



Understanding Client Support Strategies to Improve Clinical Outcomes in an Online Mental Health Intervention

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Outline

- Problem
- Solution
- Previous Work
- Research Goal
- Dataset
- Methods and Results
- Discussion



Mental Health Crisis – Widespread!

 Leading cause of suicide and disability.

 Lifetime occurrence



 Current: Depression in employees



 Current: Depression in college students





Mental Health Crisis – Huge Cost!



**long-term
sickness
absence**

in England **attributed
to mental ill health**



In 2016,

42.7%

employment rate

for those who report mental illness
as their main health problem (Mental
illness, phobia, panics, nervous
disorders (including depression, bad
nerves or anxiety). **Compared to
74% of all population**



**Total Socioeconomic Cost
in England is estimated to
be £105 billion.**



Mental Health Crisis – Lack of access!





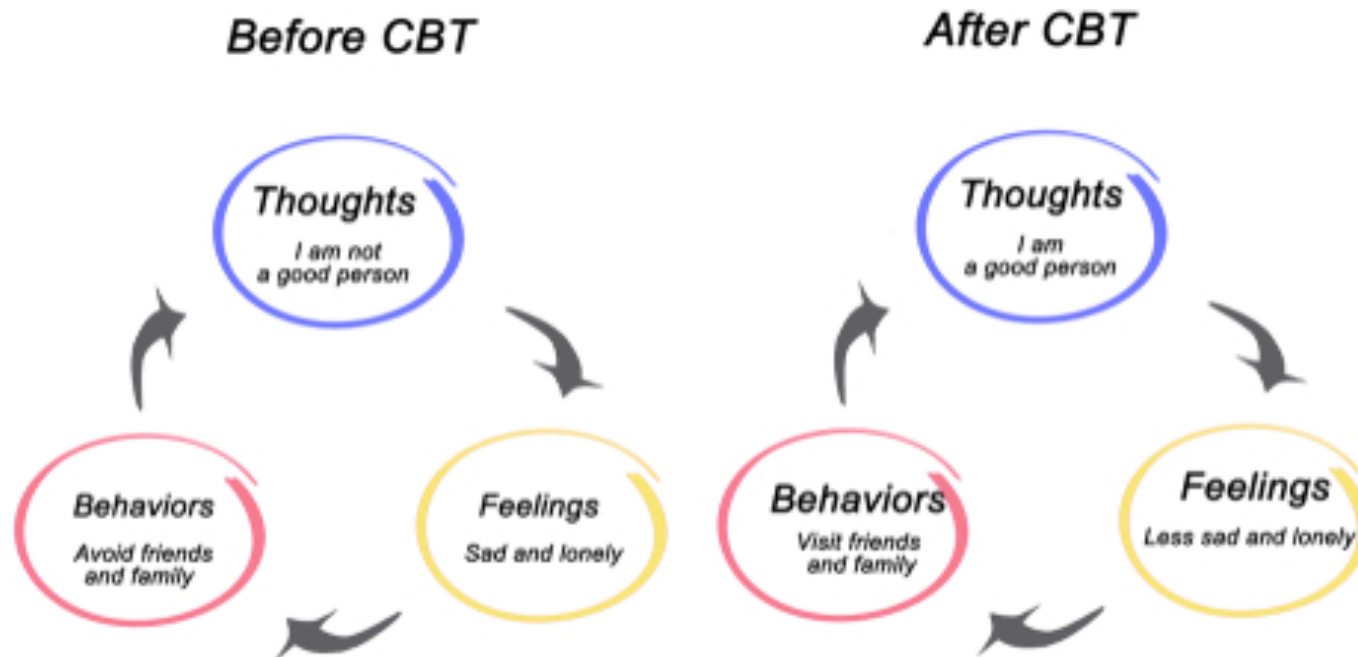
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Mental Health Crisis – A Solution!

- 💡 Online Mental Health Services.
- 💡 CBT → Very structured --> Software!
- 💡 E.g.
Internet-based Cognitive Behavioral Therapy (iCBT)


