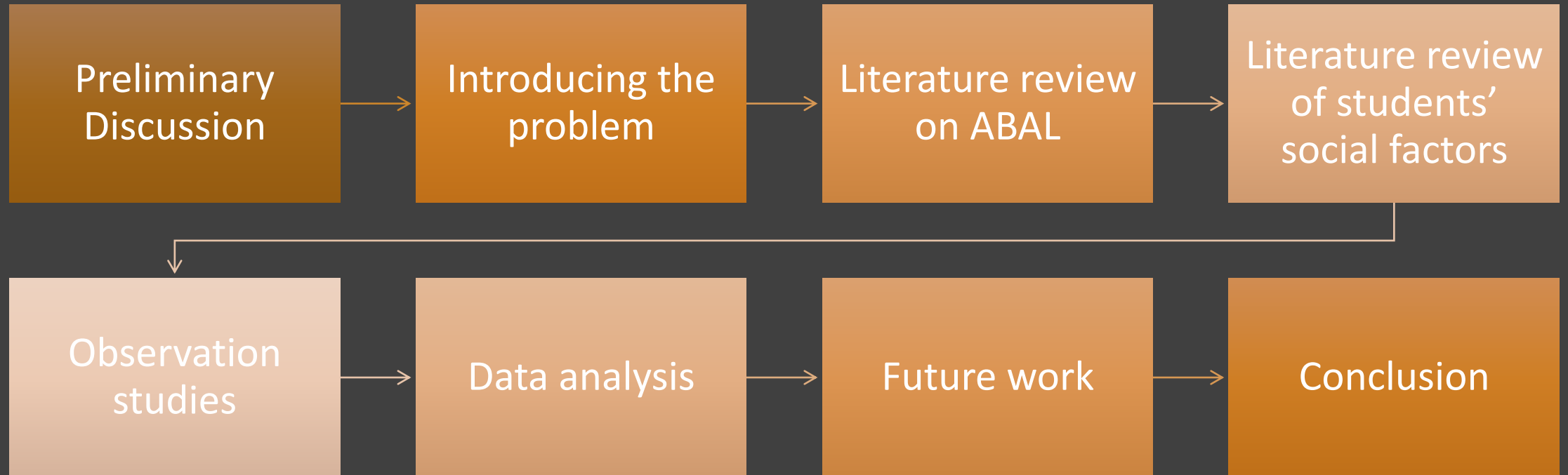# A Study of Social Factors in Activity-based Active Learning Class Correlating to Students Performance
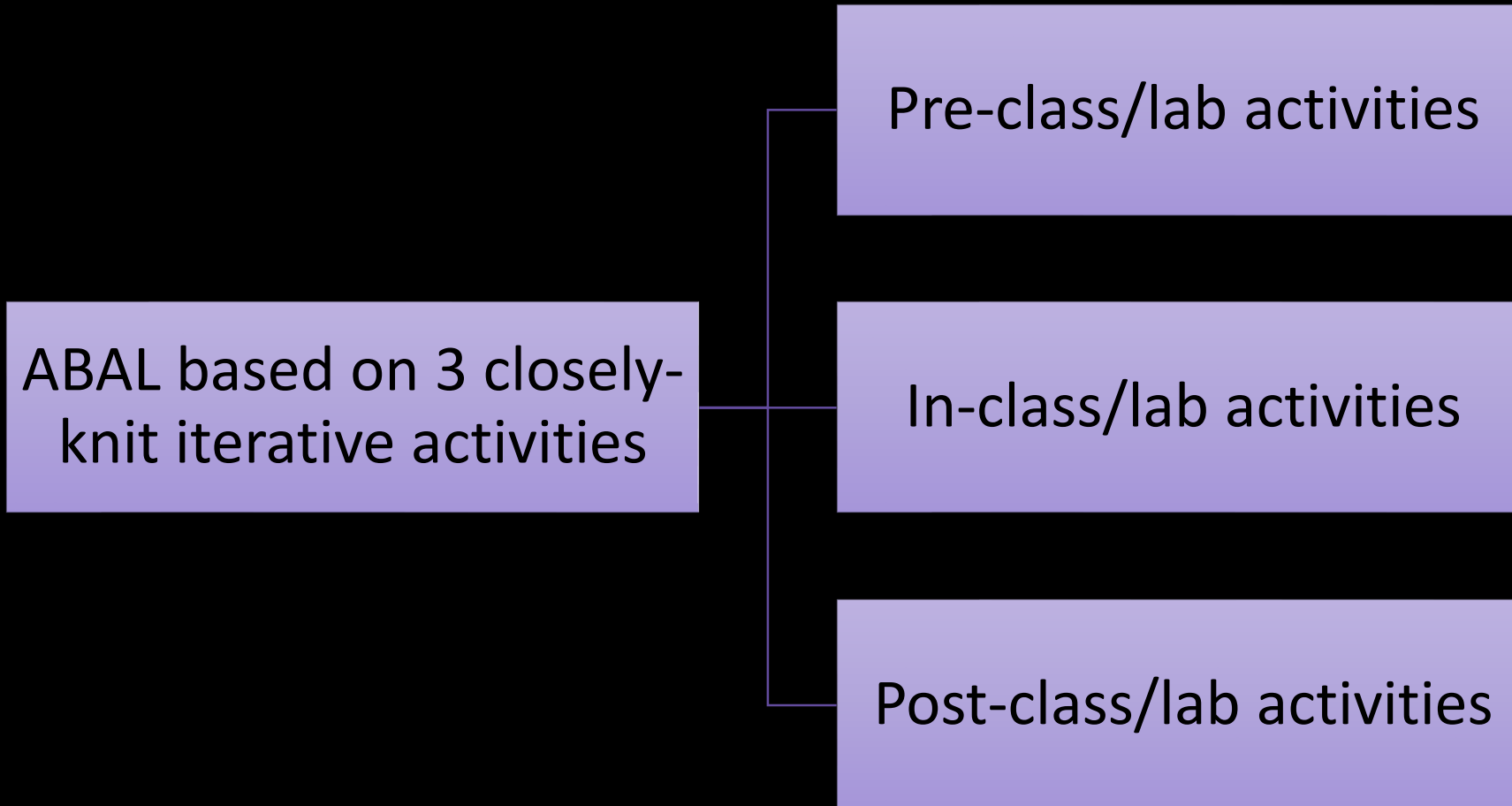
Presentation Outline

What is an ABAL class?

- ABAL – Activity-based Active Learning
- It is one of the different forms of Active learning
- Specializes in students' learning process through activities

What is an ABAL?

ABAL based on 3 closely-knit iterative activities

- Pre-class/lab activities
- In-class/lab activities
- Post-class/lab activities

Benefits of an ABAL (1/3)

01
Fostering group interaction and collaboration

02
Enforcing and encouraging student participation and engagement

03
Decreasing students dropout rate

Benefits of an ABAL (2/3)

01
Improving student learning and self-learning skills

02
Removing limitations of cognitive processing

03
Improving student metacognition

Benefits of an ABAL (3/3)

01
Improving student understanding of concepts

02
Teaching students to think like programmers

03
Improving students' performance and perception about learning experience.

Social Disruptive Factors

01

Interfering in classroom learning and learning environment

02

Weakening students' respect for the academic environment

03

Impairing students' academic and intellectual development

04

Decreasing students' engagement, commitment and retention

05

Causing social isolation, possibility of depression or other issues

Introducing the problem

The study the social factors of students in an ABAL class that could impact students' performance becomes crucial
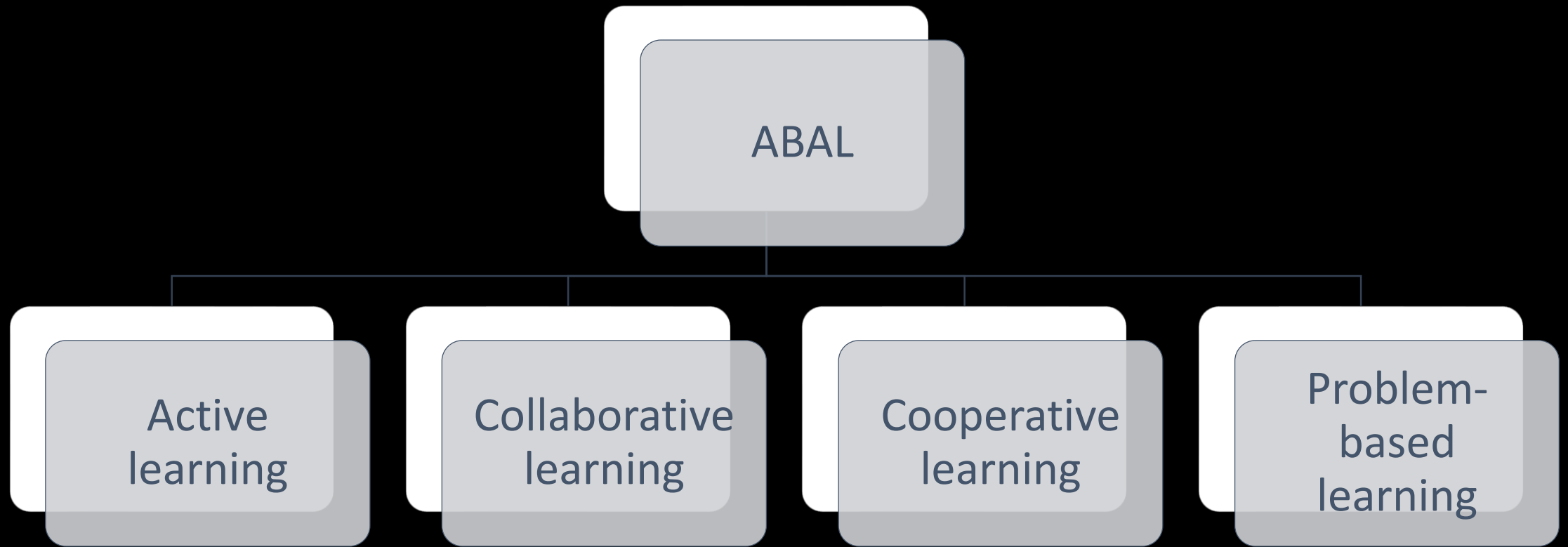
Motivation behind an ABAL class

An ABAL approach shifts class time from passive lecture-based learning to interactive, fun, disciplined, often social activities

→ Students also continuously go through low-stake assessments to evaluate their learnings, which helps to identify and address any problems early on.

Anatomy of an ABAL

ABAL approach – I: Categorization of 235 pedagogical patterns (Dehbozorgi, Maher, Dorodchi, & MacNeil, 2017)

| Pattern category	Pattern focus	Percentage focused
Lecture design	Delivering "good lecture"	74.0
Feedback and assessment	Improvements from experts' feedback and observations	8.9
Course design	Self and external, observations and data analysis of various courses	8.5
Diversity imbalance	Gender imbalance	3.4
Teamwork and group work	Group discrepancies	3.0
Class activities and assignment	Analysis of different class activities and assignment content and delivery	2.1

ABAL approach - II

- In this approach, the students' reflection/self-assessment are not considered in parallel with class time (Dorodchi, Dehbozorgi, Benedict, Desai, & Mahzoon, 2017).

ABAL approach - III

In this approach, two important issues regarding students' performance/satisfaction were addressed (Dorodchi & Dehbozorgi, 2017).

- Lack of continuous discipline in the course impacts students' performance negatively
- Lack of students' overall satisfaction affects course retention of students

ABAL approaches
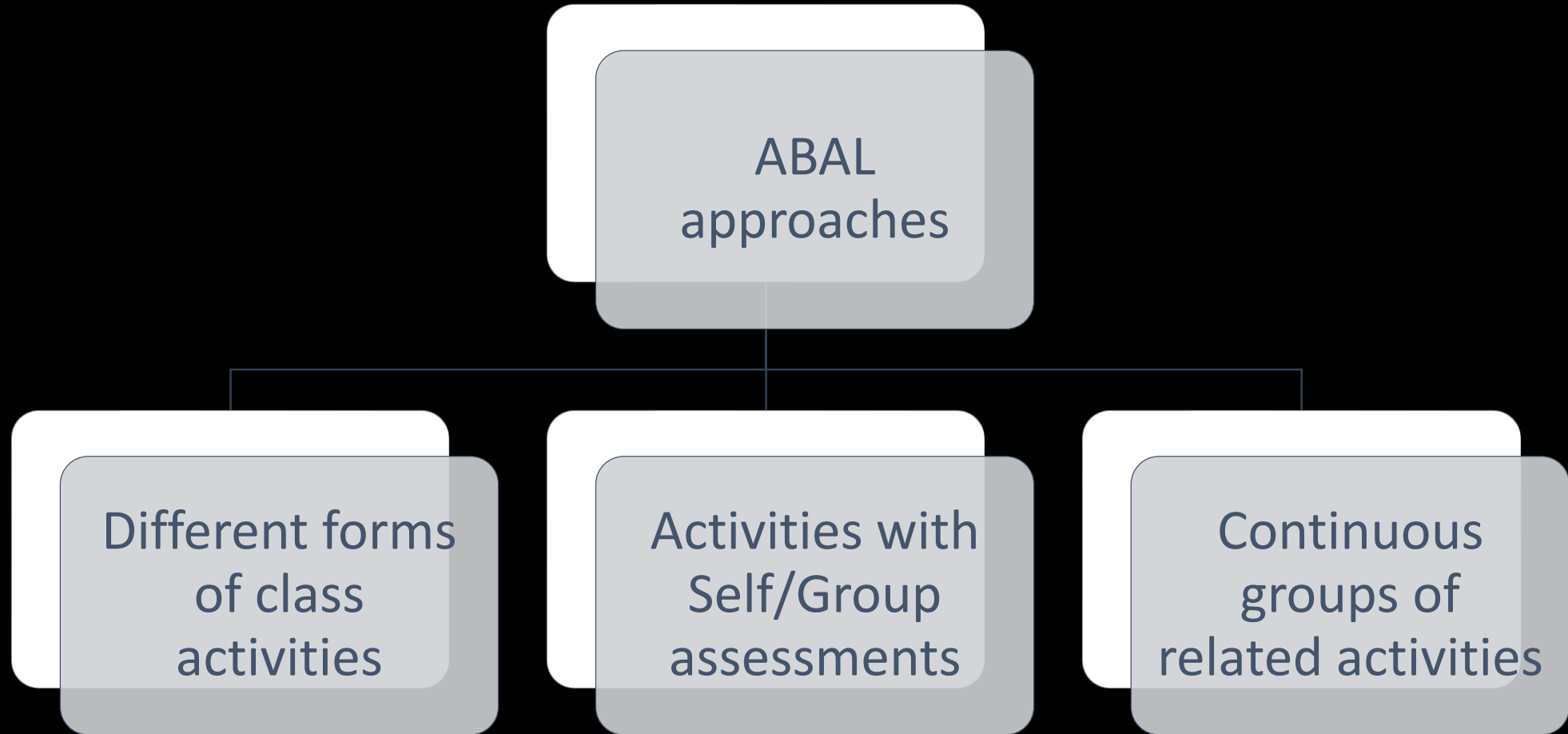
Conclusion of ABAL approaches

- These reviews had led us to an insight on how an ABAL approach revolves around class activities and students' interaction

- Consequently, the questions raises as how students' social factors could play a role in those activities and eventually students' learning?

