My Thinking Your Thinking

Critical Thinking course for secondary schools

My Thinking

Your Thinking

critical thinking course for
Pakistan Secondary Schools

میری سوچ آپکی سوچ

Final Report for
United States Institute of Peace

About the project partners

The IC Thinking method is designed to increase complex and critical thinking. Developed and tested at the University of Cambridge over the past twelve years, IC Thinking courses for young people in England, Scotland, Kenya, Bosnia-Herzegovina, Kosovo, Macedonia, Finland, Sweden, Nigeria, Iraq and now Pakistan have shown consistent and significant results across different ages, educational levels, type of extremism or intergroup tension, and across security, prevention and education contexts. Results show increased cognitive complexity and critical, flexible thinking about social issues, along with gains in perspective taking, contextual reasoning, pro-social conflict resolution and citizenship values, which together indicate resilience to extreme thinking, with growing evidence for sustained behaviour change.

For this project, 'Education Program for Pakistan Secondary Schools' (2019- 2021), Dr Sara Savage and IC Thinking psychologists collaborated with Dr Feriha Peracha and Social Welfare Academics and Training psychologists in the design, implementation and assessment of a new IC-based critical thinking course for secondary schools in Pakistan, entitled *My Thinking Your Thinking*. The two partner organisations have collaborated since 2011. This includes a precursor project, to develop and assess an IC Thinking course for youth detained for Taliban militancy at the Sabaoon Deradicalisation and Rehabilitation Centre, which is directed by SWAaT senior psychologists. SWAaT psychologists have carried out significant work in schools in areas vulnerable to extremism, which paved the way for the delivery of this project.

IC thinking

S.W.A.aT
FOR PAKISTAN
Social Welfare, Academics and Training

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Glossary of terms and acronyms

PVE-E - Preventing Violent Extremism through Education initiatives aim to help build learners' resilience to violent extremism, and includes equipping learners of all ages with skills and values for global citizenship and critical thinking.

CVE - Countering violent extremism involves seeking to diminish radicalization (also called de-radicalisation) and recruitment to terrorism through approaches that seek to deter from, or persuade people to exit, VE (violent extremism).

ICS - Interacting Cognitive Subsystems is an empirically tested framework by psychologists Barnard and Teasdale that explains the two main ways humans process meaning: 1) logical, word-based, focussed processing and 2) sensory, emotional, embodied, multi-layered processing. These dual systems naturally and ideally interact, but under conditions of extreme stress they can separate - during which thinking can be overwhelmed by emotions. We argue that critical thinking requires an interdependence and balance between both systems.

IC - Integrative Complexity is a measure of cognitive complexity, and concerns one's ability to differentiate and integrate multiple perspectives or dimensions on an issue. Decades of IC research by Peter Suedfeld and colleagues has demonstrated that IC is one of the best psychological predictors of violence arising from intergroup conflict and extreme thinking.

MTYT - *My Thinking Your Thinking* is the name of the critical thinking course developed for Pakistan secondary schools, and hints at the importance of recognising and respecting differing perspectives.

TTP - Tehreek-e-Taliban Pakistan (TTP) activity increased dramatically in Swat, KPK, Pakistan after the war in Afghanistan following 9/11. TTP influence was able to ride on shared Pashtun loyalties and intensified into a full Taliban insurgency until 2009.

KPK - Khyber Pakhtunkhwa province (KPK or KP) in northern Pakistan is mountainous and beautiful, but the region has suffered from violent extremism for years, due in part to its geographic and cultural proximity to volatile regions of Afghanistan.

SPM –Standard Progressive Matrices developed by Raven (SPM) is a non-verbal, culture-free test of reasoning abilities that affords internationally comparable score ranges.

PCT- Paragraph Completion Tests are widely used with integrative complexity coding. Open-ended prompts invite participants to write freely, which, in the case of this study, are paragraphs about one's self-identified ingroup, and self-identified outgroup.

Control / Intervention - This is a rigorous research method to determine whether a cause-and-effect relationship exists between an intervention (such as MTYT) and an outcome (such as increases in IC scores). In this study, MTYT is the Intervention of 9 sessions; the Control participants did not experience MTYT, and instead had their usual school lessons.

Pre-test / Post-test - In this study, the PCT is given to both Intervention and Control participants at the beginning of MTYT (pre-test) and at the end (post-test) to assess **change** in IC and related measures.

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Executive Summary

The project aim was to create a critical thinking course for Pakistan secondary students that addresses social polarisation and extreme thinking in vulnerable areas of KPK and Punjab, to promote citizenship values and resilience to extreme thinking of any kind. The *My Thinking Your Thinking* (MTYT) course has nine multi-media, action-learning sessions (18 contact hours), and was delivered to 14-16 year olds in secondary schools in KPK and Punjab. Average age of students was 14.8 years.

My Thinking Your Thinking MTYT is rooted in psychological theory of emotion and thinking, and promotes critical thinking about social issues through sessions that elicit an interplay between logical thinking and emotion-fused thinking gradually at higher levels of complexity.

Course impact is measured by change in the level of participants' integrative complexity (IC), a cross-culturally valid measurement for identifying the ability to think complexly in the face of intergroup conflict, a non-fakable change that predicts more peaceful resolution to conflict and intergroup tensions.

Course Assessment. Baseline reasoning scores of 4600 students were taken in advance of MTYT, using a non-verbal reasoning scores test (SPM) with international comparisons. 51% of students' reasoning scores were below the bottom 30th percentile, indicating low reasoning abilities.

20 critical thinking courses were delivered in ten secondary schools in KPK and Punjab regions of Pakistan. The overall MTYT sample size was 700 from which 687 datasets were code-able. Participants in the Intervention condition who experienced MTYT totalled 331, and participants in the Control condition did not experience MTYT totalled 296. Pakistan schools are gender segregated; 552 are secondary school male students and 59 are female. 76 teachers also participated in MTYT.