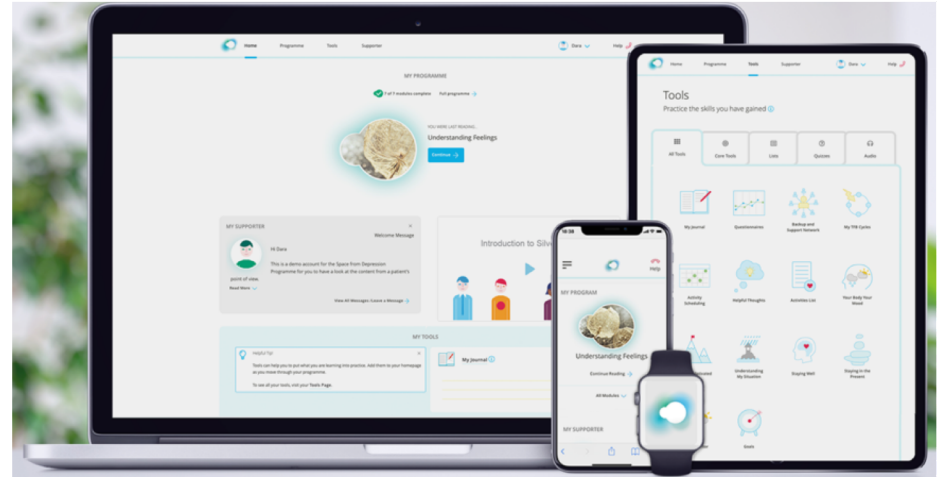




SilverCloud Health




SilverCloud




Space from

Anxiety




Space from

Depression




Space from

Chronic Illness



Space from

Eating Issues






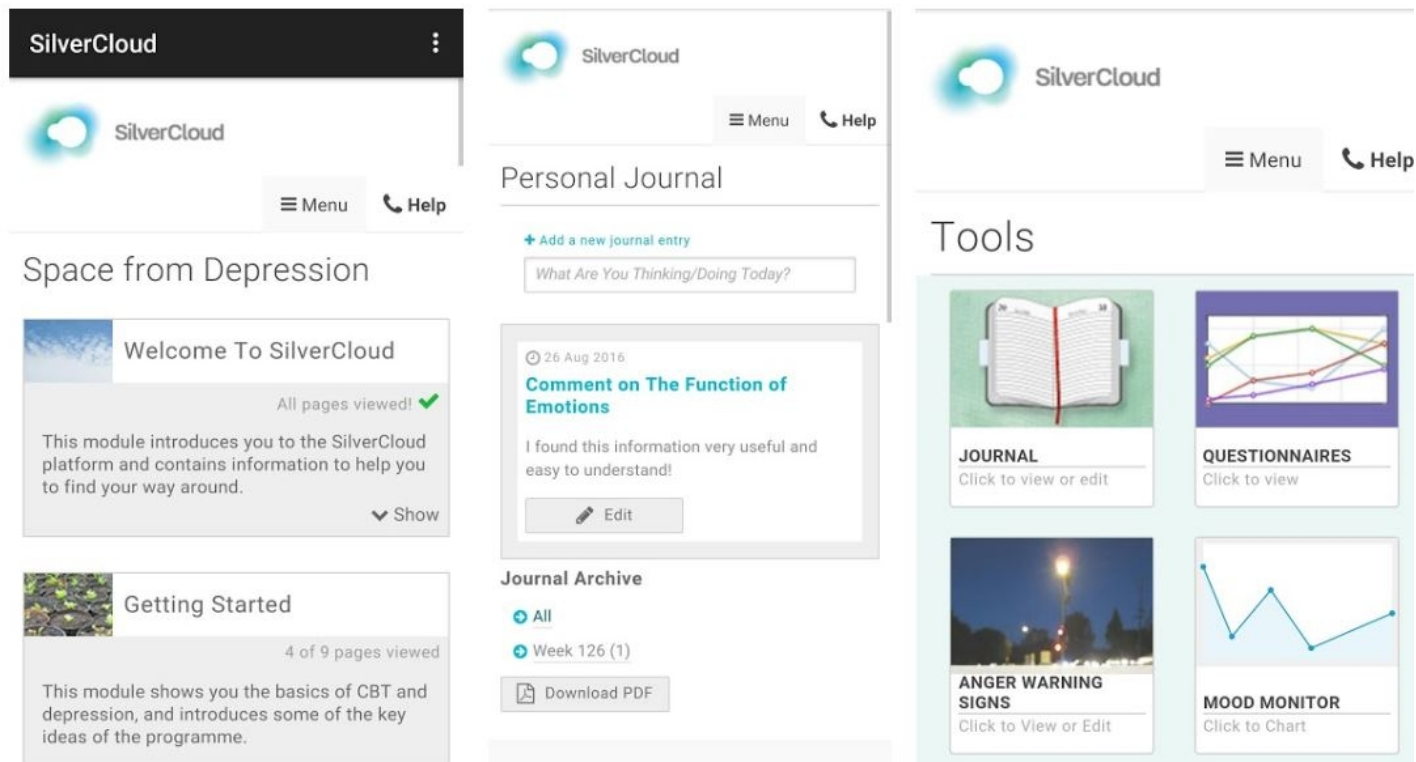
Space from

Stress



SilverCloud – An Introduction

-  Content: a “online course” like structure.
-  Tools: accessed any time.
-  Supporter



The image displays three screenshots of the SilverCloud user interface. The first screenshot shows the 'Space from Depression' landing page, featuring a 'Welcome To SilverCloud' message and a 'Getting Started' module. The second screenshot shows the 'Personal Journal' interface, including a recent entry titled 'Comment On The Function of Emotions' and a 'Journal Archive' section. The third screenshot shows the 'Tools' section, which includes options for 'JOURNAL', 'QUESTIONNAIRES', 'ANGER WARNING SIGNS', and 'MOOD MONITOR'.



SilverCloud – Content



“Space” or program dependent, and “prescribed”.

Understanding Feelings
1 of 10 pages viewed

This module takes a closer look at moods and emotions. In this module you can explore different aspects of emotions, physical reactions, action and inaction, and see how they are all connected.

- ✓ Introduction
- 🔔 Emotions & Your Body Quiz
- 📄 Understanding Emotion
- 📄 Physical Body Reactions
- 📄 Lifestyle Choices
- 👤 Personal Stories
- 🔄 The TFB Cycle
- 🔄 Mapping Lifestyle Choices
- 🔄 Staying In The Present
- 🔄 Review



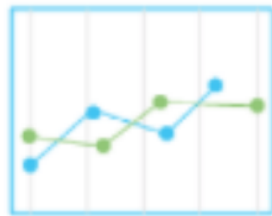


SilverCloud – Interactive Tools

 Accessible anytime



My Journal



Questionnaires



Backup and Support Network



Goals



Staying in the Present



Goals



Mood Monitor



My TFB Cycles



Hierarchy of Fears







SilverCloud – Supporter

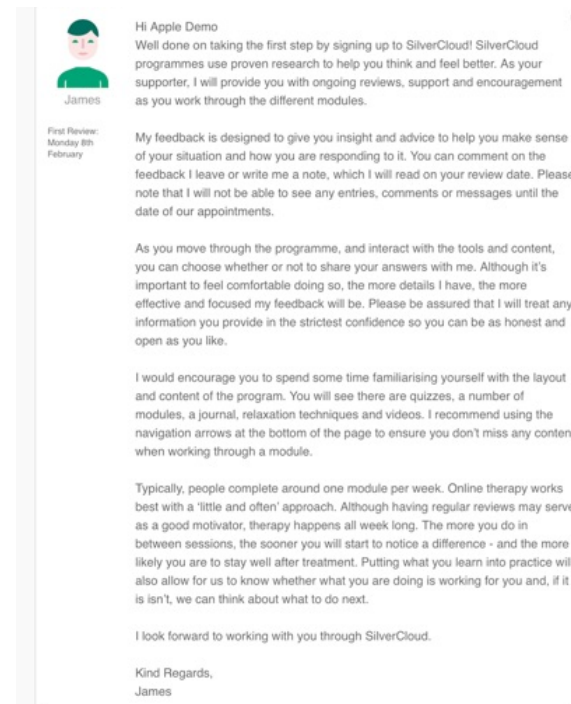
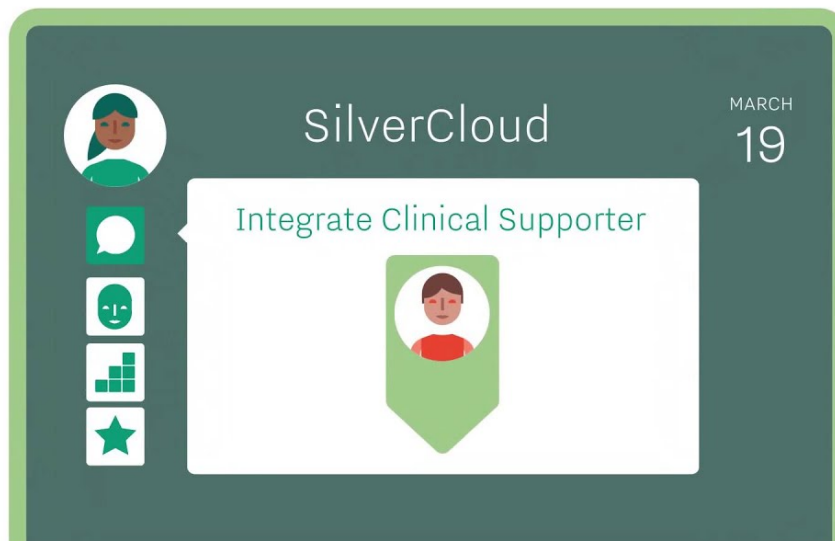
- 💡 Adherence and Attrition Issues
→ Human supporter
- 💡 Increased accountability