Students' social problems in classroom

- Several problems have been reported regarding students' social behaviors

Literature Review of social disruptive behaviors
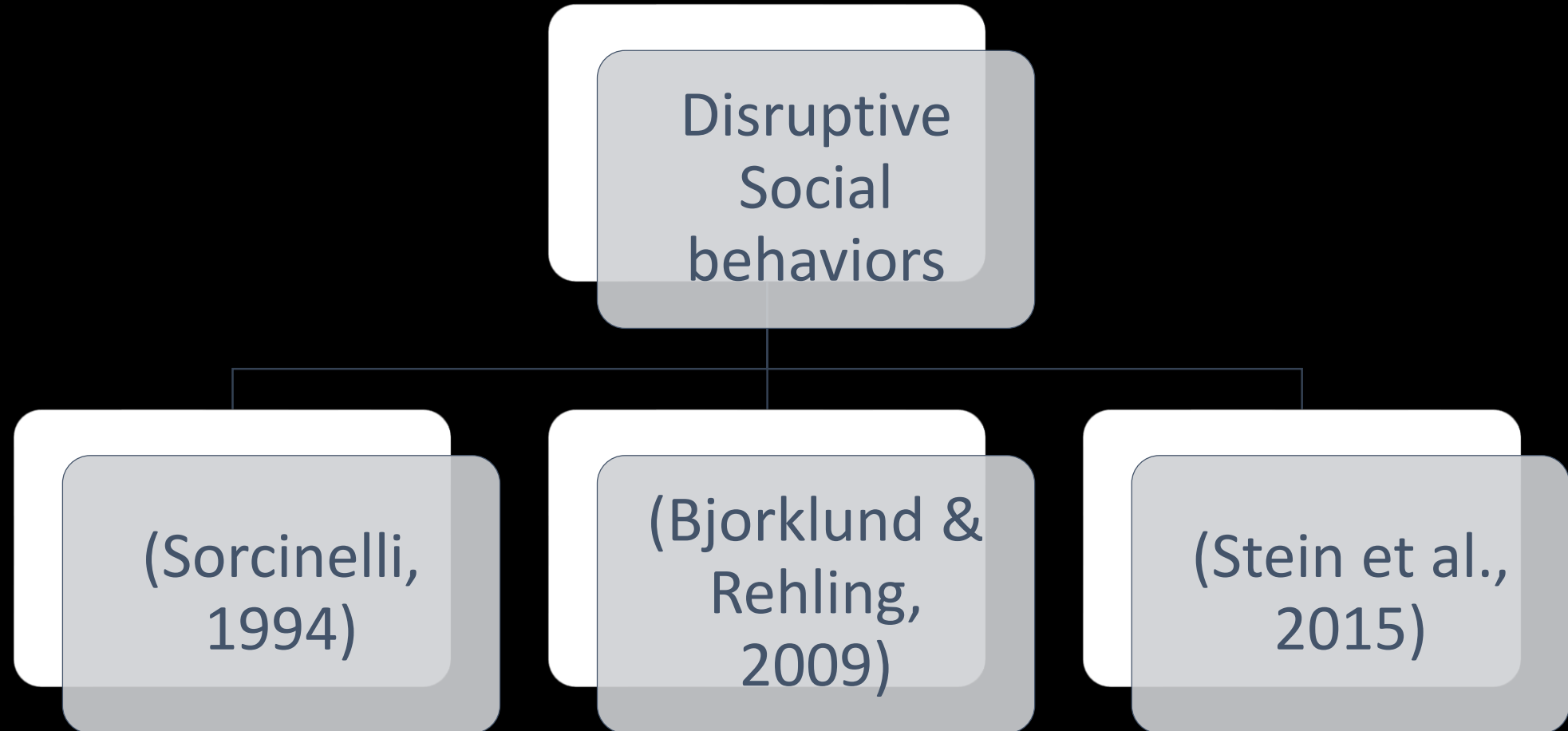
Disruptive behaviors (Traditional lecture-based class) (Sorcinelli, 1994)	
Immature behaviors	Talking during lectures, chewing gums, being late and creating disturbances
Inattentive behaviors	Sleeping during class, cutting class, acting bored/apathetic, not paying attention, being unprepared and leaving class before it is finished
Miscellaneous behaviors	Cheating and showing interest towards trivial things

Social problems in traditional lecture-based class (Bjorklund & Rehling, 2009)		
Immature	**Inattentive**	**Miscellaneous**
Distracting Behaviors: Sleeping, eating, drinking, yawning, nose-blowing, fidgeting and swearing	Using a palm-pilot/iPod or computer for non-class activities. Reading non-class material and doing homework for other classes. Displaying inattentive posture or facial expressions.	Continuing to talk after being asked to stop and conversing loudly with the class. Non-verbally showing disrespect for others and making disparaging remarks.
Discarding trash after class has begun	Getting up during class, leaving and returning. Allowing a cell phone/text messaging to ring during the class	Questioning the value of an assignment or activity. Nonverbally indicating dissatisfaction with an assignment, activity or grade
Arriving late/leaving early	Packing up books before the class is over.	Coming to the class under the influence of drugs or alcohol

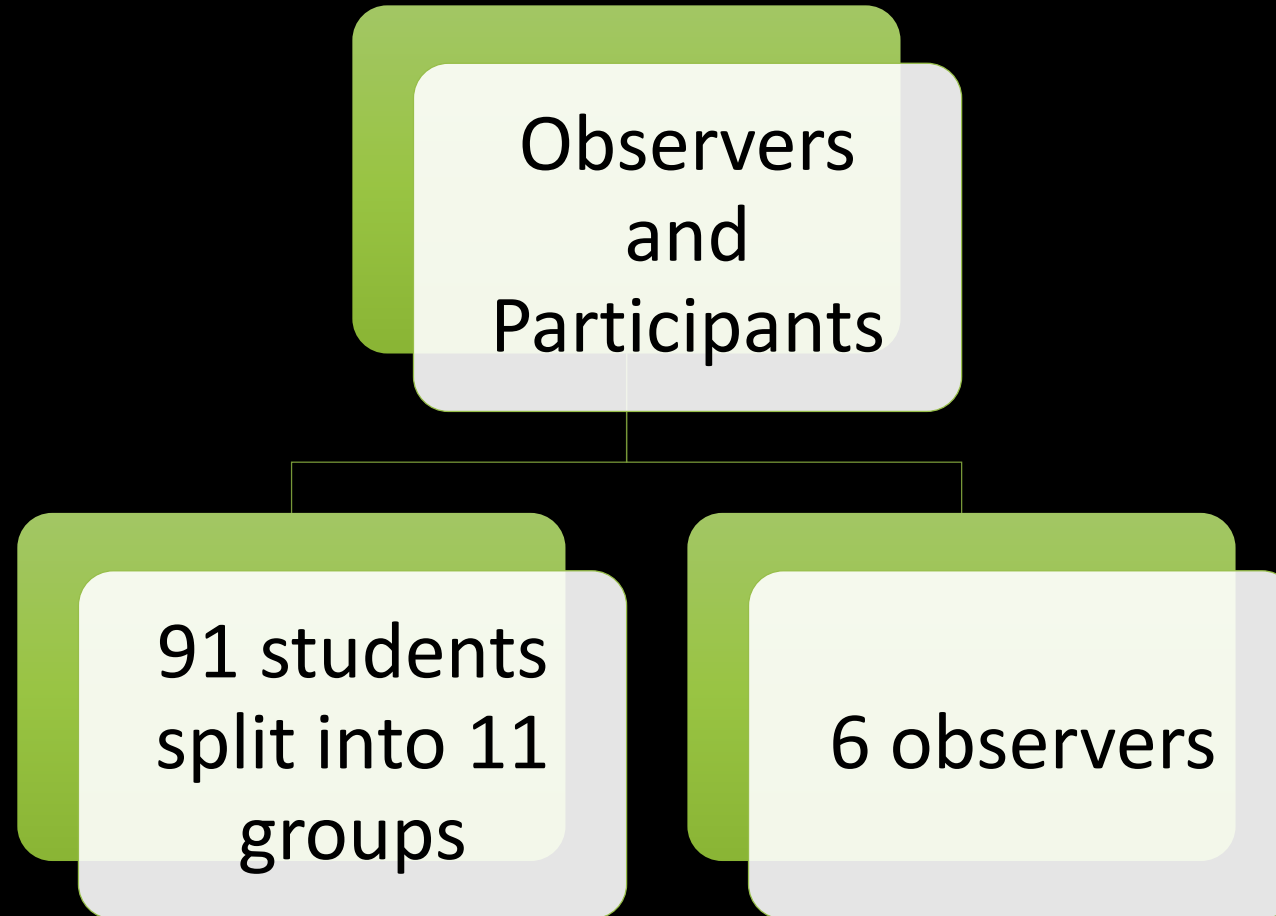| Disruptive behaviors (Team-based learning) (Stein et al., 2015) |
|---|
| Not showing signs of preparedness before coming to the class |
| Not able to participate/contribute in group discussions |
| Not taking individual/group responsibility |
| Dominating by doing group's major work by a group member |
| Group member's unilateral decision that affects the whole group |
| Not showing up for the classes |
| Unequal contribution in group |
| Signs of stubbornness/arrogance by group member |
| Lack of seriousness in the class (using phones, disrupting other people during lecture, creating disturbances, missing deadlines etc.) |
| Lack of initiation |
| Shyness/introvertness by a member in group's communication |
| Group communication is restricted/unable to freely move and interact with the group |

Observations – When?

ITCS 1212 - Fall 2017

Mondays and Wednesdays

1:00 PM to 3:15 PM

Observations – People involved?

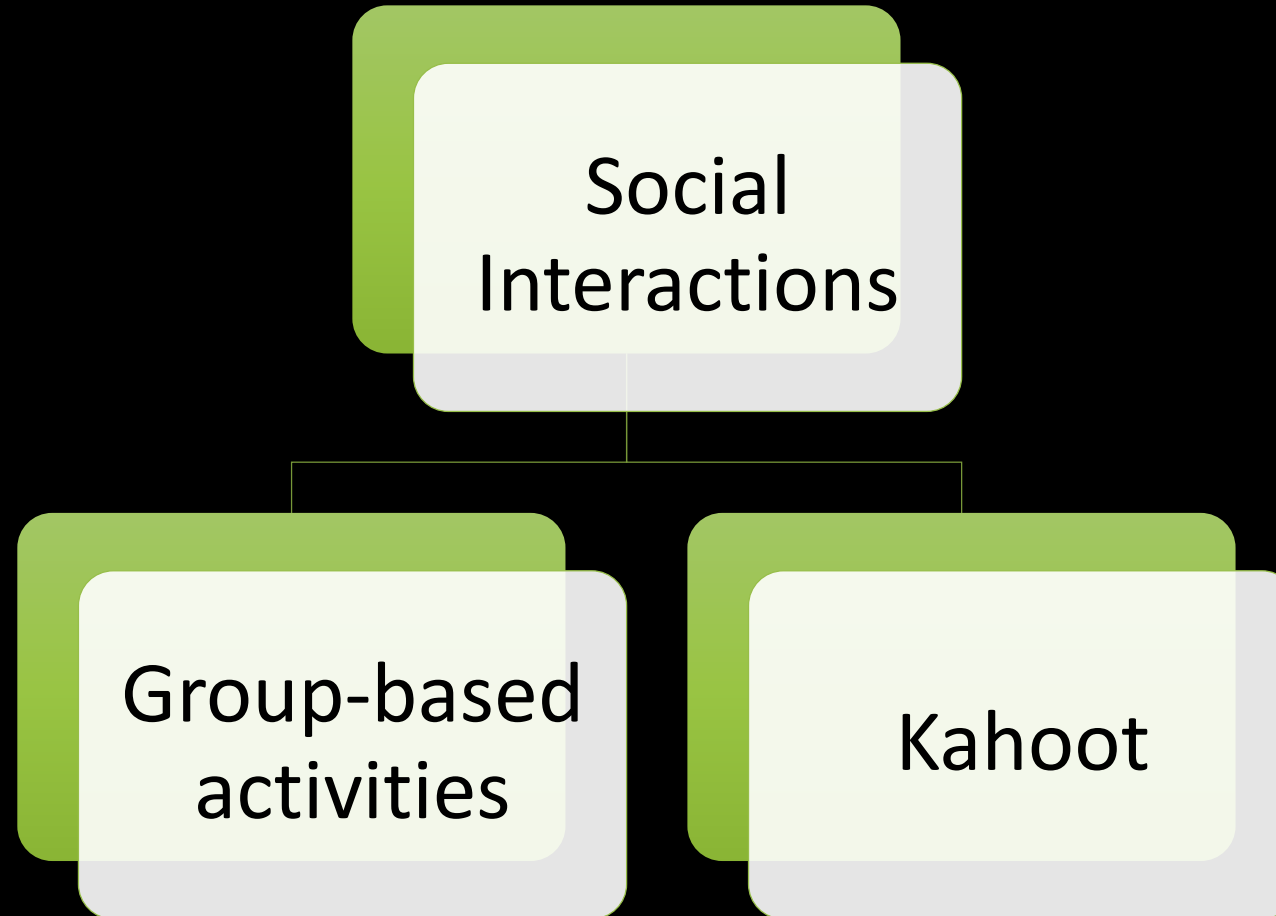Observers and Participants

91 students split into 11 groups

6 observers
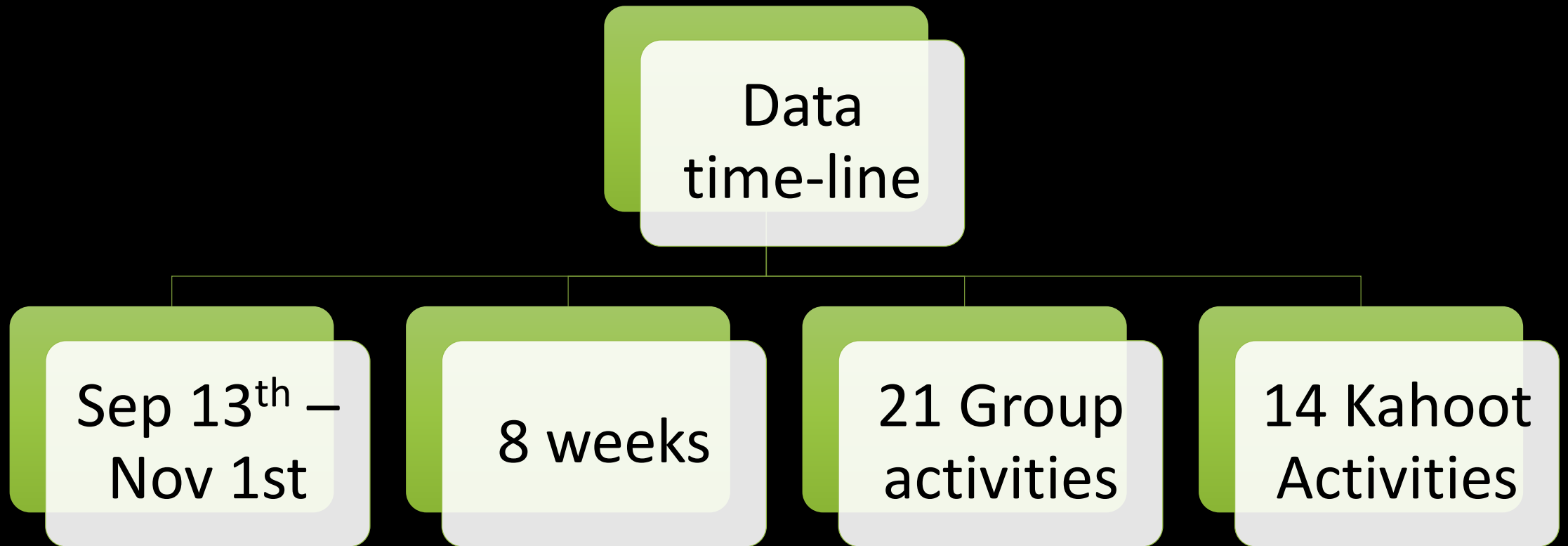
Observations

Observation of social interactions

Group Cohesiveness Traits (Fragale, 2013)

Traits	Objective	Core Values
Goal Setting	To develop a shared vision, mission and set of values	Specific, measurable, attainable, realistic and timely
Communication	Means of accomplishing goals	Emphasis on quantity and quality Clearly define and delegate responsibilities Exchange ideas and information
Trust	Self-knowledge and competence	Greater commitment Greater effort Greater corporation
Accountability	Holding each member responsible	Individual and Group accountability
Recognition	To appreciate each other's roles and responsibilities	Healthy arguments and appreciating each other's contributions

	Goal Setting (from questionnaire)
GS1	Team demonstrates good understanding and planning of the goal/objectives of the activity.
GS2	Effective use of time.
GS3	Effective Use of Resources ex: TV / Google Docs / Board
GS4	The group asked beneficial questions to TA's and between themselves about the activity.
GS5	Notes on staying on task(engaged and active):

	Communication (from questionnaire)
C1	Direct, open and honest
C2	Group communicates changes in plans clearly prior to implementation.
C3	Good listening skills
C4	Members interact primarily to share information
C5	Notes on Communication (Interaction):

	Trust (from questionnaire)
T1	Each member believes what other members are saying
T2	Group seems to share a common goal and works towards it.
T3	Delegate responsibility instead of "I'll take care of it" (Group work ex: Flowcharts)
T4	Group views disagreements as positive OR The team overall seems to get over disagreements pretty well (during Kahoot)
T5	Notes on Trust:

	Accountability (from questionnaire)
A1	Share decision-making (during Kahoot)
A2	Accept feedback from each other (during Kahoot)
A3	Group members have objective conversations and the members don't take the conversations personal. (Programming Tasks / Group Work)
A4	Notes on Mutual Accountability:

	Recognition (from questionnaire)
R1	Genuine appreciation of each other's accomplishments. (during Kahoot)
R2	Recognize and appreciate complimentary role functions. (Group work)
R3	Accepts feedback from TA's / Instructor
R4	Notes on Recognition of Each other:
O1	Notes on Observation process:

Goal Setting

Intervene and ask what are you doing?

