This left a total of 223 participants.

*4.1.2 Procedure.* Study 3 is a $2 \times 2 \times 2$ between-subjects experiment with three independent variables: Feedback Type (Negative, Positive), Social Support (Low, High), and Message Target (Individual, Group). The same experimental materials and procedures as Study 2 were used, with a few changes. Participants were recruited from Mechanical Turk to participate in the pilot program *Turkers for Wikipedia*. Study 3 did not include a no-feedback condition. All participants were recruited to three-person groups, analogous to the collective socialization condition in Study 2. Study 3 did not include an individual socialization condition, in which they worked alone. However, unlike Study 2, where three naive participants composed the groups, in Study 3, participants were assigned to groups with two confederates who posed as other Mechanical Turk workers also new to the program (newcomer confederates). Participants completed a 5-minute tutorial and a 10-minute editing task. The tutorial and editing tasks were the same as in Study 2. The participants and the newcomer confederates were assigned complementary subtasks on the same Wikipedia article and worked on the tasks using the same custom-built interface.

The two newcomer confederates acted out scripts involving predefined editing behaviors mimicking editing behaviors seen among real participants from Study 2. These behaviors were selected because they involved a range of typical editing behaviors before feedback (e.g., minimal editing, bad-quality editing, good-quality editing) and a range of changes in editing behavior in response to feedback (e.g., minimal to minimal, bad to good, etc.). Confederates were randomly assigned to one of 20 editing scripts for each experimental session independent of the experimental condition to model variability in real participants' behaviors.

**Social Support.** Before the experimental session began, each participant was assigned to a social support condition. In the low-support condition, newcomer confederates introduced themselves but sent no other messages. In the high-support condition, newcomer confederates were randomly assigned to one of 10 high-support chat scripts. The scripts were written to provide either emotional support (e.g., *"Even with mistakes, we are all doing so well given how hard this HIT is"*) or information support (e.g., *"Based on the instructions, it sounds like each of us should skim the article and then write a few sentences to summarize it"*), or to bolster group identity (e.g., *"Let's pay attention to the feedback we got. We're still going to do better than the other groups"*). The scripts were written to provide the support in a variety of ways, either explicitly (e.g., *"One way to make sure you do not have grammatical mistakes is to proofread your writing"*) or more implicitly (e.g., *"I make mistakes all the time, so I'm going to proofread my work to make sure I'm not making any grammatical errors"*) [4]. Chat messages were modified from messages sent by real participants in Study 2. Both confederates sent approximately the same number of messages.

**Feedback.** As in Study 2, 5 minutes into the main editing task, EvalTurk, another confederate, evaluated the participant's work and gave feedback to the participant and to one of the confederates. Participants were randomly assigned to receive feedback with a specific critique of their work expressed either in a negative tone (e.g. ,*"You are not doing a good job . . ."*) or a positive one (e.g., *"You are doing a great job! . . ."*).

**Individual versus Group Target.** Participants were also randomly assigned to receive a message that targeted them individually or the group as a whole. Messages that targeted individuals used the people's names and were posted in the group chat as two separate messages (e.g., *"Henry, you are not doing a good job. . ."*). Messages that targeted a group addressed the group collectively and included both criticisms as a single message (e.g., *"You folks are not doing a good job . . ."*). In each condition, EvalTurk made one critique of the work done by the participant and of work done by one of the confederates.

### 4.2 Dependent Variables

**Manipulations Checks**

After finishing the editing task, participants completed a short questionnaire for us to check the manipulations.

*Perceived Feedback Tone*: Participants reported the degree to which feedback from EvalTurk was positive or negative in tone on one bipolar 7-point Likert scale.

*Perceived Feedback Target*: Participants reported the degree to which feedback from EvalTurk was aimed at the group as a whole (7-point Likert scale).

*Perceived Social Support*: Participants reported the degree to which they felt informational support (e.g., *"To what extent did LunaBlu and awikiturker provide you with useful information?"*), emotional support (e.g., *"How encouraging were LunaBlu and awikiturker of you?"*), or social support (e.g., *"I am starting to identify with LunaBlu and awikiturker."*) using five items adapted from social support scales used by [43] and [2] and measures of group identity [23]

**General Motivation.** As in Study 2, two independent coders rated the degree to which participants completed their tasks both immediately before feedback and at the end of the experimental sessions on 10-point scales (see Study 2); the average was used as a measure of general motivation (ICC = 0.93).