Despite the low baseline reasoning scores and the impacts from rote teaching course results are highly significant comparing pre-test to post-test scores. **Intervention participants show significant IC gain and large effect size** whereas Control participants show negligible gain. IC gains are stronger for their Outgroup (IC score 2.31) which is predictive of conflict resolution and social harmony. Ingroup IC gains (self-identified as family, kin, friends) are less strong (1.23) but still significant. IC gain is significant across regions, genders, students and teachers.

Before MTYT, participants' responses were structured in very low IC terms, showing black-and-white contrasts of 'all good' versus 'all bad', clear-cut social categories of inclusion or exclusion, and causal thinking structures that preclude the possibility of negotiation and compromise. After the course, participants' show an ability to perceive exceptions to the rule, some validity in other people's differing views, and options for mutual problem solving, respecting own and others values, particularly for the Outgroup. Scores from social dilemmas show increased value complexity, and increased ability to perceive shared interests between opposing groups.

The outlook for the planned larger roll-out of MTYT is extremely promising for impacting Pakistan students and for influencing educational method more generally. We hope that next steps will embed MTYT within teacher training colleges in Pakistan and elsewhere, using scalable and digital means of training and measurement successfully tried and tested during this project.

BACKGROUND

Critical thinking and PVE-E

International organisations have been calling for critical thinking skills to be integrated into education to equip young people to engage with our complex, polarised social, political and economic world.[1,2,3] School initiatives to prevent extreme thinking have tended to rely on logical arguments and factual information. Others rely on open classroom conversations to air difficult topics. However, there is little evidence of success in resolving the strong emotional and social commitments to extreme ideologies.[4,5,6] One reason for this is *reactance*, a cognitive defence that occurs when people feel that others are trying to persuade them to change their minds. Reactance means that people 'double-down' on their thinking, stop listening, and become even more committed and extreme in order to bolster their thinking against change.[7]

This human tendency presents a serious challenge to critical thinking programmes for PVE-E, and requires an understanding of how emotions interact with thinking. Thus, we draw on two research frameworks in psychology to promote an interaction between thinking and emotions to achieve a 'deep' critical thinking: 1) Interacting Cognitive Subsystems[8] and 2) Integrative Complexity[9].

Deep critical thinking needs to exercise both emotion-infused, sensory, embodied thinking (which is open and multi-layered) and detached, logical thinking (which is focused and linear).[10,11,12] These two ways of processing meaning are evidenced by brain studies and a large body of psychological studies. For clarity, we use the laymen's terms 'Heart Thinking' and 'Head Thinking' to describe these dual ways of processing meaning, explained below.

Using the framework of ICS, we developed the **My Thinking Your Thinking** (MTYT) critical thinking programme for secondary schools in Pakistan to work with these dual ways of thinking and to promote connectivity between them.

Students wear 'pin prick glasses' in MTYT to experience seeing only a tiny bit of the visual field – illustrating how reactance defends against information that may threaten our identity or viewpoint.

The interaction between Head and Heart Thinking provides multi-layered input to support the ability to think contextually, complexly and critically *without* provoking threat while increasing awareness of one's own and others' emotions and values.

Head Thinking ← → Heart Thinking

Rote education

Another major challenge to promoting deep critical thinking is the prevalence of rote teaching methods in Pakistan schools. This relies on word for word repetition and memorisation tasks. On any given topic, students tend to assume there is a single right answer. As students can be anxious about giving the teacher the 'wrong' answer, learning becomes a search for teacher's *expected* answer. This prioritises a concrete level of thinking that avoids abstract or critical analysis, and proceeds mainly in black and white terms.

To benchmark students' reasoning skills for this project, we tested 4600 secondary school students in Punjab and KPK using the Standard Progressive Matrices (SPM). The SPM is a culture-free nonverbal measure of reasoning abilities with a database of international comparisons. It was alarming to find that a majority of the secondary school students we tested scored below the bottom 30th percentile relative to international SPM data, across private and government schools in both KPK and Punjab.

This widespread deficit in reasoning seems to be linked to rote teaching methods reliant on word for word repetition and memorization.

As students are taught to view their social world as they are 'told' to see it, in a clear cut, 'this is that' manner, applying higher-level abstract principles in order to reason about the social context is unfamiliar and often out of reach.

Close links between vulnerability to extremist ideologies and hard sciences teaching methods based on finding a single correct answer have been evidenced in Middle East contexts (Ref). SWAaT psychologists similarly have found that over 90% of the TTP militant youth population detained at Sabaoon Deradicalisation and Rehabilitation Centre in the Swat region, northern Pakistan, scored below the bottom 25th percentile on reasoning abilities according to the Standard Progressive Matrices (SPM). In addition to these low reasoning scores, the detained youths also showed black and white, low complex thinking in pre-tests.[13,14]

Interviews with the Sabaoon youths further revealed how these young Swatis had been ill-equipped to 'see through' the binary, extreme TTP ideology that had easily persuaded the youth with arguments showing an empathetic face towards Swati's ingroup while denouncing their outgroups - a strategy widely used by violent extremist groups.

A core aim of this project is to enable students to 'see their thinking' (called meta-cognition). This happens through externalising thinking via group activities, which enables students to perceive the various influences that shape their views.

Overall, the cost to students and to the society of Pakistan arising from the rote educational method is well attested.[15] Almost every social and economic deficit within the country, the gaps in science, technology, climate/ water conservation, lack of equal educational and career opportunities for females, social unrest and tensions between groups are made worse by, or sustained by, the prevailing rote educational method.

The lion's share of our effort in adapting the IC Thinking method to Pakistan secondary schools involved supporting students with basic steps in reasoning and emotional awareness. We layered input involving Head Thinking and Heart thinking to support a range of learning styles: practical, visual, verbal, kinetic, verbal, analytic. By careful, repeated scaffolding of basic steps in each session, participants were enabled to move beyond low complex, right/wrong, them/us thinking. More complex, nuanced reasoning gradually emerged, applying higher level principles, such as values, to specific contexts. We found that training course facilitators also needed

this scaffolding in order to address tendencies towards rote teaching. Teachers, observing the impact on their students, requested to participate in their own MTYT courses. In the words of senior school staff:

Teacher: 'The sessions are making a difference to the most rigid of people who are set in their ways through years of patriarchy, socio economic hardships and binary thinking.'