Team demonstrates good understanding and planning of the goal/objectives of the activity. *

	1	2	3	4	5	6	7	
Strongly Disagree	○	○	○	○	○	○	○	Strongly Agree

Effective use of time. *

	1	2	3	4	5	6	7	
Strongly Disagree	○	○	○	○	○	○	○	Strongly Agree

Effective Use of Resources ex: TV / Google Docs / Board *

	1	2	3	4	5	6	7	
Strongly Disagree	○	○	○	○	○	○	○	Strongly Agree

The group asked beneficial questions to TA's and between themselves about the activity. *

	1	2	3	4	5	6	7	
Strongly Disagree	○	○	○	○	○	○	○	Strongly Agree

Data Analysis

Likert Scale questions — Group Cohesiveness Traits

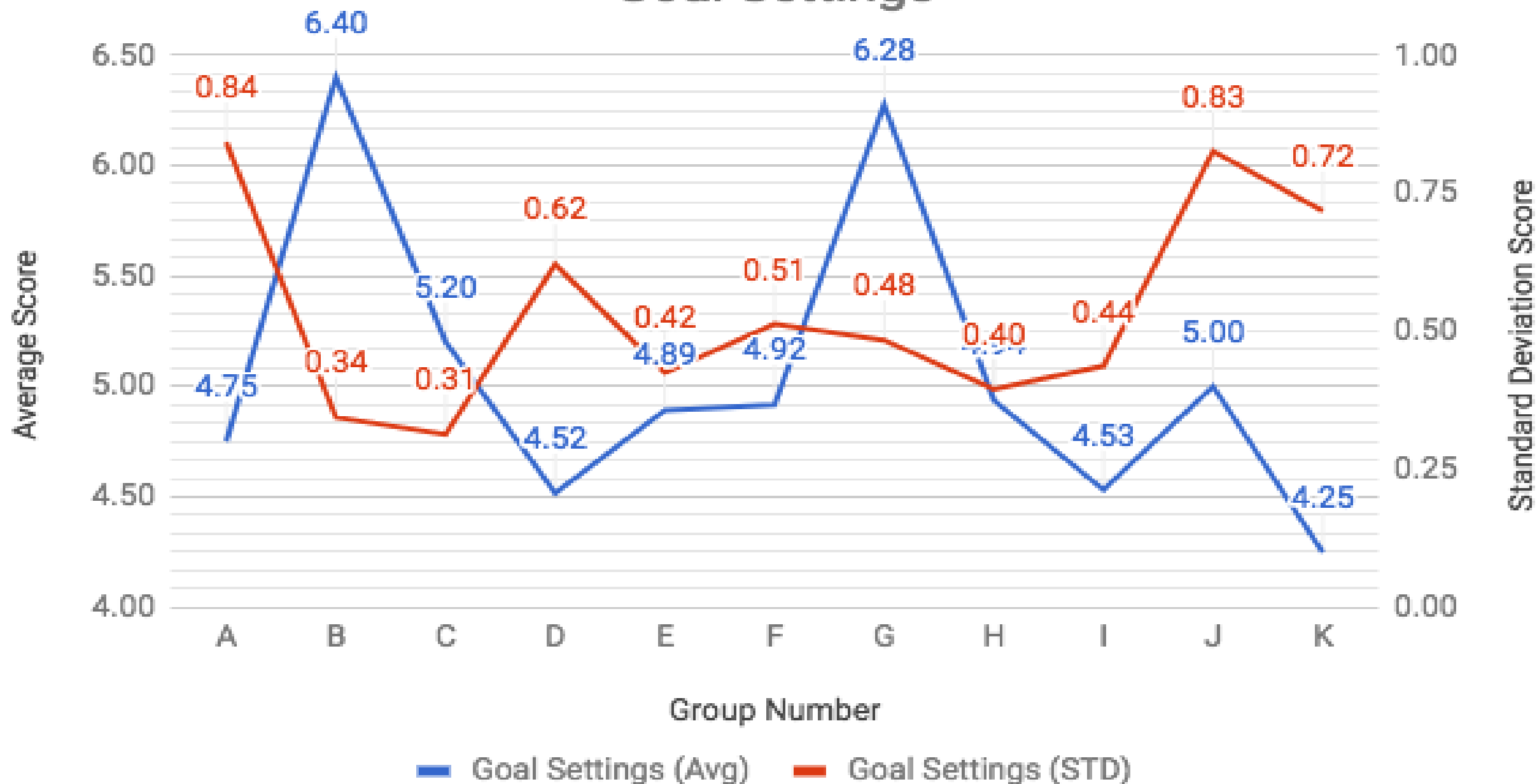Open-ended questions — Code book, Sentiment analysis
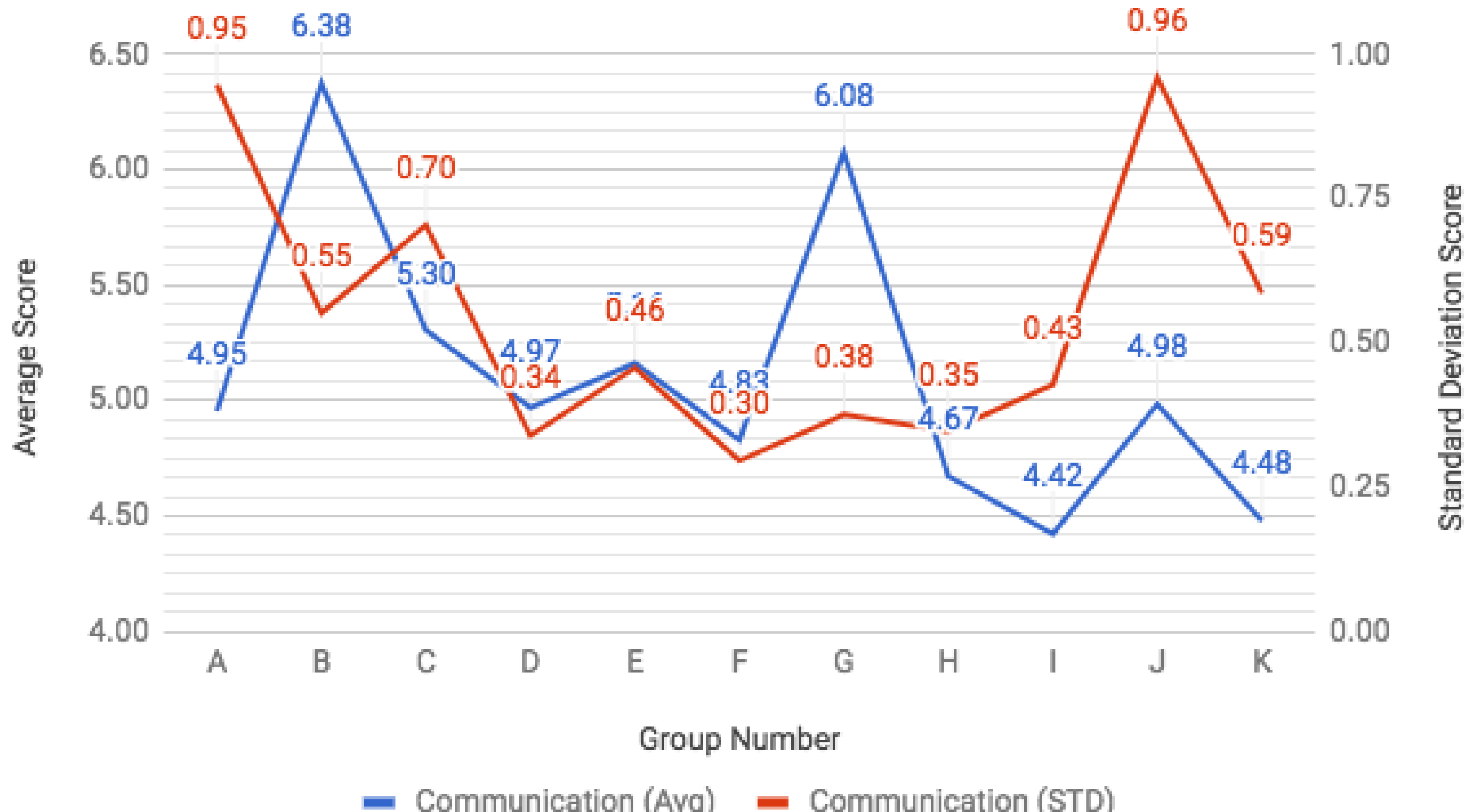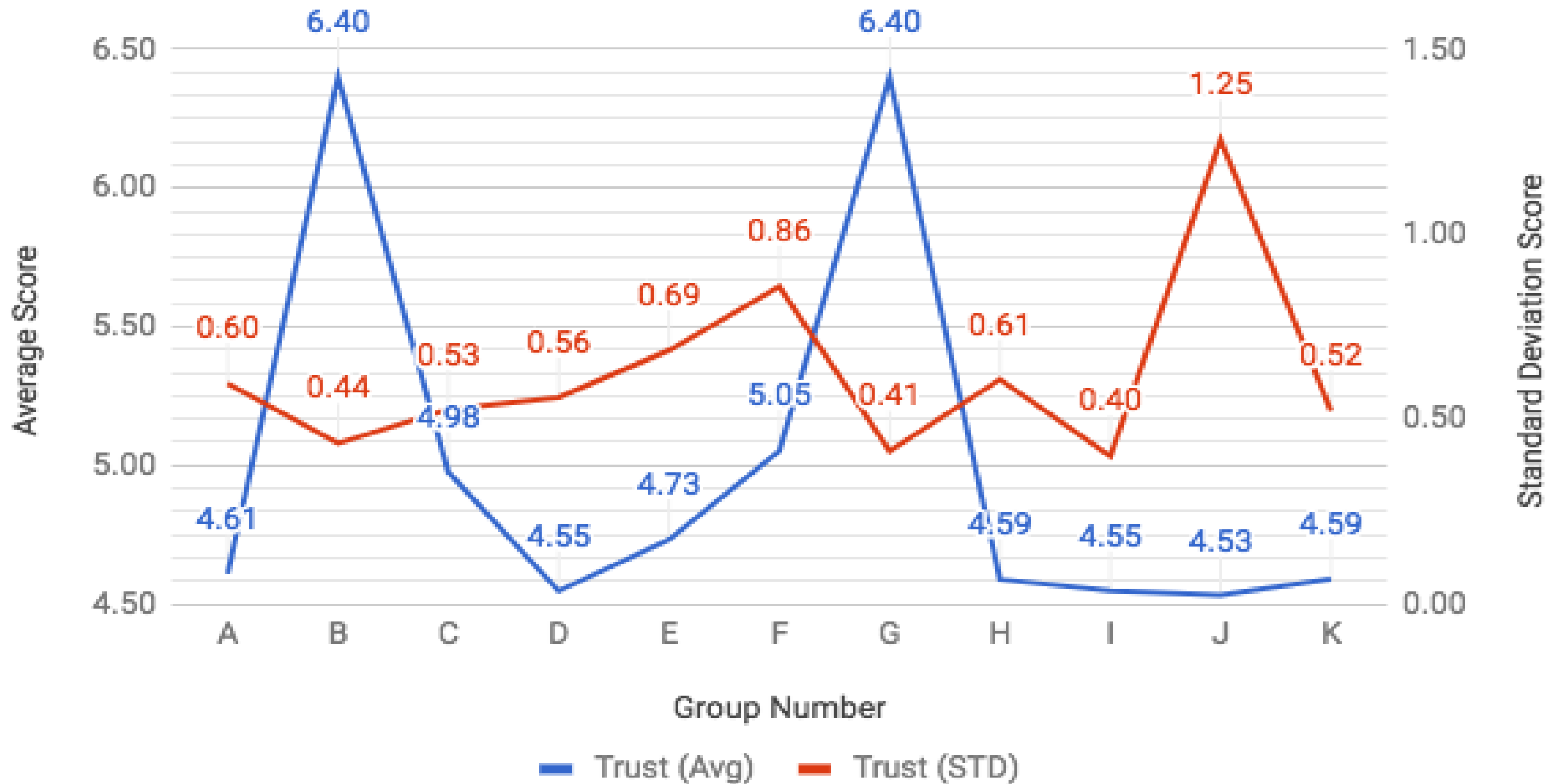
Correlations — Kahoot, Group-based activities
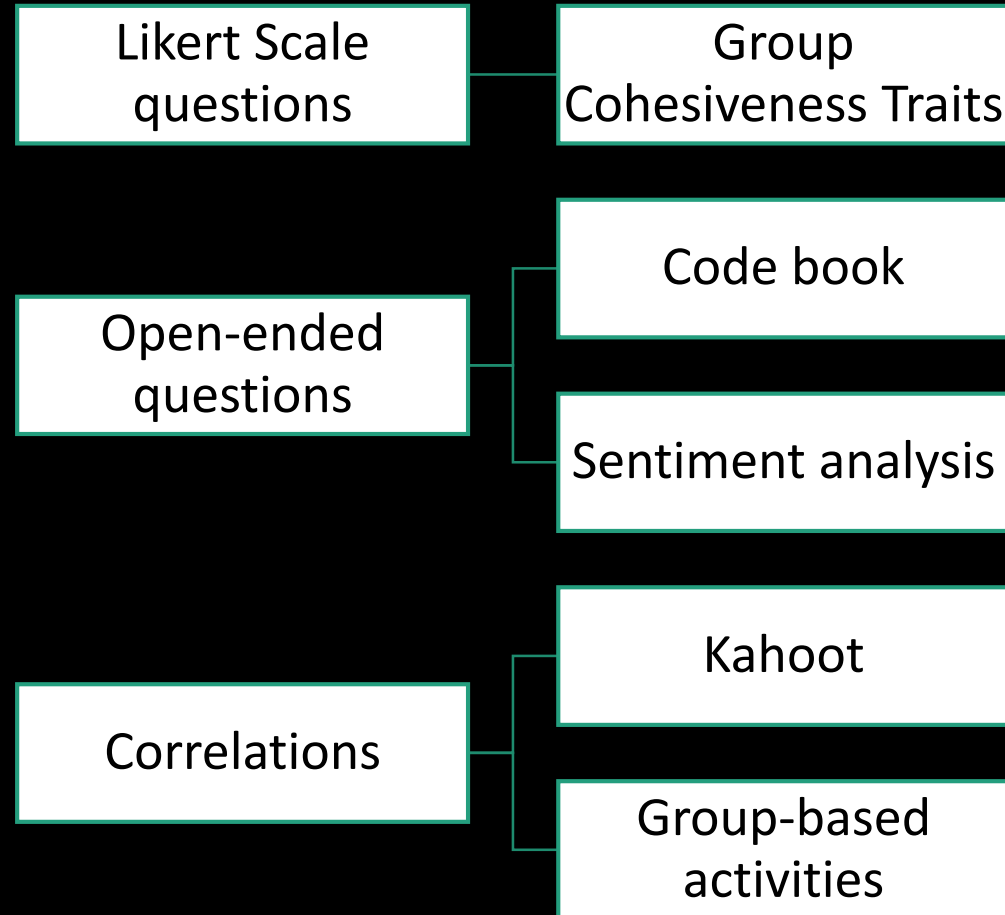
Group cohesiveness traits
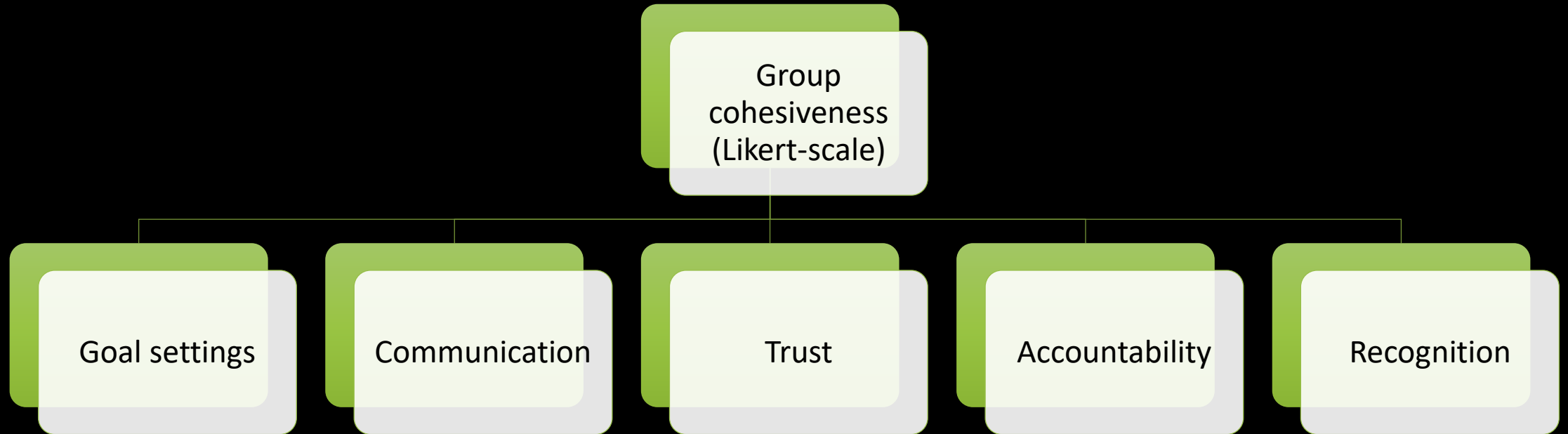
Goal Settings