**Focal Effort.** As in Study 2, coders rated whether each participant's work adhered to Wikipedia's rules and guidelines using a set of specific rubrics (10-point scales, see Study 2). Each participant's work was judged immediately before feedback and at the end of the experimental session. There was high agreement between the two coders (ICC = 0.74–0.98); thus, the average of the two coders' scores was taken for each rule and the average across the rules was taken as a measure of rule following.

*4.2.1 Statistical Analyses.* Analyses used regression models. Analyses examining general motivation after feedback used general motivation before feedback as a covariate. Similarly, analyses predicting focal effort after feedback include focal effort before feedback as a covariate. Degrees of freedom in the models are based on 223 individuals, except in the cases when there are missing values.

*4.2.2 Manipulation Checks.* Manipulation checks showed that the manipulations of social support, message target, and feedback valence were all successful. High-support scripts were associated with greater perceived social support ($t(200) = 7.24$, $p < 0.001$). Group feedback messages were associated with a greater perception that feedback was aimed at the group as a whole ($t(200) = 8.30$, $p < 0.001$). Negative feedback messages were associated with greater perceived negativity of the messages ($t(200) = 8.55$, $p < 0.001$).

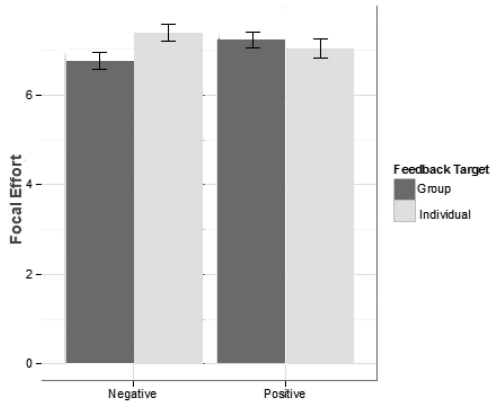



Fig. 5. Mean focal effort (SE) in response to feedback, controlling for focal effort before feedback. A comparison of response to critical feedback messages depending on the message tone (negative or positive) and target (individuals or a group).

### 4.3 Results

*4.3.1 General Motivation.* An analysis of the impact of social support, message target, and feedback tone on general motivation after feedback revealed no significant main effect of social support ($t(217) = -0.64$, $p = 0.52$), a marginally significant main effect of message target ($t(217) = 1.65$, $p < 0.10$), and no main effect of feedback tone ($t(217) = 0.511$, $p = 0.61$). In addition, there was no significant interaction between social support and feedback tone on general motivation ($t(217) = 0.29$, $p = 0.78$), and no significant interaction between message target and feedback tone on general motivation ($t(217) = 0.35$, $p = 0.73$). Participants who received an individual feedback message completed a greater proportion of the task after feedback ($M = 5.35$, $SD = 3.13$) than those who received a group feedback message ($M = 4.82$, $SD = 3.12$), although this difference was only marginally statistically significant.

*4.3.2 Focal Effort.* Figure 5 shows the impact of social support, message target, and feedback tone on focal effort after feedback. There was no significant main effect of social support ($t(173) = 1.27$, $p = 0.21$), message target ($t(173) = 1.32$, $p = 0.19$), or feedback tone ($t(173) = 0.72$, $p = 0.94$) on focal effort. There was also no significant interaction between social support and feedback valence on focal effort ($t(171) = 0.161$, $p = 0.87$). There was a significant interaction between message target and feedback tone on focal effort ($t(171) = -2.11$, $p = 0.04$). As Figure 5 shows, negative feedback messages targeting a group lead to less focal effort, while negative feedback messages targeting individuals lead to greater focal effort.

