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Tibetan Buddhist monastic debate: Psychological and neuroscientific analysis of a reasoning-based analytical meditation practice

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Abstract

Analytical meditation and monastic debate are contemplative practices engaged in by Tibetan Buddhist monastics that have up to now been largely unexplored in Western contemplative science. The highly physical form of contemplative debating plays an important role in the monastic curriculum. Based on discussions and recorded interviews Tibetan monastic teachers and senior students at Sera Jey Monastic University and preliminary experiments, we outline an initial theory that elucidates the psychological mechanisms underlying this practice. We

then make predictions about the potential effects of this form of debating on cognition and emotion. On the basis of initial observations, we propose that successful debating requires skills that include reasoning and critical thinking, attentional focus, working memory, emotion regulation, confidence in your own reasoning skills, and social connectedness. It is therefore likely that the many cumulative hours of debate practice over 20+ years of monastic training helps to cultivate these very skills. Scientific research is needed to examine these hypotheses and determine the role that monastic debate may play in terms of both psychological wellbeing and educational achievement.

Keywords

Monastic debate, Meditation, Contemplative practice, Emotion regulation

1 Introduction

Although the literature on contemplative practices is burgeoning, the extant literature is almost exclusively restricted to the study of mindfulness and other concentration and awareness meditation practices (Dahl et al., 2015; Van Dam et al., 2018). Such practices represent only a small morsel of the palette in the contemplative tradition that further includes many practices focusing on self-enquiry (Dahl et al., 2015). Two practices that focus on self-enquiry and are common to Tibetan monastic traditions (especially the Gelug school) are analytical meditation and monastic debate. These practices involve a process of deep contemplation on the nature of mind and reality, which are said to result in shifts of consciousness that give the feeling of an elucidation of something that was unknown before (Kounios and Beeman, 2009). Both analytical meditation and debate rely on critical reasoning as opposed to authority or scripture. Given their centrality to monastic training in Tibetan Buddhism as a means of cultivating critical reasoning and wisdom, analytical meditation and monastic debate may have beneficial effects on cognition and emotion. For this reason, it is worth exploring in more detail whether those practices could provide suggestions for the improvement of Western psychological and educational practices. Moreover, these practices may provide benefits for physical and mental health even in old age. In this chapter, we first describe debate in general. This section is based on a review of the literature on monastic debate complemented by a series of interviews with approximately 30 monastics acquired over the course of 2 years. The interviewees include both novice and advanced monastics, as well as senior teachers and experts in monastic debate. We then outline a biobehavioral model of monastic debate, followed by some initial quantitative measures of its phenomenology. We also place monastic debate in the phenomenological matrix that has recently been proposed to categorize contemplative practices. Finally, we use the descriptions of analytical meditation and debate to speculate about how these practices may be of use in modern society in domains such as education.

2 General introduction of debate as a form of analytical meditation

2.1 What is monastic debate?

Monastic debate is a highly social practice in which the understanding of the memorized and contemplated material is deepened by means of constant questioning. “It is a creative activity that depends upon continually placing the thinking of participants at risk.” Unlike Western-style debate, in which the objective is to convince the opponent, this form of debate is more dialectic and serves to “carry the participants to logical conclusions they may not have otherwise realized.” (Lieberman, 1992). The main question that drives the debate is “What is the consequence of that?” (Tillemans, 2008).

Monastic debate is also unique in its physical manifestation with clapping movements, stomping on the ground and other specific gestures (see Fig. 1 for an impression) that make the debate more engaging and urgent. Importantly, monastics we interviewed explained that these gestures are symbolic reminders that the goal of each question posed is to remove ignorance and to compassionately alleviate misconceptions about reality. Debating can also involve humor, teasing, and even shoving matches between the various challengers to get the opportunity pose a question or make a statement (Dreyfus, 2008). The physical dimension of the practice may help the interlocutors to convert knowledge from mere intellectual knowledge to embodied knowledge.

Debates follow strict argumentation rules, intended to guide the debaters toward insights into the logical consequences of the defender’s statements. These insights

FIG. 1

Impression from a monastic debate at Sera Jey monastic University.

are important, because it gives the interlocuters a deeper understanding of the different theories in Buddhist philosophy and how they compare to each other. Moreover, it allows the debaters to examine what it would mean to really apply these philosophical insights in the context of other scriptures or everyday life. The structure of debates, with its emphasis on dissecting definitions and categories, ensures that both debaters are very clear on what they are talking about (Liberman, 1992).

