

AP Seminar Performance Task 2: Individual Research-Based Essay and Presentation

Directions and Stimulus Materials

January 2022

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Introduction

This performance task, highlighted in bold below, is one of three parts of the overall assessment for AP Seminar, and one of two performance tasks. The assessment for this course comprises the following:

Performance Task 1: Team Project and Presentation

- › Component 1: Individual Research Report
- › Component 2: Team Multimedia Presentation and Oral Defense

Performance Task 2: Individual Research-Based Essay and Presentation

- › **Component 1: Individual Written Argument**
- › **Component 2: Individual Multimedia Presentation**
- › **Component 3: Oral Defense**

End-of-Course Exam

- › Part A: Three Short-Answer Questions (based on one source)
- › Part B: One Essay Question (based on four sources)

The attached pages include the directions for Performance Task 2, information about the weighting of the task within the overall assessment, and detailed information as to the expected quantity and quality of work that you should submit.

Also included are the stimulus materials for the task. These materials are theme-based and broadly span the academic curriculum. After analyzing the materials, develop a research question that suits your individual interest based on a thematic connection between at least two of the stimulus materials. Your research question must be rich enough to allow you to engage in meaningful exploration and to write and present a substantive, defensible argument.

AP Seminar Performance Task 2: Individual Research-Based Essay and Presentation

Student Version

Weight: 35% of the AP Seminar score

Task Overview

This packet includes a set of stimulus materials for the AP Seminar Performance Task 2: Individual Research-Based Essay and Presentation.

You must identify a research question prompted by analysis of the provided stimulus materials, gather information from a range of additional sources, develop and refine an argument, write and revise your argument, and create a presentation that you will be expected to defend orally immediately following your presentation. Your teacher will give you a deadline for when you need to submit your written argument and presentation media. Your teacher will also give you a date on which you will give your presentation.

Task Components	Length	Date Due (fill in)
Individual Written Argument (IWA)	2,000 words	
Individual Multimedia Presentation (IMP)	6–8 minutes	
Oral Defense (OD)	Respond to 2 questions	

In all written work, you must:

- Acknowledge, attribute, and/or cite sources using in-text citations, endnotes or footnotes, and/or through bibliographic entry. You must avoid plagiarizing (see the attached AP Capstone Policy on Plagiarism and Falsification or Fabrication of Information).
- Adhere to established conventions of grammar, usage, style, and mechanics.

Task Directions

1. Individual Written Argument (2,000 words)

- › Read and analyze the provided stimulus materials to identify thematic connections among the sources and possible areas for inquiry.
- › Compose a research question of your own prompted by analysis of the stimulus materials. Your question must relate to a theme that connects at least two of the stimulus materials.
- › Gather information from a range of additional sources representing a variety of perspectives, including scholarly work.
- › Analyze, evaluate, and select evidence. Interpret the evidence to develop a well-reasoned argument that answers the research question and conveys your perspective.
- › Throughout your research, continually revisit and refine your original research question to ensure that the evidence you gather addresses your purpose and focus.
- › Identify and evaluate opposing or alternate views and consider their implications and/or limitations as you develop resolutions, conclusions, or solutions to your research question.

- › Compose a coherent, convincing and well-written argument in which you:
 - Explain the significance or importance of your research question by situating it within a larger context.
 - Establish a well-organized argument that links claims and evidence and leads to a specific and plausible conclusion, resolution or solution that addresses your research question.
 - Integrate at least one of the stimulus materials as part of your argument. (For example, as providing relevant context for the research question or as evidence to support relevant claims.)
 - Evaluate different perspectives by considering objections to them, and their limitations and/or implications.
 - Include relevant evidence from credible sources to support your claims. You should include evidence from scholarly work.
 - Cite all sources that you have used, including the stimulus materials, and include a list of works cited or a bibliography.
 - Use correct grammar and a style appropriate for an academic audience.

- › Abide by the 2,000-word limit (excluding footnoted citations, bibliography, and text in figures or tables). Word count does include titles, sub-headings, and in-text citations.
- › Remove references to your name, school, or teacher.
- › Upload your document to the AP Digital Portfolio as directed by your teacher.

2. Individual Multimedia Presentation (6–8 minutes)

- › Develop and prepare a multimedia presentation that will convey the argument from your final paper to an educated, non-expert audience.
- › Be selective about the information you choose for your presentation by focusing on key points you want your audience to understand.
- › Design your oral presentation with supporting visual media (e.g., presentation slides, a poster, a website), and consider audience, context, and purpose.
- › Prepare to engage your audience using appropriate strategies (e.g., eye contact, vocal variety, expressive gestures, movement).

- › Prepare notecards or an outline that you can quickly reference as you are speaking so that you can interact with supporting visuals and the audience.
- › Rehearse your presentation in order to refine your design and practice your delivery.
- › Check that you can do the presentation within the 6- to 8-minute time limit.
- › Deliver a 6- to 8-minute multimedia presentation in which you:
 - Contextualize and identify the importance of your research question.
 - Explain the connection between your research and your analysis of the stimulus materials.
 - Deliver a well-organized argument that connects claims and evidence.
 - Incorporate and synthesize relevant evidence from various perspectives to support your argument. Make sure you cite or attribute the evidence you use to support your claims (either orally or visually).
 - Offer a plausible resolution(s), conclusion(s), and/or solution(s) based on evidence and consider the implications of any suggested solutions.
 - Engage the audience with an effective and clearly organized presentation design that guides them through your argument.
 - Engage the audience with effective techniques of delivery and performance.

3. Individual Oral Defense

Defend your research process, use of evidence, and conclusion(s), solution(s), or recommendation(s) through oral responses to two questions asked by your teacher. Be prepared to describe and reflect on your process as well as defend and extend your written work and oral presentation. Make sure you include relevant and specific details about your work in your answers.

Sample Oral Defense Questions

Here are some examples of the types of questions your teacher might ask you during your oral defense. These are *examples only*; your teacher may ask you different questions, but there will still be one question that relates to each of the following two categories.

1. Reflection on Research Process

- › How did some preliminary information you gathered inform your research?
- › What evidence did you gather that you didn't include? Why did you choose not to include it?
- › How did your research question evolve as you moved through the research process?
- › Did your research go in a different direction than you originally expected?
- › What information did you need that you weren't able to find or locate?
- › How did you approach and synthesize the differing perspectives in order to reach a conclusion?

2. Extending argumentation through effective questioning and inquiry

- › What additional questions emerged from your research? Why are these questions important?
- › What are the implications of your findings to your community?
- › How is your conclusion in conversation with the body of literature or other research sources you examined?
- › How did you use the conclusions or questions of others to advance your own research?

AP Capstone™ Policy on Plagiarism and Falsification or Fabrication of Information

A student who fails to acknowledge the source or author of any and all information or evidence taken from the work of someone else through citation, attribution or reference in the body of the work, or through a bibliographic entry, will receive a score of 0 on that particular component of the AP Seminar and/or AP Research Performance Task. In AP Seminar, a team of students that fails to properly acknowledge sources or authors on the Team Multimedia Presentation will receive a group score of 0 for that component of the Team Project and Presentation.

A student who incorporates falsified or fabricated information (e.g. evidence, data, sources, and/or authors) will receive a score of 0 on that particular component of the AP Seminar and/or AP Research Performance Task. In AP Seminar, a team of students that incorporates falsified or fabricated information in the Team Multimedia Presentation will receive a group score of 0 for that component of the Team Project and Presentation.

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Research



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Author for correspondence:
Michele J. Gelfand
e-mail: mgelfand@umd.edu

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THE ROYAL SOCIETY
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The cultural evolutionary trade-off of
ritualistic synchrony

Michele J. Gelfand¹, Nava Caluori², Joshua Conrad Jackson³
and Morgan K. Taylor⁴

¹Department of Psychology, University of Maryland, 1147 Biology-Psychology Building, College Park, MD 20742, USA

²Department of Psychology, University of Virginia, Charlottesville, VA 22903, USA

³Department of Psychology and Neuroscience, University of North Carolina, Chapel Hill, NC 27599, USA

⁴Department of Psychology and Neuroscience, Duke University, Durham, NC 27708, USA

MJG, 0000-0002-9780-9230; NC, 0000-0003-1632-4512; JJC, 0000-0002-2947-9815

From Australia to the Arctic, human groups engage in synchronous behaviour during communal rituals. Because ritualistic synchrony is widespread, many argue that it is functional for human groups, encouraging large-scale cooperation and group cohesion. Here, we offer a more nuanced perspective on synchrony's function. We review research on synchrony's prosocial effects, but also discuss synchrony's antisocial effects such as encouraging group conflict, decreasing group creativity and increasing harmful obedience. We further argue that a tightness–looseness (TL) framework helps to explain this trade-off and generates new predictions for how ritualistic synchrony should evolve over time, where it should be most prevalent, and how it should affect group well-being. We close by arguing that synthesizing the literature on TL with the literature on synchrony has promise for understanding synchrony's role in a broader cultural evolutionary framework.

This article is part of the theme issue 'Ritual renaissance: new insights into the most human of behaviours'.

1. Introduction

Over 100 years ago, in the Yaghan peninsula at the southern-most tip of South America, the Yamana people practised an elaborate initiation ritual. Young men brought the spoils of their hunt into the community's great hut where they shared it with other members of the village. Once the men had passed inside, those gathered around the hut began singing in harmony, and did not stop until the young men had shared their food with each of the hut's occupants and left [1]. Across the world in northern Australia, the Tiwi people engaged in a very different initiation ritual involving young men who jumped over a fire-pit. Before the fire jumping began, the jumpers circled the fire and danced using the same sequence of downward hand movements. Afterwards, the group danced in single file, chanting a song together [2].

These initiation rites are starkly different in many ways, but they do share a feature that recurs in societies around the world: ritualistic synchrony. Even though they were separated by tens of thousands of kilometres and their ancestry diverged thousands of years ago, the Tiwi and Yamana people each practised the same forms of synchronous dancing and singing, and they are far from alone. Ritualistic synchrony—including synchronous dancing, singing, chanting, drumming or marching—has been documented in every region of the world [3], and today it appears everywhere from choirs, to military parades, to pre-game rituals in rugby games [4].

Ritualistic synchrony's universality suggests that it may hold some kind of adaptive benefit for societies, as is the case with other global practises such as irrigation, tool use, cooking and children's games [5–7]. In particular, some have claimed that ritualistic synchrony increases social cohesion and cooperation in communities of humans [8–11], and even potentially in non-human animals [12].

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The goal of our paper is to offer some nuance to this functionalist perspective. We review past research on the prosocial effects of ritualistic synchrony, and also summarize emerging research on the darker side of synchrony, including higher groupthink and destructive obedience and lower creativity. We then situate synchrony within broader literature on culture, suggesting that tightness–looseness (TL) theory provides a framework to explain this trade-off and to predict how ritualistic synchrony proliferates and evolves over time. Above all, by integrating synchrony with research on TL, we begin to understand synchrony’s role in a broader cultural evolutionary framework.

2. The religious and intellectual history of ritualistic synchrony

Ritualistic synchrony has been practised by humans for thousands of years. Australian rock art dating back to 20 000–38 000 BCE appears to depict human figures beating sticks to the ground and engaging in synchronous dancing [13], and many of the world’s oldest texts such as the Vedas, the Pyramid texts and the Book of the Dead depict synchronous marching, dancing or singing during ritual [14,15].

The intellectual study of synchrony, however, is far more recent. Religious ritual did not feature in many early theories of religion, which instead focused on the origins of religious beliefs rather than practises [16–19]. In the early twentieth century, Durkheim & Swain [20] reoriented the study of religion to focus on the *function* of religious practises, including ritualistic synchrony. Durkheim described this function by introducing the notion of ‘collective effervescence,’ the feeling of excitement and connection felt when a community participates in a collective or synchronous action. Religious rituals, Durkheim argued, fostered a sense of collective effervescence that was not only pleasant to experience, but was also adaptive for society as a whole. Durkheim theorized that participating in physiologically arousing and synchronizing religious rituals could be a bonding activity, leading people to feel more camaraderie with fellow participants and ultimately express more prosociality towards these participants. To the extent that religious rituals involved many members of a community, they could build valuable cross-cutting bonds within a society that increased cooperation and coordination.

This functionalist perspective has echoed throughout many more recent theories of religion [21,22]. Indeed, accounts of religion and morality [23,24], belief in supernatural punishment [25,26] and participation in doctrinal rituals [27] draw directly from Durkheim’s argument that religion is adaptive for societies. As we discuss next, studies of ritualistic synchrony have taken a similarly optimistic view of synchrony’s effects on human behaviour.

3. Empirical literature on synchrony: the good and the bad

(a) The good: effects of synchrony on cooperation and cohesion

The study of synchronous rituals has been mostly experimental, allowing researchers to methodically test when and why ritualistic synchrony may promote cooperation and cohesion. While

synchronous rituals observed in the field cannot be easily reproduced in the laboratory, experimental manipulations of synchrony often involve participants moving, dancing or vocalizing in synchrony with other participants in order to mimic the coordinated collective action of rituals. For example, participants in an experiment’s synchrony condition may follow an experimenter while marching in step [8,9], tap to the same tune on a metronome [10,28,29], dance together while moving their limbs in the same way [30–34] or sing or chant together to the same tune [8]. By contrast, participants in the control group will engage in asynchronous actions, or actions with no explicit synchrony instruction.

Many of these experimental studies find that synchrony increases prosociality and cooperation compared to control conditions. Some studies have used economic games to show that synchrony increases people’s tendency to make decisions that would maximize economic reward for the group, even at a potential cost to the individual [8–10,30,35,36]. For example, one study showed that chanting in sync increased people’s donations to a collective pot of money, even though it was in their interest to withhold donations [10]. Other research has shown that synchronized participants are more likely to put effort into collective tasks instead of free riding [9]. Studies have even found that synchrony can increase costly altruism. Subjects who went through a synchrony manipulation were more likely to help when a co-participant in the synchronous activity became a victim of a moral transgression, even when helping was costly [37]. A number of these effects have been replicated within dyads [8,28,38] and large groups of over 40 people [9,39]. They have even been reproduced in analyses of real rituals. A study that examined nine rituals from different community groups in New Zealand found that those involving synchrony were the most likely to elicit group-beneficial decisions in economic games [35].

There has also been research on how synchrony affects self-reported group cohesion. Studies have found that people in a group that experiences synchrony tend to feel more trusting towards and united with their group members [8,10], feel more similar, and report more liking towards group members [28–30,37,40]. Synchrony also increases perceptions of social bonding [33,34,41–43], prosociality towards the ingroup [33,35] and the ability to get along with group members, even in difficult environments [32,39].

The prosocial effects of synchrony can be seen from a young age. Infants as young as 14–15 months expect social affiliation between synchronized actors [44] and are more likely to help an experimenter reclaim a dropped object after moving synchronously with the experimenter [11,45,46]. Synchrony also promotes prosocial behaviour towards peers in older children. For example, children who participate in synchronous activities together perceive themselves to be more similar [47] and are more helpful and cooperative towards each other [48,49] than children who do not experience synchrony. Children who moved in sync with each other are also more successful at completing joint tasks [50].

Some research suggests that synchrony’s effects on group cohesion and trust could be potential mediators of the link between synchrony and cooperation [10,30,37]. Others have examined alternative mechanisms, such as enhanced attention and memory [51–53], mentalizing [54], viewing oneself and others as interdependent [55,56] and/or physiological changes that encourage feelings of group bondedness [30,38,57]. There is no consensus on which mechanism is most predictive of

cooperation, and it is likely that these different mediators can coexist and simultaneously influence cooperation.

Synchrony not only affects cohesion, it also affects group potency. Military drills frequently involve synchronous marching and drumming in order to increase in-group bonds and make groups seem more formidable. These strategies appear to be effective: engaging in synchrony leads groups to overestimate their own formidability and to see their foes as less threatening [58]. Synchrony also makes groups appear more entitative [59,60], cohesive [61,62] and physically formidable [62] to outsiders. For example, when people see individuals waving in sync [60] or walking or speaking in sync [61], they perceive these individuals as more bonded.

These studies paint a clear picture of synchrony's prosocial effects. Not all studies have replicated these effects [41], and there are some conditions where synchrony does not help performance, such as in complex tasks where group members need to fulfil diverse and specialized roles [63,64]. Nevertheless, meta-analyses suggest that synchrony can increase cohesion, cooperation and coordination between group members [65–67]. Some studies even suggest that synchrony can have broad effects on prosociality that stretch beyond one's own ingroup to strangers and outgroup members [31,34,56,68]. Taken together, this research generally supports the view that synchrony is functional for communities.

(b) The neglected dark side of synchrony: effects of synchrony on conformity and groupthink

The functionalist perspective on synchrony focuses exclusively on the benefits of synchronous rituals for groups. Improved cooperation and cohesion can indeed be adaptive for a group, lending the group an advantage in situations that would require coordination among its members. However, the major focus in the literature on synchrony's prosocial effects does not preclude the potential for synchrony to have a dark side.

In support of this notion, several studies have found that synchrony can promote conformity [40,69], aggression [70] and destructive obedience [71,72]. For example, studies on synchrony and conformity found that synchrony made people more likely to copy majority opinions when selecting products, rather than following their personal preferences [69]. Complementary studies on synchrony and destructive obedience found that synchrony—compared to a non-synchrony control activity—made people more likely to comply with a request to administer a sound blast to a stranger [71], and more likely to follow an experimenter's command to grind up live pillbugs [72]. In these studies, synchrony promoted obedience, but to aggressive and morally compromised commands.

(c) Does synchrony reduce creativity and productive dissent?

