Mosaic of Social Support:
Understanding How College Students Manage Mental Health

Sun Young Park[1], Sid Ambulkar[2], Yikai Zou[1], Jina Huh[2]

University of Michigan[1]   University of California, San Diego[2]

Ann Arbor, MI, USA   La Jolla, CA, USA

{sunypark, yktsou}@umich.edu; {sambulka, jinahuh}@ucsd.edu

ABSTRACT

Mental health and wellness concerns are a significant issue among college student due to the stressors of required independence coupled with academic pressure and career-related responsibilities. Due to stigma associated with seeking help and a lack of appropriate resources, college students often do not receive adequate mental health care. In this paper, we present how college students seek help in managing their mental wellness through social support. We conducted interviews with 19 college students at a large public university in the U.S. Midwest. We found that students selectively shared their concerns with different social groups depending on the availability of these social circles, their needs for intimacy, and their expectations for help. We call this support environment the Mosaic of Social Support. We discuss implications for technology-mediated social support strategies that support such mental health management practices and deliver personalized help to serve the unmet needs on college campuses.

Author Keywords

College students; mental health; mental wellness; social support.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous; User-centered design; J.3; Life and medical sciences: Health.

INTRODUCTION

Mental health issues, growing both in severity and prevalence, are a serious concern among college students due to the burden of managing personal and career-related life transition.

According to a recent national survey [2], 49.8% of students reported feeling that things were hopeless, 85.1% felt overwhelmed with their given tasks. Nearly 10% had seriously considered committing suicide in the last year. 75% of mental disorders have first onset by age 24 [27], and account for nearly 50% of the disease burden for young adults in the U.S. [61].

Research has shown a myriad of evidence on the importance of social support in mental health [1,48,52,54]. Effective social support means providing tailored support according to the needs of the receiver: building resilience to stress [48], increasing self-esteem in response to PTSD or sexual abuse [5,23,24], and advising coping skills for adapting to stressful life circumstances like heart disease and social deprivation [16,23,44,57]. Family support was crucial for decreasing depression for emerging adults between the ages of 20-30 [52]. Peers' social support helped college students a sense of belonging [22], feel validated in their struggles [41], and develop empathy for others [53].

Stigma, secrecy, and negative cultural attitudes towards mental illnesses suppress help-seeking behavior [8,14,34]. Stigma not only affects the person with the mental illness but also others (e.g., friends, family, physicians) as a society, resulting in a culture of "don't ask, don't tell." Accordingly, individuals do not receive timely, proactive help [12]; and those who need the most help are those left with a lack of support resources.

The field of HCI investigated a variety of ways to support young adults and adolescents in mental health wellness. Starting with self-tracking or passively monitoring users' statuses [30,39,58], researchers explored providing therapy modules [51], developing games as a way to provide treatment or social support [9], and using social media to understand [11,15,43] and potentially generate solutions for mental health [15,25,33]. Using such technologies provides effective solutions to addressing stigma and increasing access to therapeutic tools. However, more work is needed to examine how technologies can provide tailored social support–one that provides the targeted type and quality that the literature presents as an effective social support.

In this paper, we present interview results on college students' existing practices around seeking social support, which we call, *fluid mosaic of social support*. We discuss how *fluid mosaics*, as tailored social support practices, shed light on the roles of technology-mediated social support for college students.

BACKGROUND

College students face a number of stressors that affect mental health due to the transition from adolescence to college life [38] and changes in lifestyle including increased personal responsibility and independence [26,55]. Students must manage the stress of both academic [21,31] and work pressure [47]. At the same time, students face stressors around building relationships with friends and developing a sense of belonging [18,22].

To address student mental health, universities offer on-campus counseling services and conduct additional outreach through workshops, written materials, and online information [29]. However, these counseling services are under-utilized for preventative visits, but over-utilized for emergency visits [6,42]. Stigma prohibits help-seeking behavior [14], and negative cultural attitudes towards professional help [8,34] reduce likelihood of students seeking help when they need it.

Social support is defined as "support accessible to an individual through social ties to other individuals, groups, and the larger community" [36] and is "available in times of need to give psychological, physical, and financial help" [62]. High levels of social support can protect against the impacts of mental illness of college students [48] by providing help with social adjustment and college transition [10,40], as well as reducing depressive symptoms and risk of suicide [19,20].