Communication

Trust

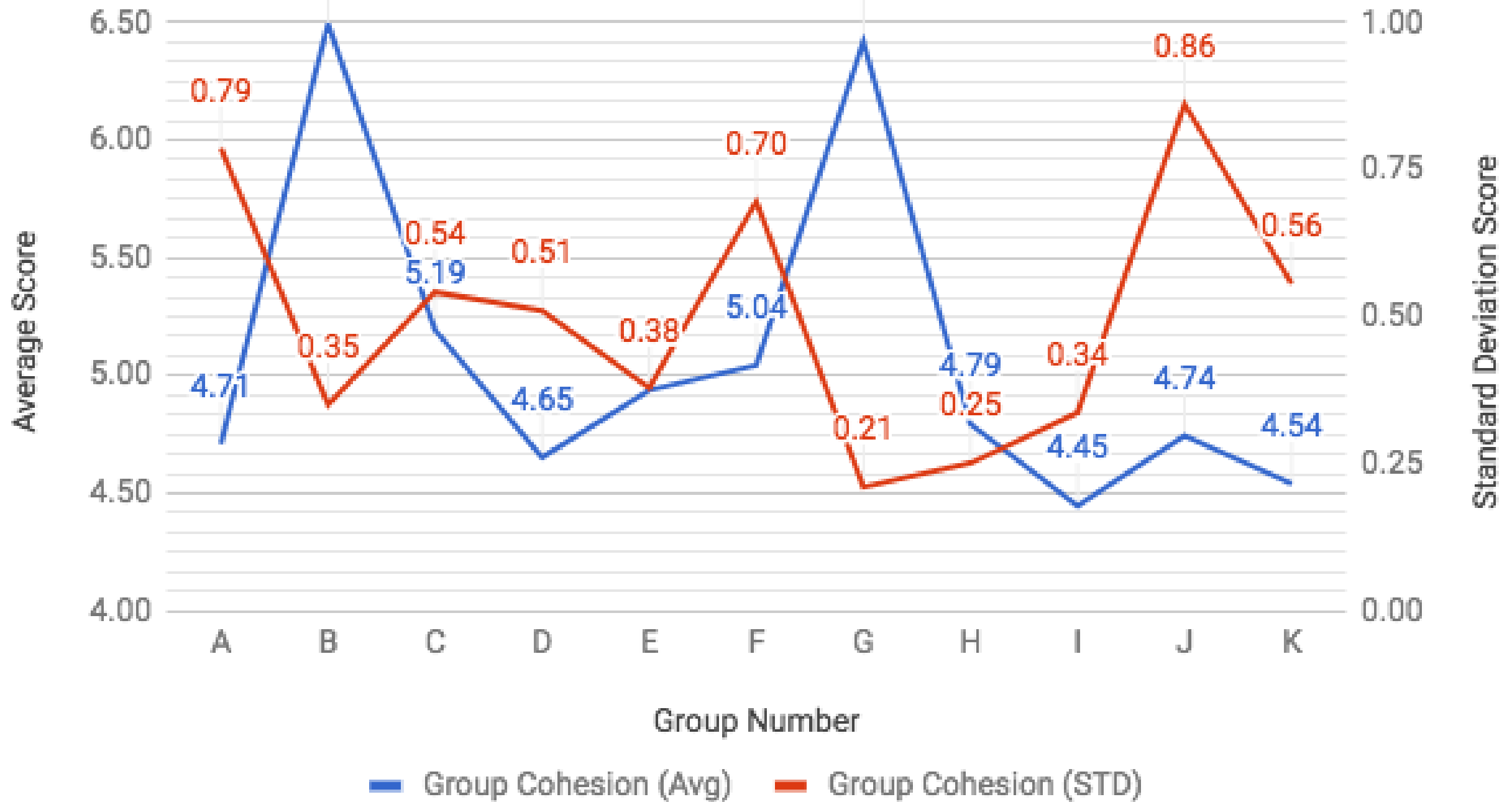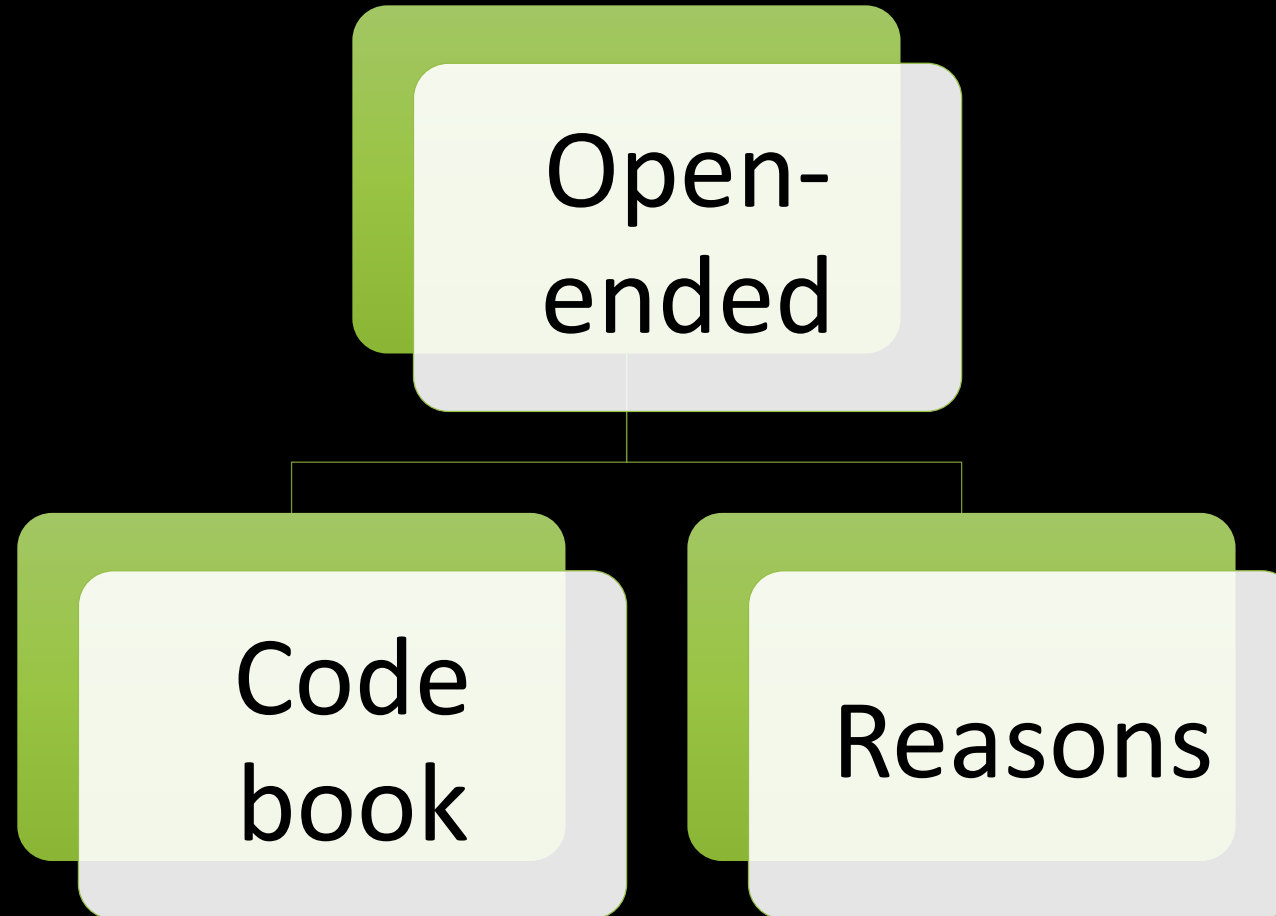Accountability
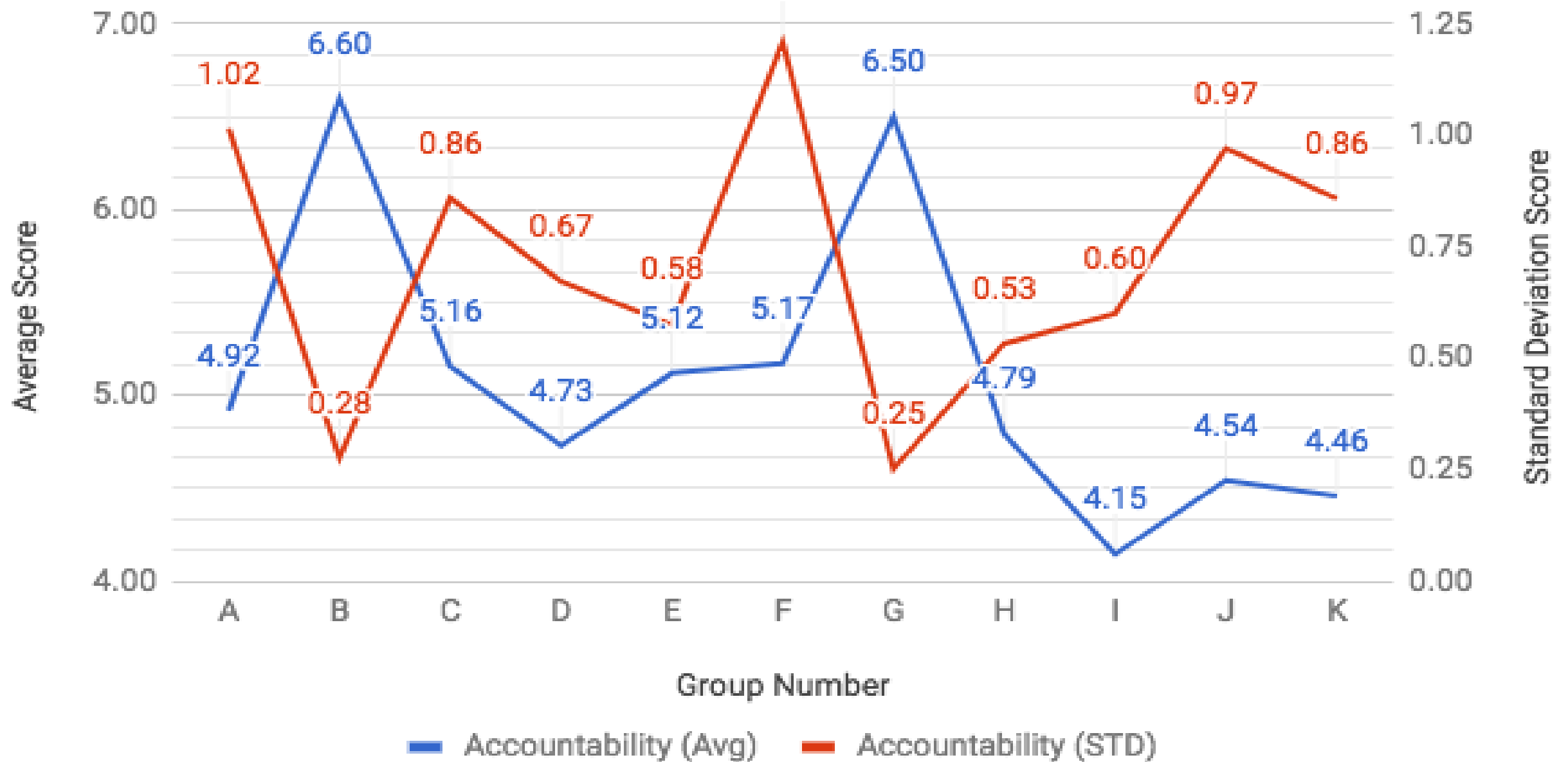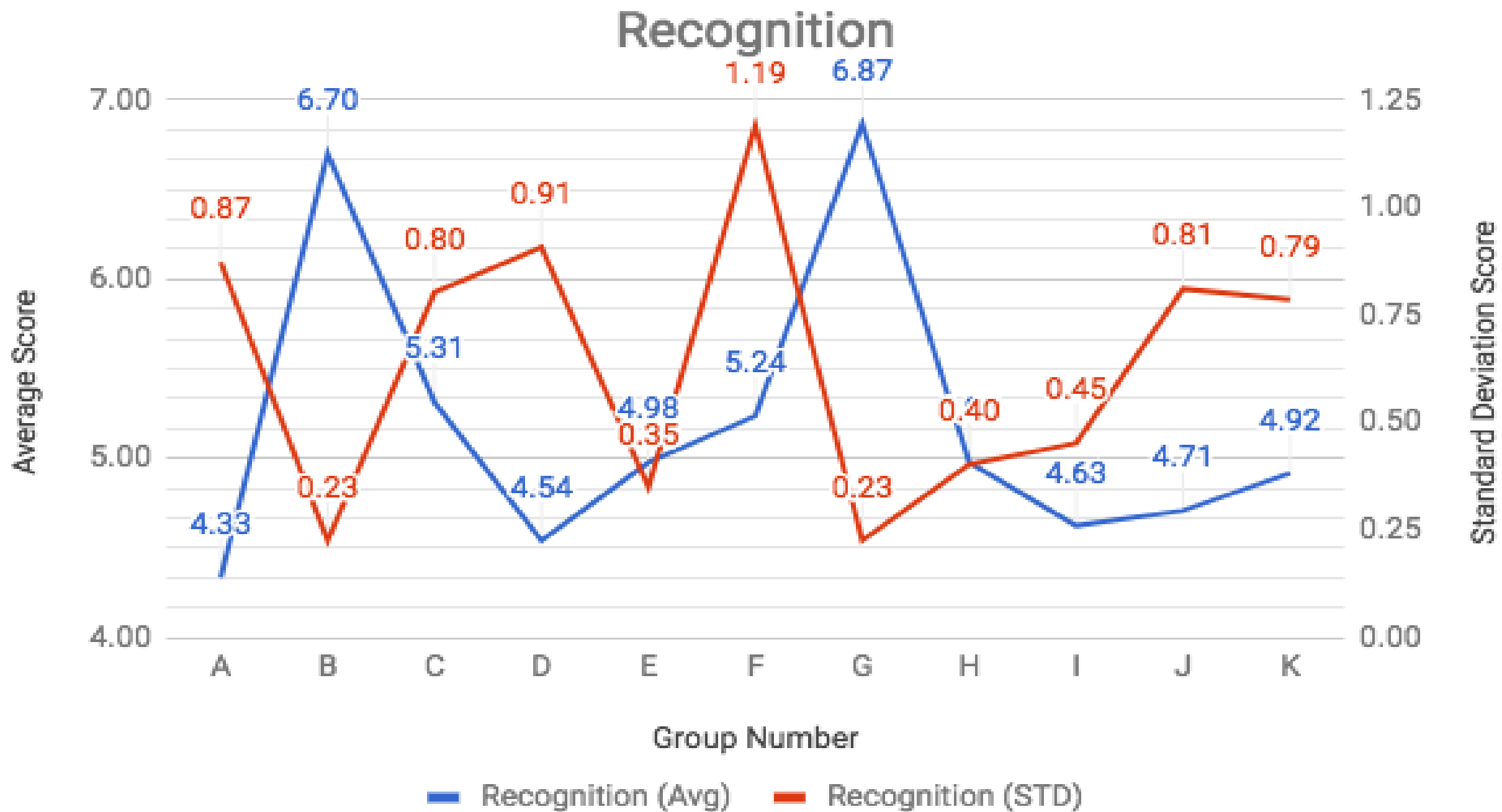
Recognition