Building on this nascent work, we advance that synchrony presents a *trade-off* for groups that has been neglected thus far in the literature. While synchrony increases cohesion and cooperation, it may increase conformity, reduce creativity and foster groupthink. To explore this possibility, we conducted two studies which examined whether synchrony decreased groups' abilities to think creatively (study 1) and discouraged minority perspectives during a decision-making task (study 2).

Study 1 explored synchrony's adverse effect on group creativity, a relationship that had been raised in past literature

Table 1. Study 1 model statistics.

outcome	<i>b</i> (s.e.)	d.f.	<i>t</i>	<i>p</i>
creativity	−0.62 (0.29)	39	−2.11	0.04
complexity	−0.07 (0.19)	39	−0.34	0.73
word count	−9.04 (10.38)	39	−0.87	0.39

[73,74], but never conclusively demonstrated. In this study, 149 participants assigned to 42 groups of either three or four individuals walked for 7–8 min around campus either in step with the experimenter (synchrony manipulation) or at their own pace (control condition). We chose this manipulation because it has been used in previous research to show that synchrony can facilitate cooperation [8,9] and formidability [58], and we wanted to test whether the same manipulation that spurs prosocial behaviour could also have detrimental effects on creativity. After the manipulation, participants wrote a collaborative story as a group, which two coders assessed for creativity and complexity. Coders were blind to condition when rating these stories (see the electronic supplementary material). We used latent profile analysis [75] to examine the effect of condition on story ratings while accounting for the fact that multiple participants contributed to the stories within each group.

We found that synchrony had the expected negative effect on creativity. Groups that had marched synchronously around campus wrote less creative stories than groups that marched at their own pace (table 1 and figure 1). Neither the complexity of stories nor the length of stories (word count) varied based on condition, demonstrating the unique effect of synchrony on suppressing creativity. Stories by synchronous groups showed more typical characters and less innovative storylines than stories by asynchronous groups, suggesting that coordination can in fact present roadblocks to group success when it requires creative thought.¹

We next explored whether synchrony affects group dissent, testing whether synchrony would make participants less likely to speak out against their group even when it was in their group's interest. In this second study, 278 participants were assigned to 80 groups, each with three or four members. We manipulated synchrony through a chanting task adapted from past research [10] that required the group to either chant the same one-syllable words as each other (synchronous condition) or different one-syllable words from each other (asynchronous condition) for 6 min. We then measured group dissent using the ACME group decision-making task ([76]; see the electronic supplementary material). This task allowed us to measure the extent to which one member of each group who was randomly assigned to be given more complete information than other group members (termed the 'minority participant') spoke up to share information from their packet (termed 'information pooling'), argued in favour of their opinion about which company to choose, and repeated these arguments. We predicted that, if synchrony suppresses healthy group dissent, these minority participants would be less likely to share their information and argue in favour of their unique opinions in the synchrony condition than in the control condition.

A χ^2 -test revealed that information pooling was significantly less likely in the synchrony condition than the control condition (table 2 and figure 1). A separate χ^2 -test also showed that fewer minority participants made an initial

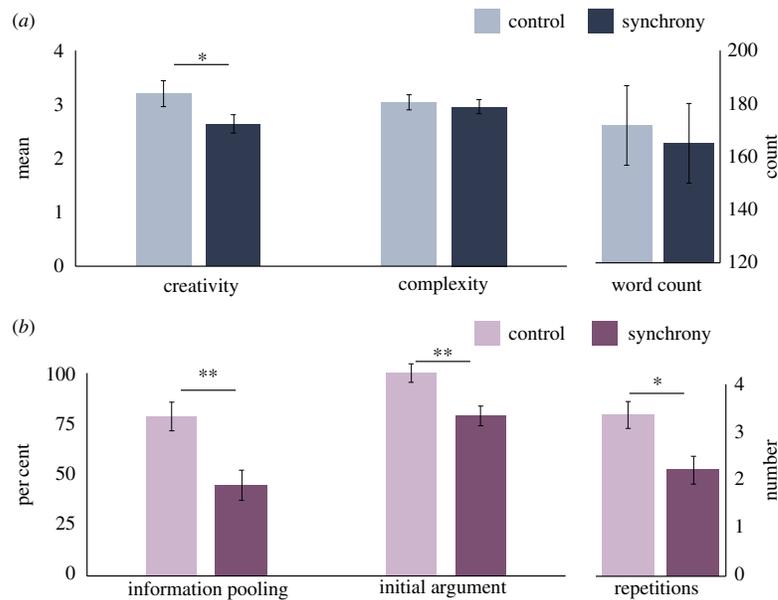


Figure 1. Synchrony's effects on creativity (a) and dissent (b). Error bars represent standard error. ** $p < 0.01$, * $p < 0.05$.

Table 2. Study 2 model statistics.

44.7	78.6	80	9.74	0.002
78.9	100	80	9.82	0.002
2.21 (1.80)	3.36 (1.82)	80	-1.15 (0.41)	0.006

argument for their unique opinion in the synchrony condition than in the control condition. Minority participants in the synchrony condition also repeated their arguments fewer times than in the control condition after making an initial argument in favour of their unique opinion. Not only did synchrony suppress the initial urge to argue for one's unique opinion, it also suppressed the desire to *continue* to argue for one's own opinion, thereby reducing healthy group dissent.

These studies illustrate a darker side of synchrony that stifles creativity and individual thought within highly bonded groups. These effects could be hypothetically beneficial when groups need to make quick consensus-based decisions, but destructive when diversity and healthy disagreement are important for groups to make effective decisions [77].

4. Situating ritualistic synchrony within broader cultural evolutionary processes

(a) What explains synchrony's cultural evolutionary trade-off?

The existing literature on ritualistic synchrony suggests a trade-off for human groups. On the one hand, synchrony leads people to feel closer with and more bonded to their group, and encourages group cooperation. On the other hand, synchrony

also seems to increase people's obedience to aggressive and counterproductive group norms, and may decrease group creativity. Figure 2 summarizes this proposed trade-off.

There has been surprisingly little synthesis of synchrony's positive and negative effects. Elegant meta-analyses and reviews have discussed the prosocial [65–67] effects of synchrony, but few have integrated these effects with more negative effects of synchrony. Open questions thus remain about why synchrony has both negative and positive effects, which social ecologies might benefit most versus least from synchronous ritual, and whether synchrony shares features with other secular aspects of culture.

Here, we address these questions from the perspective of TL theory, a broad theory of how ecology gives rise to cultural and psychological variation. TL theory situates synchrony within a broader suite of features that emerge in societies to foster cooperation, cohesion and coordination at the expense of individuality and creativity, and identifies new directions for future research.

(b) Tightness–looseness theory: a broad theory of cultural evolution

Around the same time that the literature on ritualistic synchrony was developing, another parallel literature on the strength of social norms, or TL, was evolving. TL theory suggests that all

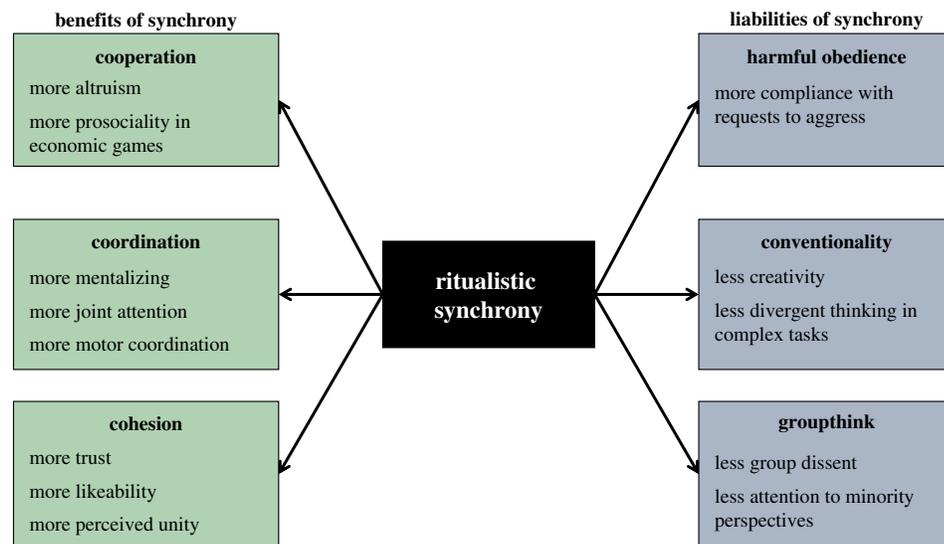


Figure 2. The proposed trade-off of ritualistic synchrony. (Online version in colour.)

groups have social norms, but some groups' norms are tighter—with strict rules and punishments for deviance—whereas others are looser—with weaker rules and more tolerance for deviance. In this section, we illustrate how TL theory can address open questions about ritualistic synchrony.

TL theory has roots in ancient history and philosophy. Herodotus, an ancient Greek who is generally considered the father of history, contrasted the Persian openness to foreign ideas and practises with Egyptian rigidity around cleanliness, religion and authority relations [78]. Centuries later, Pelto [79] documented differences in the strength of norms across traditional societies, observing that the Hutterites, Hanno and Lubara were 'tight' in that they had strong norms, were very formal, and had severe punishments for norm violations. By contrast, the Kung Bushmen, Cubeo and Skolt Lapps were 'loose,' with weaker norms and more tolerance for deviance. Pelto speculated that these differences might arise from ecological conditions which forced communities to coordinate and cooperate, an intuition that was tested almost 50 years later by Gelfand *et al.* [80].

Gelfand *et al.* [80] found that differences in cultural tightness across 33 current-day nations could be traced to historical levels of natural disasters, disease prevalence, resource scarcity, and invasions. Later research demonstrated that variation across the 50 United States followed a similar pattern: compared to looser states, tight states had higher death rates owing to natural disasters, greater food insecurity, and more disease prevalence [81]. Jackson *et al.* [82] showed that non-industrial societies can also be differentiated on TL, and that ecological threats predict greater tightness. They also found that tightness is correlated with social complexity across cultures, perhaps because social complexity engenders a heightened need for the large-scale cooperation and coordination tightness can provide. While these studies were correlational, evolutionary game theoretic models have also shown that threat affects the evolution of tightness [83], and experimental research has shown that reminders of different threats temporarily tighten groups [84,85]. Neuroscience research using hyperscanning has likewise shown that

coordination is higher under conditions of threat, at least in part owing to enhanced brain synchrony [86]. This line of research suggests that groups develop strong norms and punishments in order to coordinate to survive, whether owing to ecological and social threats or to increasing complexity and subsistence demands.

Research from TL theory is so relevant to the synchrony literature because tightness shares many of synchrony's trade-offs. Research on TL has also shown that as groups tighten to deal with coordination needs, they also experience a number of trade-offs associated with *order* versus *openness*. Tight groups have more monitoring, order, and self-control, which is critical for coordinating in the face of threat [81,87,88]. By contrast, loose groups that have fewer coordination needs are more open; they are much less ethnocentric and more tolerant of people from stigmatized groups [85], are more creative [81,89–91], and are more open to new ideas [92]. These symmetries between tightness and synchrony suggest that future research on the antecedents and consequences of synchrony may be able to fruitfully draw from existing research on TL.

(c) Implications for regional and historical variation and trade-offs associated with synchronous ritual

Research on cultural tightness raises several new predictions for how synchrony may be distributed across cultures and how it may change over time. For example, one intriguing possibility is that ritualistic synchrony may also be most prevalent following periods of ecological and social threat, societal complexity, and subsistence styles that require coordination. While there has been little research on the role of threat and need for coordination in the evolution of ritualistic synchrony, there are a few suggestive studies. For example, in Malinowski's [93] ethnographic work in the Trobriand Islands, ritualistic synchrony was most common among groups who fished at sea, which was considerably more threatening than fishing in lagoons. Another study [3] found that larger, more complex groups had the highest

levels of synchrony in their rituals. These studies suggest that ritualistic synchrony may have many of the same ecological correlates as cultural tightness.

TL theory helps us to understand why ritual may have positive and negative trade-offs in producing cooperation and cohesion at the expense of creativity and dissent, as the former two may be adaptive for dealing with threat and coordination needs while the latter two may not. TL research also raises intriguing possibilities for new research on the trade-offs of ritualistic synchrony. For example, does ritualistic synchrony relate to increased order, such as greater self-monitoring and higher self-control? Indeed, one study found that ritual improved children's ability to delay gratification [94]. On the other hand, like tightness, ritualistic synchrony may lead to lower openness, such as having more cultural inertia or resistance to change in groups. While our studies show how synchrony can decrease creativity and dissent in groups, future research could test whether synchrony—like tightness—increases ethnocentrism and the desire for autocratic leaders [85,90].

Other research on the TL trade-off is instructive for the ritualistic synchrony literature. One important question is how the intensity and frequency of rituals impacts group well-being. Recent work suggests that extreme levels of either tightness or looseness may be maladaptive. Harrington *et al.* [95] found a curvilinear effect such that nations with extreme tightness or looseness showed the lowest happiness relative to nations that are moderate on TL. Groups that are extremely loose may experience chaos and a lack of control and be unable to coordinate. By contrast, groups that are extremely tight may experience repression and a loss of any autonomy. This raises the question of whether there is an optimal level of ritualistic synchrony for groups.

Finally, future research could use the TL trade-off to explain the evolution of other religious beliefs and practises. For example, the belief in moralizing and punitive high gods shares many of synchrony's group-level effects. Moralizing religious belief predicts greater cooperation [96] and less cheating [97,98]. However, it also has a dark side, predicting aggression [99] and compliance to authority [23]. Recent studies even show that moralizing beliefs emerge during times of ecological threat and conflict [100,101], much like cultural tightness. This raises the intriguing possibility that ritualistic synchrony and moralizing high god belief serve

many of the same cultural evolutionary functions, and may emerge in the same kinds of societies.

5. Conclusion

Many millennia have passed since the first human ritual, and many decades have passed since scholars began examining the potential function of ritualistic synchrony. Past research has examined ritualistic synchrony with rose-coloured lenses, documenting the positive effects of synchrony on cooperation and coordination. Here, we suggest that ritualistic synchrony represents a trade-off with both positive and negative effects on group behaviour. Synchrony may not only increase parochial cooperation and coordination, but may also increase obedience, groupthink and impair group creativity. By integrating this research with cultural tightness theory, we also raise the possibility that these trade-offs are adaptive to particular ecological and historical contexts where there is a need for coordination. This analysis situates research on ritualistic synchrony within a vast literature on cultural evolution.

Ethics. The IRB at the University of Maryland, College Park approved both studies and consent was given from all subjects prior to any data collection.

Data accessibility. All data, analysis scripts, materials and coding manuals will be available at Open Science Framework (<https://osf.io/amhr2/>).

Authors' contributions. All authors designed the research; M.J.G., N.C. and J.C.J. designed the review; N.C. and M.K.T. ran the studies; N.C. analysed the data; M.J.G., N.C. and J.C.J. wrote the manuscript.

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Endnotes

¹We note that previous studies using this walking manipulation have used video recordings [9] and confederates [59] to confirm that the instruction to walk in synchrony does indeed produce synchronous movement. While we did not use one of these methods to confirm that movement, we believe that the success of these instructions in past studies lends credence to our manipulation's efficacy.

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The Holdout

Norman Rockwell



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Illustration by Barbara Rego

Ultra-Fast Fashion Is Eating The World

Even a pandemic can't stop people from buying clothes they don't need.

By Rachel Monroe

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LAST FEBRUARY, on a sunny afternoon in West Hollywood, two girls with precise eye makeup paused on Melrose Avenue and peered in the windows of a building whose interior was painted a bright, happy pink. Two pink, winged unicorns flanked racks of clothes: ribbed crop tops, snakeskin-print pants, white sleeveless bodysuits. One of the girls tugged on the door, then frowned. It was locked, which was weird. She tugged again. Inside, a broad-chested security guard regarded them impassively from behind a pink security desk.

Erin Cullison, the U.S. public-relations rep for PrettyLittleThing, a fast-fashion brand founded in 2012, watched the girls give up and walk away. She sighed. Although the West Hollywood showroom closely resembles a store, it is not, in fact, a store. It is not open to the public; the clothes on the racks don't have price tags. "People try to give us cash, but we're not even set up to take money," Cullison told me. Instead, the clientele is made up of the brand's influencer partners—thousands of them—who can make an appointment to visit the showroom every couple of weeks and "get gifted." They try on the latest styles and take advantage of various "photo moments": lounging on the plush pink couch, posing on the pink staircase, peeking out of the London phone booth repainted—yes—pink. They can snack on a pink-frosted cupcake, and (provided they're 21 or older) drink a glass of rosé at the store's pink bar, before heading home with several items of free clothing.

PrettyLittleThing is part of the Boohoo Group, a company that has become a dominant force in retail fashion over the past decade; along with several other aggressive and like-minded companies, it is quickly reshaping the industry. Boohoo stock is now publicly traded on the London Stock Exchange (LSE: BOO), but it started as a family business. As the legend goes, the family patriarch, Abdullah Kamani, immigrated to the U.K. from Kenya in the 1960s and

began selling handbags from a street stand. Eventually, he opened a textile factory that supplied the retailers that, starting in the 1990s, shook the fashion world with their cheap clothes and high merchandise turnover: H&M, Topshop, and the Irish fast-fashion juggernaut Primark.

Abdullah's business was successful enough that he bought himself a Rolls-Royce; his son Mahmud saw the potential for even greater profits. In 2006, Mahmud and his business partner, Carol Kane, began selling cheap clothes directly to consumers through Boohoo.com. Without the burden of retail stores, the company's costs were relatively low, except when it came to marketing. Young girls who went on YouTube (and, later, Instagram) were inundated with microtargeted ads for Boohoo bodysuits and minidresses. Boohoo's founders understood that social media could be leveraged to make new brands quickly seem ubiquitous to their target audience. "If you have that imagery out there you are perceived as a much larger business than you actually are," Kane told the trade publication *Drapers*.