SilverCloud – Supporter (contd.)

-  Reviews progress weekly. Provides feedback.
-  Should spend 10 min per message.
-  Should send 6-8 such messages.
-  Other guidelines (e.g. answer questions, promote engagement with platform, be positive)





SilverCloud – Outcome-based

- 💡 Clients also fill out weekly surveys that measure symptoms of depression and anxiety.





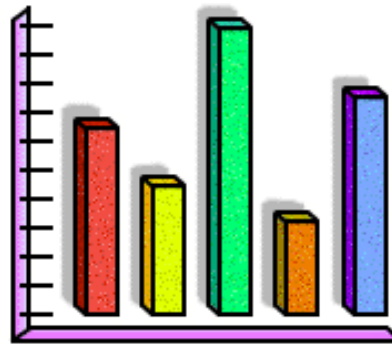
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Previous Work – In Short

- Previous work focusses on duration and frequency of human support.



- Little is known about how supporter behaviors impact client outcomes.





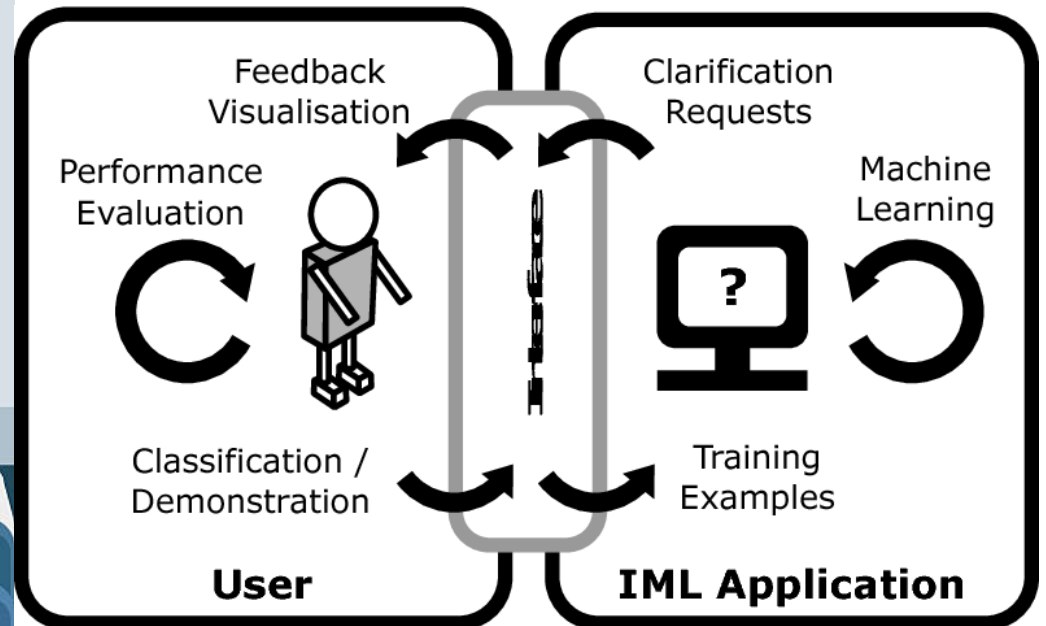
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Research Goal

- 💡 More nuanced understanding of supporter behaviors:
 - 💡 → Better Supporter Training.
 - 💡 → ML for Recommending Supporter Behavior.





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Dataset

- Space for Depression and Anxiety.
- >200,000 messages sent by ~3500 supporters to ~50,000 clients.



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Outline

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- Methods and Results:
Clustering Supporters
- Discussion



Clustering Supporters – Method

Compute 4 outcome measures for each supporter and cluster them using K-means with $K=3$.

Message-level
change

Client-level
change

Message-level
improvement rate

Client-level
improvement rate



Clustering Supporters – Method (contd.)

1. Message-level Change (MC): Average change in scores across all messages sent by supporter s .
2. Message-level Improvement Rate (MR): Percentage of messages sent by supporter s that were followed by an improvement.



Clustering Supporters – Method (contd.)