Not just social support, but tailored social support depending on the population and mental illness is essential in providing an effective solution. For instance, for sexual assault survivors with PTSD, building resilience and self-esteem through social support that reduces self-blame and promotes avoidance coping has been found as critical [59]. For those suffering from severe social anxiety, close friends providing high peer group acceptance was effective [32].

HCI researchers demonstrated how technology-mediated social support can bring effective mental health solutions to the young adult population. Online social networks are a representative example, where a myriad of studies show their effectiveness in improving mental illness outcomes [15,25,35]. For instance, moderated online social therapy showed success in developing a sense of belonging, security, positivity, and protection [33].

At the heart of these successes lies anonymity and accessibility–Balani and De Choudhury found being anonymous in online support groups allowed honest and candid expression of thoughts, experiences, and beliefs [3]. However, among adolescent populations, social media use has been correlated with depression symptoms [49] and linked to cyberbullying [50] and internet addiction [7]. Negative interactions on such platforms lowered self-esteem [60].

HCI researchers also developed technologies to enhance support exchanges among existing social networks. Digital family portraits [28,45,46,56] augmented connections between extended family members and elderly adults. CoupleVIBE [4] and MissU [37] explored the power of implicit communication between distant partners; Eichhorn et al. simulated the effects of physical intimacy through a physical stroking device for long-distance couples [13].

As such, HCI work has investigated augmenting a variety of social support sources: online support groups, social media for mental health, and tangible media for significant others and family members. More work can shed light on stigma related challenges in seeking help around mental health in this specific population–college students, a representation of emerging adulthood transitioning from dependent to partially independent adults–and how we can better deliver tailored social support for this group.

Our goal in this paper is to examine how college students currently practice seeking tailored social support and how stigma plays a role in this practice. We then derive lessons learned about how technologies can support and augment such practice.

METHODS
We conducted interviews with college students about how they currently manage mental health and what social support resources they use. We recruited 19 participants (13 females; age 20-30; 6 non-Hispanic White, 6 East Asians, 5 Indians, 1 African-American; 6 undergraduate, 13 graduate; 7 international students) from a large public university in the U.S. Midwest. 2 had been clinically diagnosed with a mental disorder, and 14 had experience with professional counseling services. We recruited participants through school-wide departmental e-mailing lists. All interviews were audio recorded and transcribed for analysis. Three researchers conducted the data analysis, using the open coding method from the grounded theory approach [17] in Atlas.Ti 7. Once we identified the core themes, we conducted axial coding to systematically explore the properties and dimensions of each theme. As a group, we compared, discussed and revised the themes through a series of iterations until agreement was reached. The Institutional Review Boards of authors' universities approved the study. Below, we describe how our participants exchanged social support for managing mental health, followed by suggested role of technology-mediated social support for college students.

MOSAIC OF SOCIAL SUPPORT FOR MANAGING MENTAL HEALTH
In this study, we found that during times of distress, college students actively made efforts to cope with their struggles by seeking support from various social groups. These social groups ranged from close friends and family to strangers and anonymous individuals.

Each of these groups had unique benefits and limitations in fulfilling the needs of the participants; various levels of stigma around sharing one's concerns with the groups generated the most significant limitation in using these social groups as support. The participants pieced together these social groups in ways that would best help address their evolving mental health needs.

Close Friends: Supporting Sociocultural Sensitivity, Providing Active Listening and Proactive Support
Culturally relevant and sensitive support was often lacking from other social groups, even from family. Active listening and proactive support was a rare quality found in existing social networks. Close friends, a dedicated and intimate group of friends, provided support for this gap.

For instance, P2 described how his close Korean-American friends helped with his concerns around identity, acculturation and assimilation as an immigrant in the U.S.: "I am viewed as Korean in the U.S., but American in Korea" and how he was able to feel he was not alone by sharing this common concern with his close Korean-American friends. He felt sharing this concern with his parents would not work because his parents taught him to not show weakness; and sharing this concern would only cause unnecessary worry from his parents. P19 had trouble finding a health professional who understands bisexual perspectives; her family had a conservative, middle-eastern upbringing, thus sharing her "sexual deviance" with her family did not help either. She instead found support from her close friends: *"Our relationship was based on talking. It wasn't based on going out. It wasn't based on a school. It was really based on him knowing me."* (P19)