Social media wasn't just a convenient place to advertise—it was also changing how we think about our clothes. Fashion brands have always played on our aspirations and insecurities, and on the seemingly innate desire to express ourselves through our clothing. Now those companies had access to their target shoppers not just when they stood below a billboard in SoHo or saw an ad on prime-time TV, but in more intimate spaces and at all hours of the day. Brands flooded our feeds with their wares, whether through their own channels or, more surreptitiously, by enlisting influencers to make an item seem irresistible, or at least unavoidable.

The more we began documenting our own lives for public consumption, meanwhile, the more we became aware of ourselves (and our clothing) being seen. Young people, and young women in particular, came to feel an unspoken obligation not to repeat an #outfitoftheday; according to a 2017 poll, 41 percent of women ages 18 to 25 felt pressure to wear a different outfit every time they went out.

Boohoo's founders understood that the company had to hustle to keep customers' attention—to "be fresh all the time," as Kane has put it. "A traditional retailer might buy three or four styles, but we'll buy 25," Kane told *The Guardian* in 2014. Not having to keep hundreds of stores stocked meant Boohoo could be flexible about inventory management. In 2018, H&M was sitting on \$4.3 billion worth of unsold items. Boohoo, by contrast, could order as few as 300 or 500 units of a given style—just enough to see whether it would catch on. Only about a quarter of the initial styles were reordered, according to Kane.

Over time, Boohoo accumulated rich data about online consumer behavior, and further tailored the shopping experience to its shoppers' tastes. "They know that first-time customers like to see *this* product category, or customers from this geographic area like *this* color palette," Matt Katz, a managing partner at the consulting firm SSA & Company, told me.

In normal times, Boohoo's agility and ingenuity offered crucial advantages over the competition. When the pandemic hit, those advantages became decisive.

IN 2015, when Tricia Panlaqui was 12, she pretended she was 13 so she could start an Instagram account, where she posted videos of herself doing the kinds of things that 12-year-olds do: cartwheeling, blowing kisses at the camera, putting on makeup. By her 15th birthday, she had moved on to what she felt was a more grown-up medium—YouTube—and focused her content on fashion. When she posted haul videos, a YouTube genre that's a combination of an unboxing and a bedroom fashion show, her viewership skyrocketed. Brands began reaching out, offering her sponsorship deals.

In Tricia's earliest videos, her outfits had mostly come from familiar mall stores: a white sweater from Express, distressed denim cutoffs from American Eagle. But once she hit 10,000 followers, her channel began to feature clothes from a different set of brands, ones that were typically

online-only and based in China. There was Shein, which sells \$10 bathing suits, and Zaful, where the prices were even lower. These companies had cropped up alongside lesser-known brands whose names tend to be two words awkwardly jammed together: DressLily, NastyDress, TwinkleDeals, TrendsGal, FairySeason. You wouldn't find their goods at the mall or see them advertised on TV, but if you were a young woman between the ages of 12 and 22 on social media, their targeted ads were inescapable.

When Tricia agreed to make a video featuring a company's products, she would typically receive a few hundred dollars' worth of free merchandise. The product quality could be iffy, but the clothes were cheap and abundant—which meant she could make more haul videos.

There was nothing particularly groundbreaking about Tricia's fashion sense, or her online persona. She liked iced vanilla lattes from Starbucks and leggings from Lululemon. But she had warm, wide eyes, and she spoke to the camera in a friendly, direct way. The more content she made about shopping, the more views—and ad revenue—she earned. The year Tricia turned 16, she made nearly \$40,000 from ad revenue, sponsorships, and commissions; to celebrate her birthday, she showed off her purchases from a shopping spree that had cost her \$3,000—all money she had made through her YouTube channel. Once Tricia surpassed 100,000 followers—a key metric for YouTube influencers—she began getting offers from better-known fast-fashion brands, including Boohoo, as well as other companies that were following its digital-first model, such as Princess Polly and Fashion Nova.

To Tricia, sometimes these companies all seemed to be copying one another. Someone would send her a loose tie-front tank top, and then a few days later four other brands would deliver their versions of the same style. She soon had more clothes than she knew what to do with. She gave them to friends and charities and thrift stores; she sold them on the social-shopping app Depop and ran giveaways for her followers. Her closet still overflowed with outfits, so she stuffed the excess into suitcases.

Working with these brands gave her some pause. Cheap clothes come with severe environmental consequences, and this troubled Tricia. (Her sponsors were self-conscious about this too—she says they asked her to hide the plastic packaging their clothes came in so it wouldn't be visible in the videos.) The industry's labor practices are also suspect, and commenters chided her for working with companies that had terrible track records. She temporarily cut ties with Shein after it was accused of using child labor in its factories. "But as sad as it is, every brand is doing some type of thing," she told me. "You'd have to cancel every single brand."

When the coronavirus arrived, Tricia was worried—with the world falling apart, would anyone care about shopping? Clothing retailers were among the hardest hit by the pandemic. In April, U.S. clothing sales plummeted by 79 percent from March; McKinsey predicted that global fashion-industry revenues would contract by 30 percent in 2020. Brands like Primark were saddled with what one industry observer called an "inventory crisis"—billions of dollars of merchandise intended for now-closed shops.

With less inventory and no brick-and-mortar stores, Boohoo and its competitors had no such drag on their operations. Quick to pivot, the brands sent Tricia sweatpants and hoodies and suggested themes for her videos: *Corona style! Lounging at home!* Even with the economy in free fall, demand for cheap, cute clothes persisted.

In times of crisis, consumers don't stop shopping—they just limit their purchases to affordable pleasures. Fast fashion had expanded its market share during the 2008 global financial crisis; now this new cohort of companies—known as ultra-fast fashion—was poised to do the same. While the rest of the retail sector struggled and legacy companies such as J.Crew and Neiman

Marcus filed for bankruptcy, many of Tricia’s sponsors and their rivals thrived. Asos’s sales rose rapidly from March to June. Boohoo had its best quarter ever. “We’ve seen an incredible sprint to digital,” Matt Katz told me. “What would’ve taken seven years has taken seven months—or seven weeks.”

Boohoo’s clothes may not feature prominently in *Vogue* photo shoots, and may, for now, appeal to customers who are mostly under the age of 30. But the rise of ultra-fast fashion marks a major shift in the retail world. Two decades ago, the first fast-fashion companies redrew the lines of a staid industry. Now their faster, cheaper successors are upending it. In the process, they are changing our relationship to shopping, to our clothes, and even to our planet.

BACK WHEN going to the mall was still a possibility, Tricia filmed another video. She held up a yellow plastic bag from a former fast-fashion powerhouse, Forever 21. “I normally don’t go there and, like, buy clothes there ... but our store was 70 percent off so I was like, ‘Okay,’” she said, sounding skeptical.

For those of us who grew up haunting the food courts of suburban malls, Forever 21 was once the epitome of fast fashion. When the company filed for bankruptcy in 2019, some interpreted it as the end of an era. If Millennials killed homeownership, golf, and department stores, perhaps Generation Z consumers, who claimed to prize sustainability and transparency, would be the death of fast fashion. In study after study, young shoppers said they preferred eco-friendly products from socially conscious companies; surely they wouldn’t support an industry notorious for its alarming environmental toll and history of exploiting workers. But that isn’t exactly what happened.

When Forever 21 (then known as Fashion 21) opened its first store—in the Highland Park neighborhood of Los Angeles, in 1984—the majority of the clothes bought in the U.S. were still produced domestically, and most fashion brands released new styles seasonally. “Your mom took you shopping at the beginning of the school year. You got two pairs of jeans, and maybe if you were really lucky, you could squeeze a dress out of her,” recalls Aja Barber, a writer and fashion-sustainability consultant.

But macro-level changes were transforming the industry. Synthetic fibers made it possible to manufacture cheaper (and in many cases less durable) clothes; new trade policies led to a globalized supply chain. Companies shifted production offshore, where environmental regulations were less stringent, or nonexistent, and garment workers sometimes earned 20 times less than in the U.S. Clothing got massively cheaper.

Forever 21, which initially catered to L.A.’s Korean community, set itself apart by offering a steady flow of new merchandise that capitalized on emerging styles. As it grew, its co-founder Jin Sook Chang reviewed as many as 400 new designs a day. Shopping for fast fashion was exciting—there was always something new, and the merchandise was so cheap that you could easily justify an impulse buy.

While high-end fashion companies were still releasing fall and spring collections, Forever 21’s rival Zara offered fresh styles twice a week. The company, which prefers to distance itself from the “fast fashion” label, says it was just trying to respond to customers’ desires. But stocking inexpensive, ever-changing options also stimulated our desire to buy more. If you found a look you liked at Zara, you had to snap it up right away, or else suffer from fashion FOMO. One study found that, whereas the average shopper visited any given store about four times a year, Zara shoppers stopped in once every three weeks.

Traditional brands initially scoffed at fast fashion, but they also feared losing market share; they, too, began shifting manufacturing overseas and releasing items more frequently. The 2008 financial crisis further cemented fast fashion's hold on the market. If you were going to a job interview while the economy collapsed around you, a \$25 Forever 21 blazer was hard to beat. Even after the economy recovered, people kept buying inexpensive clothes, and in ever-larger quantities. Worldwide, clothing production doubled from 2000 to 2015, while prices dropped: We were spending the same amount on clothes, but getting nearly twice as many items for it. At its peak, in 2015, Forever 21 made \$4.4 billion in global sales.

It's hard to overstate how much and how quickly fast fashion altered our relationship with clothing, conditioning us to believe that our clothes should be cheap, abundant, and new. Trends used to take a year to pass from the runway to the mainstream; now the fashion cycle has become so compressed that it takes just a few weeks, or even less. Americans buy a piece of clothing every five days, on average, and we pay so little for our garments that we've come to think of them as disposable. According to a McKinsey study, for every five new garments produced each year, three garments are disposed of.

Like many retail brands, Forever 21 was hit hard by the shift to online shopping. While other companies invested in their e-commerce platforms, Forever 21 doubled down on brick-and-mortar retail, signing leases in malls that were steadily losing foot traffic. When shoppers did visit stores, they found a retailer that was out of touch with the times. In 2015, two-thirds of teenage girls in the U.S. identified as "special size"—plus, petite, tall—but mall shops were slow to respond to this reality. Not all Forever 21 stores had a plus-size section; when the fashion blogger known as Fat Girl Flow visited one that did, in 2016, she found it "tiny [and] dimly lit with yellow lights, no mirrors, and zero accessories on the shelves."

By contrast, many of the ultra-fast-fashion brands that were arriving on the scene featured thick-thighed models in minidresses and lingerie. PrettyLittleThing has made a point of embracing body positivity—prominently featuring models with stretch marks, models with vitiligo, models with colostomy bags. And while the ultra-fast-fashion companies were partnering with girls like Tricia, as late as 2017 Forever 21 was still spending nearly half its marketing budget on radio ads.

The companies that once shocked the industry with their speed no longer seemed quite so fast. Two decades ago, Zara was revolutionary for offering hundreds of new items a week; nowadays, Asos adds as many as 7,000 new styles to its website over the same period. Fast-fashion companies used to brag about getting a new style up for sale in as little as two weeks. Boohoo can do it in a matter of days.

B OOHOO'S PROFITS DOUBLED in 2017. They doubled again in 2018. Meanwhile, the third generation of the Kamani family was making inroads in the fashion business. Umar, Mahmud's son, had founded PrettyLittleThing when he was 24. Now he was turning it into Boohoo's splashier little sister. The clothes were bolder (more body-con dresses, more crop tops, more metallics) and the branding was emphatically pinker.

PrettyLittleThing's branding reflects Umar's flashy persona. On Instagram, where he has 1 million followers, he's posted photos of himself posing with Drake, sunbathing in the Maldives, and Jet Skiing behind a yacht. He hosted J.Lo's 50th birthday party at Gloria Estefan's house, and claims to FaceTime with will.i.am nearly every day.

The first generation of fast-fashion brands still tends to take its cues from traditional gatekeepers. Ultra-fast-fashion companies more often look to celebrity culture. Sometimes, this takes the form of partnerships: PLT has produced lines with Kourtney Kardashian; Fashion Nova has linked

up with Cardi B. Other times, though, ultra-fast-fashion companies simply copy the looks of these and other stars. In 2019, Kim Kardashian posted a picture of herself in her closet wearing a tight gold dress with a midriff cutout. “Fast fashion brands, can you please wait until I wear this in real life before you knock it off?” she pleaded in the caption. Within hours, one company, Missguided, posted an extremely similar outfit on its Instagram page, promising to have the dress for sale within a few days. (Kardashian sued the company for copying her looks and was granted \$2.7 million in damages.)

PLT’s aesthetic may be as celebrity-obsessed as its founder, but the real force behind its social-media marketing are the thousands of *Bachelor* contestants, TikTokers, Instagram models, and YouTubers like Tricia who have been enlisted to post about the brand. Studies show that the more we use social media, the more time and money we spend shopping online. Following influencers correlates with even more shopping. In 2017, data from the social-media-analytics company Hitwise showed that PLT was the most popular emerging fast-fashion brand, with a 663 percent rise in traffic to its online store since 2014. From 2016 to 2019, the company’s annual sales went from about \$23 million to nearly \$510 million.

Still, in training consumers to look for the shiniest, newest style, companies like PrettyLittleThing might be establishing the conditions for their own obsolescence. Today’s young shoppers have little brand loyalty. Consider Nasty Gal, which was once heralded as the “fastest growing retailer” of 2012 by *Inc.* magazine. Within a few years it filed for bankruptcy—and was bought by the Boohoo Group, which cut prices and closed the brand’s remaining brick-and-mortar stores. “Pre-COVID, not only were consumers buying and wearing things for a shorter amount of time, but they were also constantly looking for newness, which had been accelerating the cycle by which individual brands come in and out of favor,” says Adheer Bahulkar, a partner and retail specialist at the global consulting firm Kearney. “The sheer amount of newness in the market makes it difficult for any given brand to keep up.”

A BOUT TWO MILES away from PrettyLittleThing’s showroom, a line formed outside another West Hollywood storefront. The occasion was the annual sample sale at Dolls Kill, a mass-market brand dedicated to selling nonconformism. On the surface, Dolls Kill looks like the polar opposite of PrettyLittleThing; whereas PLT is all about converging on the trends of the moment, Dolls Kill shoppers identify as misfits and dress accordingly. But the companies are banking on similar strategies to keep young shoppers coming back: aggressive online engagement, an abundance of styles, and unrelenting newness.

Dolls Kill is where you go when you want to buy neon platform combat boots or a pair of shimmery, iridescent bell-bottoms. There’s a dash of mall-goth in its aesthetic, alongside some anime-inspired hyperfemininity and raver psychedelia. Despite—or perhaps because of—its outsider cachet, Dolls Kill has attracted attention from powerful venture-capital investors. Amy Sun, then a partner at Sequoia Capital, a major Dolls Kill investor, surveyed the hundreds of shoppers clamoring to get inside the sample sale: their Billie Eilish neon-streaked hair, their skeleton-print hoodies. From inside the store, club music pulsed hypnotically. “You can feel the brand magic,” Sun said. “Which is super hard to build.”

Dolls Kill’s founders, Shaudi Lynn and Bobby Farahi, met at a rave. She was a DJ; he had recently sold his media company and was “partying,” he later told *Inc.* Farahi was impressed with Lynn’s fashion sense, and business acumen. She would buy something cute on eBay for \$5, then turn around and sell it for \$100. “She looked for items that were hard to find, that were viral in nature—items that made people say, ‘Hey, where did you get that?’” Farahi said. Lynn and Farahi began dating, and launched an online boutique in 2012. Lynn chose the name Dolls Kill because she liked the way the two words sounded together—one soft, one hard.

At first, they imagined that Dolls Kill would be a niche brand, popular mostly with club kids. But then something started to shift—the Burning Man aesthetic was creeping into the workaday world; festival culture went mainstream. Word began to circulate: If you wanted your #ootd to be colorful and weird and stand out on social media, Dolls Kill was a good place to shop.

In the age of the fickle consumer, one strategy is to make customers feel like part of a community. Dolls Kill proved adept at this. “All the models on our sites are customers who submitted photos of themselves. They are just ecstatic, and they become evangelists,” Farahi has said. In 2018, the company opened its flagship Los Angeles store. It was designed to look like an industrial nightclub, with raw-concrete floors, exposed-brick walls, and an Italian sound system the company referred to in a press release as “insane.” The stores are less a revenue generator than a way to reinforce that feeling of community, Farahi told me: “Are they here to shop, or are they here to meet other people, hang out, be part of a movement?”

In 2014, Dolls Kill attracted \$5 million in an initial round of funding led by Maveron, the venture-capital firm co-founded by former Starbucks CEO Howard Schultz; five years later, the company raised another \$40 million in a second round. That round was headed by Sequoia, which thinks Dolls Kill has the potential to be a “generation defining” brand, Sun told me. Rebellion against the mass market had mass-market appeal, she believed. “The age of conformity is over,” she said. “Anytime I wear anything from them, people are like, where did you get that?”

Despite its aggressive attitude, Dolls Kill has its own network of influencers and brand ambassadors, just as its more conformist peers do. The first day of the sample sale was invitation-only; the room was full of Dolls Kill superfans, but also influencers like Jake Fleming, a lithe, blond fashion YouTuber in his early 20s. He told me that he liked Dolls Kill just fine—its clothes photographed well and he always wore them to Coachella—but attending this event was basically work for him. “We went to a brand party before this, and we have two more brand parties tomorrow,” he said, a hint of fatigue evident in his voice.