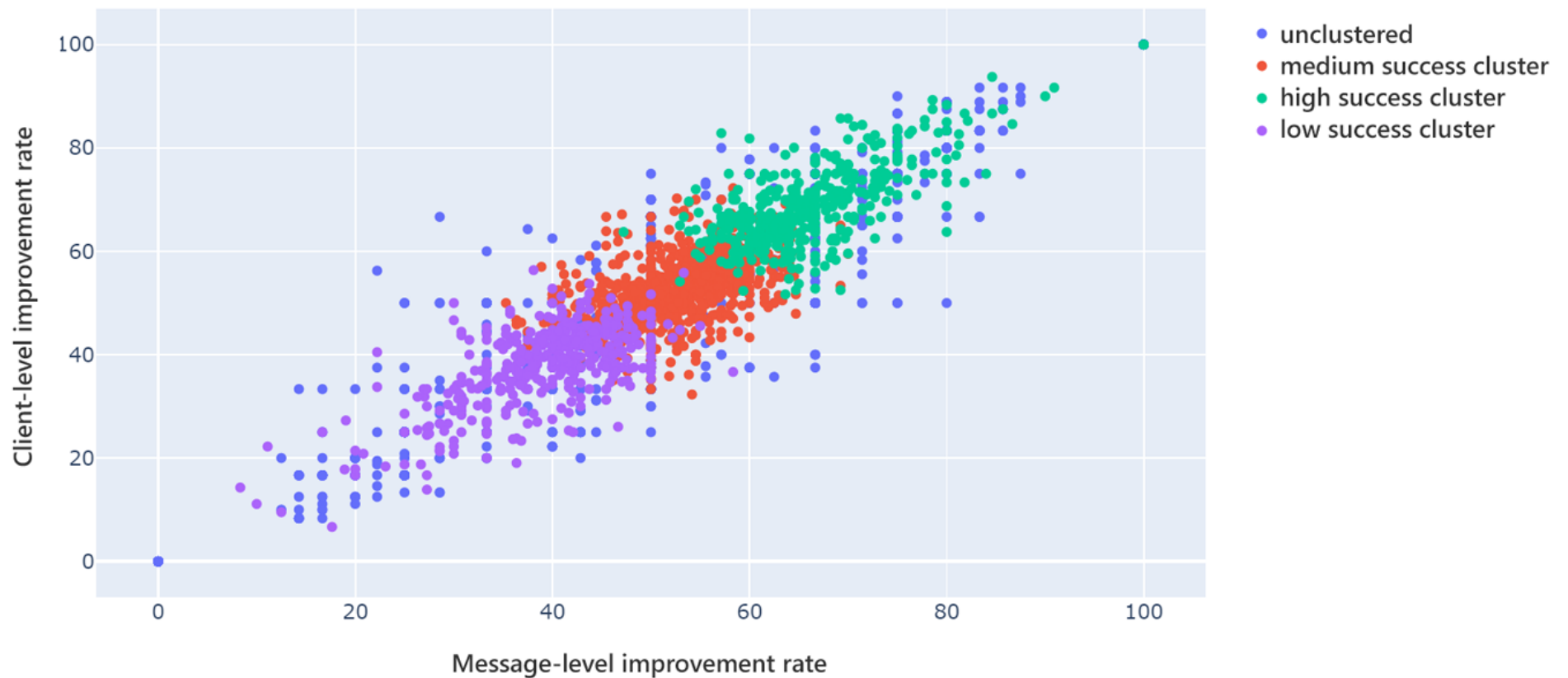
Better account for client-level differences:

3. Client-level Change (CC): Compute Message-level Change for each client, and average it.
4. Client-level Improvement Rate (CR): Compute Message-level Improvement Rate for each client separately, and average it.



Clustering Supporters – Results

K-means with $K=3$





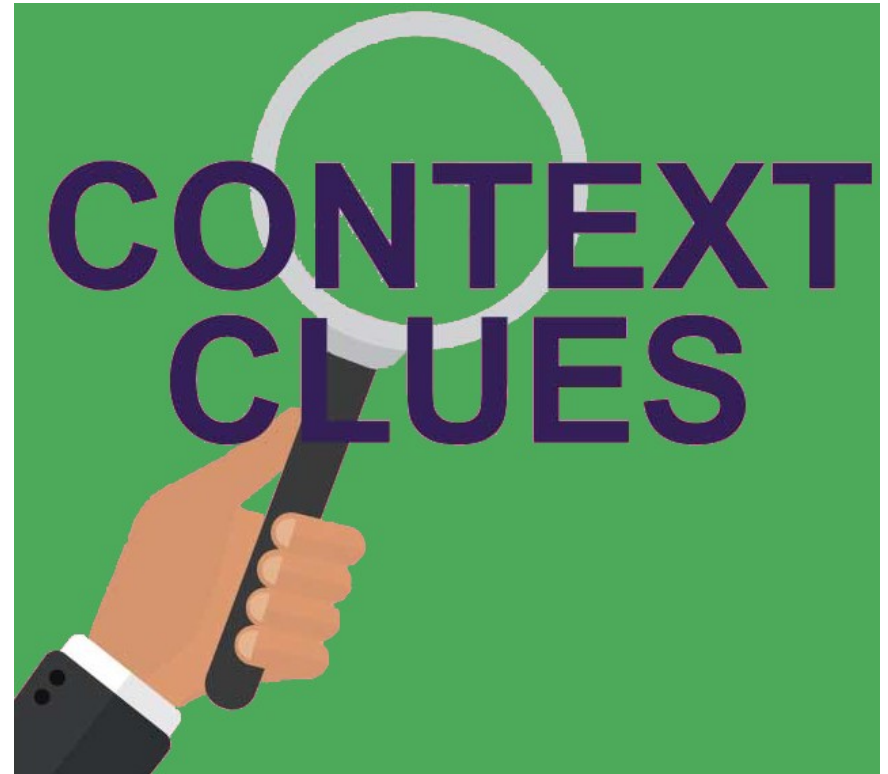
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Successful Support Strategies
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Successful Support Strategies – Features

- Client <Context> Variables:
 - 5 Variables:
ContentViews,
Shared,
MessageNumber,
CurrentPHQ-9, and
CurrentGAD-7.
 - BINNED



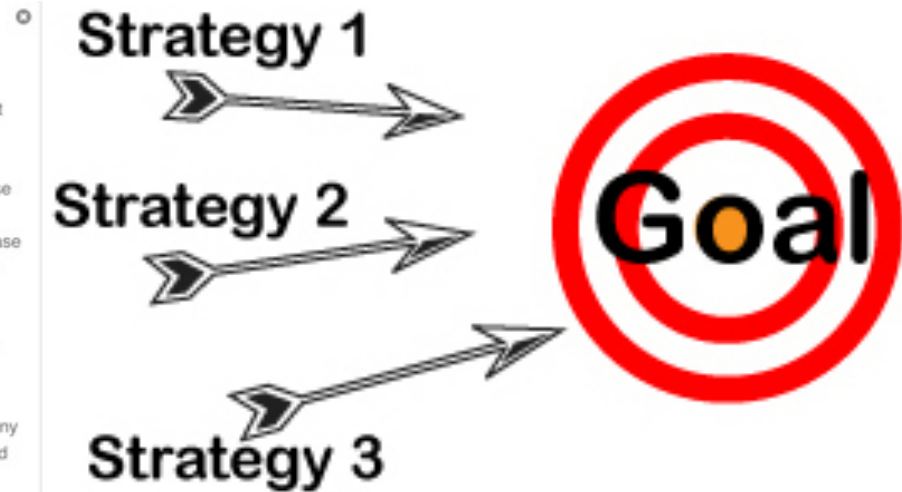


Successful Support Strategies – Features (contd.)

Hi Apple Demo
Well done on taking the first step by signing up to SilverCloud! SilverCloud programmes use proven research to help you think and feel better. As your supporter, I will provide you with ongoing reviews, support and encouragement as you work through the different modules.