In its simplest form, debate consists of an interaction between a defender, who is sitting down, literally defending their ground and being held to consistency of the assertions he or she^a agrees to, and the challenger, who is standing and challenges the statements of the defender without being held to consistency for their statements (Dreyfus, 2008). Challenger and defender take turns in the debate. The challenger is making statements, often in the form of syllogisms, and sometimes accompanied by quite active movements and strongly expressed emotions. Monastics we interviewed explained that the goal of the challenger is to demonstrate an inconsistency in the defender's argumentation, and when one is detected, s/he emphasizes that by a loud utterance of "tsa!" In contrast, defenders can only choose from one of four response options to each of the challenger's statements: (1) I agree, (2) please state a reason why, (3) the reason is not established, or (4) no pervasion (i.e., the statement does not apply to this class/these beings; Lama, 2018; Sera Jey Science Centre, 2015).

In general, being the defender is considered to be the more challenging role in the debate, because the defender has no agency about the topic of the debate and direction in which it flows. Not surprisingly, therefore, the final examination in the Gelug monastic tradition requires the candidate to make a monastery tour and serve as a defender in all the major Gelug monasteries (Sera, Drepung, Gaden)—thereby requiring the candidate to face many unfamiliar challengers.

Another important characteristic of debate is that long pauses with silence are considered a weakness—and when they occur, either debater can be ridiculed by the onlookers or be the victim of a counterattack (Liberman, 1992, 2008). Hence, debaters must develop the ability to think quickly. Frequently, sessions begin with debate being practiced with just one defender and one challenger. In the second part of a typical debate session, group debates are conducted that consist of multiple challengers and/or multiple defenders. We have observed that the groups are fairly fluid with 1–4 challengers and 1–4 defenders, and the rest of the class of up to 30 people observing. These observers may sometimes jump in when a debate is really engaging, wanting to help the challenger or defender, or to respond to outrageous statements of one of the debaters.

Debate has a theatrical quality, in which debaters show dramatic movements and sounds (MacPherson, 2000). This staging contributes to the joyful and captivating quality of debate (Liberman, 2015). The dramatic show is also used to impress both

^aTraditionally, much debate was done by male monastics, but recently also female monastics have started to engage in debate and obtain higher degrees in Buddhist studies. For a more extensive description of debate practices by female monastics, see MacPherson (2000).

observing senior monks tasked with assessing the debate sessions, and wider audiences, for example during the debate exams (Lieberman, 1992). The function of the observing mentors is to ensure that debaters follow the rules and to provide guidance, especially to younger monastics that are still getting familiar with logical reasoning found in Buddhist philosophy.

2.2 Types of monastic debate

Monastics we interviewed report that two important classes of debate are counting debates and logic debates. Counting debates focus on having the debaters jointly trying to recall a text, its outlines, enumerations, and definitions. By contrast, logic debates focus on trying to find out what conclusions are consistent and what conclusions are inconsistent with premises contained within the text (Lama, 2018). For this reason, a counting debate tends to precede a logic debate. Nevertheless, a real-life debate may meander in and out of counting debate when it is needed. Monastics told us that debates typically begin with a focus on reproduction of definitions of terms, which is then followed by a dissection of these definitions in terms of their logical consequences and consistencies/inconsistencies with other sources. Whereas the recitation of a definition would be part of the counting debate, the dissection of its consequences would be part of the logic debate. Debates also meander between periods in which the structure of debate is rigidly applied, and periods in which the discussion flows more freely (Lieberman, 1992).

2.3 How is debate taught?

Debate is a crucial component of Tibetan monastics' philosophical training. First, monastics listen to and read the material to be studied, then they memorize and contemplate the text, and finally they test and deepen their understanding through the practice of debating (Dreyfus, 2003). Monastics report that debating is a critical part of their training because their own logic and reasoning becomes the final authority, as opposed to relying completely on scripture.

Debate is found playing differing roles in each of the four major schools or traditions of Tibetan Buddhism. At the major monastic universities of the Gelug tradition, such as Sera Jey Monastery, monastic debate is first taught when monks are approximately 14 years old. To learn the rules of logic and argumentation on abstract topics such as colors, students first memorize scripted debates and simply read them out like play (Dreyfus, 2003). They gradually shift toward actual debating, but still following the scripts fairly strictly as they continue to learn the rules of logic and argumentation on abstract topics such as colors. After approximately 2 years, the focus has shifted from learning the skill of debate to using debate as a tool to acquire knowledge about the studied texts. Debating continues for a total of about 20 years, until monks obtain their Geshe degree (the endpoint of education, roughly equivalent to a PhD). Not all monks finish this whole curriculum. Some specialize in other topics such as ritual, others obtain jobs as administrators, and some leave the

monastery. During the academic session (approximately 10 months per year), debate is practiced for approximately 5 h per day, at least 6 days a week in monasteries in the Gelug tradition of Tibetan Buddhism. A monk that graduates with a Geshe degree will have spent more than 25,000 h in debate practice. Once a year, debates take place between the different classes. Monastics report that these inter-class debates are an extra challenge because the debaters must now face opponents with unfamiliar knowledge and strategies. Other traditions rely less on debate; for example, Namdroling monastery, which is part of the Nyingma tradition, debate is practiced for only 1–2 h a day, for typically 8 years, and this allows these monastics to take more classes (Lempert, 2012).