THE DOLLS KILL SAMPLE SALE was one of the last times I was in a crowded room. A month later, when most of the country shut down, I spent many hours scrolling through online stores—not so much buying but browsing. PrettyLittleThing had hundreds of leggings listed on its website, and I looked at all of them: white faux leather, flame-print mesh, seamless gray ombré. Dolls Kill was featuring velour tracksuits in candy-colored tones. The browsing suited my mood of low-key dissatisfaction, the itchy, procrastination-prone state that one of my friends calls “snacky.” I had a closet full of clothes and nowhere to wear them, but I added items to my basket anyway—improbable outfits for imaginary parties in a world that no longer existed.

The ultra-fast-fashion brands have designed a shopping experience that makes the consumer feel as if the clothes magically appear out of nowhere, with easy purchasing and near-immediate delivery. The frictionless transactions contribute to the sense that the products themselves are ephemeral—easy come, easy go.

Of course, the clothes don’t come from nowhere. Ultra-fast fashion brings with it steep environmental costs. “You may get a \$1 bikini,” Dana Thomas, the author of the 2019 book *Fashionopolis: The Price of Fast Fashion and the Future of Clothes*, told me. “But it’s costing society a lot. We’re paying for all of this in different ways.”

Producing clothing at this scale and speed requires expending enormous amounts of natural resources. Cotton is a thirsty crop; according to Tatiana Schlossberg, the author of *Inconspicuous Consumption: The Environmental Impact You Don’t Know You Have* (2019), producing a pound of it can require 100 times more water than producing a pound of tomatoes. But synthetic textiles

have their own problems, environmentally speaking. They're a major source of the microplastics that clog our waterways and make their way into our seafood. McKinsey has estimated that the fashion industry is responsible for 4 percent of the world's greenhouse-gas emissions; the United Nations says it accounts for 20 percent of global wastewater.

Meanwhile, the volume of clothes Americans throw away has doubled over the past 20 years. We each generate about 75 pounds of textile waste a year, an increase of more than 750 percent since 1960. Some thrift shops, glutted with flimsy, synthetic wares, have stopped accepting fast-fashion donations. Discarded clothes get shipped overseas. Last year, a mountain of cast-off clothing outside the Ghanaian capital city of Accra generated so much methane that it exploded; months later, it was still smoldering.

Fast-fashion companies tell their customers that it's possible to buy their products and still have a clean conscience. H&M has ramped up its use of organic cotton and sustainably sourced materials; Boohoo sells 40 or so items partially made from recycled textiles. Aja Barber, the fashion-sustainability consultant, told me she sees most of these efforts as little more than greenwashing: "It's like, 'Oh look, these five items that we made are sustainable, but the rest of the 2,000 items on our website are not,'" she said.

Then there is the human toll. The rise of fast fashion was made possible by the offshoring of manufacturing to countries where labor costs are kept low through the systematic exploitation of workers. When Rana Plaza, an eight-story factory in Bangladesh, collapsed in April 2013, killing more than 1,110 and wounding thousands more, the disaster brought international attention to the alarming labor conditions in overseas garment factories. Some ultra-fast-fashion companies have emphasized on- and near-shoring, relocating manufacturing domestically or to nearby countries, which allows them to speed up production and distribution. About half of Boohoo's merchandise is produced in the U.K.; in 2018, 80 percent of Fashion Nova's clothes were reportedly made in the United States.

But domestic manufacturing doesn't necessarily mean ethical manufacturing. Several of Fashion Nova's Los Angeles-based suppliers were investigated by the Department of Labor for paying wages as low as \$2.77 an hour. (Fashion Nova now mandates that all contractors and subcontractors pay minimum wage.) Reporters in the U.K. have uncovered disturbing practices at Boohoo's suppliers, including impossible quotas, unsafe working conditions, and garment workers paid well below the minimum wage. Fast-fashion companies typically outsource production to a long chain of contractors and subcontractors, making accountability a challenge. Eventually, Tricia started shooting Shein haul videos again, after the company posted a self-exonerating explication of its labor practices on its website. But fast-fashion influencers, like fast-fashion consumers, have little insight into supply chains that are kept intentionally opaque.

Last spring, as the coronavirus tore across Europe, Boohoo and other fast-fashion brands kept distribution centers open. Workers told labor advocates that social distancing was impossible, and that they were expected to bring their own hand sanitizer. By late June, Leicester, the U.K.'s textile-manufacturing hub, had an infection rate three times higher than that of any other city in the country. (Boohoo has since pledged to make its supply chains public and require third-party suppliers to adhere to ethical guidelines.)

Regulators have started to take notice of fast fashion's less savory practices, though their efforts have failed to keep pace with the industry, or have just plain failed. In the U.K., a special parliamentary committee that spent a year studying the environmental and labor impact of fast fashion made a number of recommendations, including levying a one-penny garment tax that would be used to improve textile recycling; the government rejected them all. Last fall, the California state assembly failed to pass a bill that would have held fashion companies accountable for wage theft by third-party contractors.

Also last fall, an independent audit commissioned by Boohoo found that the company had been quick to capitalize on COVID-19 as an opportunity to boost sales, but had paid little attention to low wages and unsafe working conditions in its suppliers' factories both during the pandemic and prior to it. "Growth and profit were prioritized to the extent that the company lost sight of other issues," the report found. But it also concluded that Boohoo hadn't broken any laws. The day the report was released, the company's stock rose 21 percent.

For the moment, at least, there seems to be insufficient political will to rein in the industry's excesses. But that doesn't necessarily mean ultra-fast fashion is here to stay. With so many cheap products saturating our feeds, perhaps buying yet another disposable bodysuit or bandeau won't feel as stimulating as it used to.

The last time I spoke with Tricia, she had enrolled in a premed program. She told me that she'd been making a new kind of video. "I'm styling the clothes I already have in my closet—so I'm keeping up with fashion, but using the clothes I already have," she said. Haul videos were still popular, but she thought I should be paying attention to another trend: "Secondhand clothing and thrifting is so hot right now."

Rachel Monroe is a contributing writer at The Atlantic and the author of Savage Appetites: Four True Stories of Women, Crime, and Obsession.

Excerpts from *Democracy in America, 1835-1840*

Alexis De Tocqueville

Amongst the novel objects that attracted my attention during my stay in the United States, nothing struck me more forcibly than the general equality of conditions. I readily discovered the prodigious influence which this primary fact exercises on the whole course of society, by giving a certain direction to public opinion, and a certain tenor to the laws; by imparting new maxims to the governing powers, and peculiar habits to the governed. I speedily perceived that the influence of this fact extends far beyond the political character and the laws of the country, and that it has no less empire over civil society than over the Government; it creates opinions, engenders sentiments, suggests the ordinary practices of life, and modifies whatever it does not produce. The more I advanced in the study of American society, the more I perceived that the equality of conditions is the fundamental fact from which all others seem to be derived, and the central point at which all my observations constantly terminated.

I then turned my thoughts to our own hemisphere, where I imagined that I discerned something analogous to the spectacle which the New World presented to me. I observed that the equality of conditions is daily progressing towards those extreme limits which it seems to have reached in the United States, and that the democracy which governs the American communities appears to be rapidly rising into power in Europe. I hence conceived the idea of the book which is now before the reader.

It is not, then, merely to satisfy a legitimate curiosity that I have examined America; my wish has been to find instruction by which we may ourselves profit. Whoever should imagine that I have intended to write a panegyric will perceive that such was not my design; nor has it been my object to advocate any form of government in particular, for I am of opinion that absolute excellence is rarely to be found in any legislation; I have not even affected to discuss whether the social revolution, which I believe to be irresistible, is advantageous or prejudicial to mankind; I have acknowledged this revolution as a fact already accomplished or on the eve of its accomplishment; and I have selected the nation, from amongst those which have undergone it, in which its development has been the most peaceful and the most complete, in order to discern its natural consequences, and, if it be possible, to distinguish the means by which it may be rendered profitable. I confess that in America I saw more than America; I sought the image of democracy itself, with its inclinations, its character, its prejudices, and its passions, in order to learn what we have to fear or to hope from its progress. ...

I have shown how it is that in ages of equality every man seeks for his opinions within himself: I am now about to show how it is that, in the same ages, all his feelings are turned towards himself alone. Individualism is a novel expression, to which a novel idea has given birth. Our fathers were only acquainted with egotism. Egotism is a passionate and exaggerated love of self, which leads a man to connect everything with his own person, and to prefer himself to everything in the world. Individualism is a mature and calm feeling, which disposes each member of the community to sever himself from the mass of his fellow-creatures; and to draw apart with his family and his friends; so that, after he has thus formed a little circle of his own, he willingly leaves society at large to itself. ...

Amongst aristocratic nations, as families remain for centuries in the same condition, often on the same spot, all generations become as it were contemporaneous. A man almost always knows his forefathers, and respects them: he thinks he already sees his remote descendants, and he loves them. He willingly imposes duties on himself towards the former and the latter; and he will frequently sacrifice his personal gratifications to those who went before and to those who will come after him. Aristocratic institutions have, moreover, the effect of closely binding every man to several of his fellow-citizens. ...

Amongst democratic nations new families are constantly springing up, others are constantly falling away, and all that remain change their condition; the woof of time is every instant broken, and the track of generations effaced. Those who went before are soon forgotten; of those who will come after no one has any idea: the interest of man is confined to those in close propinquity to himself. As each class approximates to other classes, and intermingles with them, its members become indifferent and as strangers to one another. Aristocracy had made a chain of all the members of the community, from the peasant to the king: democracy breaks that chain, and severs every link of it. As social conditions become more equal, the number of persons increases who, although they are neither rich enough nor powerful enough to exercise any great influence over their fellow-creatures, have nevertheless acquired or retained sufficient education and fortune to satisfy their own wants. They owe nothing to any man, they expect nothing from any man; they acquire the habit of always considering themselves as standing alone, and they are apt to imagine that their whole destiny is in their own hands. Thus not only does democracy make every man forget his ancestors, but it hides his descendants, and separates his contemporaries from him; it throws him back forever upon himself alone, and threatens in the end to confine him entirely within the solitude of his own heart. ...

... The Americans have combated by free institutions the tendency of equality to keep men asunder, and they have subdued it...It is difficult to draw a man out of his own circle to interest him in the destiny of the State, because he does not clearly understand what influence the destiny of the State can have upon his own lot. But if it be proposed to make a road cross the end of his estate, he will see at a glance that there is a connection between this small public affair and his greatest private affairs; and he will discover, without its being shown to him, the close tie which unites private to general interest. ... Local freedom, then, which leads a great number of citizens to value the affection of their neighbors and of their kindred, perpetually brings men together, and forces them to help one another, in spite of the propensities which sever them. ...

It would be unjust to suppose that the patriotism and the zeal which every American displays for the welfare of his fellow-citizens are wholly insincere. Although private interest directs the greater part of human actions in the United States as well as elsewhere, it does not regulate them all. I must say that I have often seen Americans make great and real sacrifices to the public welfare; and I have remarked a hundred instances in which they hardly ever failed to lend faithful support to each other. The free institutions which the inhabitants of the United States possess, and the political rights of which they make so much use, remind every citizen, and in a thousand ways, that he lives in society. They every instant impress upon his mind the notion that it is the duty, as well as the interest of men, to make themselves useful to their fellow-creatures; and as he sees no particular ground of animosity to them, since he is never either their master or their slave, his heart readily leans to the side of kindness. Men attend to the interests of the public, first by necessity, afterwards by choice: what was intentional becomes an instinct; and by dint of working for the good of one's fellow citizens, the habit and the taste for serving them is at length acquired. ...

... If each citizen did not learn, in proportion as he individually becomes more feeble, and consequently more incapable of preserving his freedom single-handed, to combine with his fellow-citizens for the purpose of defending it, it is clear that tyranny would unavoidably increase together with equality.

... The political associations which exist in the United States are only a single feature in the midst of the immense assemblage of associations in that country. Americans of all ages, all conditions, and all dispositions, constantly form associations. They have not only commercial and manufacturing companies, in which all take part, but associations of a thousand other kinds—religious, moral, serious, futile, extensive, or restricted, enormous or diminutive. The Americans make associations to give entertainments, to found establishments for education, to build inns, to construct churches, to diffuse books, to send missionaries to the antipodes; and in this manner they found hospitals, prisons, and schools. If it be proposed to advance some truth, or to foster some feeling by the encouragement of a great example, they form a society. ...

Thus the most democratic country on the face of the earth is that in which men have in our time carried to the highest perfection the art of pursuing in common the object of their common desires, and have applied this new science to the greatest number of purposes. ...

Amongst democratic nations, ...all the citizens are independent and feeble; they can do hardly anything by themselves, and none of them can oblige his fellow-men to lend him their assistance. They all, therefore, fall into a state of incapacity, if they do not learn voluntarily to help each other. If men living in democratic countries had no right and no inclination to associate for political purposes, their independence would be in great jeopardy; but they might long preserve their wealth and their cultivation: whereas if they never acquired the habit of forming associations in ordinary life, civilization itself would be endangered. A people amongst which individuals should lose the power of achieving great things single-handed, without acquiring the means of producing them by united exertions, would soon relapse into barbarism. ...

... A government might perform the part of some of the largest American companies; and several States, members of the Union, have already attempted it; but what political power could ever carry on the vast multitude of lesser undertakings which the American citizens perform every day, with the assistance of the principle of association? It is easy to foresee that the time is drawing near when man will be less and less able to produce, of himself alone, the commonest necessities of life. The task of the governing power will therefore perpetually increase, and its very efforts will extend it every day. The more it stands in the place of associations, the more will individuals, losing the notion of combining together, require its assistance: these are causes and effects which unceasingly engender each other. ... The morals and the intelligence of a democratic people would be as much endangered as its business and manufactures, if the government ever wholly usurped the place of private companies.

Feelings and opinions are recruited, the heart is enlarged, and the human mind is developed by no other means than by the reciprocal influence of men upon each other. I have shown that these influences are almost null in democratic countries; they must therefore be artificially created, and this can only be accomplished by associations. ...

No sooner does a government attempt to go beyond its political sphere and to enter upon this new track, than it exercises, even unintentionally, an insupportable tyranny; for a government can only dictate strict rules, the opinions which it favors are rigidly enforced, and it is never easy to discriminate between its advice and its commands. Worse still will be the case if the government really believes itself interested in preventing all circulation of ideas; it will then stand motionless, and oppressed by the heaviness of voluntary torpor. Governments therefore should not be the only active powers: associations ought, in democratic nations, to stand in lieu of those powerful private individuals whom the equality of conditions has swept away. ...

Nothing, in my opinion, is more deserving of our attention than the intellectual and moral associations of America. ... If men are to remain civilized, or to become so, the art of associating together must grow and improve in the same ratio in which the equality of conditions is increased.

The Song of Freedom at the Estonian Song & Dance Festival

Nikon Europe, July 18, 2014

Laulupidu is one of the largest choral events in the world. The Estonian festival, which now occurs every five years, attracts an audience of 100,000 spectators who travel from far and wide to take in the sounds of the 25,000-person joint chorus. The first of these celebrations was held in 1869.

The tradition of Laulupidu is rooted in the Estonian National Awakening. The choral songs, which are all performed in Estonian have been key in preserving Estonian language and culture. The festivals are considered as key factors in establishing Estonian independence twice—once in 1918 and again in 1991.

[The Song of Freedom at the Estonian Song & Dance Festival](#)

Excerpt from *The Namesake*

by Jhumpa Lahiri

...

Gogol's fourteenth birthday. Like most events in his life, it is another excuse for his parents to throw a party for their Bengali friends. His own friends from school were invited the previous day, for pizzas that his father picked up on his way home from work, a basketball game watched together on television, some Ping-Pong in the den. His mother cooks for days beforehand, cramming the refrigerator with stacks of foil-covered trays. She makes sure to prepare his favorite things: lamb curry with lots of potatoes, luchis, thick *channa dal* with swollen brown raisins, pineapple chutney, sandeshes molded out of saffron-tinted ricotta cheese. All this is less stressful to her than the task of feeding a handful of American children, half of whom always claim they are allergic to milk, all of whom refuse to eat the crusts of their bread.

Close to forty guests come, from three different states. Women are dressed in saris far more dazzling than the pants and polo shirts their husbands wear. A group of men sit in a circle on the floor and immediately start a game of poker. These are all his mashis and meshos, his honorary aunts and uncles. Presents are opened when the guests are gone. Gogol receives several dictionaries, several calculators, several Cross pen-and-pencil sets, several ugly sweaters. His parents give him an Instamatic camera, a new sketchbook, colored pencils and the mechanical pen he'd asked for, and twenty dollars to spend as he wishes. Sonia has made him a card with Magic Markers, on paper she's ripped out of one of his own sketchbooks, which says "Happy Birthday Goggles," the name she insists on calling him instead of Dada. His mother sets aside the things he doesn't like, which is almost everything, to give to his cousins the next time they go to India. Later that night he is alone in his room, listening to side three of the White Album on his parents' cast-off RCA turntable. The album is a present from his American birthday party. Born when the band was near death, Gogol is a passionate devotee of John, Paul, George, and Ringo. He sits cross-legged on the bed, hunched over the lyrics, when he hears a knock on the door.

"Come in!" he hollers, expecting it to be Sonia in her pajamas, asking if she can borrow his Rubik's Cube. He is surprised to see his father, standing there in stocking feet, a small potbelly visible beneath his oat-colored sweater vest, his mustache turning gray. Gogol is especially surprised to see a gift in his father's hands. His father has never given him birthday presents apart from whatever his mother buys, but this year, his father says, walking across the room to where Gogol is sitting, he has something special.