Group Cohesion

Analysis of open-ended

| Goal Settings	Communication	Trust	Accountability	Recognition	Observation
Active and engaged (GS1)	Good (C1)	Good (T1)	Entire-group (A1)	Good (R1)	
Inactive and disengaged (GS2)	Bad (C2)	Bad (T2)	Half-group (A2)	Bad (R2)	Bad (O2)
	Neutral (C3)	Neutral (T3)	No-group (A3)	Neutral (R3)	

Code	Reasons
A1	Responsible discussion about class activities
	Concluding discussion to a common solution
	Motivating themselves when they answered wrong
	Discussing where they made a mistake
A2	Less participation
	Less discussion incorrect answers/understanding
	Less responsibilities delegation
A3	Not paying attention
	No discussion
	No participation
C1	Discussion about class activities
	Signs of leaderships
C2	Discussion about non-class activities
	Signs of Domination
	Working alone
	Group is mostly silent
	Signs of Shyness
	Group members are completely silent
C3	Discussion in pairs

| Code	Reasons
GS1	Focused, engaged and interactive
	Raising doubts/questions to TA
	Effective use of class resources
	Group enjoyed Kahoot
GS2	Asked off-topic questions to TA
	Dependency (Unable to function without leader of the group)
	Didn't ask TA any questions
	Distracted in non-class activities
	Free-riding group members (Relying on group to get the work done with min/zero contributions)
	Not listening to instructor/TA
	Unable to ask TA any questions even when struggling with the activities
	Signs of cluelessness about the activity
O2	Disrespecting TA (Being condescending/rude to TA)
	Group member absent
	Group member came late
R1	No signs of disapproval (Happy, excited, compassion towards the group and/or the activities)
R2	Signs of disapproval (Unhappy and hopeless towards the group and/or the activities)
R3	Neutral appreciation (No signs of positive/negative emotions towards the group and/or the activities)
T1	Preparedness
	Signs of leadership
	Healthy arguments
T2	Unable to challenge the group opinions
	Unable to trust the group opinions

