Beyond Screen Time:
How Emotional Content Shapes Social Media's Impact on Youth Mental Health

Sophie Xu, Culver Academies, Indiana

BACKGROUND

Social Media Usage– 95% of adolescents use social media; ⅓ almost constantly. Average daily usage exceeds 3.5 hours daily and is estimated to be 5-7 hours. Social media has become a "primary social environment" for U.S. youth.

Mental Health Crisis– Suicide is the 2nd leading cause of death for ages 10–24. Depression affects nearly 1 in 5 adolescents.

Impact of Social Media Usage– Social media can provide peer support and identity exploration, while excessive social media use can lead to depression and distress.

Focus on Time– Most prior studies measure "*time online*" but ignore what types of content young adults consume and how they engage.

RESEARCH QUESTIONS

RQ1: How are social media usage behaviors correlated with depressive symptoms? (S1)

RQ2: Does sleep quality mediate the relationship between social media content exposure and depressive symptoms? (S1, S2)

RQ3: How do the emotional tone of social-media content (e.g., sentiment, emotions) predict depressive symptoms? (S2)

RQ4: Can content-level feedback and visualization of social-media exposure improve users' awareness of risky engagement patterns that are associated with poorer mental health? (S3, S4)

HYPOTHESES

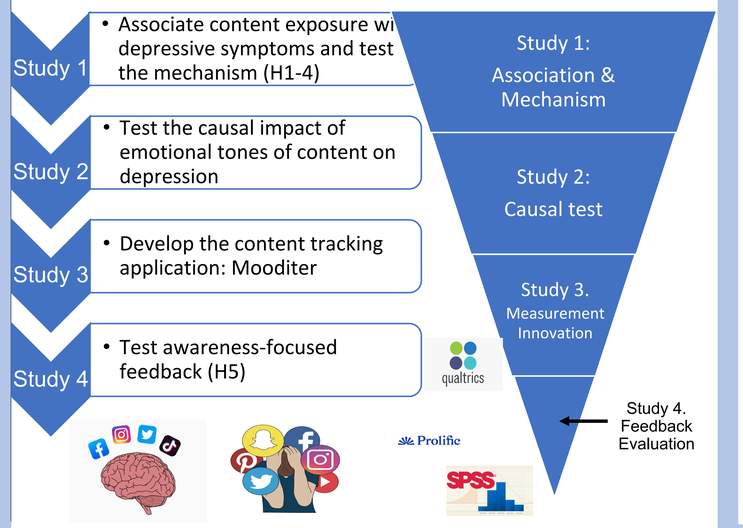
H1: Social media content features predict depression after controlling for total time online:

H2: Sleep quality partially mediates the relationship between social media content exposure and depressive symptoms.

H3: Exposure to more positive (negative) emotional content is associated with lower (higher) depressive symptoms.

H4: Participants exposed to content-level feedback will report higher perceived awareness and stronger intention to adjust consumption than participants who see time-only feedback.

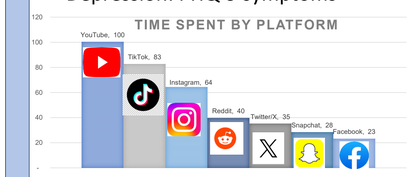
MULTI-STUDY DESIGN

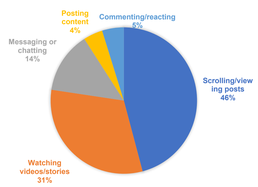


STUDY 1: WHY AND HOW CONTENT MATTERS

Research Design: Survey of 503 young adults

- Age 18-25, 41% male, 55% female
- Qualtrics survey with 11 questions
- Depression: PHQ-9 symptoms





Emotional Tone: Survey of another 102 young adults (H4-H5)

Correlation	Disgust	Time	Anger	Fear	Sadness	Surprise	Joy	Sentiment
Depression	0.25	0.25	0.24	0.18	0.17	-0.14	-0.28	-0.36

Findings:

- Content explains depressive symptoms beyond time online (H1).
- Sleep quality fully/partially mediates the effects of content exposure (not time) on depressive symptoms (H2)
- Emotional tone is associated with depressive symptoms (H3)
- Third genders experience stronger depressive symptoms from their usage of social media to escape real-world problems (H4)

Outcomes	Mean	Std	Min	Max
Depression	1.88	0.71	1	4
Sleep Quality	3.12	0.92	1	5

Regression Model Estimates

IV\DV	Depress	Sleep Q	Depress
Compare	0.174	-0.071*	0.150
Escape	0.073	-0.100	0.041*
Follow	-0.050	0.117	-0.010
Total Time	0.000	0.000	0.000
Connect	-0.070	0.047	-0.055
Bored	0.088	-0.098*	0.048
Sleep Qual			-0.332
R-square	0.230	0.081	0.392

p<0.05, *p<0.1

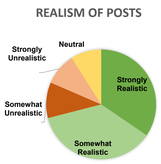
STUDY 2: EMOTIONAL CONTENT AND SLEEP QUALITY

Research Design: Randomized Exposure to Emotional Content

- 200 young adults randomly assigned to view posts differing only in emotional tone.

	Positive Condition	Negative Condition
Posts	"I CAN'T BELIEVE THIS!! 🎉 Just got amazing news and I'm shaking!! Let's goooo!!"	"This is so unfair. I'm seriously furious right now. Why does this keep happening?"
Emotional Response	68.65	25.15

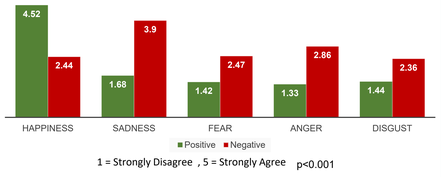
1 = Very Negative, 100 = Very Positive



Findings:

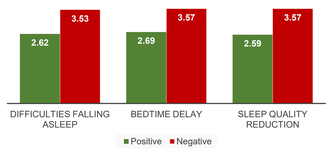
- Sleep quality worsens after participants viewed more negative posts.
- Participants exposed to negative content reported lower happiness and higher levels of sadness, anger, and fear immediately after viewing.

T-Test of Mean Differences in Experienced Emotions



1 = Strongly Disagree , 5 = Strongly Agree p<0.001

T-Test of Mean Differences in Sleep Quality



STUDY 3: CONTENT-AWARE MEASUREMENT INNOVATION

Screenshot every 5 seconds → Extract text via OCR → Sentiment Emotion: NLP → Temporal summaries: LLM → Adaptive nudging reminders

Mooditer

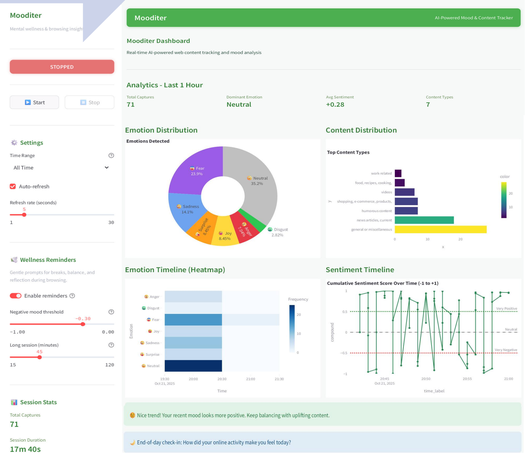
Your personalized social media mood monitor

Goal:

- To develop a privacy-preserving tool that captures *what* users encounter on social media, rather than only how long they spend online.
- Translates these exposures into interpretable emotional and content-level metrics to identify early warning signals and support awareness

Output: Interactive dashboard displaying

- Time spent online, (ii) sentiment trajectories, (iii) emotion distributions, and (iv) content-category summaries.