KPK School Principal: 'Words cannot express how engaged and enthusiastic the students are. This course is changing how these young people think and this influence will last for generations to come.'

Teacher: 'It was very hopeful, interactive and innovative. It changes hearts – a change from negative thinking.'

Punjab School Principal: 'The behaviors of the senior teachers towards the junior colleagues and support staff has always been very rigid and there has been extreme gender bias at this school (male teachers thinking they are superior to the females). There has been back biting and jealousies, and abusive language. This program has taught everyone about the importance of teamwork and understanding other people's point of view.'

Read more about 'Improving educational outcomes through cognitive flexibility and complexity', Appendix 1.

HOW THE COURSE WORKS

Throughout each MTYT session, students engage with difficult social issues through structured group activities. They are given opportunities to playfully enact the natural preference for one's own (randomly assigned) 'ingroup' while challenging the opposing 'outgroup'. They are challenged through role-played conflict scenarios and multi-media input to think about the differing priorities of conflicting groups. The activities resource them to take a larger view, at higher levels of complexity, balancing conflicting emotions, values and reasoning into their decision making, often with the help of spatially mapping out differing positions on 'hot' topics. Reflecting on these visual, verbal, movement inputs help to integrate Head Thinking and Heart Thinking, while keeping arousal in the safe middle zone to avoid threat or reactance. These techniques are unique in the field of PVE-E, to our knowledge.

The process facilitates an understanding of those who, for example, prioritise the community versus the individual, or security versus innovation, and how participants' own and others' thinking is shaped by social influences, media and personal needs.

Sessions often end by exploring practical solutions based on shared values to achieve a collaboration that honours the important values of opposing groups.

Student: 'It was fun for me, unlike anything I have experienced before. I was not being forced to do anything and I was put into groups where I had a different point of view from them but I saw how everything could be sorted out by having a discussion with others.'

The activities act as a vehicle for unpeeling layers of social difference involving cultural identity, values and unquestioned assumptions to enable deep critical thinking, aware of the foundation of one's knowing.

In summary, the programme design is rooted in psychological theory of emotion and thinking.[16] The scaffolded learning that occurs promotes more cognitively flexible, complex and integrated thinking. Course impact is measured by change in the level of participants' cognitive complexity measured by integrative complexity.[17]

Our group sees the world in black and white. We are the GOOD group who will win against the BAD.

My old way of seeing things isn't working anymore… it is more complex than I thought.

I am making sense of all this, standing on my own set of values.

... enabling a shift in *how* people are thinking

IC is a tried and tested cross-cultural measure for identifying the ability to think complexly in the face of intergroup conflict, a change which is predictive of outcomes to intergroup conflict (whether violence increases or decreases in real world events) in over 300 journal articles.

Course content

MTYT has nine multi-media activity learning sessions (approximately 18 contact hours), designed for students aged 14-16 in secondary schools in KPK and Punjab.

We developed course content that is within the life experience of participants, acceptable to school contexts, and likely to invite Head Thinking and Heart Thinking to interact at higher levels of complexity. Course themes were chosen based on fieldwork[18,19] and research on cultural risk factors that correlate with frequency of extremism in a range of cultural contexts. One such risk factor concerns how tightly communal societies can dominate the life of individuals, inviting low tolerance for any deviance or difference and a justification for strong punishments. The first and second MTYT sessions, 'It's Not Fair' and 'Don't Ask Questions' address black and white thinking in response to unfairness and punishments for breaking rules or social norms.
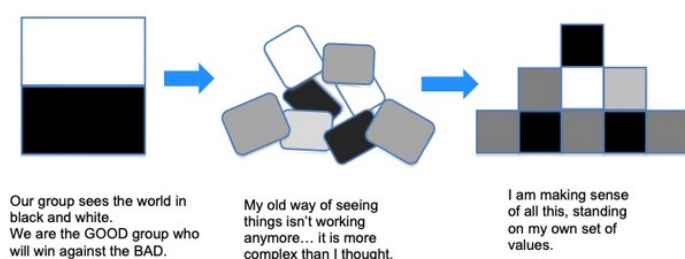
Participants say:
'During the Hasan activity, I enjoyed the role play which really allowed me to be myself and understand things from a parent's perspective as well.'

'This first session … we were involved in so many activities and those activities changed our minds in how we think, and our thinking after the session.'

A second course theme pertains to balancing the individual's values and goals with those of the family, school, cultural group or other authorities in 'Who's Who in Your World'. Themes of bullying and labelling those who are different are explored with higher IC skills.

In the sessions 'My Group, Their Group' and 'Peace and Conflict', role-played conflicts in which injustice is perpetuated toward the ingroup are enacted. A theme of male dominance was indirectly addressed by including problem solving options that promote equal opportunities for females. By using randomly assigned groups, fictionalised ingroup and outgroup dynamics are safely elicited.

These themes present 'hot issues' which could ordinarily provoke threat to identity and strong emotional responses, which can cause

cognitive complexity to decrease, in order to protect against uncertainty or threat.