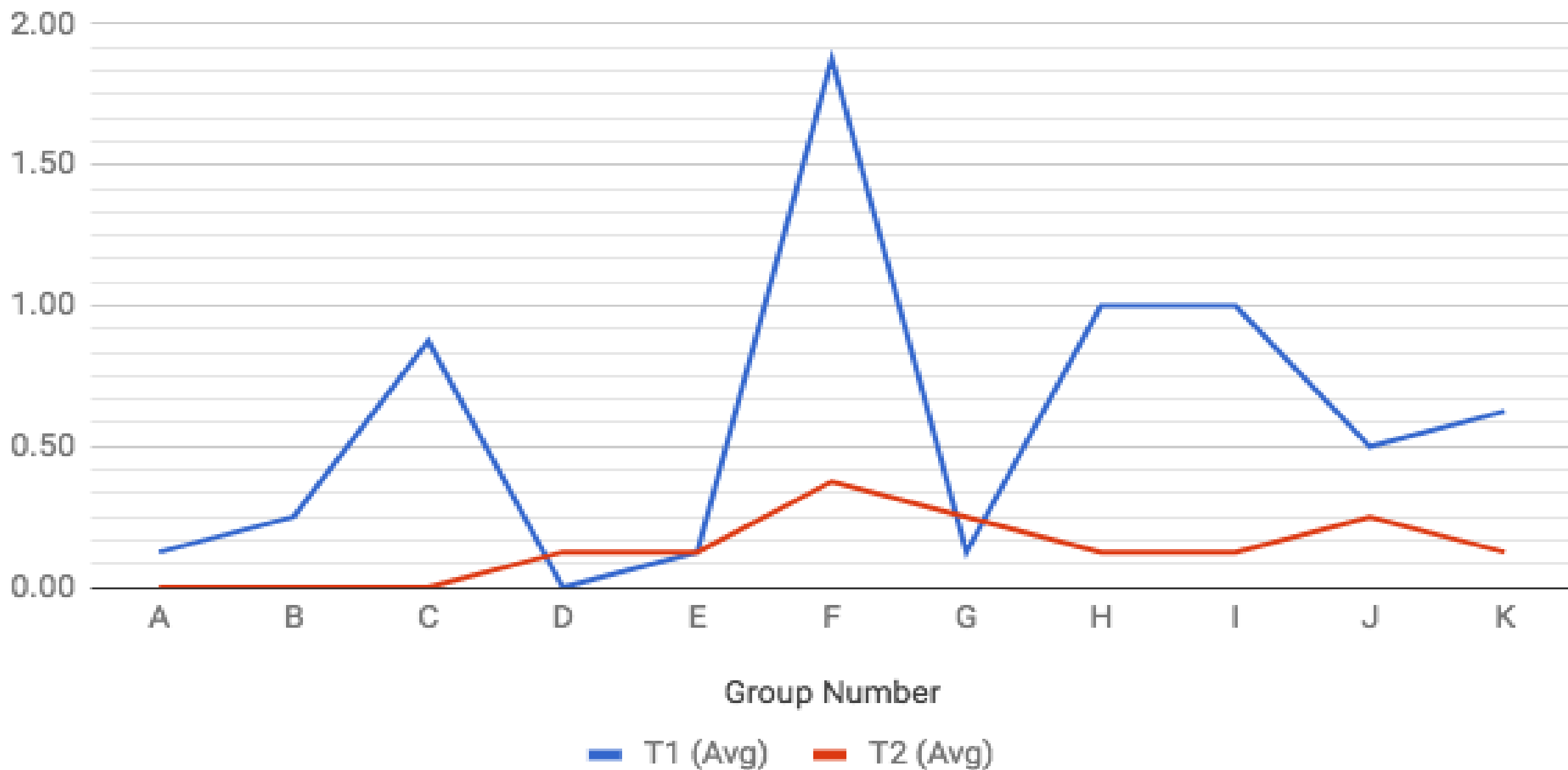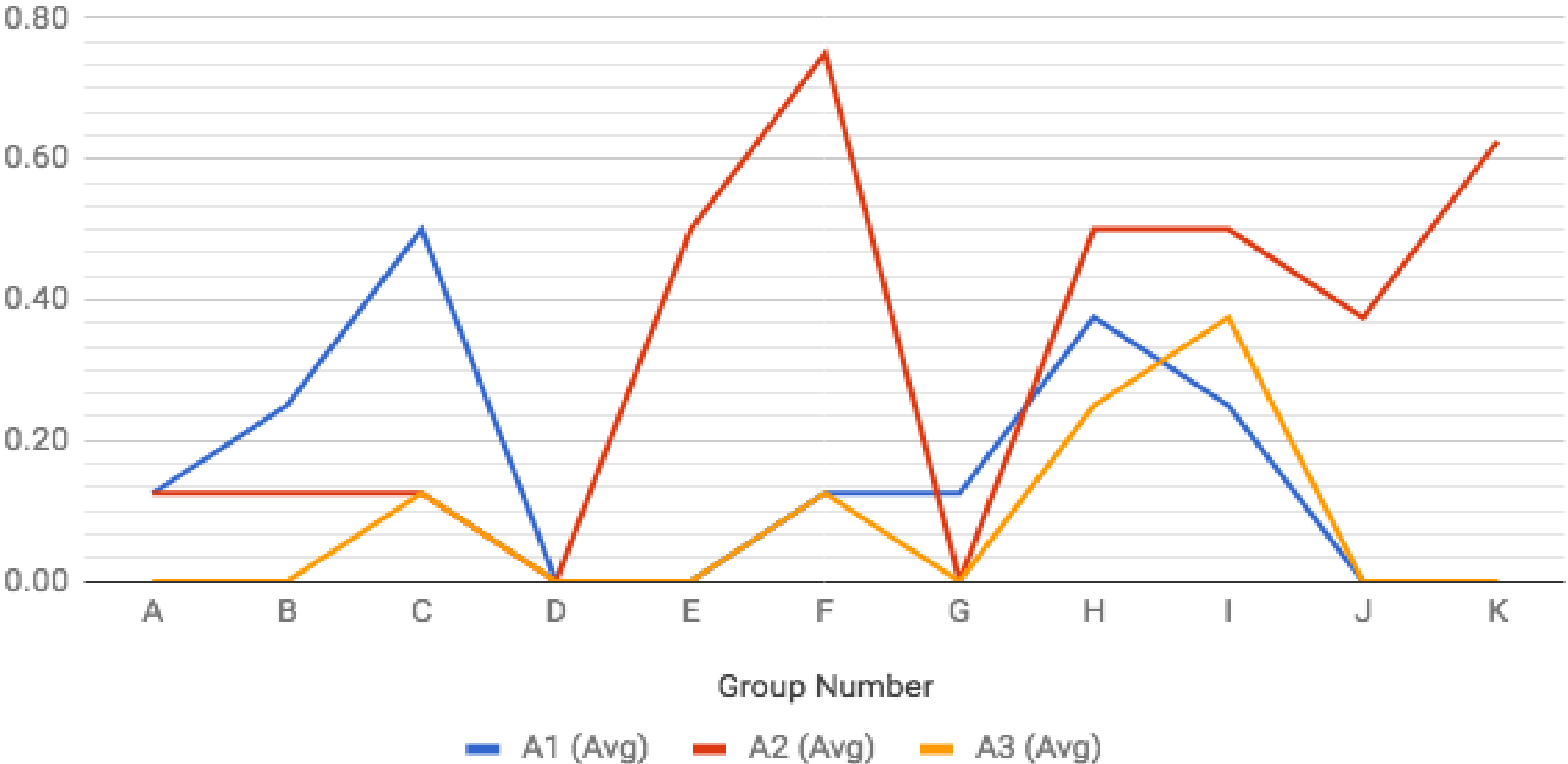# Social factors from open-ended
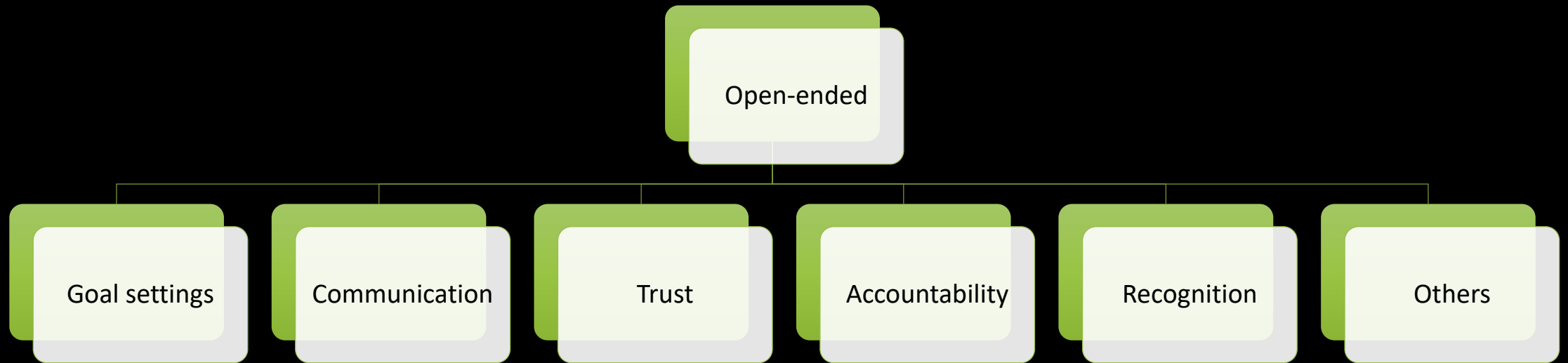
Social factors from Goal Settings
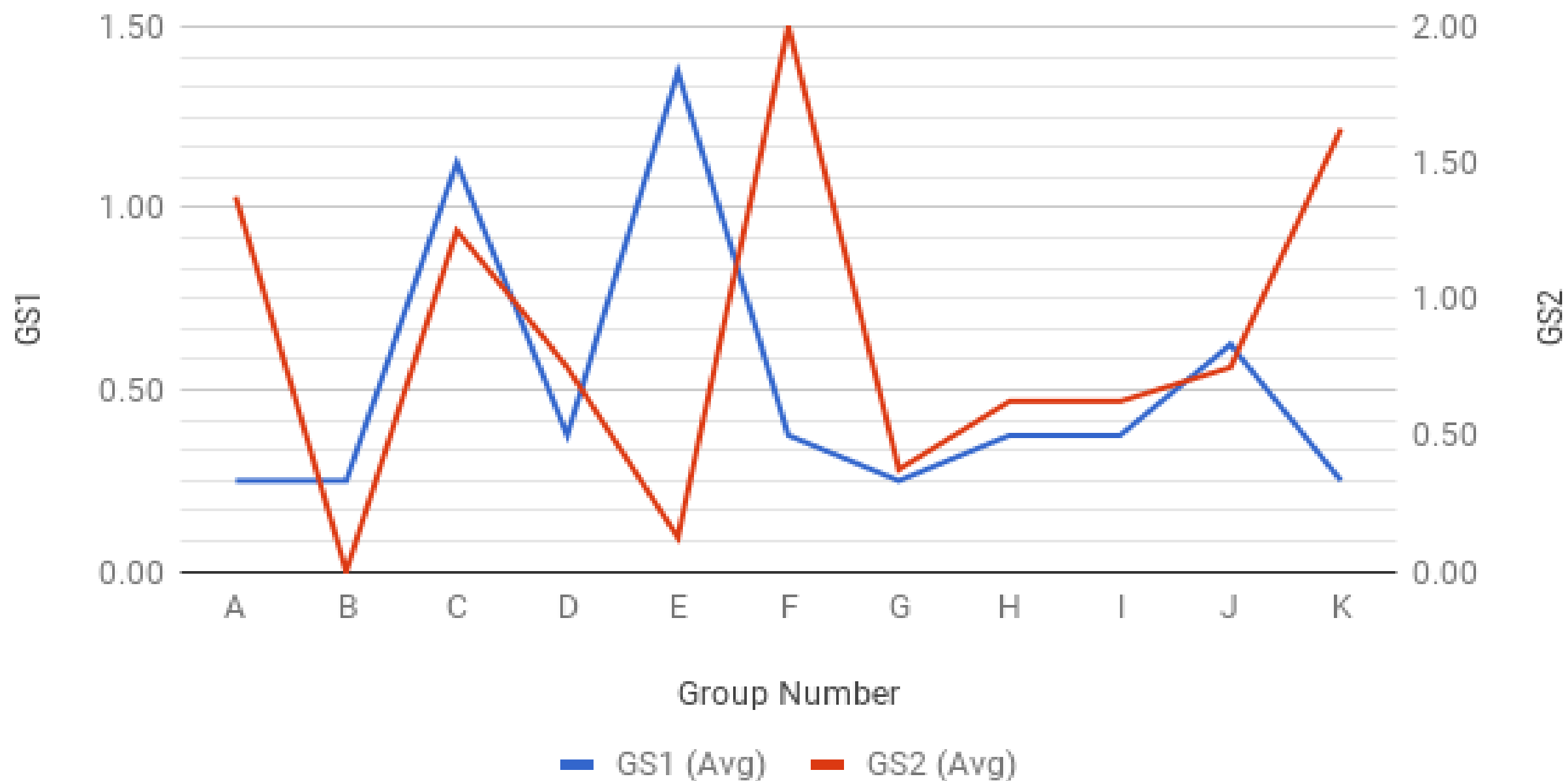
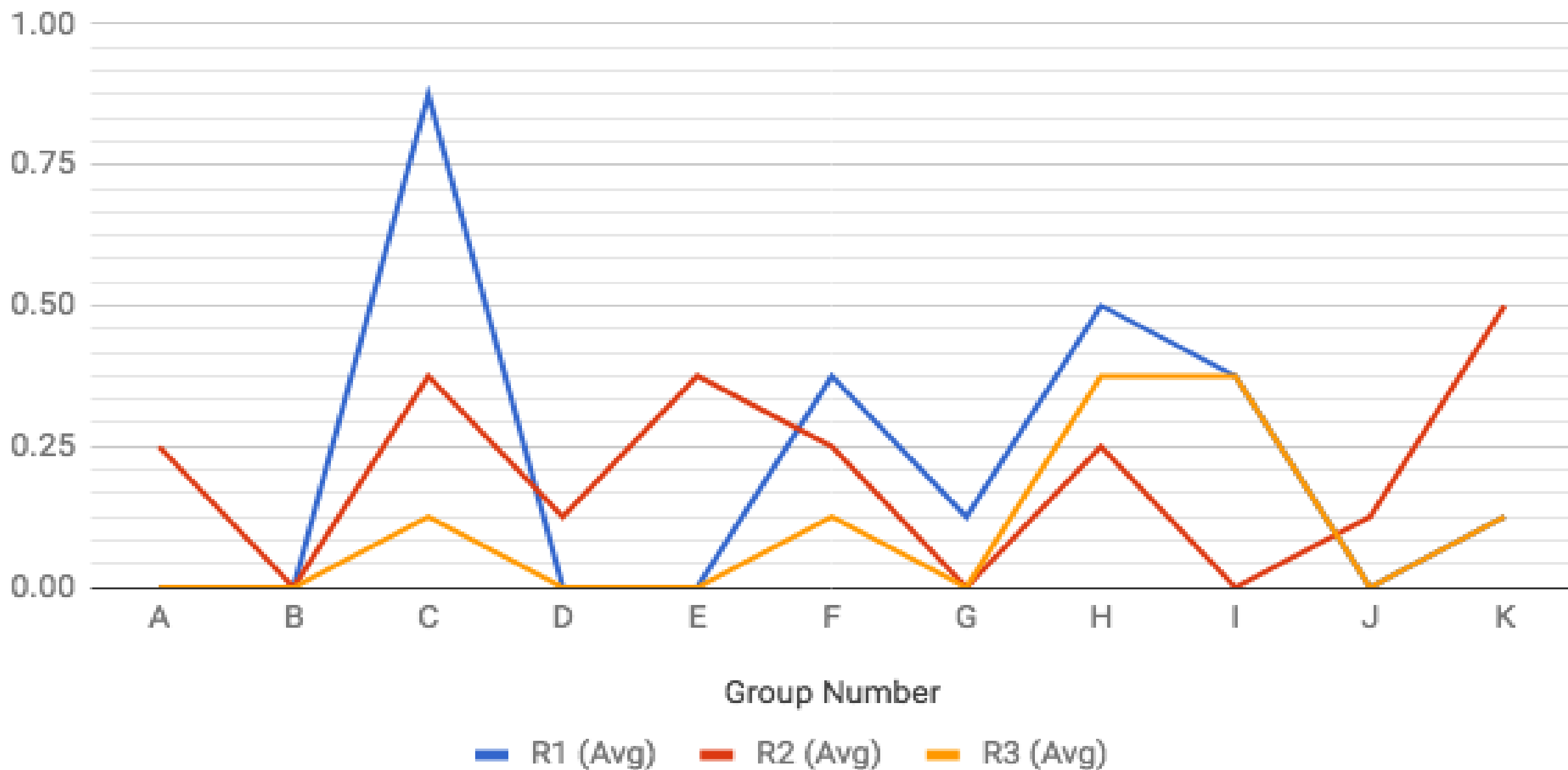Social Factors from Communication
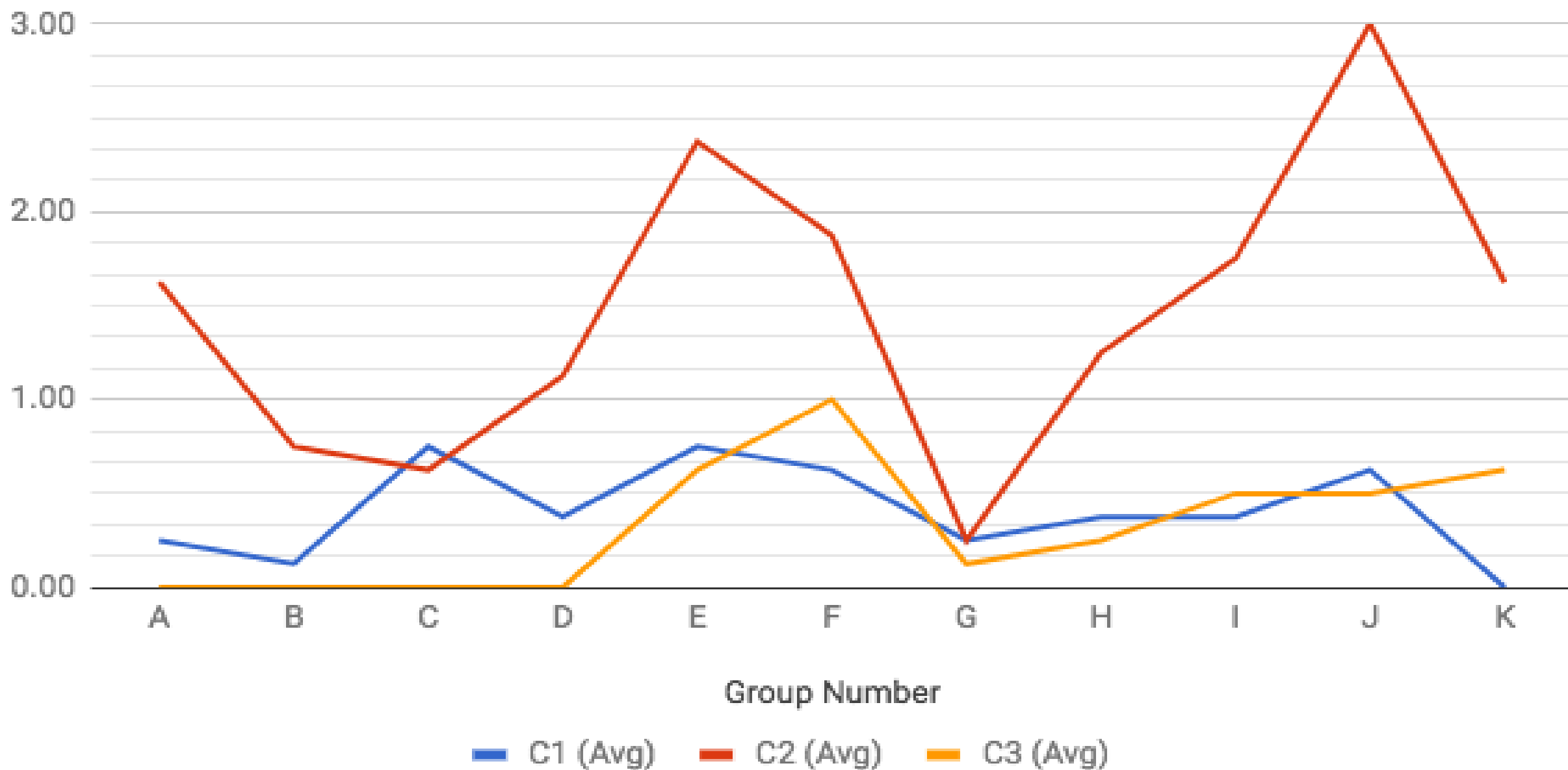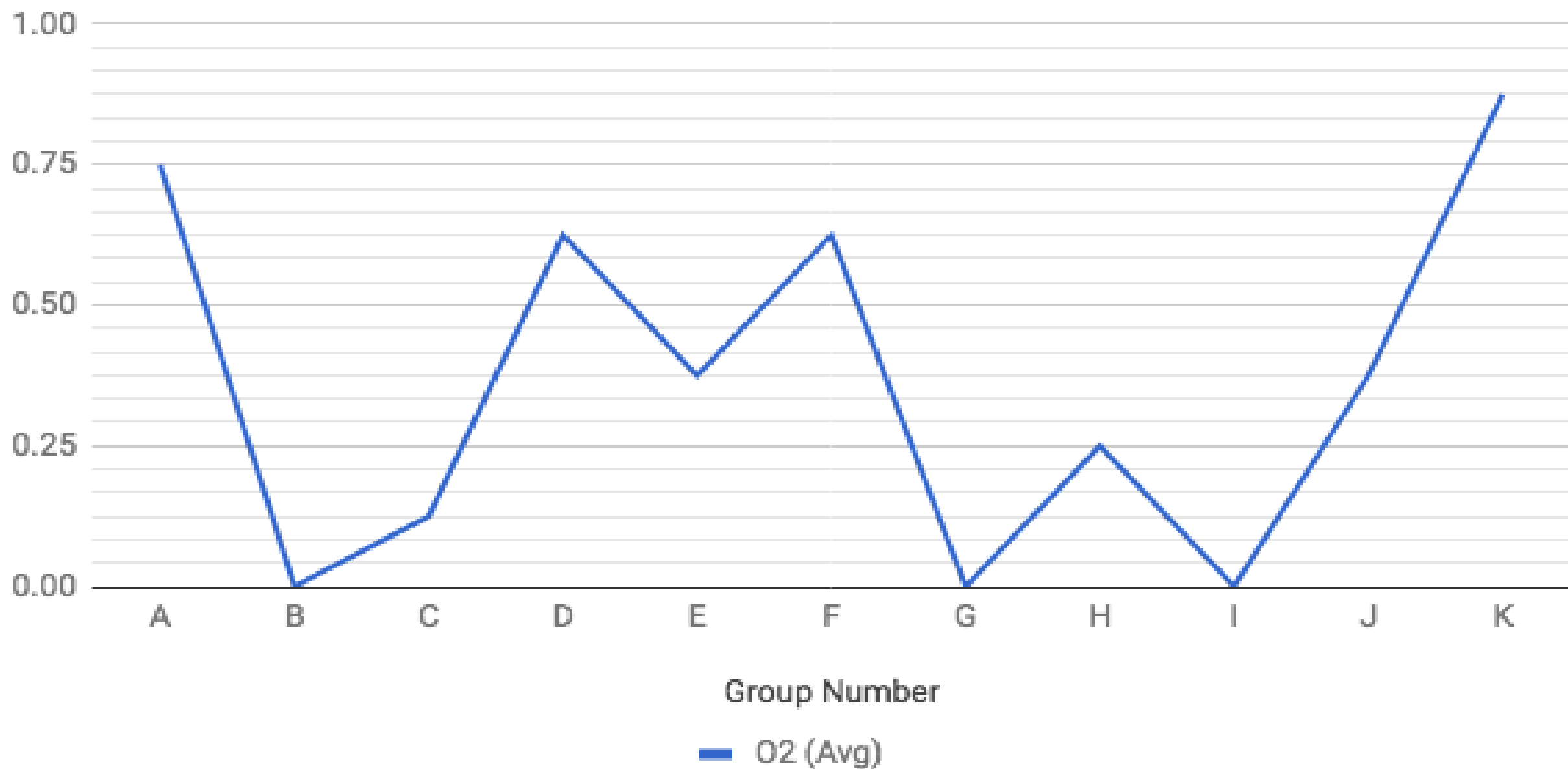
Social Factors from Trust
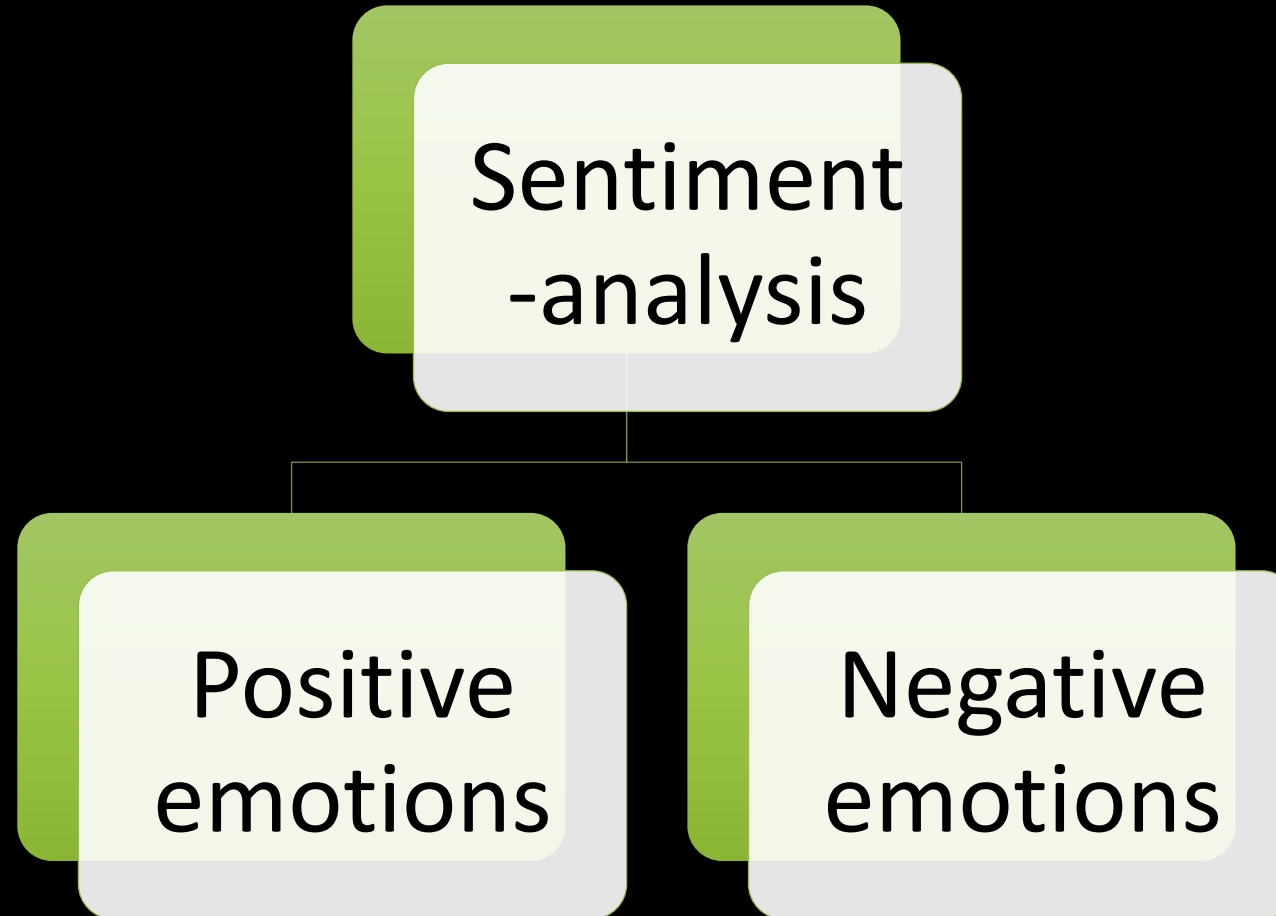
Social Factors from Accountability