The gift is covered in red-and-green-and-gold-striped paper left over from Christmas the year before, taped awkwardly at the seams. It is obviously a book, thick, hardcover, wrapped by his father's own hands. Gogol lifts the paper slowly, but in spite of this the tape leaves a scab. "The Short Stories of Nikolai Gogol," the jacket says. Inside, the price has been snipped away on the diagonal.

"I ordered it from the bookstore, just for you," his father says, his voice raised in order to be heard over the music. "It's difficult to find in hardcover these days. It's a British publication, a very small press. It took four months to arrive. I hope you like it."

Gogol leans over toward the stereo to turn the volume down a bit. He would have preferred “The Hitchhiker’s Guide to the Galaxy,” or even another copy of “The Hobbit” to replace the one he lost last summer in Calcutta, left on the rooftop of his father’s house in Alipore and snatched away by crows. In spite of his father’s occasional suggestions, he has never been inspired to read a word of Gogol, or of any Russian writer, for that matter. He has never been told why he was really named Gogol. He thinks his father’s limp is the consequence of an injury playing soccer in his teens.

“Thanks, Baba,” Gogol says, eager to return to his lyrics. Lately he’s been lazy, addressing his parents in English, though they continue to speak to him in Bengali. Occasionally he wanders through the house with his running sneakers on. At dinner he sometimes uses a fork.

His father is still standing there in his room, watching expectantly, his hands clasped together behind his back, so Gogol flips through the book. A single picture at the front, on smoother paper than the rest of the pages, shows a pencil drawing of the author, sporting a velvet jacket, a billowy white shirt, and a cravat. The face is foxlike, with small, dark eyes, a thin, neat mustache, an extremely large pointy nose. Dark hair slants steeply across his forehead and is plastered to either side of his head, and there is a disturbing, vaguely supercilious smile set into long, narrow lips. Gogol Ganguli is relieved to see no resemblance.

For by now he’s come to hate questions pertaining to his name, hates having constantly to explain. He hates having to tell people that it doesn’t mean anything “in Indian.” He hates having to wear a nametag on his sweater at Model United Nations Day at school. He hates that his name is both absurd and obscure, that it has nothing to do with who he is, that it is neither Indian nor American but, of all things, Russian. He hates having to live with it, with a pet name turned good name, day after day, second after second. He hates seeing it on the brown-paper sleeve of the *National Geographic* subscription his parents got him for his birthday the year before, and seeing it perpetually listed in the high honor roll printed in the town’s newspaper. At times his name, an entity shapeless and weightless, manages nevertheless to distress him physically, like the scratchy tag of a shirt he has been forced permanently to wear. At times he wishes he could disguise it, shorten it somehow, the way the other Indian boy in his school, Jayadev, had got people to call him Jay. But Gogol, already short and catchy, resists mutation. Other boys his age have begun to court girls already, asking them to go to the movies or the pizza parlor, but he cannot imagine saying, “Hi, it’s Gogol” under potentially romantic circumstances. He cannot imagine this at all.

From the little he knows about Russian writers, it dismays him that his parents chose the weirdest namesake. Leo or Anton, he could have lived with. Alexander, shortened to Alex, he would have greatly preferred. But Gogol sounds ludicrous to his ears, lacking dignity or gravity. What dismays him most is the irrelevance of it all. Gogol, he’s been tempted to tell his father on more than one occasion, was his father’s favorite author, not his. Then again, it’s his own fault. He could have been known, at school at least, as Nikhil. That one day, his first day of kindergarten, which he no longer remembers, could have changed everything.

“Thanks again,” Gogol tells his father now. He shuts the cover and swings his legs over the edge of the bed, to put the book away on his shelves. But his father

takes the opportunity to sit beside him on the bed. For a moment he rests a hand on Gogol's shoulder. The boy's body, in recent months, has grown tall, nearly as tall as Ashoke's. The childhood pudginess has vanished from his face. The voice has begun to deepen, is slightly husky now. It occurs to Ashoke that he and his son probably wear the same size shoe. In the glow of the bedside lamp, Ashoke notices a scattered down emerging on his son's upper lip. An Adam's apple is prominent on his neck. The pale hands, like Ashima's, are long and thin. He wonders how closely Gogol resembles him at this age. But there are no photographs to document Ashoke's childhood; not until his passport, not until his life in America, does visual documentation exist. On the night table Ashoke sees a can of deodorant, a tube of Clearasil. He lifts the book from where it lies on the bed between them, running a hand protectively over the cover. "I took the liberty of reading it first. It has been many years since I have read these stories. I hope you don't mind."

"No problem," Gogol says.

"I feel a special kinship with Gogol," Ashoke says, "more than with any other writer. Do you know why?"

"You like his stories."

"Apart from that. He spent most of his adult life outside his homeland. Like me."

Gogol nods. "Right."

"And there is another reason." The music ends and there is silence. But then Gogol flips the record, turning the volume up on "Revolution 1."

"What's that?" Gogol says, a bit impatiently.

Ashoke looks around the room. He notices the Lennon obituary pinned to the bulletin board, and then a cassette of classical Indian music he'd bought for Gogol months ago, after a concert at Kresge, still sealed in its wrapper. He sees the pile of birthday cards scattered on the carpet, and remembers a hot August day fourteen years ago in Cambridge when he held his son for the first time. Ever since that day, the day he became a father, the memory of his accident has receded, diminishing over the years. Though he will never forget that night, it no longer lurks persistently in his mind, stalking him in the same way. Instead, it is affixed firmly to a distant time, to a place far from Pemberton Road. Today, his son's birthday, is a day to honor life, not brushes with death. And so, for now, Ashoke decides to keep the explanation of his son's name to himself.

"No other reason. Good night," he says to Gogol, getting up from the bed. At the door he pauses, turns around. "Do you know what Dostoyevsky once said?"

Gogol shakes his head.

" 'We all came out of Gogol's overcoat.' "

"What's that supposed to mean?"

"It will make sense to you one day. Many happy returns of the day."

Gogol gets up and shuts the door behind his father, who has the annoying habit of always leaving it partly open. He turns the lock on the knob for good measure, then wedges the book on a high shelf between two volumes of the Hardy Boys. He settles down again with his lyrics on the bed when something occurs to him. This writer he is named after—Gogol isn't his first name. His first name is Nikolai. Not only does Gogol Ganguli have a pet name turned good name but a last name turned first name. And so it occurs to him that no one he knows in the world, in Russia or India or America or anywhere, shares his name. Not even the source of his namesake.

Plenty of people changed their names: actors, writers, revolutionaries, transvestites. In history class, Gogol has learned that European immigrants had their names changed at Ellis Island, that slaves renamed themselves once they were emancipated. Though Gogol doesn't know it, even Nikolai Gogol renamed himself, simplifying his surname at the age of twenty-two, from Gogol-Yanovsky to Gogol, upon publishing in the *Literary Gazette*.

One day in the summer of 1986, in the frantic weeks before moving away from his family, before his freshman year at Yale is about to begin, Gogol Ganguli does the same. He rides the commuter rail into Boston, switching to the Green Line at North Station, getting out at Lechmere, the closest stop to the Middlesex Probate and Family Court. He wears a blue oxford shirt, khakis, a camel-colored corduroy blazer bought for his college interviews that is too warm for the sultry day. Knotted around his neck is his only tie, maroon with yellow stripes on the diagonal. By now Gogol is just shy of six feet tall, his body slender, his thick brown-black hair slightly in need of a cut. His face is lean, intelligent, suddenly handsome, the bones more prominent, the pale-gold skin clean-shaven and clear. He has inherited Ashima's eyes—large, penetrating, with bold, elegant brows—and shares with Ashoke the slight bump at the very top of his nose.

The courthouse is an imposing, pillared brick building occupying a full city block, but the entrance is off to the side, down a set of steps. Inside, Gogol empties his pockets and steps through a metal detector, as if he were at an airport, about to embark on a journey. He is soothed by the chill of the air-conditioning, by the beautifully carved plaster ceiling, by the voices that echo pleasantly in the marbled interior. A man at the information booth tells him to wait upstairs, in an area filled with round tables, where people sit eating their lunch. Gogol sits impatiently, one long leg jiggling up and down.

The idea to change his name had first occurred to him a few months ago. He was sitting in the waiting room of his dentist, flipping through an issue of *Reader's Digest*. He'd been turning the pages at random until he came to an article that caused him to stop. The article was called "Second Baptisms." "Can you identify the following famous people?" was written beneath the headline. The only one he guessed correctly was Robert Zimmerman, Bob Dylan's real name. He had no idea that Leon Trotsky was born Lev Davidovich Bronstein. That Gerald Ford's name was Leslie Lynch King, Jr., and that Engelbert Humperdinck's was Arnold George Dorsey. They had all renamed themselves, the article said, adding that it was a right belonging to every American citizen. He read that tens of thousands of Americans, on average, had their names changed each year. All it took was a legal petition.

That night at the dinner table, he brought it up with his parents. It was one thing for Gogol to be the name penned in calligraphy on his high-school diploma, and printed below his picture in the yearbook, he'd begun. But engraved, four years from now,

on a bachelor-of-arts degree? Written at the top of a résumé? Centered on a business card? It would be the name his parents picked out for him, he assured them, the good name they'd chosen for him when he was five.

"What's done is done," his father had said. "It will be a hassle. Gogol has, in effect, become your good name."

"It's too complicated now," his mother said, agreeing. "You're too old."

"I'm not," he persisted. "I don't get it. Why did you have to give me a pet name in the first place? What's the point?"

"It's our way, Gogol," his mother maintained. "It's what Bengalis do."

"But it's not even a Bengali name. How could you guys name me after someone so strange? No one takes me seriously."

"Who? Who does not take you seriously?" his father wanted to know, lifting his fingers from his plate, looking up at him. "People," he said, lying to his parents. For his father had a point; the only person who didn't take Gogol seriously, the only person who tormented him, the only person chronically aware of and afflicted by the embarrassment of his name, the only person who constantly questioned it and wished it were otherwise, was Gogol.

"I don't know, Gogol," his mother had said, shaking her head. "I really don't know." She got up to clear the dishes. Sonia slinked away, up to her room. Gogol remained at the table with his father. They sat there together, listening to his mother scraping the plates, the water running in the sink.

"Then change it," his father said simply, quietly, after a while.

"Really?"

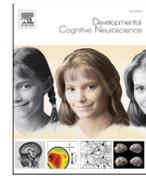
"In America anything is possible. Do as you wish."



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Neural sensitivity to conflicting attitudes supports greater conformity toward positive over negative influence in early adolescence

Kathy T. Do, Ethan M. McCormick, Eva H. Telzer *

Department of Psychology and Neuroscience, University of North Carolina, Chapel Hill 235 E. Cameron Avenue, Chapel Hill, NC, 27599-3270, United States

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ABSTRACT

Adolescents often need to reconcile discrepancies between their own attitudes and those of their parents and peers, but the social contexts under which adolescents conform to the attitudes of others, or the neurocognitive processes underlying decisions to conform, remain unexplored. This fMRI study assessed the extent to which early adolescents ($n = 39$, ages 12–14) conform to their parents' and peers' conflicting attitudes toward different types of behavior (unconstructive and constructive) and in response to different types of influence (negative and positive). Overall, adolescents exhibited low rates of conformity, sticking with their pre-existing attitudes 65% of the time. When they did conform, adolescents were more likely to conform to their peers' attitudes towards constructive than unconstructive behaviors, exhibiting decreased activation in the ventromedial prefrontal cortex, dorsal anterior cingulate cortex, insula, and inferior frontal gyrus during peer conformity toward constructive over unconstructive behaviors. Adolescents were also more likely to conform when their parents and peers endorsed relatively more positive influence than negative influence, exhibiting increased activation in the temporoparietal junction when considering conforming to negative over positive influence. These results highlight early adolescents' ability to stick with their own opinions when confronted with opposing attitudes and conform selectively based on the social context.

1. Introduction

Learning how to balance being themselves and fitting in with their social group can be particularly challenging during adolescence, a developmental period during which the need to establish a unique identity coincides with the desire to find belonging within social groups (Steinberg and Monahan, 2007; Steinberg and Silverberg, 1986). What determines if and when adolescents resist or conform to social pressures? When there are potential conflicts between their own and others' opinions, adolescents may need to weigh the decision to stick with their pre-existing attitudes (i.e., resist) against the potentially beneficial effects of shifting their attitudes toward group norms (i.e., conform) (Deutsch and Gerard, 1955). When they do conform, adolescents are highly attuned to the social context in which social influence unfolds, flexibly shifting their attitudes toward the person or behavior that is most salient for that decision context (Biddle et al., 1980; van Hoorn et al., 2014). Parents and peers are two important sources of influence that shape everyday attitudes and behaviors during adolescence, but their relative influence changes based on both external factors (e.g., type

of behavior at hand) (Brittain, 1963; Sebald and White, 1980) and internal factors (e.g., personal values toward a behavior) (Padilla-Walker and Carlo, 2007). What remains unknown, however, is the underlying neurocognitive processes that guide decisions to conform across different social contexts, particularly when adolescents are confronted with parent and peer opinions that differ from their own.

Prevailing conceptions of adolescence suggest conformity is monolithic and unidimensional, such that youth will be excessively susceptible, particularly to negative influences from their peers (DiGuseppi et al., 2018; Munoz Centifanti et al., 2014; Sumter et al., 2009). However, this perspective may be oversimplified because prior research has mostly examined social influence in isolation, focusing on only one type of influence or type of behavior (Choukas-Bradley et al., 2015; Knoll et al., 2015; Widman et al., 2016). In addition, the absence or attenuation of unconstructive behaviors (e.g., less reckless driving) is often conflated with the positive effects of social influence, such as the encouragement of constructive behaviors (e.g., driving safely in peer contexts) (Cascio et al., 2015a), with few studies comparing social influence on both constructive and unconstructive behaviors (but see

* Corresponding author at: 235 E. Cameron Avenue, Chapel Hill, NC, 27599-3270, United States.
E-mail address: ehtelzer@unc.edu (E.H. Telzer).

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Berndt, 1979). This constrains our ability to assess how conformity decisions unfold across a wide range of social contexts, thereby perpetuating negative stereotypes of adolescence that may inadvertently shape future attitudes and behaviors (Qu et al., 2020).

Value-based decision making models provide a useful conceptual framework for understanding how conformity decisions may be driven by neural signals that encode the motivational value of various stimuli from the environment (Falk and Scholz, 2018; Pfeifer and Berkman, 2018). The brain's valuation system, which includes the ventromedial and orbital subregions of the prefrontal cortex (vmPFC, OFC) and striatum, has been hypothesized to compute the subjective value of possible choices before determining the most valued option to enact in a given context (Bartra et al., 2013; Clithero and Rangel, 2014). Insofar as the decision to conform represents a value-based choice, the relative value of a set of choices (e.g., conform or resist) is compared before selecting the choice that is most valued and consistent with the goal at hand. Indeed, increased activity of the ventral striatum and OFC is associated with greater value-guided choices in adolescents relative to adults (Barkley-Levenson and Galvan, 2014) and predicts the extent to which adolescents adopt others' attitudes as their own (Cascio et al., 2015a, 2015b; Welborn et al., 2015). Importantly, such value-based computations vary across individuals and social contexts.

The extent to which social information from others is salient to an individual's self-interests and social goals can change the value of conformity decisions (Falk and Scholz, 2018). Indeed, a recent meta-analysis found that decision making in social contexts not only robustly recruits the vmPFC and ventral striatum, but also the dorso-medial PFC (dmPFC), dorsal anterior cingulate cortex (dACC), insula/inferior frontal gyrus (IFG), and, depending on the social context, other regions implicated in social cognition (e.g., temporoparietal junction (TPJ), posterior superior temporal sulcus (pSTS)) (van Hoorn et al., 2019). The so-called mentalizing brain network, which includes the dmPFC, TPJ, and pSTS, is involved in simulating the mental states of others (Dufour et al., 2013), with individual differences in TPJ and pSTS activation positively associated with adolescents' susceptibility to peer influence across social contexts (Cascio et al., 2015b; van Hoorn et al., 2016). The insula, dACC, and IFG are commonly involved in encoding the salience of internal and external cues that motivate and regulate behavior (Menon and Uddin, 2010), including monitoring cognitive inconsistencies between one's own and others' choices (Apps et al., 2016; Izuma, 2013). For example, dACC activity increases when individuals' opinions conflict with the group opinion, which predicts subsequent adjustment of behavior (Berns et al., 2005; Klucharev et al., 2009). Collectively, neural processes related to valuation, mentalizing, and salience monitoring may support how adolescents balance self- and social-relevant considerations during conformity decisions.

2. Current study

The aim of the current study was to examine how conformity decisions are evaluated in the developing brain and unfold across social contexts, particularly when adolescents' own opinions conflict with the opinions of their parents, peers, or both. We focus on early adolescence (12–14 years), a developmental period marked by increased susceptibility to both antisocial and prosocial influence (Foulkes et al., 2018; Knoll et al., 2017), significant changes in the salience of parent and peer relationships (Steinberg and Silverberg, 1986), and a social reorientation of the brain that renders social contexts particularly salient (Blakemore and Mills, 2014; Nelson et al., 2016). To probe the neurocognitive processes underlying decisions to conform toward conflicting influence, early adolescents completed an experimental task during a functional magnetic resonance imaging (fMRI) scan, in which they were shown parent and peer attitudes that conflicted with their own attitudes and were instructed to indicate who they agree with. We manipulated the social influence in two ways so that we could examine whether participants conform (1) to their parents' or peers' attitudes toward

constructive (e.g., working hard in school) versus (vs.) unconstructive (e.g., smoking a cigarette) behaviors and (2) when their parents and peers endorsed attitudes that reflected relatively more positive influence (e.g., rating "smoking a cigarette" as more "bad" than the participant) vs. negative influence (e.g., rating "smoking a cigarette" as more "good" than the participant). By measuring conformity across different types of behavior (i.e., constructive and unconstructive) and types of influence (i.e., positive and negative), we thus were able to capture how conformity unfolds across varying social contexts, particularly when adolescents were confronted with conflicting influences from their parents and peers.