'Meta-cognition' skills are employed to enable participants to step back, 'see their thinking', get some emotional distance to protect against reactance and blame. Thus, thinking can expand and take in the bigger picture, in order to create solutions based on both parties' important values.
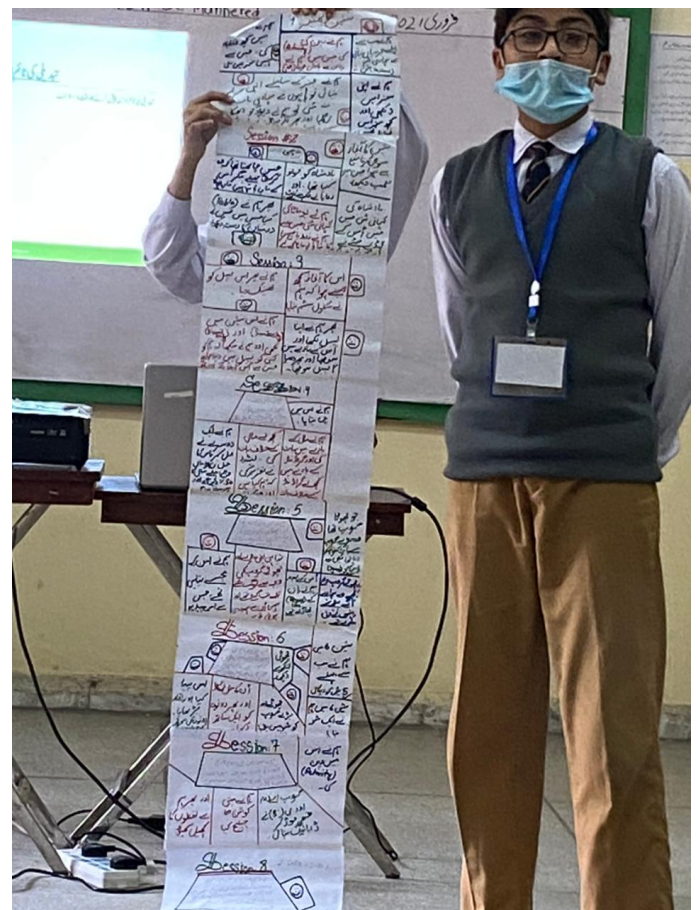
Participants say:

'I could not bring myself to throw the label in the bin during the labelling activity in session 4, because it brought up so much pain for me… I thought about it deeply - how I did not deserve it, and it was very emotional throwing it away the next day in front of everyone.'

'I learnt to be a better brother to my sisters, instead of being aggressive I listened to their point of view and considered their views as being important though previously I just screamed at them.'

'The biggest lesson for me was that we have similar values even if we are different people, it has given me a feeling of universal brotherhood.'

Towards the end of the course, task-focussed sessions reinforce the ability to think in more complex, balanced, and integrated ways. These skills were enacted through creating a 'Balanced TV Report' about the conflict in 'Conflict and Peace', learning to 'see through' extreme speech online, applying Media Information Literacy skills in the 'Tricks with Words' session, and preparing an illustrated narrative of one's own cognitive change throughout the course.

Presenting how his thinking changed session by session in his Timeline of Change.

COURSE ASSESSMENT

Hypotheses

We expect that participants who have taken MTYT (the Intervention condition) **will show significant gains in IC scores** demonstrating increases in complex, critical thinking. We expect that participants who have not taken MTYT (the Control condition) will not show comparable gains.

Secondly, using multiple methods of assessment, we expect that after the intervention (MTYT) participants' responses to two questionnaires will show an ability to reason using more than one value (called 'value complexity') and emergence from black and white about ingroup/s and outgroup/s.

Ethics and piloting

The research method, the MTYT course materials, and the pre/ post testing instruments were approved by the International Review Board, 2019. Student and parental informed consent were arranged in advance.

Course piloting inhouse and with students revealed needed amendments, after which the course was finalised and translated into Urdu.

METHOD

Training course facilitators

SWAaT psychologists recruited potential facilitators (psychologists/ counsellors with school experience and teachers with a psychology background) by advertisement and x were selected for training which took place over four days. Of 37 trainees, 28 were shortlisted to become facilitators of the IC course; 16 in KPK, and 12 in Punjab. The trained facilitators conducted pilot courses with SWAaT members observing, mentoring and preparing them for course roll-out with

pre/post testing. Course delivery was managed and overseen by SWAaT psychologists.

Demographics

700 participants' data was collected and collated for the analysis. However, 13 participants' data was discarded in the analyses because of incomplete responses. Thus, 687 participants' data was analyzed.

The average student participant age is 14.8 years (standard deviation = 1.77). Pakistan schools are gender-segregated, and 259 are male students. An additional cohort included 59 girls from Swat KPK. Recent academic achievement mean score was similar across both Intervention and Control conditions.

60 teachers from Lahore and 16 teachers from Swat were also tested. Please see detailed Appendix 2. Demographics.

Procedure

Another challenge was the COVID pandemic, requiring mask wearing, hygiene, social distancing. School closures entailed multiple delays and re-scheduling of courses and schools.

Several weeks before the course, the SPM reasoning test was used to benchmark students' reasoning scores. The SPM results were skewed to the lower percentiles, with **51% scoring below the 30% percentile, indicating low reasoning abilities in comparison with other countries in the international SPM data base**.

Given the extreme differences between high and low achievers in Pakistan which could skew results, participants were selected from between the bottom 5th to 75th percentile rank SPM scores, excluding very low and very high SPM scorers, for both Intervention and Control conditions. Please see Appendix 3. for more detail.

Courses were delivered in 10 Schools (5 in KPK and 5 in Punjab) with 2 groups per school (20 assessed groups). Each MTYT course (18 contact hours) was led by two trained facilitators to groups, over 3-4 weeks during school time to groups of 15 participants.

Pre and post testing

331 participants experienced the MTYT course (Intervention condition), and 296 participants did not experience the MTYT (Control condition).

All 687 participants completed a pre-test before the beginning of the course and a post-test after the final session, both times responding to a Paragraph Completion Test (PCT). Participants first self-describe their own 'Ingroup' and their (different, or opposed) 'Outgroup', and write paragraphs in a free-flowing way in response to two open-ended prompts: 1) "When I think about my group…" and 2) "When I think about the other group…", resulting in four coded paragraphs per participant across pre- and post-testing conditions.