2.4 Debate and analytical meditation

In monastic training, debate (*riglam*) is complemented by seated, individual analytic meditation (*ché gom*). In fact, debate may best be regarded as an embodied and social form of analytical meditation. In fact, monastics have referred to analytical meditation as “self-debate.” During individual analytical meditation, the practitioner contemplates a passage of text or an idea in their minds. This reasoning-based form of sitting meditation is sometimes alternated with resting meditation without any particular object of focus (*jok gom*), which is thought to allow new insights to consolidate and become embodied (Desbordes and Negi, 2013; Kongtrul, 2003).

3 A biobehavioral model of monastic debate

On the basis of the phenomenology described earlier, we can start to develop a biobehavioral model of monastic debate, which can result in testable predictions for future studies. When debating, the two interlocutors start with a relatively empty slate; especially the defender will entertain a low cognitive load and a neutral emotional state. This situation arises because the defender has no idea what will happen, while the challenger can already prepare in their working memory a mental representation of the line of argument they want to pursue. Then, as each statement in the debate is made, the debater’s cognitive load increases, since they have to keep track of each statement that is made in order to prevent agreeing to contradictory statements (defender) or detect contradictions (challenger). The increase in cognitive load is accompanied by a filling of working memory with the statements the debaters have tracked. This filling of working memory likely reduces distraction by external phenomena, because so much attention is needed for the inward focus (Taaten et al., submitted). On a neural level, we expect that as the debate progresses, there is increased engagement of the fronto-parietal attention network. Specifically, the need to keep more and more information in working memory may be associated with increased engagement of the dorsolateral prefrontal cortex (Eriksson et al., 2015), while the continuous need for monitoring for logical contradictions may be

associated with activation of the anterior cingulate cortex, similar to what has been observed in other meditation practices (Posner and Petersen, 1990; Tang et al., 2015). The strong internally directed attention required for the practice may in electroencephalography (EEG) measurements manifest itself as increases in mid-frontal 4–9 Hz theta oscillations, which have also been observed in other meditation practices (Cahn and Polich, 2006).

However, attention and working memory are not the only critical cognitive functions involved in the practice of debate. Debating also requires very fast cognitive processing, as quick replies are required—there is little time to think. In other words, debate is likely to press on the speed of processing. Speed of processing has been related to brain health in general, but not to specific brain regions (Penke et al., 2010).

Similarly, mental flexibility is key: being able to look at a set of propositions from many different angles to be able to out-manuever the opponent. In the brain, cognitive flexibility is associated with activation in a wide range of areas such as the anterior cingulate cortex and prefrontal cortex (Leber et al., 2008).

Given the strong memory requirements of the practice, debate may also be associated with activation of the hippocampus and the medial temporal lobe, especially during counting debates. The logical reasoning that is continually needed during debate practice should result in increased activation in the left prefrontal cortex and left parietal areas (Goel, 2007).

As the debate proceeds, not only more working memory skills are needed but also increased emotion regulation. Challengers often employ tactics to distract their opponent, e.g., by making fun of them or displaying anger. If the defender gives in to these emotions, this is likely to impair their reasoning and ability to maintain their line of argumentation. Consequently, successful debating likely requires strong emotion regulation skills. While the defenders are the ones that most frequently face challenges in debate because they are not able to choose the topic of the debate and are subject to the emotional challenges of the challenger, also the challenger her- or himself can face difficulties. For example, the challenger can realize they do not remember a certain part of the text that is being debated and thereby be unable to corner the defender. Also bystanders, the debate observers, can create feelings of frustration in the challenger with their comments about the debate. As debaters learn to manage their emotional arousal better in the face of these challenges, we suggest that this could be associated with increased dorso-lateral prefrontal cortex and decreased amygdala activation (e.g., Desbordes et al., 2012), together with increased activity in the caudate, an area crucial for emotion regulation (Kirk et al., 2011).

Continued practice of debate may result in the improvement of the debater's ability to handle high cognitive load situations as well as emotional challenges. In addition, and more speculatively, the practice is thought to result in new insights into the nature of reality. Such insights may be similar to “aha” moments that have been described in the literature on problem solving. Such “aha” moments are typically associated with increases in parietal gamma oscillations in EEG, and in fMRI activity in the right superior temporal gyrus.