Prior research suggests that the extent to which adolescents conform to parent or peer influences depends on the social context (Brittain, 1963; Sebald and White, 1980). For instance, one study found that adolescents increase their prosocial behavior following prosocial peer feedback and decrease their prosocial behavior following antisocial peer feedback (van Hoorn et al., 2014). However, less is known about how adolescent conformity is affected when different types of behaviors or influences are pitted against each other. Thus, while we hypothesized that parent and peer conformity would differ between the types of behavior (i.e., constructive and unconstructive) and types of influence (i.e., positive and negative), we did not have predictions regarding the directionality of these behavioral effects. Given neural evidence in adolescents (Cascio et al., 2015b; Welborn et al., 2015) and adults (Klucharev et al., 2009) suggesting conformity may be a type of value-based decision, we hypothesized that greater conformity to a specific behavior or influence type would be supported by increased activity in neural regions associated with valuation (e.g., vmPFC, OFC, VS), mentalizing (dmPFC, TPJ, pSTS), and salience monitoring (e.g., dACC, insula, IFG).

In addition to our primary focus on context-dependent differences in conformity rates, we explored the relative influence of parents vs. peers, particularly when both endorsed attitudes that conflicted with adolescents' attitudes. The handful of studies that have compared parent and peer influence during adolescence have yielded inconsistent findings, with reports of no differences (Chassin et al., 1986; van Hoorn et al., 2018) or one source outweighing the other, for unconstructive behaviors (Cook et al., 2009; Sawyer and Stevenson, 2008) and constructive behaviors (Malonda et al., 2019) alike. To investigate how adolescents reconcile opposing attitudes from both their parents and peers, we leveraged our unique study design to explore whether there were differences in overall rates of conformity toward parents' or peers' conflicting attitudes at the behavioral and neural level. Since we examined conformity decisions across different social contexts (i.e., types of behavior and influence), we did not have a priori hypotheses about whether parents or peers would exert a stronger influence on adolescent attitudes overall. Similar to the neural hypotheses above, we expected that conformity to a specific person would be positively associated with neural activity in valuation-, mentalizing- and salience monitoring-related brain regions.

3. Material and methods

3.1. Participants

A total of 44 adolescents and their parents was recruited from a Midwestern community in the United States, but five participants were excluded: 2 had technical errors, 1 did not comply with task instructions, 1 had extreme ratings at the behavioral session that precluded creating balanced social influence manipulations for the fMRI task, and 1 had unusable fMRI data. The final sample included 39 adolescents ($M_{age} = 13.48$ years, $SD_{age} = .63$, range = 12.16–14.77 years; 20 females). The race/ethnicity of adolescent participants included White ($n = 17$), Black/African American ($n = 8$), Asian ($n = 3$), Other ($n = 1$), and multi-ethnic ($n = 3$ Black/White, $n = 2$ Hispanic/Other, $n = 1$ Hispanic/White, $n = 1$ Hispanic/Black, $n = 1$ Asian/White, $n = 1$ Asian/Other, $n = 1$ White/Other). Mothers reported their highest levels of education as high

school ($n = 2$), some college ($n = 8$), college ($n = 16$), some medical, law, or graduate school ($n = 1$), and medical, law, or graduate school ($n = 12$). All participants were free of MRI contraindications (e.g., metal in body). Adolescents and their parents provided written assent and consent in accordance with the university's Institutional Review Board.

3.2. Behavioral session

During a behavioral session, adolescents and their parents reported their baseline attitudes toward everyday behaviors in which adolescents might engage (Fig. 1A). Using a 10-point Likert scale (1=very bad, 10=very good), parents rated 100 behaviors, whereas adolescents rated 200 behaviors to ensure there were sufficient trials to manipulate for the fMRI task (described below). Half of the behaviors involved constructive behaviors (e.g., school habits, healthy behaviors, social interactions) and half involved unconstructive behaviors (e.g., deviancy, health risk behaviors, aggression). Constructive behaviors comprised actions that generally have more desirable consequences (e.g., working hard in school) and unconstructive behaviors comprised actions that generally have more undesirable consequences (e.g., smoking a cigarette; Table S1). Behaviors were presented in a random order and ratings were self-paced.

3.3. fMRI session

Participants underwent fMRI approximately two weeks after the behavioral session. Before the scan, participants were introduced to an age- and gender-matched peer who they were told was also participating in the study and had rated the same behaviors. Participants were shown a profile page for the peer which displayed a picture (drawn from the NIMH Child Emotional Faces Picture Set; (Egger et al., 2011)), information about their hobbies, and a self-description handwritten by the peer. During a separate task, they also spoke to and heard the peer talk to them (van Hoon et al., 2018). In reality, the peer was a confederate, and was not actually present at the scan.

3.3.1. Attitude conformity fMRI task

Participants completed the Attitude Conformity task during fMRI. On each trial, participants first viewed a behavior they previously rated (but were not reminded of their original ratings) (2 s). Following a jittered inter-stimulus interval ($M = 2$ s), participants were then shown their parents' and peers' ratings on each behavior and instructed to choose which person they agreed with most (maximum of 5 s). Participants

pressed the left index finger when they agreed with their parent or right index finger when they agreed with their peer. Participants' choices were self-paced, such that the task advanced to the next behavior upon participant response. Behaviors were presented in random order and were separated by jittered inter-trial fixation periods ($M = 2$ s). Conformity was operationalized as choosing the person whose rating conflicted with the adolescent's original rating, whereas resistance was operationalized as choosing the person whose rating was the same as the adolescent's original rating (described below).

In order to examine decisions to conform in the face of conflicting attitudes, we tailored the task to each participant based on their ratings assessed during the behavioral session. Although we collected the parents' actual ratings during the behavioral session, and ostensibly collected peers' ratings, such ratings were not used as we carefully manipulated the ratings to fall within the attitude conflict and social influence conditions described below. Of the 200 behaviors that participants originally rated at the behavioral session, 120 behaviors were selected for the fMRI task based on two criteria. First, the participant's rating for a behavior needed to fall between minimum and maximum plausible ratings determined for each behavior based on pilot data, thereby maximizing ecological validity and checking for deviant responding (e.g., rating "cheating on a test" as 10=very good was outside the range of plausibility). Second, given that extreme ratings may be less likely to change (Lin et al., 2018), the participant's rating for a behavior could not fall at the extremes of the scale (i.e., 1 or 10), ensuring that their parents' and peers' ratings could be manipulated to be below, above, or centered at participants' original ratings. Thus, the strength of participants' original ratings was relatively moderate across the subset of behaviors included in the fMRI task, with a balanced distribution across constructive and unconstructive behaviors.

3.3.1.1. Source of attitude conflict. To quantify the effect of conflicting influence, we manipulated parent and peer ratings in order to examine conformity when at least one of the influencer's ratings conflicted with the participant's original rating. There were three attitude conflict conditions that differed by the source of conflicting attitudes: Parent Conflict, Peer Conflict, and Mutual Conflict (Fig. 1B). In the Parent Conflict condition, the peer's rating was the same as the participant's original rating and the parent's rating differed. In the Peer Conflict condition, the parent's rating was the same as the participant's original rating and the peer's rating differed. In the Mutual Conflict condition, both the peer's rating and parent's rating differed from the participant's original rating and from each other. Given participants were required to

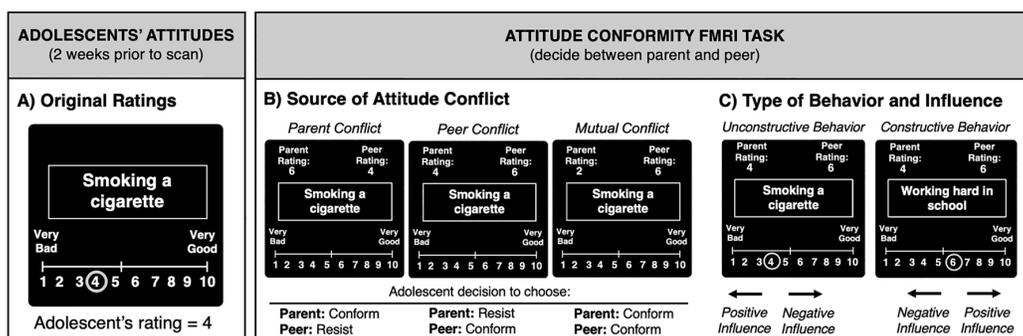


Fig. 1. Attitude Conformity task. A) Two weeks prior to the scan, adolescents rated their attitudes toward everyday behaviors (in this schematic, the adolescent rating is circled for visualization purposes but was not shown during the task). B) During fMRI, adolescents were presented with opposing attitudes from their parent and peer, which were manipulated based on the adolescent's original rating during the behavioral session. On Parent Conflict trials, just the parent's rating conflicted from the adolescent's but the peer's rating matched. On Peer Conflict trials, just the peer's rating conflicted from the adolescent's but the parent's rating matched. On Mutual Conflict trials, both the parent's and peer's ratings conflicted from the adolescent's. Conformity was operationalized as choosing the person whose rating conflicted with the adolescent's original rating, whereas resistance was operationalized as choosing the person whose rating matched the adolescent's original rating. C) Social influence was manipulated in two ways: Parents and peers (1) influenced adolescents' attitudes toward unconstructive and constructive behaviors (i.e., type of behavior) and (2) endorsed attitudes that reflected either more positive or negative influence (i.e., type of influence).

conform on Mutual Conflict trials (i.e., no option to resist), this third condition served as a control against Parent Conflict and Peer Conflict trials. In addition, the Mutual Conflict condition allowed us to explore if participants conform more to their peers' or parents' attitudes on average. Importantly, how the participant's choice on the task (i.e., parent or peer) mapped on to conformity depended on the attitude conflict condition. Conformity was defined as choosing the person whose rating conflicted with the participant's original rating, which could either be the parent (Parent Conflict), the peer (Peer Conflict), or both the parent and peer (Mutual Conflict) (Fig. 1B, "Adolescent decision to choose"). Resistance was defined as choosing the person whose rating matched with the participant's original rating, which could either be the peer (Parent Conflict) or parent (Peer Conflict) (Fig. 1B, "Adolescent decision to choose").

3.3.1.2. Type of behavior and influence. To quantify the effect of social context, we manipulated social influence in two ways in order to examine conformity toward different (1) types of behavior (i.e., constructive and unconstructive) and (2) types of influence (i.e., positive and negative). First, we included an equal distribution of constructive behaviors (e.g., working hard in school) and unconstructive behaviors (e.g., smoking a cigarette) to examine whether participants conform differently based on whether their parents' and peers' attitudes were related to constructive or unconstructive behaviors (Fig. 1C, "Constructive/Unconstructive Behaviors"). Second, we examined the extent to which participants were influenced by their parents and peers when they endorsed attitudes that reflected relatively more positive or negative influence (Fig. 1C, "Positive/Negative Influence"). Positive influence was operationalized as the parent or peer endorsing attitudes that were relatively more positive than the participant's original rating (e.g., rating a constructive behavior as more "good" along the 10-point scale than the participant and rating an unconstructive behavior as more "bad" along the 10-point scale than the participant). In contrast, negative influence was operationalized as the parent or peer endorsing attitudes that were relatively more negative than the participant's original rating (e.g., rating a constructive behavior as more "bad" along the 10-point scale than the participant and rating an unconstructive behavior as more "good" along the 10-point scale than the participant). Notably, positive and negative influence need not be on the opposite side of the scale, but instead were relative to the participant's original rating. Thus, positive influence could still be rating an unconstructive behavior as somewhat good (i.e., ratings above "5" or "6") as long as it was less good than the participant's original rating (and vice versa for negative influence). To create positive and negative influence, parent and peer ratings were manipulated to be 1–5 points below or above the participant's original rating, which was balanced across constructive and unconstructive behaviors. Positive and negative influence were examined only in the Peer Conflict and Parent Conflict conditions, where influence was manipulated in one direction. Positive and negative influence could not be examined on Mutual Conflict trials, where influence was manipulated in both directions (centered at the participant's original rating).

Overall, the task included 120 trials, which were divided equally by the attitude conflict condition (40 Parent Conflict trials, 40 Peer Conflict trials, 40 Mutual Conflict trials). Each attitude conflict condition was equally divided by type of behavior (20 constructive and 20 unconstructive behaviors). Parent and Peer Conflict trials each included 20 positive influence and 20 negative influence trials. Some participants ($n = 9$) had less balanced positive and negative influence trials due to their original ratings; this was mostly attributed to more extreme ratings of constructive behaviors at the behavioral session that made it difficult to generate additional positive influence (i.e., operationalized as even more positive ratings) for the fMRI session ($n = 6$). To compensate, we generated additional positive or negative influence trials within the same behavior type (e.g., we generated more negative influence trials on

constructive behaviors for the $n = 6$ who had fewer positive influence trials on constructive behaviors).

3.4. Behavioral data analysis

Two generalized linear mixed-effects models were fitted to trial-by-trial choices on the Attitude Conformity fMRI task. All statistical models were estimated using the GLIMMIX procedure in SAS 9.4. For interpretation, unstandardized model estimates (log-odds) were converted to odds-ratios and predicted probabilities.

3.4.1. Type of behavior analysis

First, we tested how the probability of conforming or resisting changes as a function of the type of behavior. Given the person whose rating conflicted or matched the participant's rating varied across the three attitude conflict conditions (Fig. 1B, "Adolescent decision to choose"), the dichotomous choice to endorse the peer's rating vs. parent's rating was used as the dependent variable in this model. Primary analyses focused on examining differences in aligning with the person whose attitude conflicted with (i.e., conformity) or matched (i.e., resistance) the participant's original attitude on the Peer Conflict and Parent Conflict conditions. In addition, we conducted exploratory analyses to test overall differences in aligning with peers vs. parents on the Mutual Conflict condition, where conformity was forced given both the parent's and peer's attitudes conflicted with the participant's original attitude. We estimated the following equation:

$$\begin{aligned} \text{Logit}(\text{Peer}_{ij}) = & \gamma_{00} + \gamma_{10}\text{Unconstructive}_{ij} + \gamma_{20}\text{ParentConflict}_{ij} \\ & + \gamma_{30}\text{PeerConflict}_{ij} + \gamma_{40}\text{Unconstructive} * \text{ParentConflict}_{ij} \\ & + \gamma_{50}\text{Unconstructive} * \text{PeerConflict}_{ij} + u_{0j} \end{aligned}$$

The dichotomous choice to endorse the peer's rating or parent's rating (1=peer, 0=parent) on a particular trial (i) for a particular adolescent (j) was modeled as a function of the following independent variables: the attitude conflict condition, type of behavior, and their respective interaction terms. The attitude conflict condition was entered with two dummy variables (1=ParentConflict, Other = 0; 1=PeerConflict, Other = 0) with Mutual Conflict omitted as the reference group. The type of behavior was coded as one dummy variable (1=Unconstructive, 0=Constructive). A random intercept was included to account for between-person variation in baseline propensity of choosing peer over parent. We specified a Bernoulli response distribution for the binary outcome and a logit link function to relate the predicted outcome to the linear predictors, with probability values restricted to (0, 1).

3.4.2. Type of influence analysis

In a separate generalized linear mixed-effects model, we tested how the probability of conforming or resisting differs as a function of the type of influence. Given that adolescents were forced to conform on Mutual Conflict trials (i.e., there was no option to resist), this analysis was constrained to Parent Conflict and Peer Conflict trials (80 total per participant). To focus on conformity decisions, the participant's choice on the task (i.e., peer or parent) was recoded to "conformity" (i.e., chose peer on Peer Conflict trials and chose parent on Parent Conflict trials) and "resistance" (i.e., chose parent on Peer Conflict trials and chose peer on Parent Conflict trials). The dichotomous choice to conform toward vs. resist choosing the person with conflicting ratings was used as the dependent variable in this model. We estimated the following equation:

$$\text{Logit}(\text{Conform}_{ij}) = \gamma_{00} + \gamma_{10}\text{ParentPositive}_{ij} + \gamma_{20}\text{PeerPositive}_{ij} + u_{0j}$$

The dichotomous choice to conform to or resist the person with conflicting ratings (1=conform, 0=resist) on a particular trial (i) for a particular adolescent (j) was modeled as a function of two independent variables: the difference between the parent's rating and the participant's original rating (ParentPositive) and the difference between the

peer's rating and the participant's original rating (PeerPositive). The parent and peer difference scores on unconstructive behaviors were reverse coded, so that, for unconstructive and constructive behaviors alike, higher scores indicate higher positive influence and lower scores indicate higher negative influence. A random intercept was included to account for between-person variation in baseline propensity of choosing to conform over resist. We specified a Bernoulli response distribution for the binary outcome and a logit link function to relate the predicted outcome to the linear predictors, with probability values restricted to (0, 1).

3.5. fMRI data acquisition and preprocessing

Imaging data were collected using a 3 T Siemens Magnetom Trio MRI scanner. The scan consisted of T2*-weighted echoplanar images (EPI; slice thickness = 3 mm; 38 slices; TR = 2 s; TE = 25 ms; matrix = 92 × 92; FOV = 230 mm; voxel size = 2.5 × 2.5 × 3 mm³). Structural scans were also acquired, including a T1* magnetization-prepared rapid-acquisition gradient echo (MPRAGE; 192 slices; TR = 1.9 s; TE = 2.32 ms; FOV = 230 mm; matrix = 256 × 256; sagittal acquisition plane; slice thickness = .9 mm) and a T2*-weighted, matched-bandwidth (MBW), high resolution anatomical scan (38 slices; TR = 4 s; TE = 64 ms; FOV = 230 mm; matrix = 192 × 192; slice thickness = 3 mm). To maximize brain coverage and reduce signal drop-out in orbital and temporal regions, MBW and EPI images were acquired at an oblique axial orientation.