We also responses to two Questionnaires that were developed and validated during this project: 1) Social Dilemmas Instrument (with

six typical scenarios congruent with the life experience of young Pakistanis), and 2) Dichotomous Groups Survey with 24 short items. Each was used with a different subset of participants, to avoid overly-long testing sessions. Read about the research instruments in Appendix 3.

Analysis

A total of 2748 PCT paragraphs, four per participant, with no missing data, were independently coded by two Urdu-speaking IC coders, using the standardized IC coding manual,[20] a linguistic analysis framework that focuses on the structure of argumentation (from low to higher complexity). The IC scoring method is predictive cross-culturally of real-world outcomes to intergroup conflict.

A total of 2748 written paragraphs were independently IC coded by Urdu and English-speaking coders, achieving high inter-coder reliability.

A 30% sample of these PCT paragraphs covering the range of scores across pre and post-test was translated into English and coded independently by an English-speaking expert IC coder, achieving a high level of agreement with the Urdu-speaking coders.
All data was were statistically analysed.

IC coding assesses the structure of thinking regarding social conflict, and is largely un-fakable.

IC coding predicts real world outcomes to intergroup conflict in over 300 journal articles: conflict or violence increases when IC drops, but gains in IC are strongly associated with peaceful resolution of conflicts.

RESULTS AND DISCUSSION

IC gain in Control: Intervention conditions

Overall, and with each subgroup, the participants in MTYT show significant gains in

IC, in line with our hypotheses. See Bar Charts below.

Intervention Participants Pre Post Mean IC scores

■ Pre score   ■ Post score
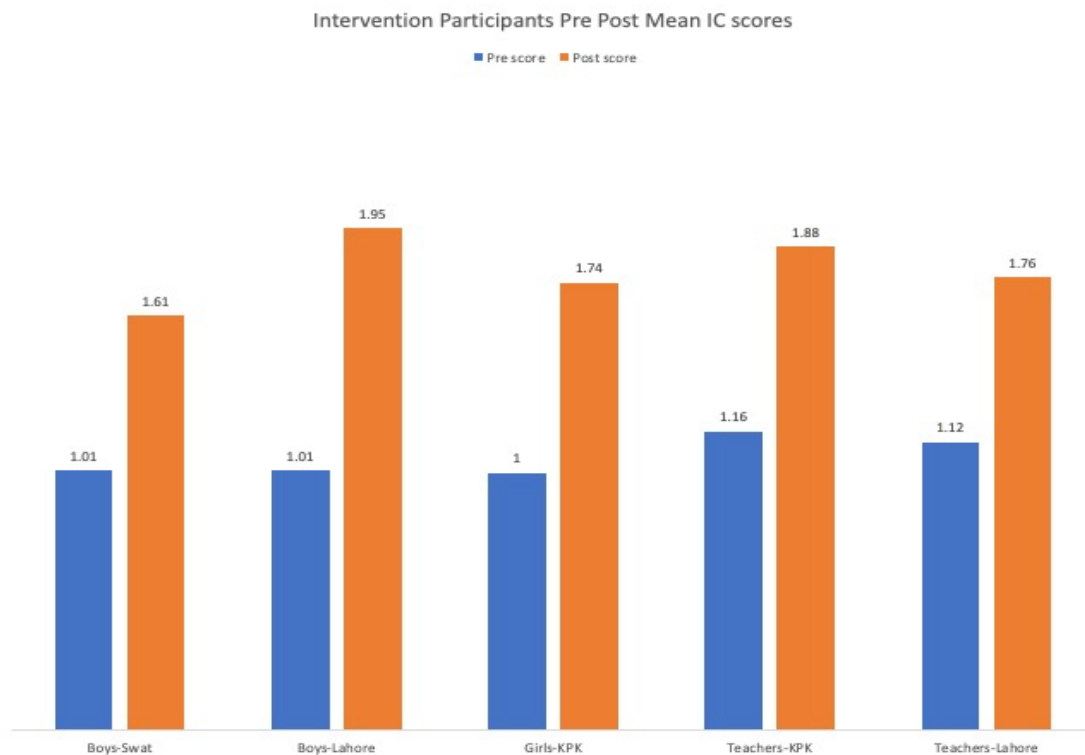
MTYT was effective in achieving increases in cognitive complexity measured by IC in both KPK and Punjab regions, for both male and female students, as well as for teachers.
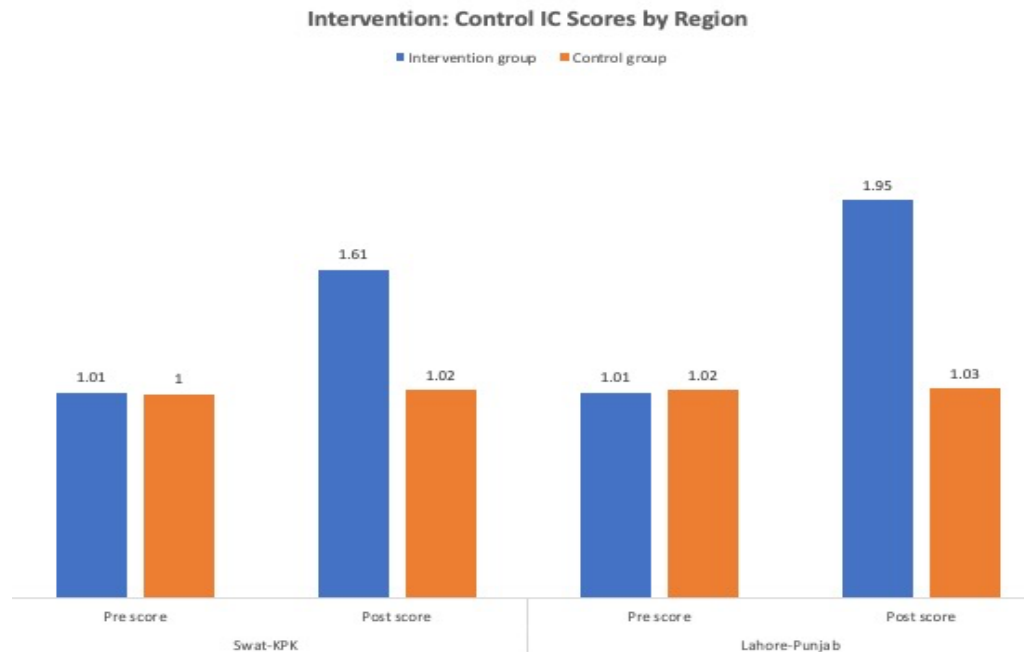
Effect sizes are large overall, very large for participants' self-described Outgroup, and moderate for self-described Ingroup. See statistics tables in Appendix 2.