Some of the insights cultivated in debate are thoughts to reduce the attachment to the importance of the self (Sahdra et al., 2010), as well as lead to reduced self-related elaboration. This reduced sense of self-related elaboration may psychologically manifest as an increase in decentering (Bernstein et al., 2015; Fresco et al., 2007) and neutrally as decreased activation of the default mode network (Christoff et al., 2009) including especially the posterior cingulate cortex (Garrison et al., 2013). On a behavioral level, a decreased sense of self-importance may be associated with increases in altruistic behavior.

In summary, monastic debate is likely associated with strong activation of the brain's memory and cognitive control systems, which increases as the debate continues of time. In addition, debate requires significant emotion regulation skills. Over time, debate may have important impacts on the nature of self-related processing. Different forms of debate have different cognitive demands. While counting debates tend to be more collaborative and are often considered to be easier, logic debates are thought to be more challenging and require more attentional resources. In the next section, we will begin to assess some of these claims by quantitatively assaying the events that occur during debating.

4 Quantifying the phenomenology of monastic debates

The performative nature of monastic debates lends it to quantitative assessments of its phenomenology. In this section, we will present analyses as well as a differentiation between logic and counting debates on the basis of mental states predicted by our biobehavioral model.

4.1 Methods

A method to assess debate phenomenology is by means of second-person judgments obtained during simultaneous measurement with dyadic EEG (reported in van Vugt et al., submitted). These second-person judgments were derived from rating video segments of debates from the EEG study on a set of predefined events of interest. In particular, the events of interest were defined on the basis of discussions with the monastic collaborators about the kinds of events that occur during debating. The monastic authors on this chapter nominated periods of agreement and disagreement as important events identifiable in debate. Agreement refers to an exchange where both debaters subscribe to the same set of statements, while disagreement refers to an exchange where the set of statements that the two debaters agree to differ from one another. Perdue (2014, location 8267) gives the following example of an exchange that could occur during a debate:

“Challenger: How do these two compare—direct perceivers and valid cognizers?

[..]

Defender: They are mutually inclusive. [..]

Challenger: It follows that they are not mutually inclusive.^b Give a reason justifying that they are mutually inclusive. [...]

Defender: Because they are different, whatever is a direct perceiver is necessarily a valid cognizer, and whatever is a valid cognizer is necessarily a direct perceiver."

We have used this classification system most intensively in a series of 54 debates that were part of the parent EEG study, wherein we classified the occurrence of expected events of interest from video recordings. Approximately half of these debates were 10-min counting debates, and half were 15-min logic debates. Since counting debates involve the simple reproduction of the material that is debated, those tend to be shorter. The debates were scored by at least two raters, and here we take the average judgments of these raters.

We compared the ratings by means of repeated measures ANOVA performed in the R statistical language (R Core Team, 2013).

In addition, we used Bayes Factors (Morey and Rouder, 2018) as they are helpful to indicate the relative amount of support for the hypotheses under consideration instead of just providing a probability of rejecting the null hypothesis. For example, the BF_{10} , which is the statistic we report here, indicates how much more evidence there is for the alternative (H_1) than for the null hypothesis (H_0). A BF_{10} of three indicates that given the data, the alternative hypothesis is three times as likely as the null hypothesis. Conversely, a BF_{10} of 0.1 indicates that there is 10 times ($1/0.1$) as much support for the null hypothesis than for the alternative hypothesis. This conveniently demonstrates another advantage of Bayes Factors: they can not only quantify support for the alternative hypothesis but also for the null hypothesis.

4.2 Analysis of debate events

In Fig. 2, we show the proportion of time during the debate that debaters were classified as expressing agreement versus disagreement, separately for the counting and the logic debates. As we predicted, the amount of agreement is higher during the counting debates than during the logic debates, while the amount of disagreement is higher during the logic debates. Indeed, while there is no significant main effect of debate type on the ratings (logic versus counting; $F(1,52)=1.40$, $P=0.24$, $BF_{10}=0.274$), there is a significant main effect of agreement ($F(1,52)=20.4$, $P=3.65 \times 10^{-5}$, $\eta_g^2=0.22$, $BF_{10}=1.05 \times 10^5$) and a significant interaction between agreement and debate type ($F(1,52)=13.4$, $p=5.8 \times 10^{-4}$, $\eta_g^2=0.16$, $BF_{10}=3.05 \times 10^3$).

^bThe seemingly illogical assertion here is a trick by the challenger. This is where the disagreement starts: the defender adopts the position that the two are mutually inclusive, while the challenger thinks they are not mutually inclusive. More precisely, according to Buddhist philosophy, all direct perceivers are valid cognizers, but valid cognizers are not necessarily direct perceivers, because valid cognition can also come about through valid inference (<http://www.rigpawiki.org/index.php?title=Pramana>).