Active listening was a "*rare*" quality of people that their close friends provided (P14): *"I have a lot of friends but not all of them are very good listeners ... people generally like to talk and then listen."* People can give superficial comfort by listening and stating *"Oh you're doing good. You're doing well. Don't worry."* (P17) But close friends listened to the participant's problems and provided constructive feedback and encouragement: *"We'll just talk about the paper, talk about their ideas, and share ideas, start working on it ... I just talk to them about all of the stress that I have right now. They will share with me their stress. They will talk to me, 'Okay, I'm at the same page with you, but we can do this.'"* (P16)

Close friends' proactive support was given without the participant actively seeking help or sharing their concerns upfront. P4 and P16 reported their close friends sensed when they were not feeling well and would routinely intervene and offer support: *"my friends helped me realize I was neglecting my mental health ... they helped me realize even an hour a week is just a good way to clear your mind and feel a sense of calmness"* (P4) Because of this comfort, intimacy, and sensitivity that close friends provided, participants were able to share concerns spontaneously, but informally during casual conversations. Since close friends are usually familiar with each other's lives, sharing was quick and simple: *"You know five or ten minutes and then I can forget about the issue."* (P4) Participants felt that their closest friends would be there to provide support them whenever they were needed, without necessarily expecting anything in return.

Limitations. Because close friends were critical to the participants' daily lives, participants also felt pressured to maintain these relationships by trying to meet expectations their friends might have for them as their close friend. P2 feared that revealing too much of himself would change the relationship he had with his friends, stating that even close friends had expectations for each other such as maintaining a positive and fun attitude when hanging out. This was a significant stressor and placed limits on how much help

participants would seek from close friends: *"It's very difficult and feel uncertain if I were to reveal a little bit my personal self, would they still be the same towards you know, friendship or not. and I think that was something really halting me from seeking help when very stressful things happened. "* (P2)

Parents: Accessible, Unconditional, and Versatile
Parents was another important social group, but a complex one, encompassing extreme ends of support qualities. This parent group had potential to provide accessibility, unconditional love, and versatile support, but poor relations and conflicts throughout childhood led to obstacles in providing a complete source of social support.

Parents provide unconditional love and support for their children; this level of depth in support helped participants to turn to parents in extreme situations: *"I was sitting in my room thinking about how to kill myself. So, my thought was not to really talk to anyone about it ... the reason why I ended up going [to therapy] in the end was because my mom suggested it."* (P19) Such reliable connection with parents would require openness and comfort like in the case of P5: *"I'm very open. My parents are sort of very modern thinkers. They've never said that anything is off the table to discuss. We've always been very open about sex or drinking or whatnot."* Further qualities of parents as support group were reassurance with unconditional support, not *"baby[ying] me about it"* (P13). P13's mother gave straightforward advice: *"you're not being productive right now... You need to get it together"* but this candidness was qualified with love and support: *"You can do it, I know you can do it, make sure you're using the strategies that I know you have in your toolkit from your therapist"* (P13).

Parents also provided significant guidance and advice through experience, including help with making career decisions (P9, P5), strategies for managing school work (P5, P13), and advice on medical issues (P5, P13). Because of their experience with dealing with such issues in the past, participants relied on them for advice when faced with similar situations, wanting *"somebody else's opinion who's been around the block a few times..."* (P5). However, not all parents could provide this kind of support when the experiences did not match (P12, 19).

Limitations. Some participants (P14, P10, P12, P14, P19) felt that they could not share intimate problems with their parents because they could not relate or were not trusted due to past conflicts. These participants, thus, often chose not to discuss personal issues with their parents, and rather chose to talk only about significant life updates and have general conversations about daily life. For instance, P12 and P19 felt that they could not discuss their issues with their parents because their parents could not understand or relate to the stressors of student life. For the participants whose parents were less involved in their lives, *"...sometimes it is difficult to explain the situation to my family because they are not in the university setting, so*

when I am stressed I can't really explain it to my mom because she needs more context, and that in itself is a bit of more pain..." (P12) P14 feared sharing concerns with parents would make her parents become overprotective and felt she would rather face the problems herself or confide only in her friends. P10 felt that her parents had "invested" in her education and had a duty to "repay" them, so sharing her stressors around school was not an option.

Painful or unpleasant experiences in the past, such as parents' child abuse (P3), memory of frequent arguments among parents (P1), or family's drug problems (P2), were obvious sources of stress for our participants not being open with their parents. More subtle forms of conflicts with parents included inability to meet family expectations (P1), judgement over mental health issues (P4), and disagreements with cultural values (P19).