Ethical Safeguards

- No private messages captured
- All data de-identified
- Local processing only
- No diagnosis or clinical feedback
- Youth-informed design

STUDY 4: APPLICATION

Objective: To test whether **content-aware social media feedback** (Mooditer) improves users' awareness of emotionally risky exposure and intentions to self-regulate, compared to **screen-time-only feedback.**

Research Design:

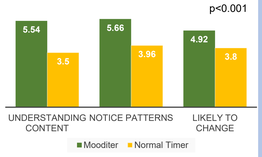
Participants: 200 Young adults (18–25)

Method: Randomized A/B testing

- Condition A (Control): Time-only dashboard
- Condition B (Treatment) : Mooditer dashboard

Key Findings:

- Mooditer improves understanding of what they were exposed to
- Mooditer increases awareness of patterns that could affect mood
- With Mooditer, they are more likely to change the types of content they engage with.



CONCLUSIONS

- This project advances understanding of how social media affects YA mental health by moving beyond screen-time metrics to examine the **emotional content of social-media experiences** and how these exposures shape well-being.
- Across four studies, this project shows that emotional content influences affect, sleep, and depressive symptoms, and that content-aware feedback (*Mooditer*) can increase awareness and self-regulation without compromising privacy.
- By integrating psychology, statistics, and data science, this research shows that social media's impact on youth mental health should be assessed **not by screen time alone, but by the emotional and contextual qualities of content**. Together, these findings offer a scalable and ethically grounded framework for studying—and potentially mitigating—youth mental-health risk in real-world digital environments.

FUTURE RESEARCH

- **Longitudinal, within-person tracking**– Future studies can collect repeated daily measures of social-media content exposure, emotion, sleep, and mood to examine *within-person dynamics.*
- **Content-aware reminders**– Future experiments can test how content-aware feedback affects self-regulation without increasing distress.
- **Deployment with enhanced safeguards**– The platform can be adapted for youth samples with parental consent, youth-informed design, and strict privacy controls to evaluate feasibility and adherence in real-world settings.