FIG. 2

Fraction of the time the debate during which debaters agree or disagree. Any moment in the debate could be classified as “agreement,” “disagreement,” or “undefined.” Error bars reflect standard error of the mean.

The monastics we interviewed said that another important common occurrence during debate is when one of the debaters is in a place in the argument where their only next option is to contradict themselves, or when they are led into a topic area they have not properly memorized, and therefore cannot effectively debate. The defender is relatively more likely to get into this kind of difficulty because given the rules of debate, s/he has no control over the topic that is being discussed, and therefore cannot steer the debate toward topics for which s/he feels more confident. Fig. 3 indicates how often a debater is bested over the course of the 15-min debate. Indeed, the defender gets into difficulty more often than the challenger ($F(1,52) = 41.6$, $P = 3.76 \times 10^{-8}$, $\eta_g^2 = 0.24$; $\text{BF}_{10} = 2.77 \times 10^6$).

Debaters overall find themselves more often in challenging situations (for example, when the next move is likely to lead to a contradiction) during logic debates than during counting debates ($F(1,52) = 6.8$, $P = 1.21 \times 10^{-2}$, $\eta_g^2 = 0.07$; $\text{BF}_{10} = 4.07$). This is not surprising given the more confrontational nature of logic debates compared to counting debates. It is not clear whether there is an interaction between these two variables because the classical statistics are not significant and the Bayes Factors do not give strong evidence either way ($F(1,52) = 2.32$, $P = 0.13$; $\text{BF}_{10} = 2.67$).

Finally, we examined how often monks were judged to be attentive or distracted by the debate observers during the different types of debates, and how frequently they were judged to have difficulty remembering something. In our biobehavioral model, we predicted that logic debates were more challenging than counting debates. In contrast, counting debates require more memory retrievals. Indeed, the data plotted in Fig. 4 support these hypotheses; the frequencies of both focus and distraction are larger during logic debates than during counting debates. This is confirmed by a

FIG. 3

Frequency with which the defender and challenger are in difficulty as a function of debate type. Error bars reflect standard error of the mean.

FIG. 4

Self-reported levels of concentration and distraction during different types of debates. Error bars reflect standard error of the mean.

main effect of mental state in a repeated measures ANOVA ($F(2,104)=5.9$, $P=3.7 \times 10^{-3}$, $\eta_g^2=0.07$, $BF_{10}=8.61$). It is not clear whether there is a main effect of logic versus counting debates ($F(1,52)=3.1$, $P=0.082$, $BF_{10}=0.45$). Less surprisingly, we can see that having difficulty remembering something is particularly common during counting debates, which are centered around recalling the study texts. This prediction is confirmed by a significant interaction between mental state and debate type ($F(2,104)=11.6$, $p=2.86 \times 10^{-5}$, $\eta_g^2=0.13$, $BF_{10}=4.00$).

In short, we found that in logic debates the proportion of time disagreeing is almost the same as the proportion of time agreeing, while during counting debates the majority of time is spent in agreement. We also found that the defender got more into trouble than the challenger, especially during logic debates. Finally, we found that there is more distraction but also more strong focus during logic debates than counting debates, while there is more difficulty in remembering during counting compared to logic debates.

5 Comparing debate to other meditation practices

Recently, a phenomenological matrix has been offered as a means to classify and compare contemplative practices (Lutz et al., 2015). Here we will attempt to fit monastic debate into this matrix. The phenomenological matrix initially emphasized two main practices: open monitoring and focused attention meditation, as variants of these are two meditation practices are the most commonly practiced in the West (Lutz et al., 2008). Whereas focused attention meditation practices involve paying attention to a single object of focus such as the breath, open monitoring meditation has no specific focus and involves a simple non-judgmental monitoring of whatever occurs in the mind. The exercise of placing debate into the phenomenological matrix may help us to understand where it is similar, and where it is different, from meditation practices more frequently described in the literature. It may also reveal where the phenomenological matrix is not able to capture crucial aspects of the practice at all.

In the phenomenological matrix, contemplative practices are initially classified along a series of functional dimensions. The first functional dimension is object orientation, referring to whether the practice entails the utilization of a particular object to retain focus. Whereas focused attention meditation is strongly focused on an object (e.g., the breath), open monitoring meditation has little object focus. Using these criteria, monastic debate perhaps does not fit well into either category. The object that is kept in focus is the text that is being discussed and the utterances that have preceded. Such an object is considerably more complex than meditation objects such as the breath or a visual image that are common in focused attention meditation.