Strangers and Anonymous: For Maneuvering Stigma and Secrecy, Forming New Relationships

The strangers and anonymous groups provided a place to fall back on when problems arose with close network social groups, such as friends and parents, when providing social support due to stigma or unavailability. Although participants generally preferred sharing their concerns with their close social groups, participants wanted to detach themselves from these groups depending on personal issues and possible stigma as an unwished consequence. By confiding in people outside of their close network, participants hoped to create a degree of separation between their issues and their personal lives.

P14 described well this position of thought: *"I'd rather have somebody I don't know learn about what I was going through rather than have someone I know remember this for my entire lifetime....I didn't want my friends to remember me to be somebody who is very sad or is stressed out. I didn't want them to judge me that way."* (P14)

Strangers. Strangers are those whom participants met in person outside close network of friends and family, such as co-workers or acquaintances from classes. Unlike close networks who have personal ties to the issue that the participant was facing, strangers could provide objective, outside perspectives, addressing issues around stigma with social distance. At the same time, participants felt they only turned to strangers who had the qualities of genuine concern, compassionate, and common interests to discuss.

Without common backgrounds with the stranger, P10 felt it was useless sharing her concerns with them because they would not understand the issue deeply. Similar backgrounds also helped to provide the opportunity to create and develop a new relationship. This common ground was important because participants felt it was important that they could mold the image of themselves into something positive through this newly formed relationship, which would separate their troubled pasts from relationships that they formed going forward: *"Also, the people I do know here aren't people I've known in the past. Even they're only*

getting to know me now. I didn't want them to remember me that way." (P14)

Anonymous. A couple participants (P1, P19) used the internet to connect with anonymous users when seeking help or advice. Anonymous platforms allowed for connecting with people with similar interests, without the risk of dealing with stigma or concern about others knowing your identity. While some found this to reduce stigma further than sharing with strangers, participants still believed that anonymous individuals could not provide as useful help as in-person sources of support.

Sharing with an anonymous group also decreased fear of stigma even more so than sharing with strangers because their identity was concealed. The required quality of this group was being compassionate: *"If it was online I wouldn't want people to know who I am, and I wouldn't want to know who other people are. I think that would be okay, and really I think the only thing I would want is compassionate people."* (P11) and feeling of safeness: *"you want to be safe there. That is the bottom line."* (P1) To share comfortably, participants needed a reasonable guarantee that people were going to help, expecting that any anonymous individual is *"understanding and is aware of what is expected out of them."* (P14) For example, P5's friends used online forums to connect with other people also struggling with autoimmune diseases and receive group support.

Limitations. Because developing trust can be intimidating or difficult with the strangers and anonymous group, there was an initial hurdle involved in seeking help from this group and sharing private information: *"I felt like talking to a stranger was a little bit like awkward because I didn't really know her that well I wasn't really sure like how much initial like trust they had."* (P4); *"I'm not too sure I could talk to random people who are not professionals ... You have a different mental state when you're a therapist compared to talking to just anonymous people."* (P14)

Despite lower initial levels of stigma, participants still worried about how they would be perceived as their relationship developed, stating that they wouldn't want to share anything too *"heavy or stressful with people I don't know, because then they wouldn't want to be my friend. Simply put."* (P7)

DISCUSSION

Our study uncovered how college students interact with various social groups. We examined their needs in building these different social groups and what types of tailored support each group provided. We also uncovered participants' limitations in sharing with these groups.

We consider this social support-seeking practice, in which the students actively develop and utilize social groups to share their concerns and seek help, as "Fluid Mosaic of Social Support." Below we describe the novelty of this concept, followed by what fluid mosaic helps us learn about

the qualities of tailored technology-mediated social support for college students.

Fluid Mosaic of Social Support
College students in this study maintain multiple social groups that are somewhat structured, but afford "fluidity" in the sense that the groups are adaptable and meet different needs of each individual. This flexible but strong form of social support evolves over time as relationships with the social groups evolve. Each student maintains a unique mosaic of social support; this mosaic consists of social groups that are pieced together to compensate each group's limitations according to each individual's constraints and needs. This mosaic is not static–it will continue to evolve in a manner that best supports the individual and their evolving mental health needs over time.

The engagement of parents, close friends, and selective choice among anonymous individuals and strangers enabled an optimal support environment. This mosaic support environment provided empathic understanding, compassion, and sense of belonging crucial for healthy emerging adulthood [19]. These social groups were not free of limitations. Reasons for these limitations attributed to availability, sensitivity to stigma, and trust issues surrounding social distance.