Comparing Intervention: Control

Typically, Control groups who have not experienced the intervention are expected to show some gain in the post test, due to familiarity with the test questions or as a result

of schooling or life experience during the pre to post-test interval. But in this study, the Control scores shows negligible post-test increase in IC. See Bar Chart below.

The Control: Intervention results below show that the gain in IC among Intervention participants is due to the MTYT course, rather than due to other sources of influence. Results suggest that the educational and cultural context outside of the MTYT course does little to promote thinking that is beyond binary, black and white structures concerning social issues.

■ Intervention group   ■ Control group

	Swat-KPK			Lahore-Punjab	
	Pre score	Post score		Pre score	Post score
Intervention group	1.01	1.61		1.01	1.95
Control group	1	1.02		1.02	1.03

What IC scores mean

These increases in IC signify a shift from black and white, binary thinking (IC score 1) to a more nuanced processing style that is more open to ambiguity and other viewpoints, promoting more pro-social, non-violent means to conflict resolution (IC scores 2, 3).

IC coding analyses the structure of argument in verbal data on a scale from 1 to 7, with a score of 1 representing the most simple cognitive structures (e.g. 'our group is completely right'), a score of 2 representing emerging complexity (e.g. 'sometimes what the other group says makes a bit of sense'), and a score of 3 representing fully differentiated cognitive structures that acknowledge the validity of different perspectives.

Scores of 4-7 represent higher-level integrations and more advanced complexity of cognitive structures (e.g., as might be observed in the writings of supreme court justices) and are rarely observed in **written** PCT field data.

Regional difference

Given the difference in levels of development between the two regions, it is not surprising that schools in Lahore, Punjab students show higher IC gains compared to Swat, KPK schools. Nevertheless, both regions showed significant gains in IC and comparing Intervention to Control conditions. This matters in the light of the recent history of Taliban insurgency in KPK, where lack of regional development and other cultural factors may continue to support more extreme thinking. Interestingly, KPK teachers showed somewhat higher IC gains than Lahore teachers.

Participants' paragraphs about their Ingroups and Outgroups show significant gains. However, there is a much stronger increase in IC regarding the Outgroup compared to the Ingroup. Outgroup effect size is very large, whereas Ingroup effect size is moderate.

This is a unique finding in over twelve years of IC Thinking assessments (which usually show relative parity between Ingroup and Outgroup scores). This possibly suggests something culturally specific to Pakistan youth.

Many participants conceptualised their Ingroup in terms of their immediate family, extended family and friends. This hints at limited life experience beyond kin and close friends for these relationally-minded young people. During MTYT course activities exploring values tensions, families were often viewed by students as a source of strength as well as conflict, and was ranked as very or most important. Yet even when the Ingroup was drawn more widely (for example, as a Pakistani citizen, or as a Muslim) an 'all-good' clear cut evaluation prevailed for Ingroups. This would be concerning if the impact of their tightly communal society on thinking still showed low tolerance for any deviance or difference, but the Outgroup results here show this dynamic has significantly changed. See Appendix 2 for detail.

Ingroup scores are lower in comparison to other IC Thinking courses, affecting the overall average. However, the Outgroup scores (2.31) are even higher than expected and compare favourably to other IC Thinking courses.

Effect sizes are large overall, very large for Outgroup, and moderate for Ingroup.

Gender

This tendency for less gain in IC scores regarding the Ingroup compared to the Outgroup is even more marked for girls. Girls show marginal post-test IC gain regarding their Ingroup. Yet their Outgroup scores do increase as expected. Given the socialisation of girls in a tightly communal cultural context particularly in northern KPK, and given that in Pakistan females remain under male and parental authority even after marriage, this unambiguous, all-good (low IC) perception of girls' self-identified family-oriented Ingroup may be vital for them. Thankfully, females' as well as males' Outgroup scores do show the expected magnitude of gain, which is predictive of pro-social conflict resolution. This trend was seen also in the results from MTYT in universities.

Teachers

Teachers gain in IC is significant, with KPK teachers slightly stronger than Lahore, Punjab, yet both are somewhat outstripped by the Lahore boys' IC gain.

Multiple methods of assessment

Participants' responses to a Social Dilemmas Instrument showed significant gain in 'value complexity', that is, reasoning about a social dilemma based on maximising the opposing values of both parties. Likert scale scores from the Social Dilemmas Instrument correlated with participants' IC scores, thus meeting a project goal of developing a more scalable, IC-related measurement.

Participants also showed significant increases in perceiving compatible interests between groups, such as sharing superordinate goals and more complex thinking about group interests. They also showed gains in more complex perception of groups' diversity, in the Dichotomous Groups Survey. These findings confirm and enrich the IC coding results.

GENERAL DISCUSSION

In summary, the significant gain in IC concerning the Outgroup (2.31) meets course aims and expectations, and is well above other IC Thinking course assessments carried out in challenging contexts.[21] The IC gain for the Ingroup is quite modest, though the post-test score (1.23) is still significant.

The reason why we elicit participants responses to about their self-identified Ingroup and Outgroup is to **prompt an intergroup tension or conflict** in order to assess how participants' thinking about it changes. This intergroup dynamic is the 'hot spot' that is intensified by extreme ideologies of any kind.