REFERENCES

- Ahmed, I., Khalid, S., & Malik, M. (2024). Social media use and youth mental health: A systematic review. *Journal of Adolescent Research, 39*(2), 123–145.
- Alonzo, R., Hussain, J., Stranges, S., & Anderson, K. K. (2021). Interplay between social media use, sleep quality, and mental health in youth: A systematic review. *Sleep Medicine Reviews, 56*, 101414.
- Blackwell, C. K., Mansolf, M., Rose, T., Pila, S., Cella, D., Cohen, A., Love, L. D., McGrath, M., Neiderhiser, J. M., Urquhart, A., & Ganiban, J. M. (2025). Adolescent social media use and mental health in the Environmental Influences on Child Health Outcomes Study. *Journal of Adolescent Health, 76*(4), 647–656.
- Centers for Disease Control and Prevention (CDC). (2023). *Youth Risk Behavior Surveillance — United States, 2023. MMWR Surveillance Summaries, 72*(2), 1–76.
- Common Sense Media. (2022). *The Common Sense census: Media use by tweens and teens, 2021.* Common Sense Media.
- Coyne, S. M., Rogers, A. A., Zurcher, J. D., Stockdale, L., Booth, M., & colleagues. (2023). Analysis of social media use, mental health, and gender identity among US youths. *JAMA Network Open, 6*(7), e2324389.
- Craig, W., Boniel-Nissim, M., King, N., Walsh, S. D., Boer, M., Donnelly, P. D., & Pickett, W. (2020). Social media use and cyber-bullying: A cross-national analysis of young people in 42 countries. *Journal of Adolescent Health, 66*(6), S100–S108.
- Fassi, L., Di Tella, M., & Adenzato, M. (2025). Adolescents' problematic social media use: A systematic review of gender differences. *Computers in Human Behavior, 151*, 107183.
- George, M. J., Russell, M. A., Piontak, J. R., & Odgers, C. L. (2018). Concurrent and subsequent associations between daily digital technology use and high-risk adolescents' mental health symptoms. *Child Development, 89*(1), 78–88.
- Khalaf, A. M., Alubied, A. A., Khalaf, A. M., & Rifaey, A. A. (2023). The impact of social media on the mental health of adolescents and young adults: A systematic review. *Cureus, 15*(8), e42990.
- Ma, Y., Park, H., & Hancock, J. T. (2024). *Simulating human–AI interaction: Synthetic personas for interface and behavior testing. Proceedings of the CHI Conference on Human Factors in Computing Systems.* Association for Computing Machinery.
- National Academies of Sciences, Engineering, and Medicine. (2024). *Social media and adolescent development: Opportunities, risks, and recommendations.* National Academies Press.
- Pazdur, M., Tutus, D., & Haag, A.-C. (2025). Risk factors for problematic social media use in youth: A systematic review of longitudinal studies. *Adolescent Research Review, 10*, 237–253.
- Pew Research Center. (2022). *Teens, social media and technology 2022.* Pew Research Center.
- Rani, S., Gupta, A., & Kumar, M. (2024). Multimodal sentiment analysis using transformer-based fusion networks. *Knowledge-Based Systems, 293*, 111574.
- Ruths, D., & Pavlovic, V. (2021). *Synthetic data and simulated personas for safe and efficient human-centered AI development. Frontiers in Artificial Intelligence, 4*, 54.
- Serra, J., Mico, L., & Lladós, J. (2023). Cross-modal representation learning for image–text retrieval: A survey. *ACM Computing Surveys, 56*(4), 1–35.
- Sharma, R., Singh, K., & Patel, V. (2025). Multi-modal deep learning approaches for detecting mental health signals in online social media. *Frontiers in Artificial Intelligence, 8*, 123456.
- Twenge, J. M., Joiner, T. E., Rogers, M. L., & Martin, G. N. (2018). Increases in depressive symptoms, suicide-related outcomes, and suicide rates among U.S. adolescents after 2010 and links to increased new media screen time. *Clinical Psychological Science, 6*(1), 3–17.
- Ulvi, O., Karamehic-Muratovic, A., Baghbanzadeh, M., Bashir, A., Smith, J., & Haque, U. (2022). Social media use and mental health: A global analysis. *Epidemiologia, 3*(1), 11–25.
- U.S. Department of Health and Human Services (HHS). (2023). *Suicide prevention strategy: Saving lives and advancing health equity.* U.S. Department of Health and Human Services.
- Office of the U.S. Surgeon General. (2023). *Social media and youth mental health: The U.S. Surgeon General's advisory.* U.S. Department of Health and Human Services.
- Valkenburg, P. M., Meier, A., & Beyens, I. (2022). The differential susceptibility to media effects model: A meta-analysis. *Psychological Bulletin, 148*(9-10), 589–618.
- Varnuccii, A., Simpson, E. G., Gagnon, S., & Ohannessian, C. M. C. (2020). Social media use and risky behaviors in adolescents: A meta-analysis. *Journal of Adolescence, 79*, 258–274.
- Viner, R. M., Gireesh, A., Stiglic, N., Hudson, L. D., Goddings, A. L., Ward, J. L., & Nicholls, D. E. (2019). Roles of cyberbullying, sleep, and physical activity in mediating the effects of social media use on mental health and wellbeing among young people in England. *The Lancet Child & Adolescent Health, 3*(10), 685–696.
- Yonker, L. M., Zan, S., Scirica, C. V., Jethwani, K., & Kinane, T. B. (2015). "Friending" teens: Systematic review of social media in adolescent and young adult health care. *Journal of Medical Internet Research, 17*(1), e4.
- Yuan, A., Song, H., Garcia Colato, E., Pescosolido, B., & Samtani, S. (2025). Improving workplace well-being in modern organizations: A review of large language model-based mental health chatbots. *ACM Transactions on Management Information Systems, 16*(1), 1–26.
- Yu, D. J., Wing, Y. K., Li, T. M. H., & Chan, N. Y. (2024). The impact of social media use on sleep and mental health in youth: A scoping review. *Current Psychiatry Reports, 26*(3), 104–119.