First Review: Monday 8th February
My feedback is designed to give you insight and advice to help you make sense of your situation and how you are responding to it. You can comment on the feedback I leave or write me a note, which I will read on your review date. Please note that I will not be able to see any entries, comments or messages until the date of our appointments.

As you move through the programme, and interact with the tools and content, you can choose whether or not to share your answers with me. Although it's important to feel comfortable doing so, the more details I have, the more effective and focused my feedback will be. Please be assured that I will treat any information you provide in the strictest confidence so you can be as honest and open as you like.

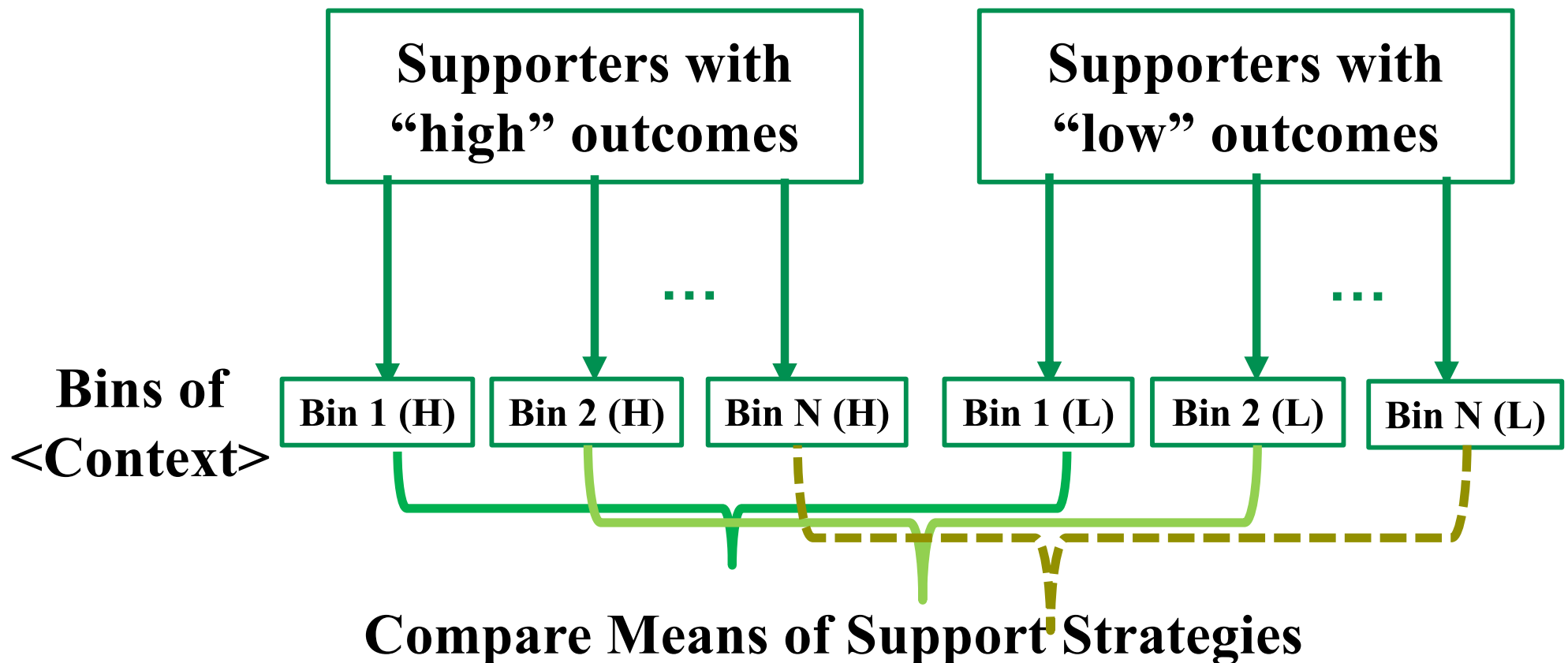


- Support <Strategy> Variables:
 - 23 variables calculated using validated lexicons and NLP techniques.
 - Can be divided into 6 categories: Sentiment, Emotion, Pronouns, Encouraging Phrases, Mental Processes & Behaviors, and Quantity.



Successful Support Strategies – Method

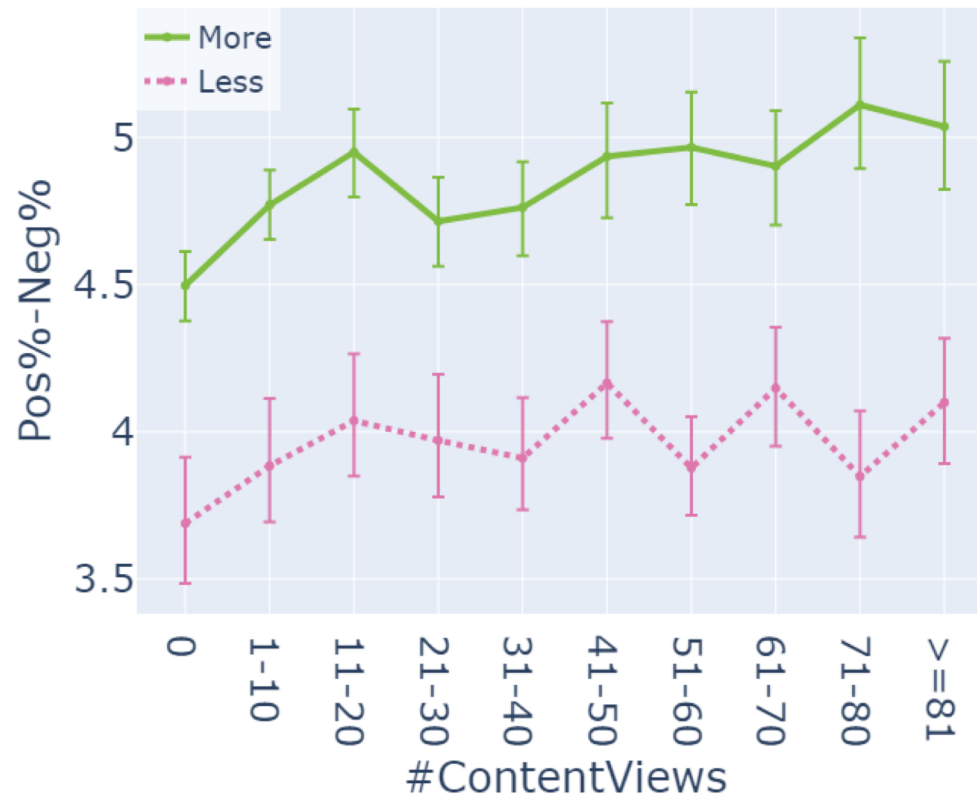
- For each <context, strategy> pair ($NP=23*5=115$),
 - Divide messages as follows:





Successful Support Strategies – Results

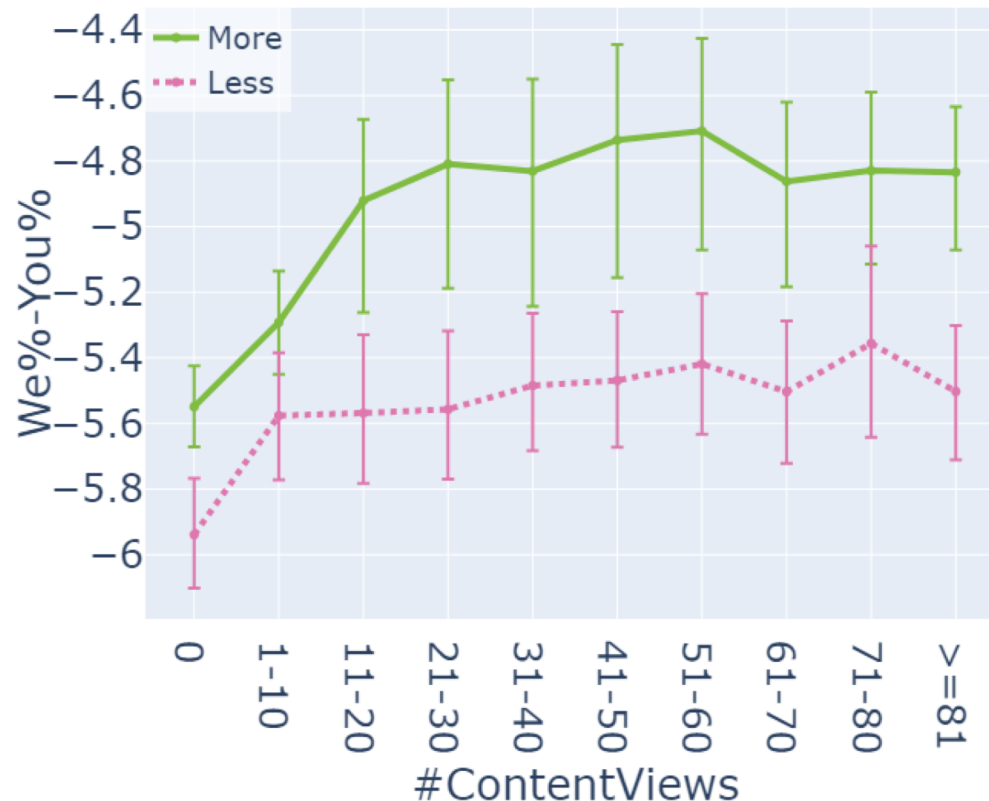
- More successful messages had:
 - Used **more positive** and **less negative** words.
 - Used **less** words associated with negative emotions such as **sadness** and **fear**.





Successful Support Strategies – Results

- More successful messages had:
 - Used **more 1st person plural pronouns** (e.g. we), and had greater difference between frequencies of 1st person plural pronouns and 2nd person pronouns.





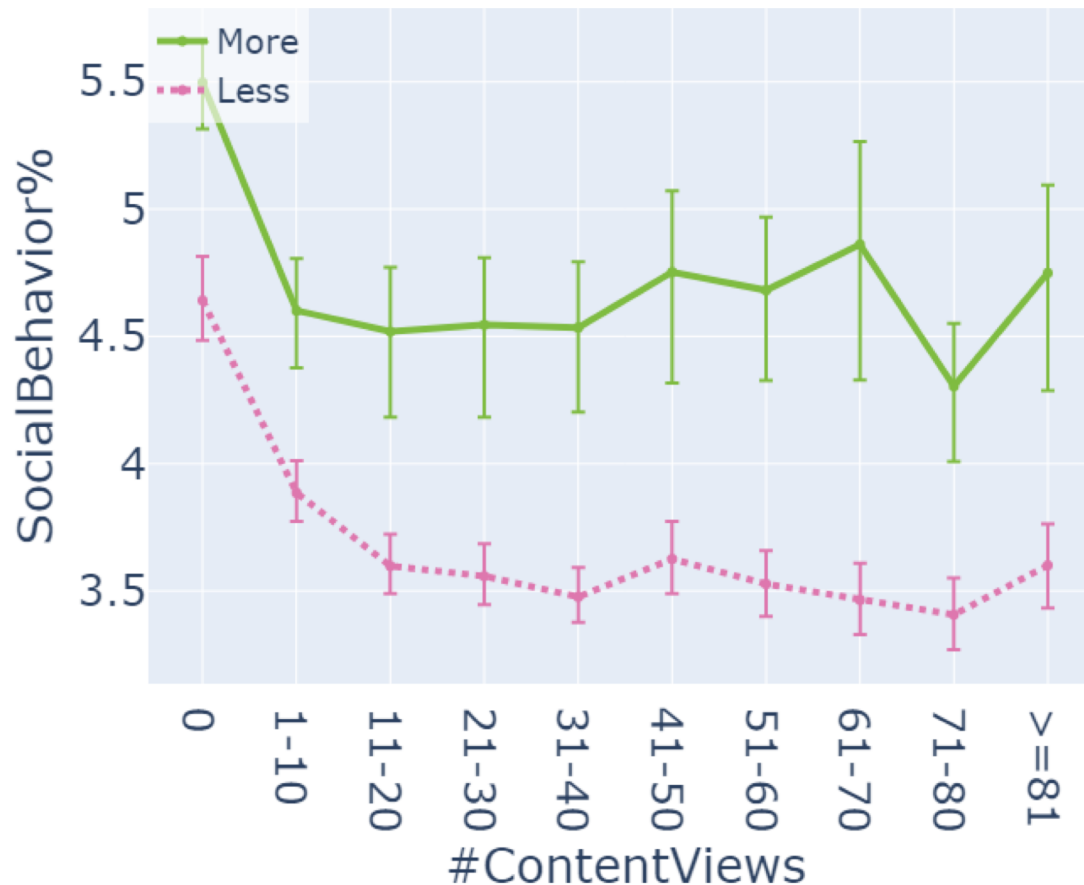
Successful Support Strategies – Results

- More successful messages had:
 - Used **more encouraging phrases** (e.g. well done, good job).



