

The Effect of Language Style on Group Decision Making Performance

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Abstract

Previous research has demonstrated that factors such as member task expertise, personality, information sharing, emergent group states (e.g., cohesion), and communication significantly predict effective group decision making. The current study examined a less well researched variable: the impact of language style. Language style, conceptualized as the words that provide the architecture for the content of speech by helping organize and shape the delivery of content words. Language style is posited to reflect underlying personality, cognitive and/or emotional mechanisms in people and has been shown to validly predict behaviors including: deception; attraction; and improvements in mental health. We hypothesized that language style would significantly predict group decision making performance, even after controlling for typically studied variables. Participants (n=276) in 92, three-person groups completed both surveys assessing personality characteristics and two intellectual, problem-solving scenarios. For each scenario, participants imagined they were stranded in a wilderness with various items. Participants rank ordered these items in terms of their importance for the group's survival both individually and as a group. Language style was examined by analyzing the verbal content of the groups' interactions. Verbal content was collected by video recording and transcribing group interactions during the problem solving scenarios. The transcripts were analyzed using Linguistic Inquiry and Word Count (LIWC) software. Group development, in terms of forming and feedback, was experimentally manipulated using a 2X2 experimental design. Stepwise regression analyses controlling for member expertise, experimental condition, personality, and pre-decision agreement showed that exclusive language (e.g., but, or, except, etc.) ($\Delta R^2 = .049, p < .01, B = .189$), causal language (e.g., because, depending, etc.) ($\Delta R^2 = .040, p < .01, B = .357$), and negations (e.g., neither, never, nothing, etc) ($\Delta R^2 = .025, p < .05, B = .186$), explained an additional 11.4% of the variance in group decision making performance. Exclusion language reflects the use of logic, reasoning, and making distinctions. Causal language reflects the thinking about and searching for causes. Negations reflect both making distinctions and negatively evaluating alternatives. Greater use of these types of language was associated with groups making higher quality decisions.

Background

"Words and language are the very stuff of psychology and communication. They are the medium by which cognitive, personality, clinical, and social psychologists attempt to understand human beings." – James W. Pennebaker

Previous research found language style to be a valid predictor of:

- Lying, (Newman et al., 2003)
- Relationship success, (Boals, A., & Klein, K., 2010)
- Emotional well-being, (Andrea, W. D., et al., 2011)
- Development of Leadership in a Group (Gonzalez, A. L., et al., 2010)

No research, however, has examined the relationship between language style and group decision making.

We chose to focus on words associated with cognitive complexity

Cognitive complexity can be conceptualized as a richness of two components of reasoning:

1. the extent to which someone can reason distinguishable differences between multiple competing solutions and
2. the extent to which someone integrates among solutions (Tetlock, 1981).

Word categories associated with cognitive complexity:

- Conjunctions (e.g., and, also, although)
- Prepositions (e.g., to, with, above)
- Causal words (e.g., because, effect, hence)
- Insight words (e.g., think, know, consider)
- Exclusive words (e.g., but, without, exclude)
- Negations (e.g., isn't, didn't, nowhere, nothing)
- Big words (words greater than six letters)

Prediction:

Word categories associated with cognitive complexity will be positively associated with group decision quality even after controlling for conventional predictors of group decision quality.

Control Variables

- Individual Task Expertise
- Group Development
- Forming
- Feedback
- Personality
- Pre-Decision Agreement

Language Variables

- Words greater than six letters
- Prepositions
- Conjunctions
- Negations
- Insight words
- Causal words
- Exclusive words

Method

Participants

Data were collected from a total of 276 undergraduate psychology students in 92, three-person groups. Seventy percent of the participants were female. Additionally, the mean age was 20.7 years. As incentive for their involvement, participants were eligible to receive extra credit in the psychology courses and a monetary award (\$20 for the individual and \$20 for each member of the group who were the most accurate in the task). Eighty groups had usable videos for analysis.

Design

A 2X2 experimental design involving both a forming activity and feedback manipulated group development. In the forming conditions, participants became acquainted with other group members by answering questions about themselves. Participants received performance feedback by publicly informing each member how their individual rankings compared to the rankings of experts.

Tasks

Participants completed two different decision making tasks: a desert survival task and a moon survival task. In both scenarios, the groups were stranded and left with a number of items that may aid in their survival. The groups' tasks were to rank order these items in terms of their importance to the groups' survival with lower numbers indicating greater importance (e.g., an item ranked number one would be considered to be most important to survival). Participants completed each exercise both individually and as a group. The order in which the exercises were completed was counterbalanced across experimental conditions.

Measures

Control Variables

Individual Task Expertise

- Determined by comparing individuals' ranking of each item to the items true rank as determined by survival experts.
- Calculated the absolute value of the difference between the two rankings.
- Difference scores were calculated for each item and then summed to determine an expertise score.
- These scores were then reversed and standardized into z-scores
- higher scores reflected higher levels of task expertise.

Group Development

Personality

- Big Five
- Self-Esteem
- Individual self-efficacy about working in groups

Pre-Decision Agreement

- Kendall's Coefficient of Concordance (Kendall's W).