Social Factors from Recognition

Social Factors from Observation Process

Open-ended analysis

Sentiment -analysis

Positive emotions

Negative emotions

Sentiment Analysis
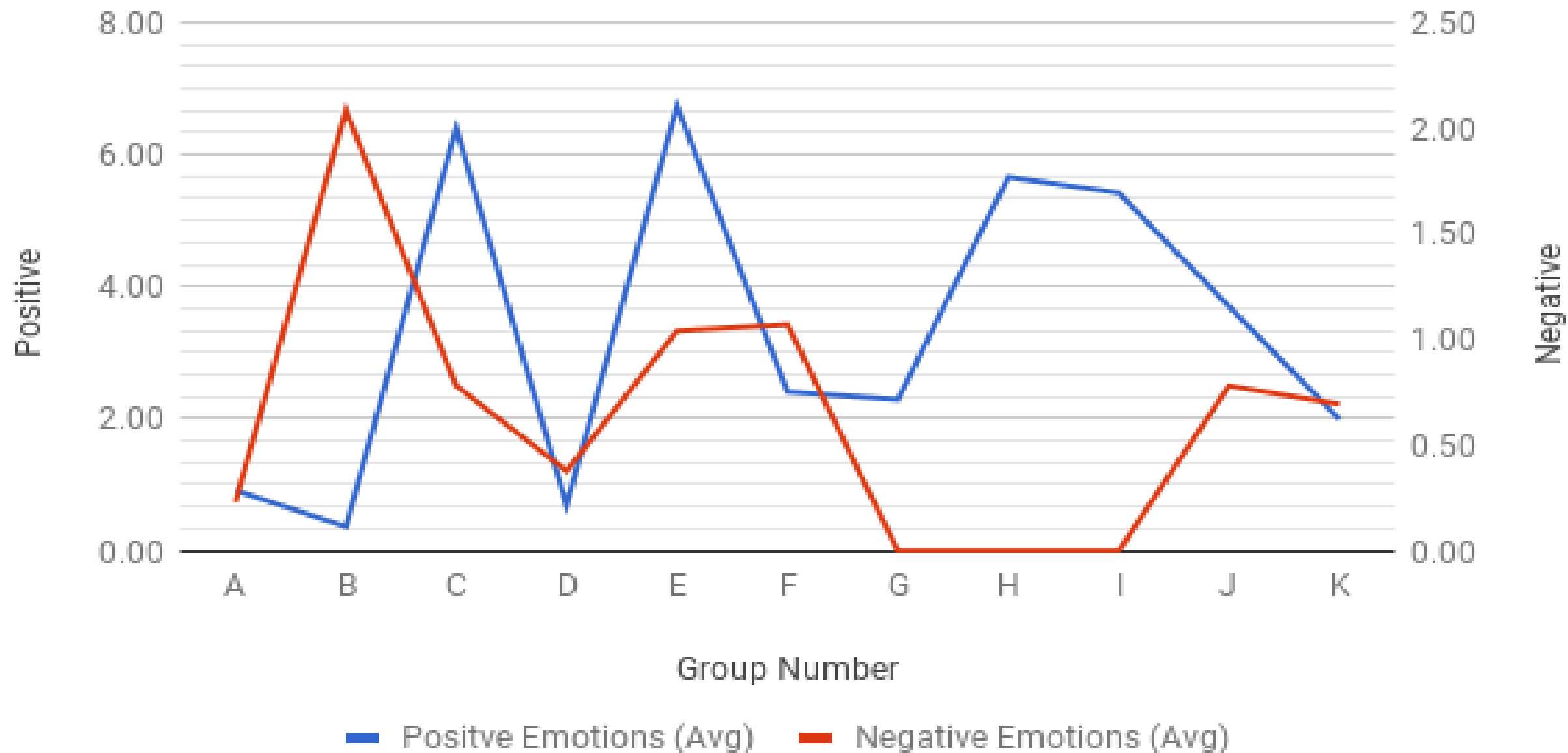
Performance
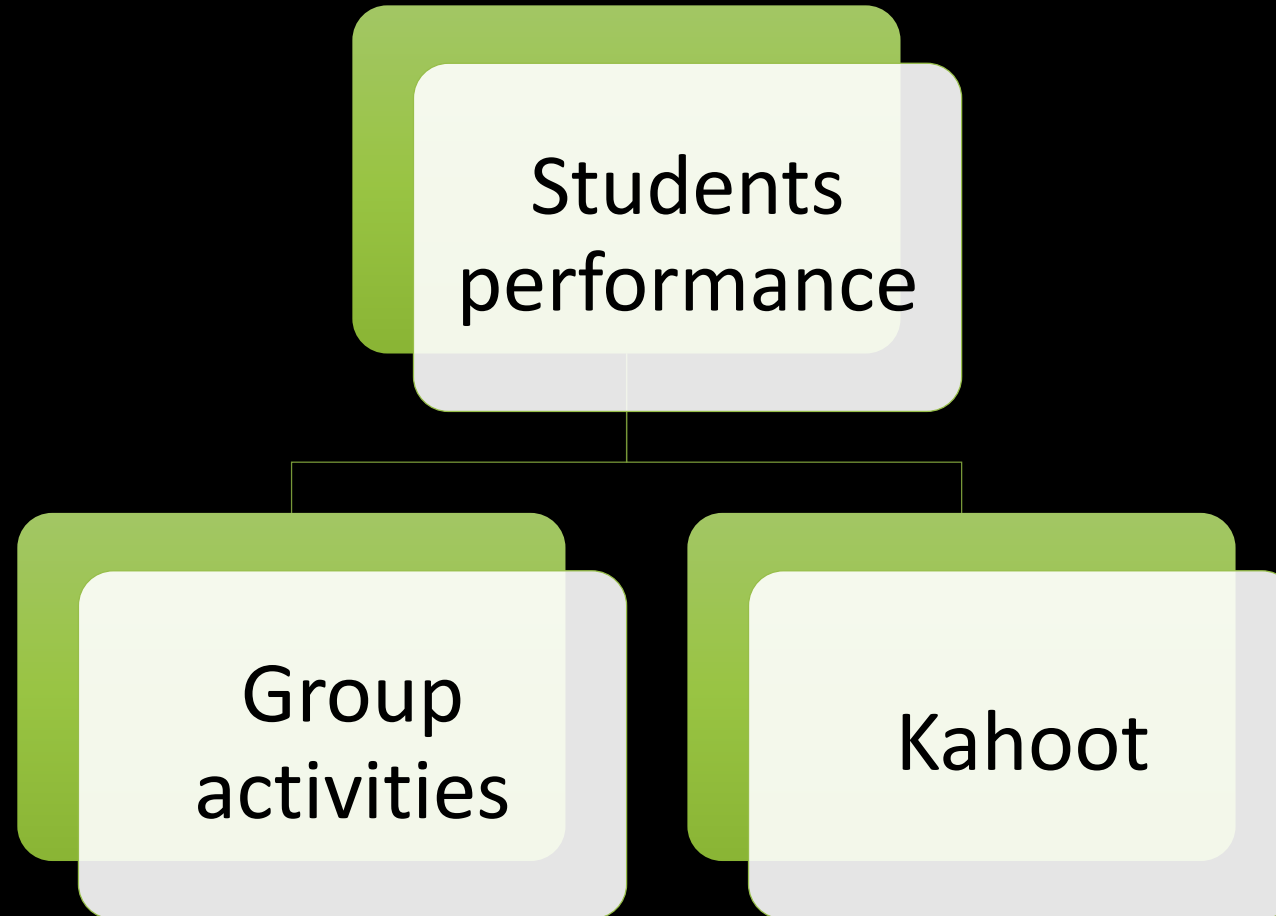
Kahoot Scores
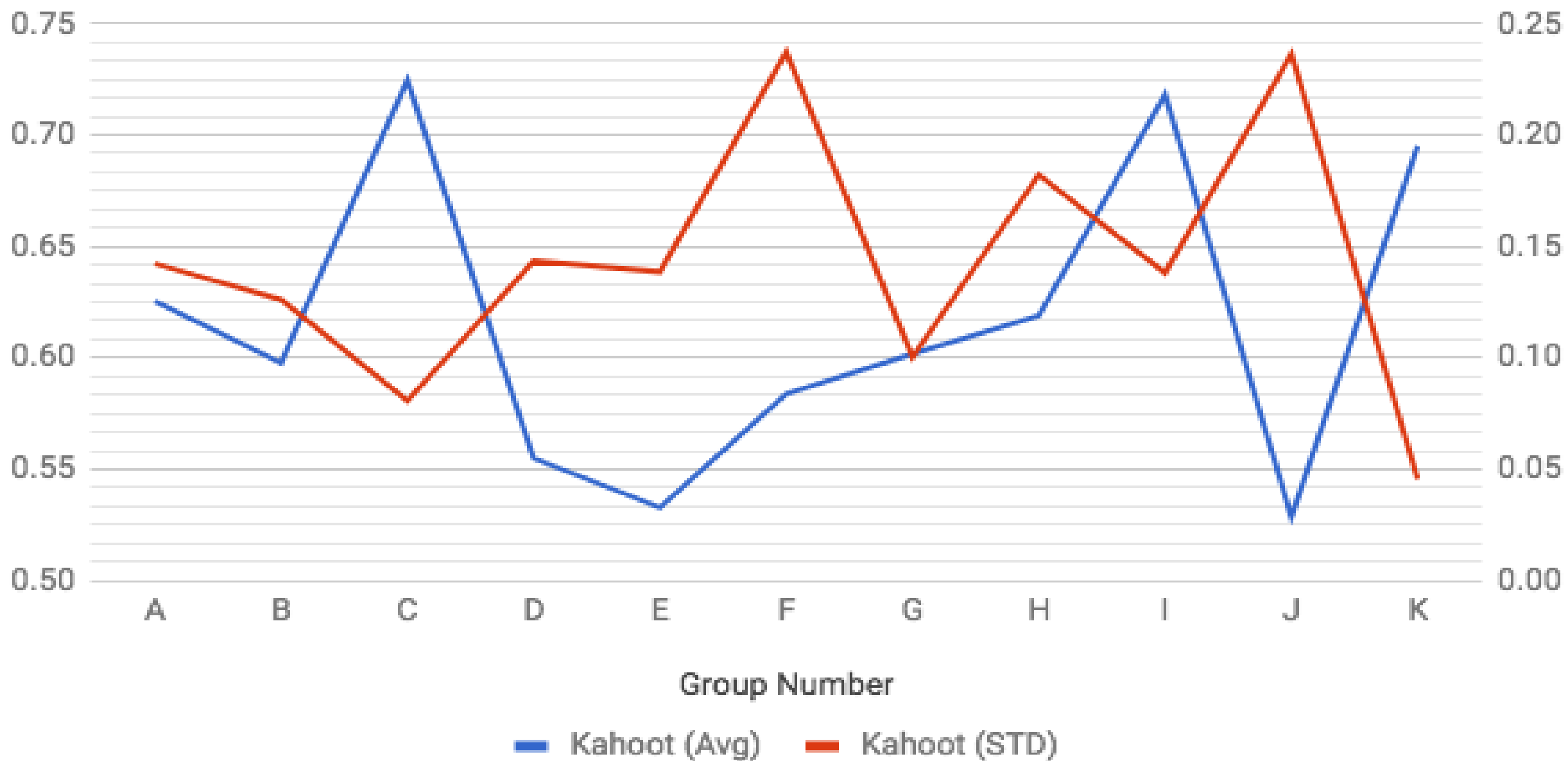
Group-based in-class activities

Correlations with performance
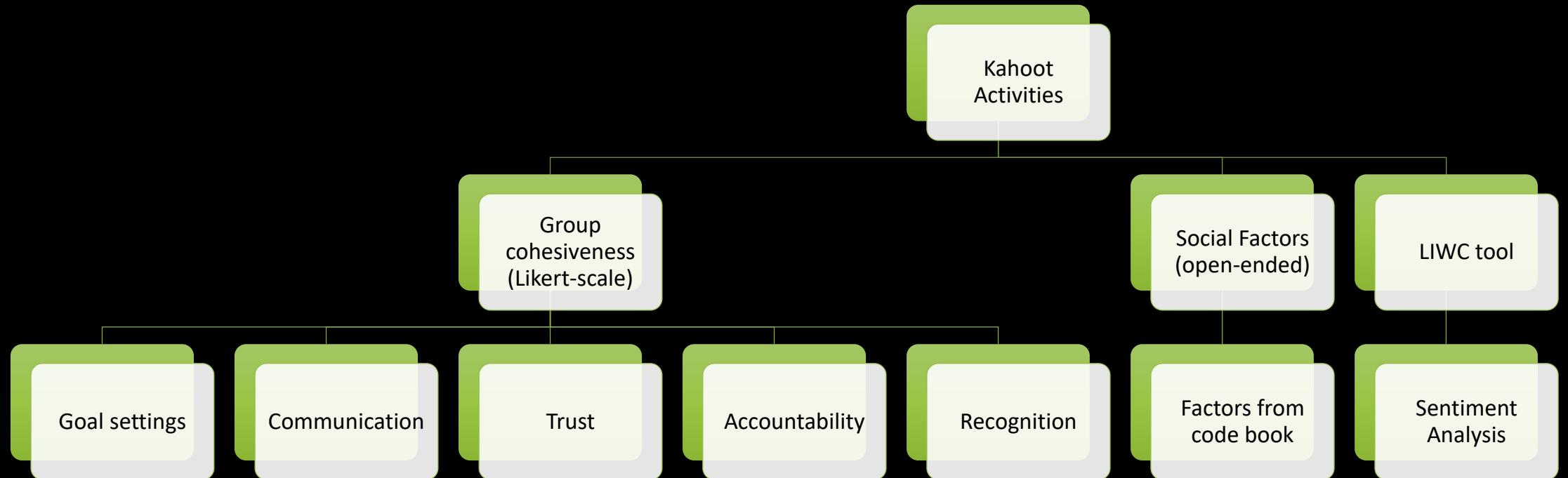
Kahoot		Pearson Coefficient (based on average)		Spearman's Rho (based on avg)	
		R value	R^2 value (coefficient determination)	R value	Two-tailed value of P
	Group Cohesion	-0.15	0.02	-0.22	0.51
	Goal Settings	-0.19	0.04	-0.14	0.69
	Communication	-0.27	0.07	-0.37	0.27
	Trust	-0.09	0.01	0.05	0.89
	Accountability	-0.23	0.05	-0.20	0.55
	Recognition	-0.05	0.00	-0.02	0.95
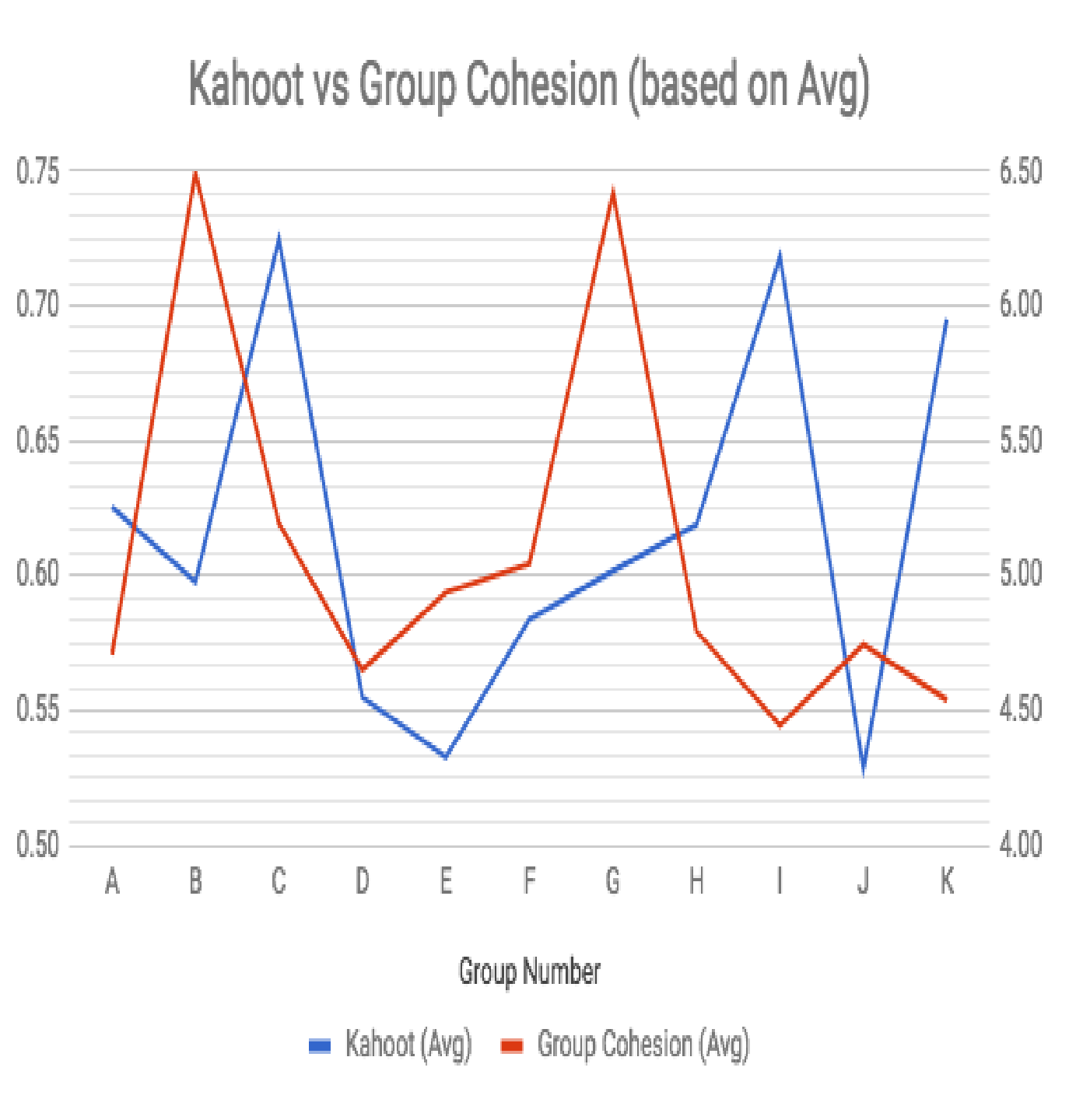
Kahoot vs Group Cohesion (based on Avg)