The second functional dimension is referred to as “dereification,” which as “the degree to which thoughts, feelings, and perceptions are phenomenally interpreted as mental processes rather than as accurate depictions of reality” (Lutz et al., 2015). Dereification in the mindfulness literature is more commonly referred to as decentering (e.g., Bernstein et al., 2015). In debate, a decentered perspective may be cultivated, for example, by systematically using reasoning to investigate where thoughts come from, how they arise from circumstances, how they are impermanent. Hence, this systematic investigation can generate a meta-cognitive perspective on one’s thoughts. In addition, the investigation can lead to a deep, reasoned, and

intellectual understanding of concepts such as impermanence. Monastics report that because this understanding is based on reason, it will not disappear as quickly as an understanding of the decentered perspective that arises on the basis of feelings that occur during mindfulness meditation. Reasoned understanding of the decentered perspective can take substantial time to develop, in contrast to the fleeting experience of decentering that arises even during practice of beginning mindfulness meditators (Hoge et al., 2015). This leads to the testable hypothesis that the amount of decentering during debate is initially less than during mindfulness, but with increasing experience, the amount of decentering during debate increases.

The third functional dimension is meta-awareness, which is defined as a state in which attention is directed to noting the current contents of consciousness (Lutz et al., 2015). As discussed in the biobehavioral model, meta-awareness is also crucial for monastic debate, in which the interlocutors have to continually monitor the train of thoughts for contradictions.

Contemplative practices are further classified according to a set of qualitative dimensions. These qualitative dimensions are mostly relevant for sitting meditation practices that focus on sensory objects and do not apply well to monastic debate. The first qualitative dimension is “aperture”—the width of the meditator’s attentional focus. The monastics have indicated that during debate, the attention is not focused so much on sensory objects, but instead on the progression of the dialog and the text that is being debated. The second qualitative dimension is vividness, a subjective sense of clarity of the meditation object. Since monastic debates do not focus on sensory objects, vividness does not seem to be such a relevant dimension. The third qualitative dimension is stability. For experienced debaters, the debate state can be so stable that they forget time completely, and find themselves debating until the next morning (Lieberman, 1992). Finally, meditation practices differ along the qualitative dimension of effort. Monastics indicate that subjectively experienced effort decreases in debates as the practitioners become more accomplished.

6 Potential applications of debate in societal domains

Having described the practices of analytical meditation and monastic debate, it is important to think about how it can be of most benefit for modern society. This first requires an analysis of its potential cognitive and affective mechanisms, followed by the societal applications.

6.1 What skills may be cultivated by monastic debate?

A worthy question to ask is what cognitive and affective mechanisms may be impacted by practicing these forms of meditation. Monastics we interviewed told us that the main reason for engaging in debate is to try to understand the true nature of phenomena so they can uproot their negative emotions and move closer toward

enlightenment. On a more mundane level, monastic debate may also enhance memory and understanding of the texts that are being studied.

From a Western perspective, practicing debate could develop a wide array of cognitive and emotional skills. One skill that is likely to be cultivated in the study and practice of monastic debate is logical reasoning. To be a successful debater, one needs to develop solid skills in logical argumentation. Dreyfus (2008) writes that “Tibetan debates aim at maximizing the rationality of the discourse of its participants.” The whole debate is centered around using reasoning to find logical consequences of assertions and inconsistencies between them. In fact, according to Geshe Lhakdor, head of the Library of Tibetan Works and Archive, debate is also used to develop “an inquisitive mind, capable of asking and answering questions by using logic and consistency” (Byłów-Antkowiak, 2017). Hence, the first years of debate training consist of learning to use the rules of logic by reasoning about simple objects such as colors (Dreyfus, 2003; Perdue, 1992). Our phenomenological analysis demonstrates that logical reasoning is trained more during logic than during counting debates (Fig. 2). Logic is not necessarily trained in individual analytical meditation, in which reasoning is confined to the individual, and therefore logical fallacies cannot be exposed by another person. Together, this suggests that debating can help reduce the likelihood of logical fallacies and thereby improve the quality of reasoning.

Another skill that is necessary for being a successful debater—and therefore likely to be cultivated by this practice—is focused attention, the ability to block out all external and internal distractions. Debaters commonly report that they do not perceive anything around them while they debate. Their attention is purely focused on their mental model of the debate and on their opponent(s). Monastics told us that this ability to block out everything else is considered to be a quality of a proficient debater, which also allows them to study effectively during the preparation of the debate (i.e., engage in analytical meditation). Consistent with these reported subjective experiences, we have collected EEG data that support the idea that focused attention is cultivated by debate practice (van Vugt et al., submitted). In addition, our quantitative analysis showed that more focused attention is required during logic than during counting debates (Fig. 4).