It would be tempting to argue that the lower Ingroup IC score is due to the tender age of 14 (the youngest age for which the IC method works), the challenges of students' surprisingly low baseline SPM reasoning scores, the pervasive impact of rote education, and the outbreak of the COVID pandemic that may have impacted the Ingroup IC scores, and thus the overall total IC. But no, we think this Ingroup finding reflects an important cultural value, as well as restricted life experience.

The overall impression given by participants' verbal data is that they found a culturally appropriate way to reduce conflict and derogation towards Outgroups, while only slightly increasing complexity of thinking about their Ingroup, retaining their loyalty and sense of inclusion within their kin and community networks.

Comparing MTYT with the Sabaoon and other IC courses

The Sabaoon IC Thinking course delivered to detained and rehabilitated militant youth at Sabaoon in northern Pakistan (average age 20 years) shows a similar pattern of higher Outgroup IC scores compared to Ingroup.

Even so, the Sabaoon IC gains are higher in comparison to MTYT. We think this difference is due mainly to the increased age and life experience of the detained and reintegrated Sabaoon intake. As well, the holistic educational and psycho-social therapeutic Sabaoon context was likely to provide a more supportive backdrop to gains in IC than a rote education context in schools. Other IC course assessments for ages 14+ show that magnitude of IC gain increases with age after age 14, but then levels off in adulthood.[22,23]

The strength of the Sabaoon results raises the question whether it is mainly extremists who need to work with Head and Heart Thinking to promote integration between them at higher levels of complexity. One teacher suggests that perhaps we **all** need it:

'This training should be carried out in our society on a larger scale because being an angry nation we need positive guidance and training which helps us change our patterns in a positive way.'

In participants' own words: Examples of gains in complex thinking

Participant R:
Pre-test: *'I belong to my family and relatives. They are right in every situation and take care of me.'*
Post-test: *'I belong to my family. They love me and take care of me. However, they are not always right about things, but we try to sort things out to make them fair for all.'*

Participant T:
Pre-test: *'All the rich people oppress the poor. The poor people are fed up with the rich ones. The rich are proud of their power and wealth and oppress the poor. They beat them.'*
Post-test: *'Some rich people in our area are proud of their wealth and they use their resources to exploit poor. But now I realize that all rich are not bad. There are some rich*

people who help poor. I now try to think in grey shades and think of the views and situations of people before making any opinion about them after taking the course.'

Participant A:
Pre-test: *'The name of my area is T. I am known as a member of the tribe Y. The tribe Y is very famous in our area. There is no one in our area who doesn't know about it or disagrees that it is the best tribe. Y people are very brave and pious.'*
Post-test: *'Y is my tribe but I cannot be proud of this tribe because Allah Almighty says that all human beings are created from one mother and one father and then created their tribes so that they can recognize each other. Therefore, it is inferred that tribes are only for identification and we should not consider ourselves superior to others. At the same time those who obey the command of Allah do not consider themselves superior to others .... I think this course promotes the teachings of God, everyone is equal!'*

Participant M:
Pre-test: *'I belong to S area, people of S area are like my family. We help each other in difficult times.'*
Post-test: *'I belong to the people of the other area because the people who live outside Pakistan all are our Muslims brothers, in India there are more Muslims than there are in Pakistan. In Palestine, Barma, India, Muslims don't live peacefully. I want to help them.'*

Participant S:
Pre-test: *'I don't belong to people who are different from Pakistan. They are non-Muslims - Kaffir.'*
Post-test: *'I belong to Pakistan because Pakistan is our country. We are made of its soil. We are opposed to all those who are opposed to our country but I'm not in favour of war. In Session 5, I learned that war could have bad consequences. To bring the peace we will have to understand each other even if we are different.'*

Does IC relate to intelligence?

Analysis of SPM scores taken before course delivery were compared with participants' IC scores. The data suggests that a pattern of relationship between SPM and IC is *inverse* at the low end of reasoning abilities. It seems reasonable to expect that gain in IC is only possible with normal (for age) reasoning abilities. The data showed that with moderate SPM scores and upwards, there was no clear relationship with IC scores. Rather, gains in IC, leveraged by an integration of Head and Heart Thinking, seem to branch out freely once a moderate level of reasoning ability is in place. See Appendix 4.

An interesting link between these factors has been observed over these past twelve years of assessing IC Thinking courses. According to independent observers' reports, gains in IC seem to improve participants' educational outcomes in the medium to longer term.[24]

We think this is likely to be a 'system' effect involving personal motivations, an improved sense of inclusion at school, a changed school milieu impacted by IC courses involving teachers and parents, experience of teaching methods that go beyond rote learning, as well as participants' own improved IC which enables a broader view. Further research is needed to explore more deeply how social, emotional and abstract intelligences inter-relate.

However, there is no question that social, emotional intelligence is a key component of employment, career and inter-personal success.[25] As well, there is ample evidence in education research that cognitive flexibility and cognitive complexity (which we argue draws on both Head and Hearth Thinking) promote a range of significant improvements in educational outcomes. Please see Appendix 1.

What do the MTYT results mean in terms of behaviour change?

Hostile attitudes and prejudice towards outgroups often arise when they are perceived as a threat to the ingroup. Extremist ideology intensifies perception of this intergroup dynamic to the point of derogating and dehumanizing outgroups. When the 'all-bad' outgroup is pitted against the 'all-good' ingroup, as analysis of extremist ideology reveals,[26] this dynamic is associated with legitimation and acceptance of aggression and violence towards the outgroup, particularly as the outgroup comes to be viewed as less than fully human and thus not deserving of humane treatment.

However, after participating in MTYT, this cognitive structure shifts, and the increase in IC regarding Outgroups signifies a lessening of adherence to any influence that legitimates violence against them, even with students as young as 14. Behaviour results largely from *how people view their current reality*, and whether options other than hostile confrontation are perceived. We are confident that our participants' attitudes and behaviour towards outgroups, going forward, will reflect this cognitive shift. Research on mid- to longer term change in behaviour is discussed below.