### 4.4 Combining Study 2 and 3

Table 3 summarizes meta-analyses of the results from Studies 2 and 3 that tests whether the effects of socialization and feedback were robust across the two studies. Across the two studies, neither the main effects of socialization type or feedback type (positive vs. negative) nor their interactions had a significant influence on general motivation. However, the interaction between socialization type and feedback type on focal effort across the two studies was obtained. In particular, participants worked harder to fix errors they made when they received negative feedback individually rather than as a group (i.e., in the individual rather than the group socialization condition in Study 2 and when feedback was addressed to a single individual rather than the group as a whole in Study 3;

Table 2. Meta-Analysis Combining Studies 2 and 3

| | General Motivation | | Focal Effort | |
|---|---|---|---|---|
| | Socialization Type | | Socialization Type | |
| | Group | Individual | Group | Individual |
| Positive feedback | $3.61^{a}$ | $4.06^{a}$ | $6.82^{a}$ | $6.87^{ab}$ |
| Negative feedback | $3.48^{a}$ | $3.55^{a}$ | $6.69^{b}$ | $7.09^{a}$ |

[1]Within outcome measure, cells with a common superscript are not significantly different from each other.

Table 3. Summary of Study Methods and Results

| Method | Study 1 | Study 2 | Study 3 |
|---|---|---|---|
| Approach | Correlational | Experimental | Experimental |
| Sample | Students | Mechanical Turk | Mechanical Turk |
| Sample size | 196 | 462 | 223 |
| Variables | | | |
| Feedback tone | Positive | Positive | Positive |
| | Negative | Negative | Negative |
| | Neutral | Neutral | |
| Socialization | Weak collective | Individual | |
| | Strong collective | Collective | Collective |
| Social support | | | Low • High |
| Feedback target | | | Individual • Group |
| Results | | | |
| Moderation by socialization | Support | Support | Support |
| Diffusion mechanism | Support | Partial support | Support |
| Social support mechanism | Partial support | Partial support | No support |

[1]Three studies were conducted to test whether collective socialization moderated the impact of feedback tone on task effort. For each study, we evaluated whether the results were consistent with two mechanisms that might have explained the findings.

$d = 0.60$, $z = 3.36$, $p < 0.001$). In addition, participants fixed fewer errors when receiving negative feedback as a group compared to receiving positive feedback as a group ($d = 0.39$, $z = 2.27$, $p = 0.02$). Phrased another way, negative feedback led to reduced focal effort when targeted at a group, but not when targeted at an individual.

### 4.5 Discussion

In Study 3, the cohort experience was experimentally manipulated to test the mechanisms through which collective socialization diminishes the impact of negative feedback on focal effort. Results indicated that differences in whom the feedback was addressed to (an individual vs. the group as a whole) rather than differences in social support moderated the effect of feedback on task effort. Meta-analysis of Study 2 and Study 3 demonstrated that when feedback was perceived to be individual, feedback with a negative tone led to greater focal effort, and the same feedback, when perceived to be aimed at a group, led to lower focal effort. These results are mostly consistent with an explanation that being in a group rather than alone diffuses the impact of messages rather than adds social support. However, some of the trends, such as the increase in focal effort when positive feedback is given to a group, cannot be explained by either message diffusion or social support.

Collective socialization and group feedback messages may induce other effects beyond message diffusion that should be explored in future research. Specifically, one consequence of collective socialization is that newcomers may pay less attention to the message with a negative tone and thus fix fewer mistakes.

## 5 GENERAL DISCUSSION

Prior empirical and theoretical work suggests that collective socialization, which is a successful technique to bring new members into offline organizations, could also benefit online communities like Wikipedia. This article reports on three studies designed to determine how introducing newcomers into an online community as a group interacts with the feedback they receive from community members to influence their motivations and performance. The studies provided consistent evidence that collective socialization altered the effect of negative feedback on focal effort, with a pattern of results that was consistent with the diffusion of social impact.

When newcomers to the community work alone, the feedback they receive from old-timers affects task effort in complex ways. Feedback with a negative tone had different effects on newcomers' overall motivation to contribute to the community and their willingness to improve their work when others identify errors in it. Study 2 showed that newcomers exerted *less general motivation* when they received negative feedback compared to receiving no feedback. Both Study 2 and 3 showed that newcomers who received messages individually exerted more focal effort (i.e., worked harder to report errors) in response to negative feedback compared to receiving no feedback or feedback with a positive tone. This pattern of results is consistent with prior work on the role of feedback in student learning [27] and work on the effect of feedback on task effort in Wikipedia [44]. The negative tone of the feedback seemed to have encouraged newcomers to fix specific mistakes in their work identified in the feedback, but may have depressed their overall motivation to contribute because it reduced their sense of self-efficacy.