Monastics have also told us that debaters steadily cultivate an ability to plan debating moves, much like chess-players, so that they can corner their opponent more effectively into adopting a contradictory position. In addition to planning ahead, a successful debater needs to keep track of the previous utterances of both interlocutors to protect against uttering inconsistencies while noting the opponent’s inconsistencies. Thus, debate likely relies strongly on working memory, where working memory is defined as a limited-capacity system that temporarily maintains, manipulates, and stores information (Baddeley, 2003). Such planning abilities of proficient debaters are not only trained *during* the practice of debate but also afterward, when good debaters replay the debate in their minds and review what went well and strategize about what other strategies could have worked better. The replay of past

debates and the development of new debate strategies can also become the focus of subsequent more formal analytic meditation practice.

Another potential by-product of analytical meditation and debate is the development of emotional awareness and adaptive emotion regulation strategies. For instance, during monastic debate, one observes periods of what appears to be disgust and loud aggressive vocalizations that are quickly followed by bursts of laughter or joy, and/or periods of relative soft-spoken calmness. In addition, monastics report that early on in one's training, debate is highly intimidating, and can provoke genuine fear, frustration, and anger. However, they also report that as they continue to practice debate, and experience that humiliation or undergoing the other's seemingly harsh interrogation is not as bad as anticipated, they develop a sense of humor with their emotions that create resilience (see also the first-person account of this process by [Dreyfus, 2003](#)). Debaters report that although strong emotions may still arise as before, they no longer have as much impact. They are more able to respond in a controlled manner to the situational arising of their emotions.

Notably, monastic debate is a highly social practice, which is significant because it has recently been demonstrated that contemplative practices that are social in nature are particularly powerful for reducing stress ([Engert et al., 2017](#)). As years progress, monastics report they develop a strong sense of social connectedness cultivated by the highly social nature of the debate. Although a strong foundation of social connectedness is supported by the communal living in the monasteries and nunneries, debating appears to amplify the ability of monastics to empathize with one another, and to predict the other's responses. Monastics are likely to acquire a strong sense of how to play with the opponent's emotions, an sensitivity to how to regulate ones' own emotions.

Social connectedness may well be measurable by modern neuroscience methods ([Dumas et al., 2010](#)). For instance, EEG hyperscanning has been demonstrated to pick up neural patterns related to empathy in Western samples ([Astolfi et al., 2015](#))—suggesting that changes in the inter-person communication during the debate may well be measurable with this method. Somewhat in-line with this idea, we found that there are differences in frontal alpha inter-brain synchrony between different states in the debate, although we observed only little change in inter-brain synchrony with experience ([van Vugt et al., submitted](#)).

Monastic debate appears to be a means to develop a sense of confidence in one's ability to reason independently ([Perdue, 2014](#)), since debaters learn to defend their reasoning against attacks from their interlocutors ([Fig. 3](#)). As monastics gain experience in winning another over through their arguments, they acquire confidence in their own ideas, instead of having to merely rely on outer sources of authority. Such confidence is beneficial for the development of independent and critical thinking ([Facione et al., 1995](#)). Moreover, the monastics say that debate gives them confidence in their knowledge of Buddhist philosophy and in the Buddhist philosophy itself.

Finally, given the highly physical nature of debate, this practice offers an outlet for the monastics' physical energy while also making the elaboration and integration of nuanced philosophical arguments more lively, playful, and motivating. Monastic debate can be thought of as a particular form of contemplative exercise, which suggests it is relevant to compare monastic debate to other forms of contemplative exercise such as tai chi and yoga (Kerr et al., 2013). However, tai chi and yoga are typically practiced quite slowly and have a much lower cardio-vascular intensity than debate, during which heart rates going up to 180bpm have been observed.^c

6.2 Potential uses for monastic debate in Western education

Some of the major challenges facing education are teaching critical thinking (Holmes et al., 2015) and increasing student motivation (Pintrich, 2003). Thus, if appropriately adapted outside of monastic context, debate could potentially become a pedagogical tool to help develop those skills (see MacPherson (2000), for a description of how debate is used in Tibetan schools in India). For instance, debaters practice continually seeing things from many different perspectives, so that they can philosophically maneuver in response to their opponent. In addition, they train in identifying the consequences of different lines of argumentation so that they can catch the inconsistencies in the opponent's reasoning. These capacities are crucial for critical thinking. Anecdotally, some of the monastics we interviewed mentioned that debate often afforded new insights when their opponents questioned assertions that they never thought about.

Debate also turns out to be highly motivating, bringing excitement to highly abstract, and challenging study material by means of its competitive nature and its active physical and theatrical form (MacPherson, 2000). As Dreyfus (2008) writes "rhetorical and performative elements are not just disruptions of a smooth system of logical connections, but give life to a practice that would otherwise be too boring to keep the attention of a large number of participants." Further supporting this idea, we once watched a particularly vigorous debate which turned out to only be about a technical grammatical issue. In his book, Dreyfus also mentions that debate serves to gather the intellectual qualities of both debaters, and the audience to help elucidate the fine technical details in even the most abstract of topics.