Preprocessing steps were completed utilizing the FMRIB Software Library (FSL v6.0). Preprocessing included: skull stripping of all structural and functional images using BET; slice-to-slice head motion correction using MCFLIRT; sequential co-registration of EPI images to the MBW, MPRAGE, and standard stereotaxic space defined by the Montreal Neurological Institute (MNI) and the International Consortium for Brain Mapping using FLIRT; removing low frequency drift across the EPI time-series using high-pass temporal filtering with a 128 s cutoff; and spatial smoothing using a 6 mm Gaussian kernel, full-width-at-half maximum. Independent component analysis (ICA) were performed on the individual level using MELODIC combined with an automated component classifier (Tohka et al., 2008) (Neyman-Pearson threshold = .3) in order to remove artifact signal (e.g. motion, physiological noise) from the functional data.

3.6. fMRI data analysis

The Attitude Conformity fMRI task was modeled as an event-related design using the Statistical Parametric Mapping software package (SPM8; Wellcome Department of Cognitive Neurology, Institute of Neurology, London, UK). In parallel with the behavioral analyses, we specified two separate individual level, fixed-effects models. Across both models, covariates of non-interest included: six motion parameters; volumes containing excessive motion (i.e., greater than 2 mm slice-to-slice movement along any axis); and the periods where the behavior was presented without the ratings (duration = 2 s). All adolescents had less than 2 mm slice-to-slice head motion on >95 % of total volumes. The jittered inter-stimulus and inter-trial periods were not modeled and therefore served as an implicit baseline for the task conditions of interest.

3.6.1. Type of behavior analysis

First, we examined the effects of unconstructive and constructive behaviors at the whole-brain level. Six conditions of interest were defined based on the three attitude conflict conditions (Parent Conflict, Peer Conflict, Mutual Conflict), each modeled separately for unconstructive and constructive behaviors. Participants' dichotomous choice of peer or parent on a given trial (1=peer, 0=parent) was included as a parametric modulator for the six conditions to identify brain regions that differentially respond to endorsing peer vs. parent attitudes. Given

the person whose attitude conflicted with the participant's attitude could either be the peer (Peer Conflict) or the parent (Parent Conflict), this PM was used to examine neural differences in aligning with the person whose attitude conflicted with (i.e., conformity) or matched (i.e., resistance) the participant's original attitude on the Peer Conflict and Parent Conflict condition. In addition to our primary analyses, we performed exploratory analyses to test for neural differences in aligning with peer attitudes (i.e., peer conformity) or parent attitudes (i.e., parent conformity) on the Mutual Conflict condition, where conformity was forced as both parents and peers endorsed attitudes that conflicted with the participant's original attitudes. Events were modeled using the onset of each event, with a duration equal to participants' response time to make a decision on that trial.

3.6.2. Type of influence analysis

Next, we examined the effects of positive and negative influence at the whole-brain level. Four conditions of interest were defined based on the type of influence (negative influence, positive influence), modeled separately for parents (i.e., Parent Conflict trials) and peers (i.e., Peer Conflict trials). Mutual Conflict trials—in which adolescents were forced to conform (i.e., there was no choice to resist)—were modeled as a separate condition of non-interest. The absolute value of the difference between the influencer's rating and adolescent's original rating (range: 1–5) was included as a parametric modulator for the four conditions to identify brain regions that track increases in the level of positive and negative influence. Events were modeled using the onset of each trial, with a duration equal to participants' response time to make a decision on that trial. Our events of interest in this model did not separately model the choice (i.e., conform or resist), but instead focused on the entire decision phase of each trial. Finally, to test how neural tracking of the level of negative vs. positive influence is associated with overall rates of conformity, we conducted a whole-brain, regression analysis at the group level using the average frequency of conformity on negative vs. positive influence trials as a regressor.

All individual subject contrasts of interest were submitted to random-effects, group-level analyses at the whole-brain level in GLMflex (http://mrtools.mgh.harvard.edu/index.php/GLM_Flex), corrected for multiple comparisons. Specifically, we ran a Monte Carlo simulation using the updated version (April 2016) of the 3dFWHMx and 3dClustSim programs from the AFNI software package (Ward, 2000) for each group-level contrast of interest. The simulation resulted in a minimum cluster size threshold ranging from 82–142 voxels across all contrasts of interest in the Type of Behavior Analysis and 86–129 voxels across all contrasts of interest in the Type of Influence Analysis at the whole brain level, both corresponding to $p < .05$, Family-Wise Error (FWE) corrected given a voxel-wise threshold of $p < .005$. All results are available on NeuroVault (Gorgolewski et al., 2015) (see <https://neurovault.org/collections/QCNBXXGZR/>).

4. Results

4.1. Type of behavior

4.1.1. Behavioral results

To examine the effect of type of behavior, we tested the probability of conforming to conflicting attitudes toward unconstructive and constructive behaviors on Parent Conflict and Peer Conflict trials vs. Mutual Conflict trials. Descriptively, participants had above-chance rates (i.e., confidence interval (CI) does not include 50 %) of resisting than conforming to conflicting attitudes (Fig. 2A). Participants only had a 34.8 % mean probability of conforming (i.e., choosing parent) on Parent Conflict trials (95 % CI [30.5 %, 39.3 %]) and a 38.8 % mean probability of conforming (i.e., choosing peer) on Peer Conflict trials (95 % CI [34.3 %, 43.5 %]). These results suggest that adolescents are overall more likely to resist than conform when either parents or peers endorsed attitudes that conflicted with adolescents' personal attitudes.

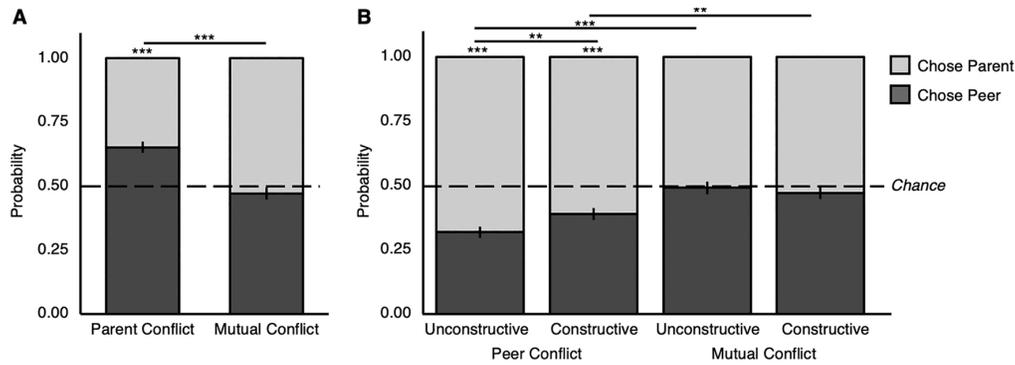


Fig. 2. Behavioral effects of type of behavior. A) Adolescents were less likely to conform to their parents’ attitudes (i.e., chose parent) on Parent Conflict trials compared to Mutual Conflict trials, regardless of the type of behavior. B) Conformity to peers’ attitudes (i.e., chose peer) on Peer Conflict trials depended on the type of behavior, such that adolescents were more likely to conform to their peers’ attitudes toward constructive than unconstructive behaviors.

Note: Error bars represent the standard error of the mean. Decisions (i.e., probability of choosing peer or parent) that occurred significantly above or below chance level (i.e., 50 % probability) are denoted by significance stars above the condition, and decisions that varied across conditions are denoted with a significance bar. *** $p < .001$, ** $p < .01$.

When they did conform, participants conformed selectively based on the source of attitude conflict and type of behavior (Table 1). As shown in Fig. 2A, participants were significantly less likely to conform to their parent on Parent Conflict trials (34.8 % mean probability; 95 % CI [30.5 %, 39.3 %]) compared to Mutual Conflict trials (52.9 % mean probability; 95 % CI [48.2 %, 57.6 %]). In other words, participants were less likely to conform to their parents when they shared similar attitudes with their peers (Parent Conflict), but had no preference for either person (i.e., conformed at chance) when they disagreed with both parents and peers (Mutual Conflict). There was no interaction with the type of behavior, suggesting that participants were equally likely to conform to their parents’ attitudes toward unconstructive and constructive behaviors.

Table 1
Generalized linear mixed-effects analysis on type of behavior.

	Est.	SE	t test	p	OR	PP
<i>Fixed effects</i>						
Intercept	-.12	.10	$t(38) = -1.20$	.24	.89	.47
Unconstructive Behavior	.08	.10	$t(4601) = .79$	.43	1.09	.52
Parent Conflict	.75	.11	$t(4601) = 7.01$	<.000	2.11	.68
Peer Conflict	-.34	.10	$t(4601) = -3.24$	.001	.71	.42
Unconstructive Behavior × Parent Conflict	-.16	.15	$t(4601) = -1.07$	.28	.85	.46
Unconstructive Behavior × Peer Conflict	-.39	.15	$t(4601) = -2.60$	.01	.68	.40
<i>Random effect</i>						
Participant effect	.16	.04				

Table shows the regression coefficient estimates (Est. represents the log-odds (logit) of choosing peers vs. parents; converted to odds ratio (OR) and predicted probability (PP) for interpretation), standard error (SE), *t* values, and *p* values from a generalized linear mixed effects analysis. Dependent variable: 1=peer, 0=parent. Independent variables: behavior type (1=unconstructive, 0=constructive) and attitude conflict condition (dummy-coded; Parent Conflict and Peer Conflict, with Mutual Conflict omitted as the reference group). A log likelihood ratio test confirmed that the inclusion of independent variables significantly improved model fit from the unconditional (i.e., no predictors) random-intercept model ($\chi^2(5) = 264.92, p < .000$). The random intercept for participants was significant ($b = .14, SE = .04, p < .001$), suggesting that there is significant between-person variability in the average probability of choosing peers over parents.

In contrast, conformity to peer attitudes depended on the type of behavior. As shown in Fig. 2B, on Peer Conflict trials, participants were significantly less likely to conform to their peers’ attitudes toward unconstructive behaviors (31.8 % mean probability; 95 % CI [27.7 %, 36.2 %]) than constructive behaviors (38.8 % mean probability; 95 % CI [34.3 %, 43.5 %]). Thus, despite generally resisting conformity (i.e., choosing their parent) when their peers’ attitudes conflicted with their own, participants were more likely conform to their peers’ attitudes toward constructive over unconstructive behaviors when they did conform.

4.1.2. fMRI results

Given differences at the behavioral level (i.e., conforming more to constructive than unconstructive behaviors) for Peer Conflict trials, but no differences by the type of behavior for Parent Conflict trials, analyses examining neural differences during conformity decisions toward unconstructive vs. constructive behaviors focused on Peer Conflict trials (Unconstructive Peer Conflict > Constructive Peer Conflict). Participants showed greater activation in the vmPFC, dACC, insula, IFG, caudate, and hippocampus when conforming to their peers’ attitudes toward unconstructive relative to constructive behaviors (Table 2; Fig. 3A). For descriptive purposes, we extracted parameter estimates of

Table 2
Whole-brain condition effects by type of behavior.

Contrast and Region	R/L	BA	x	y	z	t	k
<i>Unconstructive Peer Conflict > Constructive Peer Conflict</i>							
Ventromedial prefrontal cortex	L	11	-6	38	-12	4.80	1325 ^a
Inferior frontal gyrus	L	47	-44	32	-8	3.55	^a
Insula	R		28	8	-12	3.21	315
Dorsal anterior cingulate cortex			14	36	26	4.44	229
Caudate	R		12	10	22	3.66	200
Hippocampus	R		28	-24	-10	3.71	142

Note: L and R refer to left and right hemispheres; BA refers to Brodmann area of peak voxel; *k* refers to the number of voxels in each significant cluster; *t* refers to peak activation level in each cluster; and *x*, *y*, and *z* refer to MNI coordinates. fMRI results are reported at $p < .005$, with a corrected cluster size of 128 contiguous voxels. Regions denoted with the same superscript are part of the same cluster of activation. We included adolescents’ binary choice of peer or parent as a parametric modulator (PM; peer=1, parent=0), which identified neural activity in regions that showed differences between conformity (i.e., chose peer) vs. resistance (i.e., chose parent) decisions on Peer Conflict trials.

neural activity from two of these regions, the vmPFC and dACC, separately for Unconstructive Peer Conflict and Constructive Peer Conflict trials. As shown in Fig. 3B-C, participants exhibited increases in vmPFC and dACC activity when conforming to their peers' attitudes toward unconstructive behaviors, whereas they showed decreases in vmPFC and dACC activity when conforming to their peers' attitudes toward constructive behaviors (similar patterns were found in the other significant regions). No brain regions were more activated when conforming to peers' attitudes toward constructive vs. unconstructive behaviors. See Table S2 for a complete list of significant regions to all conditions by the source of attitude conflict and type of behavior.

4.2. Type of influence

4.2.1. Behavioral results

We next compared whether conformity changes as a function of the extent to which parents and peers endorsed negative and positive influence. Participants were more likely to conform when they encountered more positive than negative influence, an effect that was similar across parents and peers (Table 3; Fig. 4A-B). These results suggest participants selectively conform in contexts where their parents and peers endorsed more positive than negative influence.

4.2.2. fMRI results

Given no differences between parent and peer influence at the behavioral level, we collapsed across Parent Conflict and Peer Conflict trials in order to compare neural regions that track the level of negative vs. positive influence when participants considered whether to conform (Negative Influence > Positive Influence). Results revealed that participants exhibited greater activation in the TPJ when they considered conforming to relatively more negative influence than positive influence (see Table 4 for complete list of regions). For descriptive purposes, parameter estimates of TPJ activity were extracted separately for Negative Influence and Positive Influence trials. As shown in Fig. 5, participants exhibited parametric increases in TPJ activation when they considered conforming to relatively more negative influence, with no changes in TPJ activation when they considered conforming to relatively more positive influence.

To test whether the neural tracking of negative vs. positive influence predicted individual differences in average rates of conformity, we calculated a difference score between participants' average frequency of conformity to negative and positive influence, such that higher scores reflect greater conformity to negative influence. Difference scores were entered as a regressor in a whole-brain regression analysis on the Negative Influence > Positive Influence contrast. Results show that when deciding whether to conform to increasingly negative over

Table 3

Generalized linear mixed-effects analysis on type of influence.

	Est.	SE	t test	p	OR	PP
<i>Fixed effects</i>						
Intercept	-.57	.06	$t(38) = -9.57$	<.000	.57	.36
Parent Positive Influence	.11	.02	$t(3049) = 5.01$	<.000	1.12	.53
Peer Positive Influence	.14	.02	$t(3049) = 6.30$	<.000	1.15	.54
<i>Random effect</i>						
Participant effect	.08	.03				

Table shows the regression coefficient estimates (Est. represents the log-odds (logit) of conforming vs. resisting; converted to odds ratio (OR) and predicted probability (PP) for enhanced interpretation), standard error (SE), *t* values, and *p* values from a generalized linear mixed effects analysis. Dependent variable: 1=conform, 0=resist. Independent variables: type of influence condition (Parent Positive Influence and Peer Positive Influence; recoded so that higher values reflect higher positive influence and lower values reflect higher negative influence). A log likelihood ratio test confirmed that the inclusion of the independent variables significantly improved model fit from the unconditional (i.e., no predictors) random-intercept model ($\chi^2(2) = 65.47, p < .000$). The random intercept for participants was significant ($b = .07, SE = .03, p = .01$), suggesting that there is significant between-person variability in the average probability of conforming over resisting influence.

positive influence, activation in the right pSTS ($xyz = 64, -36, -8, t = 3.35, k = 214$) was associated with a lower frequency of conforming to negative over positive influence. For descriptive purposes, parameter estimates of pSTS activity were extracted and plotted against the frequency of conformity (see Fig. 5B). No other brain regions were correlated with the frequency of conformity toward negative vs. positive influence.

4.3. Peer vs. parent influence

4.3.1. Behavioral results

In addition to the primary analyses on the type of behavior and type of influence, we explored whether there were differences in conforming to parents vs. peers on Mutual Conflict trials. Exploratory analyses testing whether adolescents conformed more than chance level (i.e., CI does not include 50 %) to peers compared to parents revealed that adolescents had a 47.1 % probability of selecting their peer over parent on Mutual Conflict trials (95 % CI [42.4 %, 51.8 %]; Fig. 2A). These results suggest that, within adolescents, peers do not have a larger effect than parents when both parents and peers endorsed attitudes that conflicted with the adolescents' original attitudes.

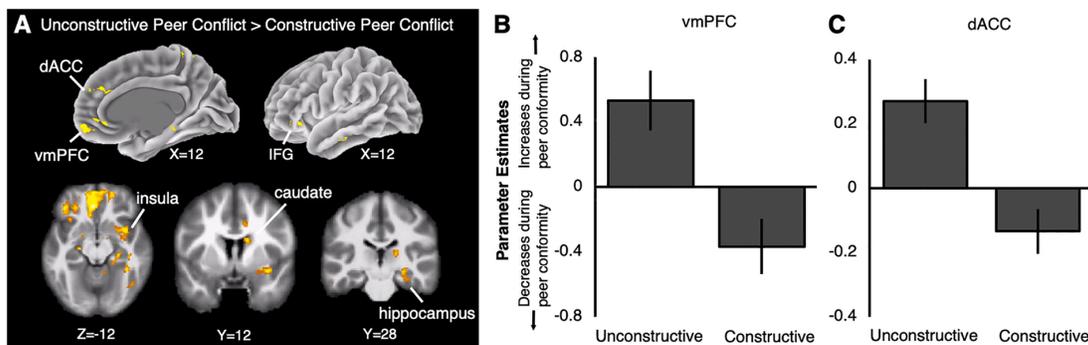


Fig. 3. Neural responses during peer conformity to unconstructive relative to constructive behaviors. A) Whole-brain results for the Unconstructive Peer Conflict > Constructive Peer Conflict contrast. Adolescents exhibited parametric increases in the B) ventromedial prefrontal cortex (vmPFC) and C) dorsal anterior cingulate cortex (dACC), and several other regions, during peer conformity toward unconstructive behaviors, whereas they showed decreases in these regions during peer conformity toward constructive behaviors.