We hypothesized that collective socialization might alter newcomers' response to feedback through two distinct mechanisms. Collective socialization would enhance socialization if newcomers received social support from their peers that helped them overcome the discouraging effects of negative feedback on their overall motivation or enhance the self-affirming effects of positive feedback (i.e., a social support mechanism). Alternatively, collective socialization would undermine socialization by causing newcomers to place less weight on any messages they receive from others; thus, they would be less likely to repair errors they made even if feedback pointed them out (i.e., diffusion of social impact). The results from two experiments are more consistent with the diffusion of the social impact mechanism than the social support one. Collective socialization moderated the effect of negative feedback on focal effort, but not on general motivation, which is more consistent with the diffusion mechanism. Newcomers undergoing individual socialization or receiving feedback individually improved the *quality of their edits more* in response to feedback with a negative tone, and newcomers undergoing collective socialization improved the *quality of their edits less* in response to such feedback. When newcomers were in a group, negative feedback had less of an impact on everyone in the group when the feedback was targeted at the group. These results suggest that one consequence of socializing newcomers in groups is that constructive criticism (which tends to be negative in tone in practice) may have less potency.

### 5.1 Design and Managerial Implications

Overall, collective socialization is likely to be advantageous for online communities. Evidence from traditional organizations suggests that overall, collective socialization leads to positive outcomes, such as better newcomer adjustment and greater organizational commitment [3]. In addition, the few socialization programs that made use of aspects of collective socialization in

online communities have been successful [13, 30, 32]. The advantage of collective socialization likely stems from the benefits it provides newcomers, such as opportunity to build relationships and learn from other newcomers. However, as we have demonstrated in this article, collective socialization can have costs as well, causing newcomers to ignore some feedback from more experienced members of the community.

Future efforts to implement collective socialization in online communities should be careful to mitigate the costs associated with socializing newcomers collectively. For example, infrastructure designers or community managers could minimize the impact of collective socialization on feedback from experienced members by avoiding situations in which newcomers as a group interact with experienced members. If newcomers have one-on-one interactions with more experienced members, they are more likely to take the communication seriously. For example, newcomers could be given their training and other socialization experiences as a group, isolated from the more experienced community, just as many universities provide orientation experiences for new students in the week before experienced students arrive on campus. Alternatively, collective socialization may only be appropriate for online communities or situations in which newcomers are not expected to interact heavily with existing members.

The findings of this article highlight the importance of considering the negative consequences of introducing a new socialization practice to an online community. Efforts to implement collective socialization should also be careful to avoid other known costs associated with learning in groups and costs associated with feeling like a part of a group, such as social loafing [26].

### 5.2 Limitations

Although the studies in this article used distinct research methods—a quantitative, observational study and two experiments—to study collective socialization in Wikipedia, none of them was identical to the way Wikipedia ordinarily operates. In Study 1, students were partially motivated by external rewards to do well in their classes, which is not typical for new volunteer editors in Wikipedia. In Studies 2 and 3, the socialization experience was short and participants were also motivated by external rewards. We purposefully sacrificed external validity to gain experimental control. While diffusion of social impact should operate regardless of the length of the socialization period and whether the motivation is external or internal, future work should examine whether this negative consequence of collective socialization generalizes to more typical socialization contexts in online communities.

Our studies represent initial efforts to investigate the potential costs and benefits of collective socialization in online communities. In these studies, we investigated only one (albeit important) consequence of socialization, namely, task effort. Other important consequences, such as long-term loyalty and the assumption of leadership later on, were not investigated. Moreover, we limited our studies to socialization in Wikipedia, an online community that has a number of unique characteristics.

## 6 CONCLUSION

This article shows across three studies that collective socialization changes how newcomers respond to feedback from existing members. The studies suggest that newcomers socialized individually are generally discouraged by feedback with a negative tone, but make more edits to fix their mistakes. Newcomers socialized collectively are equally discouraged by feedback with a negative tone, but are also less likely to make edits to fix their mistakes. Future efforts to implement collective socialization in online communities will need to be carefully designed to mitigate this negative consequence of socializing newcomers collectively.

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Received August 2017; revised February 2018; accepted February 2018