The prospect of enlivening educational material has led secular Tibetan secondary schools to utilize the monastic style and rules of debate as a pedagogical tool (Byłów-Antkowiak, 2017). More concretely, Byłów-Antkowiak (2017) gives the example of how a math lesson in such a school may involve debating about the definition of prime numbers, and a student challenger may ask a student defender questions such as: Is 5 a prime number? Is 8 a prime number? And just like debate

^cThese heart rates were observed during an in-class demonstration of the Emory-Tibet science initiative taking place at Drepung monastery in June 2018.

in the monastery, asking these questions are punctuated by claps. Similarly, analytical meditation could have a place in Western education, allowing students to test their knowledge thoroughly in a fun and physically active way. The relatively recent field of contemplative education (Barbezat and Bush, 2013) makes some efforts to integrate the method of analytical meditation in modern education, but has not yet considered monastic debate.

In addition to potential functions in education, analytical meditation could potentially also play a role in the enhancement of psychological wellbeing. For example, critical deficiencies underlying major depressive disorder are associated with an inability to decenter (Bernstein et al., 2015; Fresco et al., 2007) and impairments in working memory and emotion regulation (e.g., Disner et al., 2011; Koster et al., 2011). If debate practice can enhance the capacities of decentering, working memory, and emotion regulation, as we have suggested above, then this should also help to create resilience against relapses of depression. More specifically, monastics we interviewed gave examples of how debate practice helps them have a wider perspective on their thoughts, as well as an increased capacity to observe their thoughts from another person's perspective. Since negative self-referential thinking is a crucial hallmark of depression (Disner et al., 2011; Marchetti et al., 2016), an ability to step outside of this self-referential thinking could be beneficial to depressed patients.

6.3 Challenges and future directions

Although we believe it is important to study monastic debate, this form of contemplative practice remains a difficult endeavor to investigate with rigor and contemporary scientific methodology. Moreover, studying debate requires a tremendous amount of cultural sensitivity to establish trust and good communication. Having a research team that involves Tibetan monastics is crucial for at least two important reasons. First, because of being embedded Tibetan monastic tradition, monastics' experience with analytical meditation and debate offer key insights on how best to frame the scientific questions to pose. Second, in a very pragmatic sense, scientists not fluent in formal Tibetan must rely on monastics who have learnt Western languages to instruct their fellow monastics in the tasks of the study, as well as to translate the findings. An important case of where this trust and their multi-lingual knowledge allowed this collaboration to advance occurs from the moment to moment assessments during debate with measures such as EEG. As discussed above, those investigations rely crucially on temporal markers of events of interest. Such events can only be generated with the help of people familiar with debate, and who are able to recognize the identified moments (e.g., agreements, disagreements, etc.) when they occur (van Vugt et al., submitted). Moreover, this inclusion of the emic perspective in the scientific investigation helps to realize a richer understanding of the phenomenon under a study that is not restricted to the categories and theories of Western psychology and neuroscience.

Another important challenge in the study of monastic debate lies in the choice of outcome measures. Both self-report (e.g., questionnaires that tap emotion regulation) and behavioral measures (e.g., a logical reasoning task) that are routinely used for Western undergraduates may not even be appropriate for people from other traditions and social and cultural backgrounds (Davidson and Harrington, 2001; Henrich et al., 2010) and may lead to misunderstanding or unexpected results. To make those measures usable with other populations, intensive discussion and piloting with intelligent multi-lingual collaborators from within the communities themselves are required (Davidson and Harrington, 2001). Moreover, a proper study of monastic debate may require the development of novel measures that are more geared toward the mental habits and cognitive experiences that monastics build up in their career, which may be quite different from the mental habits of Western college students, who are usually the participants in scientific studies. For example, instead of measuring memory with a task such as free recall—in which participants are shown lists of meaningless words to remember on a screen, after which they are asked to recall this list in any order—we may develop a cognitive task in which monastics are requested to memorize a philosophical argument and recall it in order. This task is closer to the tasks Tibetan monastics experience on a daily basis.

To build a productive collaboration with monastics, it is important to have a cadre of monks who are trained in scientific methods. Fortunately there have been efforts in recent times to improve the science training of Tibetan monastics (e.g., Desbordes and Negi, 2013; Hasenkamp and White, 2017; Sager, 2013). Herein lies an opportunity for collaborative cross-cultural research, in which monastics who have undergone science training themselves are involved in the scientific study of debate. Those monastics can help conduct the scientific studies of monastic debate, while at the same time learning about how science is conducted in real life. In this way there is a synergy between teaching science and conducting science at the same time. We believe that only in this way we can begin to understand the treasure chest that is monastic debate, and bring benefits to modern society in both the East and the West.

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