Kahoot		Pearson Coefficient (based on std)		Spearman's Rho (based on std)	
		R value	R^2 value (coefficient determination)	R value	Two-tailed value of P
	Group Cohesion	0.40	0.16	0.27	0.42
	Goal Settings	0.20	0.04	0.27	0.43
	Communication	0.01	0.00	-0.26	0.45
	Trust	0.75	0.56	0.73	0.01
	Accountability	0.38	0.15	0.35	0.30
	Recognition	0.32	0.10	0.43	0.19

Kahoot vs Group Cohesion (based on STD)

Group Number

■ Kahoot (STD)　■ Group Cohesion (STD)

		Pearson Coefficient (based on average)		Pearson Coefficient (based on std)		Spearman's Rho (based on avg)		Spearman's Rho (based on std)	
		R value	R^2 value (coefficient determination)	R value	R^2 value (coefficient determination)	R value	Two-tailed value of P	R value	Two-tailed value of P
Kahoot	GS1	-0.12	0.01	-0.03	0.00	-0.30	0.36	0.36	0.28
	GS2	0.33	0.11	-0.17	0.03	0.25	0.46	-0.10	0.77
	C1	-0.26	0.07	0.77	0.59	-0.31	0.36	0.80	0.00
	C2	-0.40	0.16	0.43	0.18	-0.40	0.23	0.56	0.07
	C3	-0.13	0.02	0.29	0.08	-0.20	0.55	0.34	0.31
	T1	0.32	0.10	0.00	0.00	0.42	0.19	0.03	0.92
	T2	-0.41	0.16	0.42	0.18	-0.50	0.12	0.49	0.12
	A1	0.60	0.36	-0.11	0.01	0.64	0.03	-0.12	0.73
	A2	0.08	0.01	0.39	0.15	0.07	0.83	0.45	0.17
	A3	0.54	0.29	0.21	0.04	0.52	0.10	0.26	0.44
	R1	0.21	0.04	0.00	0.00	0.63	0.04	-0.08	0.82
	R2	0.21	0.04	-0.24	0.06	0.12	0.72	-0.18	0.60
	R3	0.57	0.33	-0.04	0.00	0.64	0.03	0.04	0.90

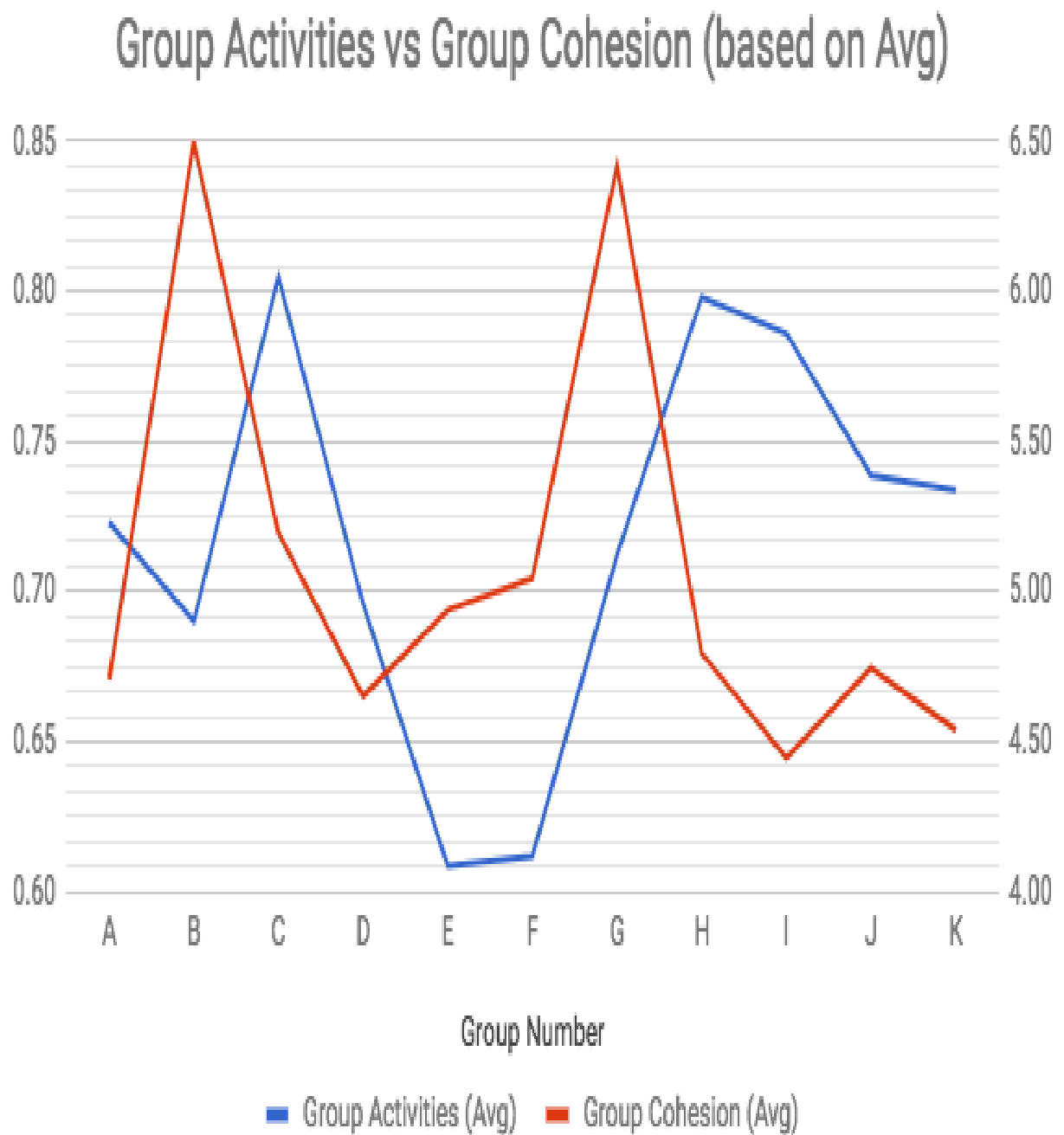|		Pearson Coefficient (based on average)		Pearson Coefficient (based on std)		Spearman's Rho (based on avg)		Spearman's Rho (based on std)	
		R value	R^2 value (coefficient determination)	R value	R^2 value (coefficient determination)	R value	Two-tailed value of P	R value	Two-tailed value of P
Kahoot	Positive Emotions	0.22	0.05	-0.12	0.02	0.05	0.87	-0.08	0.81
	Negative Emotions	-0.26	0.07	0.01	0.00	-0.42	0.20	0.03	0.94

Correlations with performance
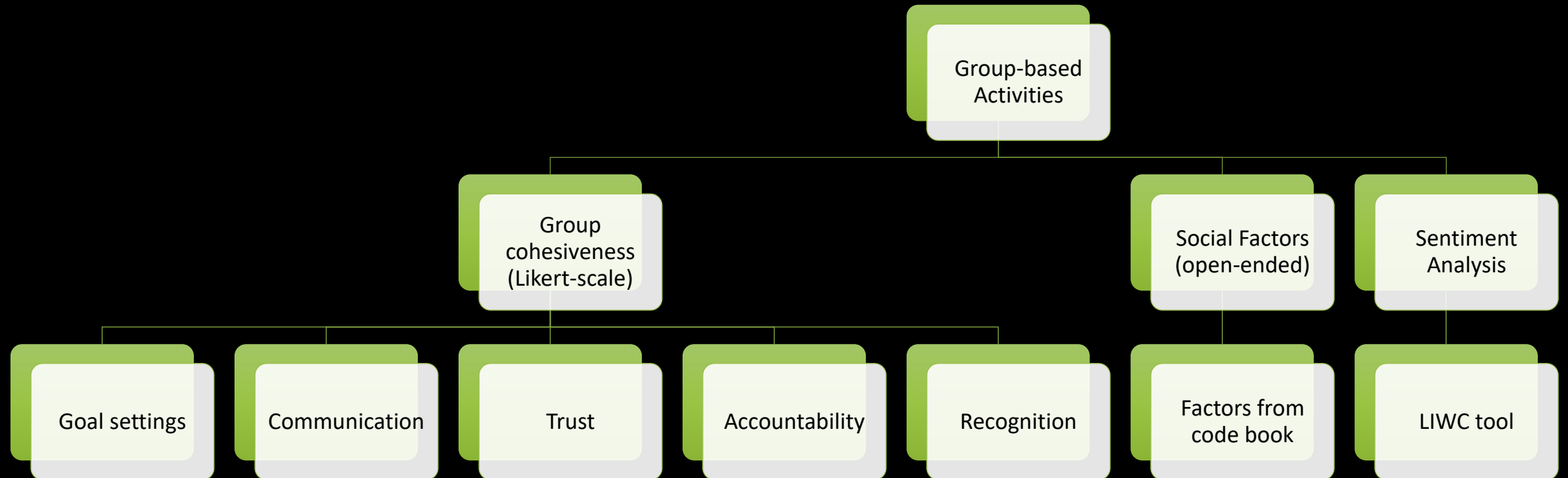
		Pearson Coefficient (based on average)		Spearman's Rho (based on avg)	
		R value	R^2 value (coefficient determination)	R value	Two-tailed value of P
Group Activities	Group Cohesion	-0.20	0.04	-0.31	0.35
	Goal Settings	-0.10	0.01	0.01	0.97
	Communication	-0.22	0.05	-0.33	0.32
	Trust	-0.20	0.04	0.45	0.17
	Accountability	-0.31	0.09	-0.49	0.13

Group Activities vs Group Cohesion (based on Avg)

		Pearson Coefficient (based on std)		Spearman's Rho (based on std)	
		R value	R^2 value (coefficient determination)	R value	Two-tailed value of P
Group Activities	Group Cohesion	0.16	0.03	-0.08	0.82
	Goal Settings	-0.17	0.03	-0.15	0.67
	Communication	-0.38	0.15	-0.41	0.21
	Trust	0.31	0.10	0.18	0.59
	Accountability	0.25	0.06	-0.08	0.82

Group Activities vs Group Cohesion (based on STD)

Group Number

- Group Activities (STD) - Group Cohesion (STD)

		Pearson Coefficient (based on average)		Pearson Coefficient (based on std)		Spearman's Rho (based on avg)		Spearman's Rho (based on std)	
		R value	R^2 value (coefficient determination)	R value	R^2 value (coefficient determination)	R value	Two-tailed value of P	R value	Two-tailed value of P
Group Activities	GS1	-0.15	0.02	0.05	0.00	0.12	0.73	0.29	0.39
	GS2	0.00	0.00	-0.12	0.01	0.14	0.68	-0.47	0.15
	C1	-0.17	0.03	0.83	0.68	0.03	0.93	0.61	0.04
	C2	-0.27	0.08	0.21	0.04	-0.17	0.61	0.18	0.59
	C3	-0.45	0.21	0.33	0.11	-0.20	0.55	0.34	0.30
	T1	0.06	0.00	0.01	0.00	0.40	0.22	-0.27	0.43
	T2	-0.42	0.18	0.32	0.10	-0.24	0.47	0.32	0.33
	A1	0.62	0.39	-0.09	0.01	0.50	0.12	-0.12	0.73
	A2	-0.21	0.04	0.38	0.14	-0.02	0.96	0.30	0.36
	A3	0.50	0.25	0.17	0.03	0.51	0.11	0.04	0.91
	R1	0.54	0.29	0.21	0.04	0.57	0.07	-0.22	0.51
	R2	-0.06	0.00	-0.26	0.07	0.08	0.81	-0.47	0.15
	R3	0.56	0.32	-0.02	0.00	0.58	0.06	-0.22	0.52

		Pearson Coefficient (based on average)		Pearson Coefficient (based on std)		Spearman's Rho (based on avg)		Spearman's Rho (based on std)	
		R value	R^2 value	R value	R^2 value	R value	Two-tailed P	R value	Two-tailed P
Group Activities	Positive Emotions	0.28	0.08	-0.10	0.01	0.36	0.28	-0.21	0.54
	Negative Emotions	-0.48	0.23	0.41	0.17	-0.56	0.07	0.48	0.13

Correlations with performance
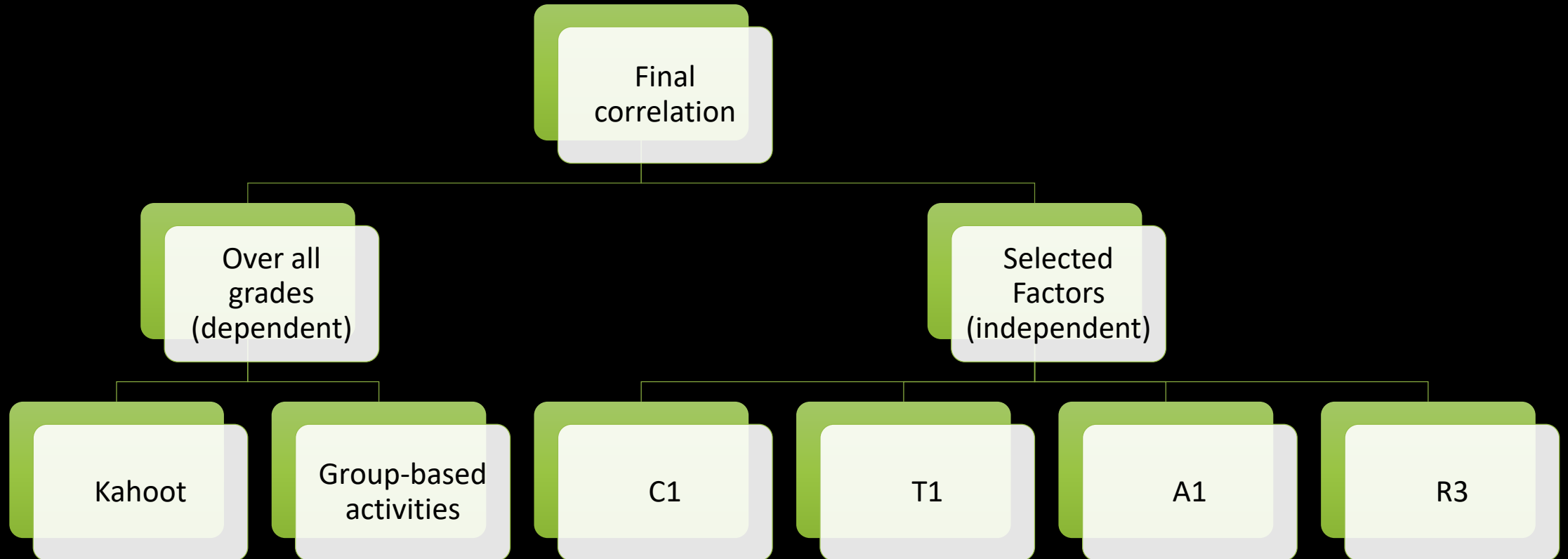
Based on Avg		Based on STD	
Dependent Variables	Independent Variables	Dependent Variable	Independent Variables
Over all grades(y)	T1 C1 A1 R3	Over all grades(y)	T1 C1 A1 R3
Multiple R	0.865487	**Multiple R**	0.890138

Conclusion

Data analysis

- Group Cohesion and its traits
- Social factors from the open-ended answers
- Sentiment analysis for each group
- How it affects Group activities and Kahoot

Future work

- Students' opinions regarding group cohesion and directly correlate with
  - Academic grades
- Correlate between students' and TAs' perspective about
  - Group Cohesion
  - Social factors

Thank you so much for your time.