How does the MTYT programme compare to other PVE-E initiatives?

An international review of PVE-E looking at 23 countries[27,28] reports that successful educational initiatives are those that prevent students from thinking in black and white terms, make them less prejudicial towards 'others' and less likely to support violence as a means to an end. The review applauds education initiatives that are oriented to rights and justice, take a more complex view of 'victims' and 'perpetrators', and understand a conflict from multiple viewpoints. It also pinpoints practices to avoid, including: arguing against other's ideologies or beliefs, individualistic exhortations to love and

harmony, appearing to stigmatise any single group, suppressing free speech, or prescribing 'approved' alternative narratives. These best practices are consonant with those of MTYT and other IC courses. The report also acknowledges that evaluation in PVE-E is notoriously difficult. We argue that the benefits of using predictive, difficult-to-fake structure of thinking, rather than assessing content (such as attitudes or beliefs) using the IC metric addresses problems encountered by CVE and PVE practitioners concerned about stigmatising certain groups and about 'faked' responses.

One-off interventions are widely considered inadequate in PVE-E, and it is recommended for programmes to be embedded in a whole school policy including students, teachers, family, community, and for which there are practical and visible outcomes such as civic engagement.

'I wish we could have the IC program for the parents as it has made such a huge difference to the teachers, there are so many changes in people who came in so rigid in the first session, including myself, who explicitly said they enjoyed it so much that they don't want it to end, and started helping the facilitators to clear up and were excited about attending the next session.'

Limitations

Thankfully, this project enabled a Control: Intervention design with a large sample size relative to most in-person psychological research. As is typical in most research on schools and education, participating schools were not randomly selected, due to operational, time and travel constraints. However, we controlled for spurious factors that randomness would seek to eliminate, for example, by benchmarking SPM scores, excluding very low and high outliers, and ensuring parity between Control and Intervention conditions on relevant factors.

It would have been preferable for the IC coding to be carried out by researchers not involved in the project. However, we know of no other Urdu speaking researchers trained as IC coders, a training that takes weeks or months at a post graduate level. We involved three (not just the usual two) independent coders and abided by the IC coding practices such as 'blind to condition' and moderating through discussion any discrepant scores (which in this project deviated by no more than one score).

It is hard to know how the COVID pandemic impacted the course experience. There seems to be no grounds for thinking this would have somehow spuriously increased IC. Rather, the stressful and uncertain conditions requiring masking and social distancing was hard on the delivery team, and must have been difficult for the schools and students also. What is surprising is the enthusiastic engagement evidenced by all involved.

Next steps for scalability

We hope to bring the MTYT deep critical thinking course and its educational method to teacher training colleges, to enable a national rollout in Pakistan and beyond through IC-trained teachers in schools, ideally including a range of school staff, parents and community members.

Throughout this project, we have sought to make delivery and measurement more scalable. We developed interactive webinars and short films for training facilitators. Scalable measurement has been enabled by the Social Dilemmas Instrument and the Dichotomous Groups Survey which both showed meaningful pre-post differences. Importantly, the Social Dilemmas Instrument scores correlated with IC scores. We hope this will provide a reliable 'proxy' assessment related to IC scores, retaining some of the non-fakable and predictive features of IC coding, without the labour-intensive cost.

What are the expected long-term effects? To answer this more fully, a longitudinal study of reintegrated former Taliban militants by a senior SWAaT psychologist is underway at a 2 year interval following the previous IC Thinking course at Sabaoon, to assess whether IC gains and behaviour change have been sustained over the months and years, as has been observed with other IC courses carried out in less challenging contexts. This study will also explore whether modest interventions provided digitally or online can help people retain their IC skills, particularly for those living in a social context with recent experience of extremism, such as northern Pakistan. We hope there will be spin-offs for online IC educational games to more easily share these resources for those working in challenging or security contexts.

As mentioned, two online short 4 session MTYT courses have been delivered to university students in collaboration with Lahore University of Management Sciences (LUMS), and the whole MTYT to University of Malakand, with strong IC results. A new IC advanced critical reasoning course applied to the study of history will be delivered to students at the University of Malakand. In each new context, adaptations of the IC course materials and activities are required, but we have yet to find a context where an adapted course fails to work.

CONCLUSION

Despite participants' low baseline reasoning abilities in comparison with other countries, the MTYT course was effective in achieving increases in cognitive complexity measured by IC in both KPK and Punjab regions, for both male and female students, as well as for teachers, even in pandemic conditions. Gain in IC regarding the Outgroup IC was stronger than for the Ingroup, which affected the overall IC gain, but even so, the expected **change to inter-group conflict dynamics** has occurred. Course assessment using a Control: Intervention results show that the gain in IC

among Intervention participants is due to the MTYT course, rather than due to other sources of influence. Questionnaire instruments showed significant increase in value complexity, decrease of black and white thinking about ingroups and outgroups and increased perception of shared values.

Together, the results suggest we have made fruitful inroads in addressing the impact of rote education on limiting reasoning, critical thinking, and thus resilience to extreme thinking, which bodes well for a national roll-out of MTYT.

To conclude, we aim to take all we have learned from the challenges and successes of this project to influence education method in Pakistan and elsewhere. This is a huge task and requires working with teacher training colleges to enable wide roll-out in secondary schools and universities. One more motivation to pursue the planned national roll-out of MTYT can be added to the concern for security, social harmony and educational improvement. Simply put, the method is experienced as helpful to individuals' personal lives:

'This course helped me in my decision making to trust myself more, and also to understand why my father sometimes cannot see my point of view and I can help him deal with his aggression without a confrontation.'

'This training helped me with anger management, how to think in shades of grey rather than extremes. Tolerance and patience. Also, I have trouble in decision making and this course has helped me with this.'

'I will tolerate people and not react on the spot, rather I will take out the time to think from my heart as well as my head in a moderate way in order to give a better response and I will not judge people on the basis of disliking them and will abstain from putting negative labels on them.

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