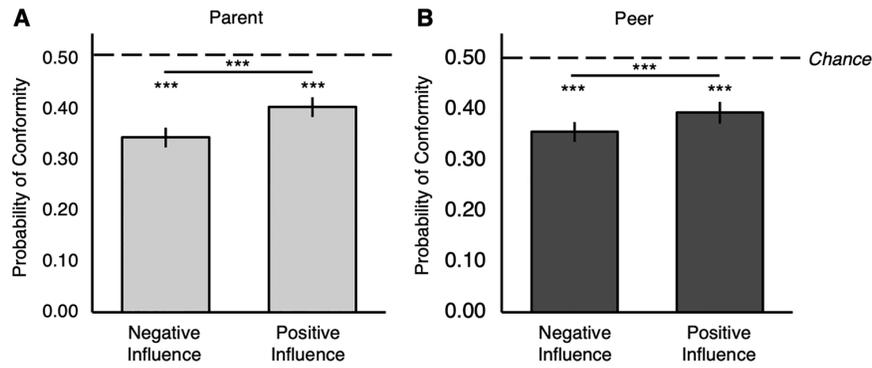


Fig. 4. Behavioral effects of type of influence. The mean probability of conformity is shown at -1 SD (i.e., negative influence) and +1 SD (i.e., positive influence) from the mean level of influence. Adolescents were more likely to conform when their A) parents and B) peers endorsed more positive influence than negative influence relative to what participants originally reported.

Note: Error bars represent the standard error of the mean. Decisions (i.e., conform or resist) that occurred significantly above or below chance level are denoted by significance stars above the condition, and decisions that varied across conditions are denoted with a significance bar. *** $p < .001$.

Table 4
Whole-brain condition effects by type of influence.

Anatomical Region	R/L	BA	x	y	z	t	k
<i>Negative Influence > Positive Influence</i>							
Temporoparietal junction	L		-50	-74	22	3.31	179
Cuneus	R	18	-4	-90	22	4.02	138

Note: L and R refer to left and right hemispheres; BA refers to Brodmann area of peak voxel; k refers to the number of voxels in each significant cluster; t refers to peak activation level in each cluster; and x , y , and z refer to MNI coordinates. fMRI results are reported at $p < .005$, with a corrected cluster size of 100 contiguous voxels. We included the absolute value of the difference between the participant's and the influencer's ratings as a parametric modulator (PM; range: 1–5), which identified neural activity in regions that tracked with the level of negative vs. positive influence.

4.3.2. fMRI results

At the neural level, we explored overall differences between the neural correlates of conformity to peer vs. parent attitudes on Mutual Conflict trials (Peer Conformity > Parent Conformity). Exploratory analyses at the whole-brain level suggest adolescents showed greater activation in the dorsolateral prefrontal cortex (dlPFC) ($xyz = -32\ 50\ 24$; $t = 3.53$; $k = 183$), OFC ($xyz = -26\ 28\ -16$; $t = 4.39$; $k = 191$), pSTS extending into posterior insula ($xyz = -50\ -34\ 8$; $t = 3.57$; $k = 313$), putamen ($xyz = -32\ -14\ 0$; $t = 6.30$; $k = 622$), and cuneus ($xyz = 16\ -92\ 28$; $t = 3.51$; $k = 983$) when they conformed to their peer over parent. No brain regions showed greater activation during conformity to parent over peer influence.

5. Discussion

The goal of the current study was to examine whether adolescents change their opinions when confronted with conflicting attitudes from their parents and peers, and characterize the neural mechanisms underlying conformity decisions across social influence contexts. In general, adolescents were more likely to resist than conform when confronted with opposing attitudes from others. When they did conform, adolescents were more likely to conform to their peers' attitudes toward constructive than unconstructive behaviors as well as when their parents and parents endorsed relatively more positive than negative influence. Exploratory analyses suggest peer influence did not outweigh parent influence overall. Neural responses in brain regions associated with valuation (e.g., vmPFC, subregions of the striatum), mentalizing (e.g., TPJ, pSTS), and salience monitoring (e.g., dACC, insula, IFG) may underlie context-dependent differences in parent and peer conformity. Collectively, these findings suggest that early adolescents may balance self- and social-related considerations differently across social contexts, which in turn guide decisions to conform to the conflicting attitudes of their parents and peers.

Overall, adolescents were less likely to conform when their parent or peer endorsed attitudes that conflicted with their personal attitudes, sticking with their pre-existing attitudes 65% of the time. These results suggest adolescents hold relatively consistent attitudes toward a behavior even when they conflict with others' attitudes. During early adolescence, youth become less willing to engage in behaviors that are inconsistent with their identity (Krieger et al., 2013) and start to show improvements in their ability to resist peer influence (Steinberg and Monahan, 2007). Consistent with prior work, our findings highlight the importance of adolescents' personal attitudes in buffering against conformity, such that youth are able to stand firm in their own attitudes even when confronted with opposing attitudes from parents or peers.

5.1. Attitude conformity toward unconstructive and constructive behaviors

When they did conform, adolescents were generally selective in who they conformed to depending on the social influence context. Whereas adolescents conformed to their parents' attitudes toward constructive and unconstructive behaviors at similar rates, they conformed to their peers' attitudes toward constructive behaviors more than unconstructive behaviors. Behavioral findings suggest that, when confronted with conflicting attitudes, adolescents may similarly incorporate their parents' conflicting attitudes toward constructive and unconstructive behaviors, but differentially evaluate and adopt their peers' conflicting attitudes based on the type of behavior.

According to a theoretical review that recasts conformity as a value-based decision (Falk and Scholz, 2018), valuation processes in the brain, with input from brain regions associated with salience monitoring and mentalizing, play a central role in encoding and responding to social influence. Consistent with this perspective, our neural results indicate that the vmPFC and striatum, brain regions associated with valuation (Bartra et al., 2013), and the dACC, insula, and IFG, brain regions implicated in salience monitoring (Menon and Uddin, 2010), show different activation patterns during conformity to conflicting peer opinions based on the type of behavior under consideration. Contrary to hypotheses, neural activity in these brain regions show decreases (rather than increases) during conformity to peers' attitudes toward constructive behaviors. These neural results were surprising given that rates of peer conformity were higher for attitudes toward constructive behaviors than unconstructive behaviors. Expected increases in brain regions implicated in value and salience monitoring were found only when adolescents conformed to peers' attitudes toward unconstructive behaviors. Although brain regions implicated in valuation and salience monitoring have been linked to conformity toward diverging group opinions, the direction of neural activity within these regions remains inconsistent between adult and adolescent samples (Falk and Scholz, 2018). In adults, it has been proposed that, similar to reinforcement learning in social contexts, a polarized response within brain regions

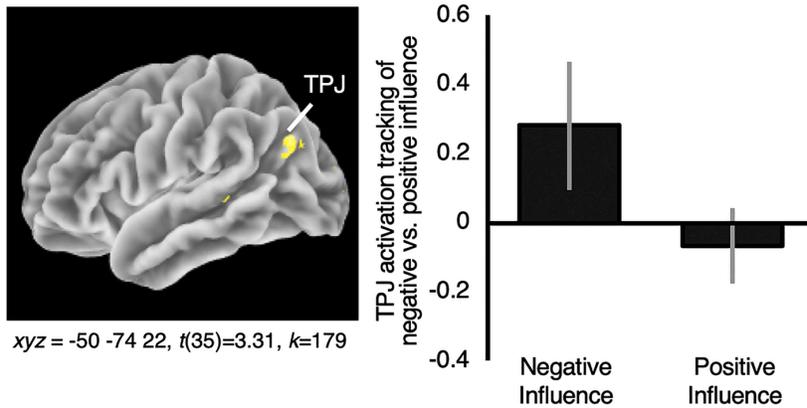
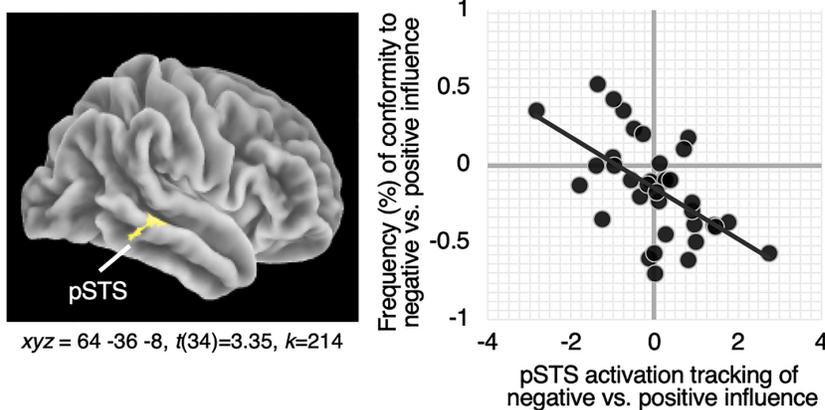
A Negative Influence > Positive Influence**B Decreasing with frequency of conformity**

Fig. 5. Neural responses during conformity to negative vs. positive influence. A) Whole-brain analyses revealed there were parametric increases in TPJ activation when adolescents considered conforming to relatively more negative influence and no parametric changes in TPJ activation when they considered conforming to relatively more positive influence. B) A whole-brain regression analysis with the average frequency of conformity revealed adolescents who exhibited greater posterior superior temporal sulcus (pSTS) activation when considering relatively more negative vs. positive influence had lower rates of conformity toward negative vs. positive influence.

associated with value and salience monitoring signals the need to update one's own preferences to align with group norms (Klucharev et al., 2009). In adolescents, however, increased activity in the brain's value system, among other cortical regions, is associated with greater conformity, with salience-related brain regions surprisingly not reported (Cascio et al., 2015b; Welborn et al., 2015). Our findings suggest that, when peers endorse diverging attitudes toward constructive behaviors, increased peer conformity in early adolescence may be supported by a downregulation of both value- and salience-related brain regions. Alternatively, increased activity in brain regions associated with valuation and salience monitoring may underlie the deterrence of peer conformity toward unconstructive behaviors, a finding reported in adults that is thought to indicate the increased salience of nonconformity to group norms (Berns et al., 2005; Tomlin et al., 2013). Collectively, these data replicate and extend prior research on adolescent conformity to conflicting peer opinions, suggesting that valuation processes in the brain are modulated by the type of behavior being influenced and highlighting the added role of salience-related signals in motivating peer conformity.

5.2. Attitude conformity toward negative and positive influences

Adolescents' decision to conform also depended on the extent to which their parents and peers endorsed relatively more positive or negative influence. When parents and peers endorsed relatively more positive attitudes than the adolescents' original attitudes (i.e., positive influence), adolescents were more likely to conform by adopting the

opposing attitudes of others. However, when parents and peers endorsed relatively more negative attitudes than the adolescents' original attitudes (i.e., negative influence), adolescents were more likely to stick with their pre-existing attitudes and resist conformity. These findings build upon prior work showing adolescents conform to their peers in both positive and negative directions (van Hoorn et al., 2016, 2014), and add to this literature by demonstrating that when confronted with both types of influence simultaneously, positive influence may outweigh negative influence in early adolescence, whether it be from parents or peers.

At the neural level, adolescents exhibited parametric increases in TPJ activation when considering higher levels of negative influence from parents and peers, but showed no changes in TPJ activation when considering higher levels of positive influence. Furthermore, adolescents who exhibited greater pSTS activation when considering relatively more negative vs. positive influence showed lower average conformity to negative over positive influence. Prior studies in adolescents have demonstrated that conflict with the group opinion is associated with increased activity in mentalizing-related regions, including the TPJ and pSTS, and higher rates of conformity (Cascio et al., 2015b; Welborn et al., 2015), which the authors interpreted to reflect the added mentalizing resources needed to understand and incorporate others' opinions when they deviate from one's own opinions. Surprisingly, we find no changes in TPJ activity during conformity to positive influences despite higher rates of conformity to positive over negative influences. Similar to comparisons between different types of behavior, expected increases in neural activity in mentalizing-related brain regions were

found only when adolescents conformed to negative influences. These data provide converging evidence that mentalizing brain systems play a significant role in shaping adolescent conformity. Greater mentalizing resources may be needed particularly when parents and peers endorse more negative than positive influences on adolescent attitudes, perhaps because such attitude discrepancies are more uncommon, ultimately rendering adolescents less susceptible to conforming toward negative influence.

5.3. Attitude conformity toward peers and parents

Exploratory analyses comparing parent to peer conformity revealed adolescents were equally likely to conform to their parents and peers when both endorsed attitudes that conflicted with the adolescents' attitudes (i.e., on Mutual Conflict trials). These results challenge prior research showing that one source of influence typically outweighs the other in adolescence (Biddle et al., 1980; Deutsch et al., 2017; Utech and Hoving, 1969) and suggest that, even when they endorse opposing attitudes, parents and peers exert a similar influence on attitudes toward everyday behaviors in early adolescence. Indiscriminate patterns of conformity toward peers and parents may have stemmed from the increased difficulty of resolving conflict between their own attitudes and those of multiple sources of influence. At the neural level, adolescents showed increased recruitment of several striatal and cortical brain regions, including the putamen, OFC, pSTS, and dlPFC, when conforming to their peers' over parents' attitudes when both endorsed attitudes that conflicted with adolescents' pre-existing attitudes. Value-based decision making models underscore that value signals in the striatum and ventral prefrontal cortex (including its orbital subregion) regulate a wide range of motivated behaviors, with self- and social-relevant considerations as key inputs to how the value of competing choices are evaluated (Baek and Falk, 2018; Pfeifer and Berkman, 2018). In contrast to the more social cognitive functions of the pSTS, the dlPFC is commonly implicated in self-control and goal-directed behavior, primarily for its role in regulating value signals assigned to competing choices (Hare et al., 2009; Miller and Cohen, 2001). Despite similar rates of attitude conformity to parents and peers, neural results suggest that brain regions associated with value, mentalizing, and self-control differentially support conformity to peers relative to parents in early adolescence.

5.4. Limitations and future directions

A major strength of this study is its ability to assess the range of susceptibility to conflicting influence across social contexts within adolescents. However, a few limitations should be noted. First, the generalizability of the current results to broader populations may be limited due to a relatively small sample size and recruitment of typically developing youth from higher socioeconomic backgrounds. In addition, the effects of peer and parent influence may be confounded by potential differences in the closeness of relationship (e.g., known parent vs. unknown peer) or the motivational relevance of the social actors employed in the current study (e.g., individual peer vs. peer group). Exploratory analysis comparing peers and parents revealed no behavioral differences in conformity, suggesting that the source of influence (parent/peer) may not be confounded with the known/unknown nature of these social relationships. Further, social influence manipulations were contingent on participants' original ratings, which unfortunately resulted in less balanced designs for some participants. Although linear mixed-effects models allow for unbalanced designs (Schielzeth and Nakagawa, 2013), future research should better optimize experimental conditions in order to appropriately disentangle the role of relational vs. contextual factors in motivating attitude change, and explore its durability or subsequent effects on modifying behavior in adolescence.

Second, because the binary-choice task forced participants to agree with either their parent or peer, it is unclear whether the decision to choose the person whose attitude matched their original attitude is the

same psychological process as resisting conflicting influence. Nevertheless, results indicate that adolescents did not always align themselves with the person whose attitudes matched their own, or make decisions arbitrarily (i.e., chance levels) or based on social preferences (i.e., greater conformity to the same person across conditions). Rather, participants' decision to align themselves with the person whose attitudes differed from their own depended on the type of behavior and influence, highlighting the importance of the social context in which conformity decisions unfold during early adolescence.

Finally, longitudinal research is needed to explore if and how these conformity patterns change across adolescence. Prior work suggests that developmental trajectories of parent or peer conformity vary significantly as a function of the type of behavior (Berndt, 1979), albeit this research has neither examined the simultaneous influence of parents vs. peers nor considered the role of adolescents' personal attitudes. Although future empirical work is warranted, one hypothesis is that known peaks in risk-taking behaviors during late adolescence (age 18–21) confer developmental shifts toward greater influence of peers over parents or greater susceptibility to the effects of negative over positive influence.

In conclusion, our study challenges many prevailing conceptions of adolescence as a time of excessive conformity to negative influence. We demonstrate that adolescence may be a time when youth are able to stand firm in their own attitudes rather than blindly conforming to the opposing attitudes of others; a time when peers exert a stronger influence on adolescents' attitudes toward constructive than unconstructive behaviors; and a time when positive influence is stronger than negative influence from both parents and peers.

Author contributions

E. H. Telzer and E. M. McCormick developed the study concept and design. K. T. Do and E. M. McCormick collected the data. K. T. Do performed data analysis and interpretation under the supervision of E. H. Telzer. K. T. Do drafted the manuscript, with critical revisions from E. H. Telzer and E. M. McCormick. All authors approved the final version of the manuscript for submission.

Declaration of Competing Interest

The authors report no declarations of interest.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.dcn.2020.100837>.

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