Successful Support Strategies – Results

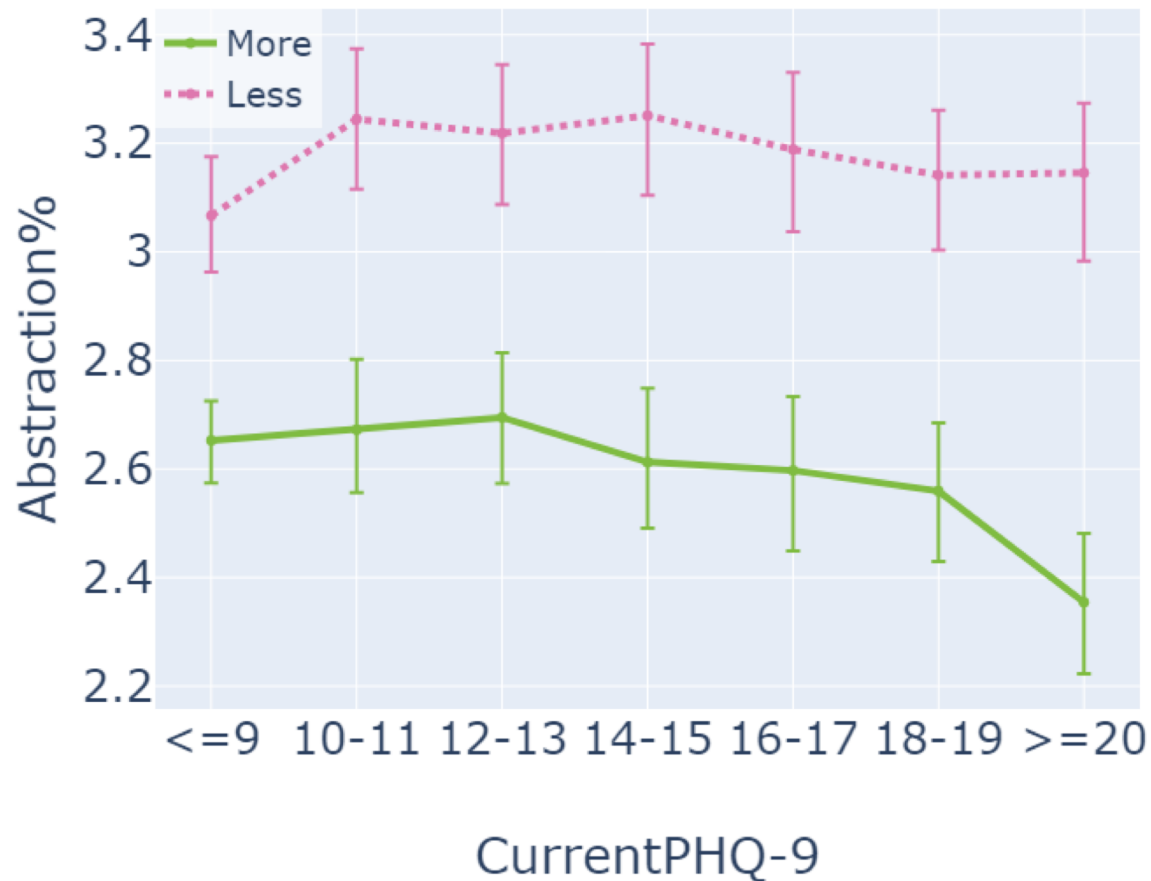
- More successful messages had:
 - Used **more** words associated with **social behavior** (*E.g. help, call, discuss, and share.*)





Successful Support Strategies – Results

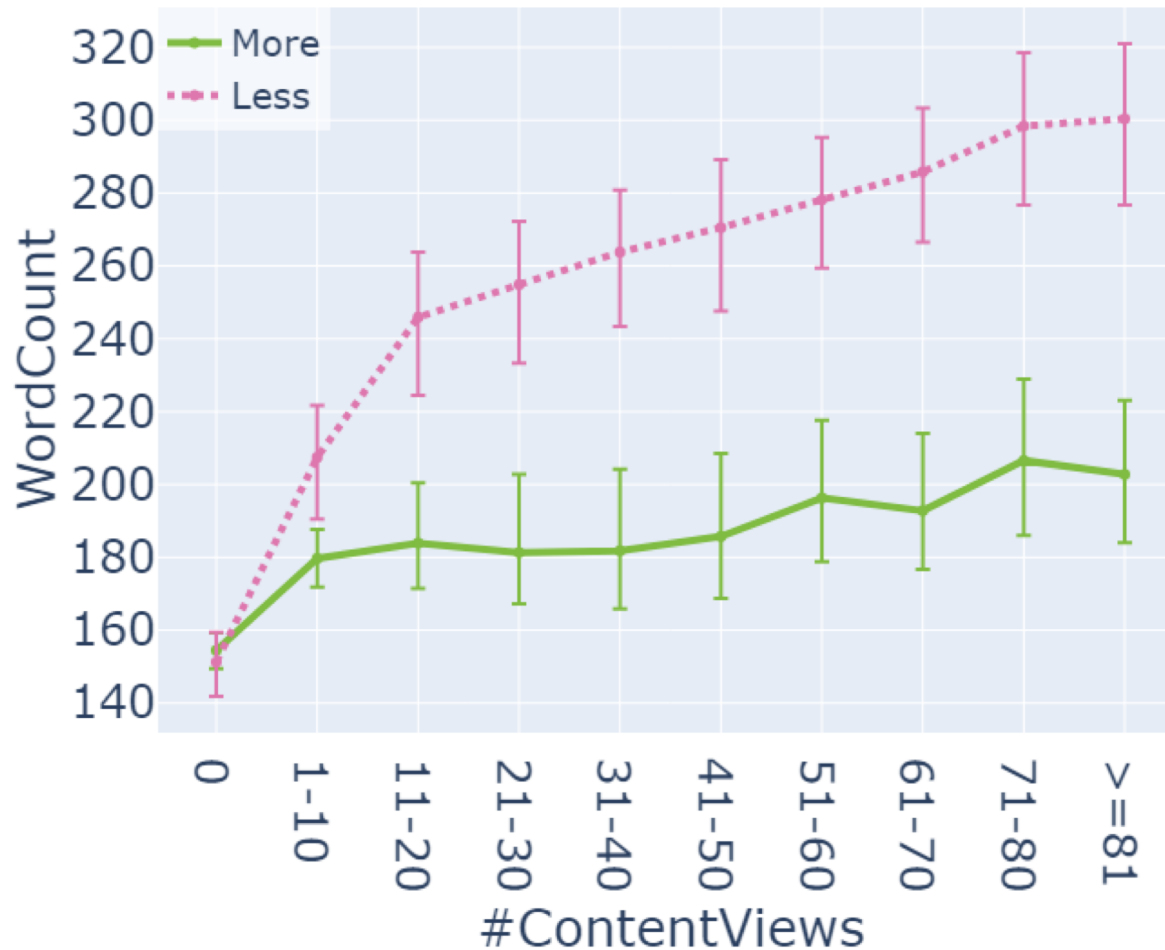
- More successful messages had:
 - Used **less** words associated with **abstraction**.
(E.g. think/thought, know, understand, and learn)





Successful Support Strategies – Results

- More successful messages were shorter!