Study Variables

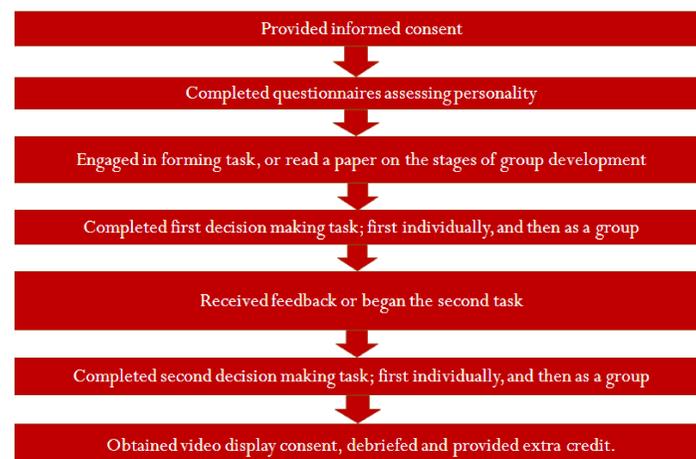
Language Style

- Transcribed group discussions
- Transcripts analyzed using LIWC (Pennebaker, Booth, & Frances, 2007)
- Counts words occurring in each category
- Reports results as percentages relative to total words in transcript.

Group Decision Quality

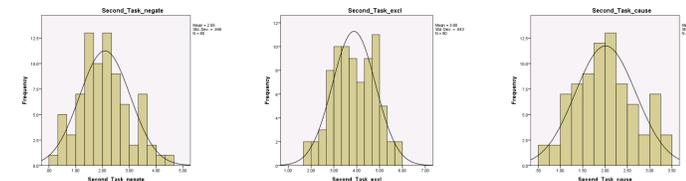
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Procedure

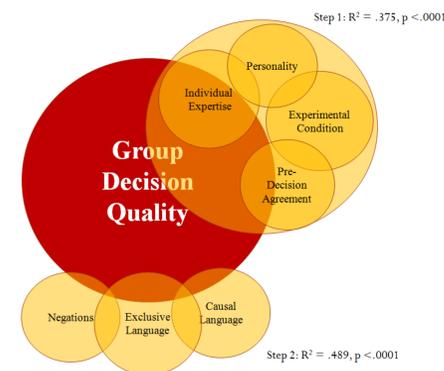


Results

	M	SD	1	2	3	4	5	6
1. Six Letter Words	8.77	1.41						
2. Prepositions	8.51	1.49	.071					
3. Conjunctions	8.93	1.58	-.112	.146				
4. Negations	2.09	0.95	.042	-.139	-.112			
5. Insights	2.59	0.78	.028	-.115	-.261*	.464**		
6. Causal	2.01	0.68	.230*	.216	.231*	-.038	.166	
7. Exclusive	3.88	0.94	.283*	.048	.210	-.206	.126	.169



Variable	B	ΔR^2	Adjusted R ²
Step 1 (Control Variables)		.375**	.375**
Individual Expertise			
Group Development (Forming and Feedback)			
Personality			
Pre-Decision Agreement			
Step 2 (Language Style)			
Cognitive Complexity Language			
Exclusive Language	.189**	.049**	.424
Causal Language	.356**	.040**	.464
Negations	.186*	.025*	.489



Additional Analyses: Linking Language Style to Creativity

Additional analyses attempted to link language style to various language functions including the idea generating functions of fluency, flexibility, and integration as well as an evaluative function.

- Fluency
 - Consideration of all conventional uses of objects.
 - Example: wearing jackets for warmth.
- Flexibility
 - Consideration of novel uses of item.
 - Example: using jackets to make a tent.
- Integration
 - Combining multiple concepts regarding resourcefulness of items in order to achieve a certain goal
 - Example: Using a life raft and a rope to drag supplies
- Evaluation
 - Examining potential negative and positive consequences to proposed ideas

	Exclusive Language	Causal Language	Negations
Fluency	.39**	.28*	.05
Flexibility	.15	.26*	-.09
Integration	.08	.10	.12
Evaluation	.37**	.12	.40**

Sample Transcripts

Low Cognitive Complexity Language Usage Group:

B: Okay.
C: Okay. What would you guys get for one?
A: Umm. A map of the moon is surface.
B: I put that. And then I erased it and put the transmitter.
C: I said oxygen.
B: Okay.
C: Okay. So. Probably **not** the oxygen right now, I guess. So you said the transmitter and then the map?
B: The map?
A: I put the--
B: Yeah. What do you think? The map?
A: Yes I think the map.
B: Okay. You want to put the map?
C: Yes. That is fine.
B: Okay.
A: You put that for two. I **didn't** have it till eight.
B: Okay.
C: What would you put for three?
B: Magnetic compass.
B: That is what I put.
A: I put a parachute.
B: What do you think?
C: I would put magnetic--
A: Yes. That is fine.

High Cognitive Complexity Language Usage Group:

A: Okay, so. Can we agree on oxygen?
C: Yes.
B: Yes.
A: Okay.
C: I put water.
A: I put water.
C: And **food because you have those to survive at all.**
A: Now, I **just don't** know why I did that **because** I had that as
B: I put the map.
A: I did too. Only
C: Yes, I think that is up there too.
A: **Because you can live on water for a long time.**
C: Yeah
A: **but food or you can't live without water but you can live without food for a while. But**
B: So, map **or** food. **Or** map **or** water.
A: Let me think. We all have.
A: Would you feel comfortable doing food as four?
C: Yes.
A: Okay.
C: That sounds good to me.
A: So we'll do the map and then the food. What would you guys have for five?
C: **I put compass so you could know your direction using the map.**
A: That is good. What did you put?
B: I **don't** know where I put that. You said compass?
A: I put the solar powered FM
B: **don't think a compass is going to work on the moon.**
C: Yeah, I **don't** know. I **just** put that. I **don't really** know anything about compasses, so (laugh).

Discussion

- These results suggest that understanding group interactions can be very useful in understanding effective versus ineffective groups.
- These results also suggest that cognitive complexity, above and beyond task expertise is important for effective group decision making.
- Future research should examine factors that influence groups' ability to utilize cognitive complexity language.