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Salient Context-Specific Support Strategies
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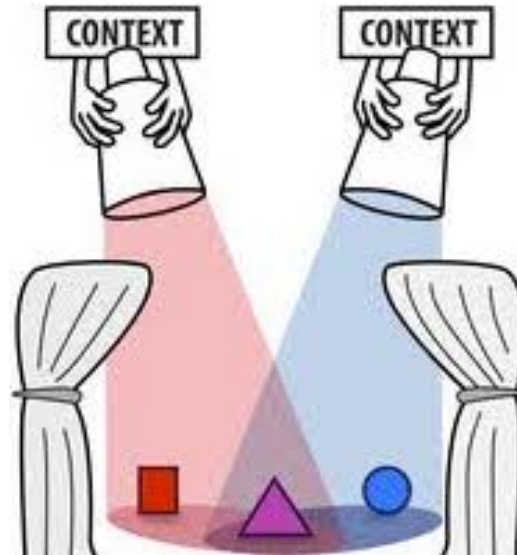


Salient Context-Specific Support Strategies

- Client Context, Supporter Behavior, and Client Outcomes → More complex relationship
 - E.g. Multidimensional Context.



Salient Context-Specific Support Strategies



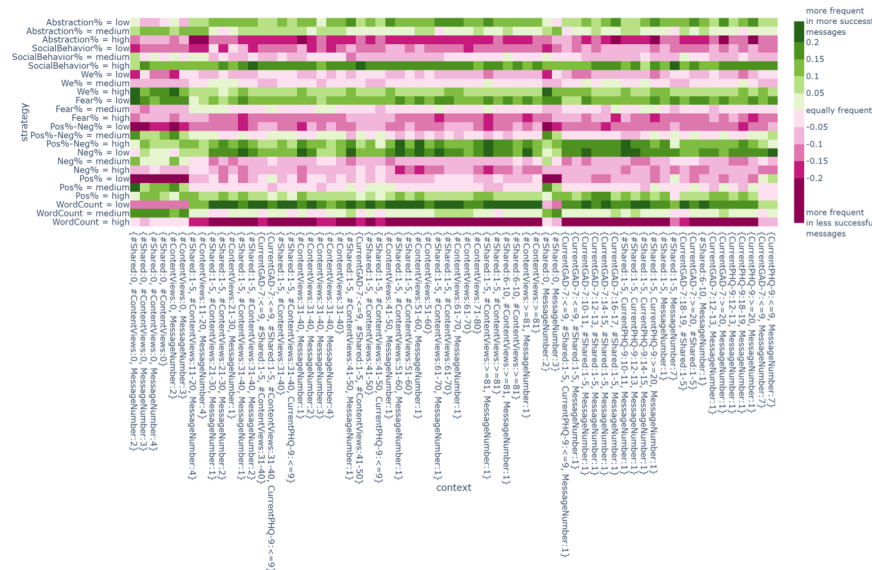
- Multidimensional Context
 - How may considering the combination of multiple context variables shift how salient a specific support strategy is?
 - Interesting for personalization!



Salient Context-Spec. Supp. Strategies – Results

- For less engaged clients, writing longer, more positive and more supportive messages is linked with greater outcomes.
- More engaged clients appear to benefit more from messages with less negative words, less abstraction, and more references to social behaviors.

See Paper! 😊





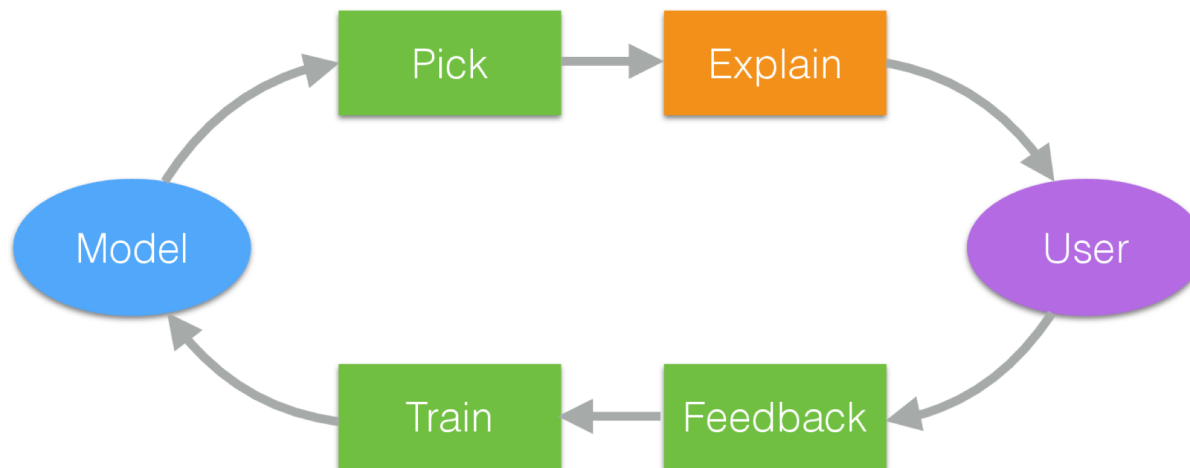
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Discussion – Conclusion

- Maintaining the Human Touch & Enhancing Supporter Agency
 - Genuine human connection important for working alliance.
 - Creates opportunities to empower supporters → better training or data-driven tools for supporters.



Boomerang
Responsible

Very unlikely
to receive a response

Subject Length ?

5

Word Count ?

280

Question Count ?

0

Reading Level ?

12+

ADVANCED FEATURES

Positivity ?

22

Politeness ?

73

Subjectivity ?

48



Thank you! 😊

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