Several other social groups not described in this paper included significant others, siblings, or people with topic expertise (e.g., professors, advisors). These groups emerged and disappeared depending on each participant's background, family upbringing, and preferences for how openly they wanted to seek help from others.

Learning From Fluid Mosaic: Requirements for Technology-mediated Social Support
We suggest three main qualities that technologies can provide versatile, tailored social support for college students: *empathic proactive support, direct advice with unconditional love of an experienced individual,* and *destigmatizing other to fall back on.* Below we describe scenarios for how technologies should be informed of when delivering social support:

- Examine how existing social groups of a user fulfill the three main qualities; and if these qualities are missing from existing social groups, the technology would find ways to fill in these gaps either by forming ideal social groups for the user or providing therapeutic tools that address the gaps. These qualities should not be considered as final; however, fluid mosaic evolves as a social group runs into limitations, generating new ways and qualities to cope with the issues.
- The support giving agent of these qualities might not be able to match the original social groups embodying the quality (e.g., parents for unconditional love quality). However, a surrogate social group, individual, or technologies can play the quality augmented by technology, which should know exactly what qualities are needed for the individual. Such case would be

useful when availability is a problem–such as those who did not want to be honest with parents due to degraded relationships. They can turn to other social groups for alternate but similar qualities or technological module designed to fulfill missing needs.
- The quality of strangers and anonymous can be included as a safety measure, if not available to users' existing support mosaic. The quality might seem subordinate compared to other social groups, and some users might have strong negativity against this social group due to lack of trust. However, our study revealed the role and quality of stranger and anonymous was a crucial quality necessary to prevent breakdown of mosaic. By being somewhere to *fall back on* when others are either not available or developed access barriers to, this piece works to amend problems, albeit temporarily.

- Technology should help to maintain sustainability of each social group, while understanding the evolving needs of the user. Students struggled to maintain status quo of "good relationships and expectations" with their social groups through selective sharing. Such tension can be a stressor if it hinders the support mosaic from completing its role. The technology should be able to ameliorate these tensions and provide sustainable ways to help maintain healthy fluid mosaic of social support.

CONCLUSION
We examined college students' existing practices of getting social support. We introduced the concept of fluid mosaic of social support, which in turn provided insights to how technologies can facilitate social support while helping students maneuver stigma around mental health. Our study contributes to guiding designing technologies to support relatively understudied population and open up conversations to quality driven technology design for mental health support.

REFERENCES
1. Francesca Agostini, Erica Neri, Paola Salvatori, Sara Dellabartola, Laura Bozicevic, and Fiorella Monti. 2015. Antenatal depressive symptoms associated with specific life events and sources of social support among Italian women. *Maternal and child health journal* 19, 5: 1131–1141.
2. American College Health Association. 2017. *American College Health Association-National College Health Assessment II: Reference Group Executive Summary Fall 2016*. Hanover, MD: American College Health Association.
3. Sairam Balani and Munmun De Choudhury. 2015. Detecting and Characterizing Mental Health Related Self-Disclosure in Social Media. In *Proceedings of the 33rd Annual ACM Conference Extended Abstracts on Human Factors in Computing Systems* (CHI EA '15), 1373–1378.
4. Elizabeth Bales, Kevin A. Li, and William Griwsold.

2011. CoupleVIBE: Mobile Implicit Communication to Improve Awareness for (Long-distance) Couples. In *Proceedings of the ACM 2011 Conference on Computer Supported Cooperative Work* (CSCW '11), 65–74.

5. G. W. Brown, B. Andrews, T. Harris, Z. Adler, and L. Bridge. 1986. Social support, self-esteem and depression. *Psychological medicine* 16, 4: 813–831.

6. Yves J. A. Chaput and Marie-Josée Lebel. 2007. Demographic and clinical profiles of patients who make multiple visits to psychiatric emergency services. *Psychiatric services* 58, 3: 335–341.

7. Dimitri A. Christakis and Megan A. Moreno. 2009. Trapped in the net: will internet addiction become a 21st-century epidemic? *Archives of pediatrics & adolescent medicine* 163, 10: 959–960.

8. Kyaien O. Conner, Gary Koeske, and Charlotte Brown. 2009. Racial differences in attitudes toward professional mental health treatment: the mediating effect of stigma. *Journal of gerontological social work* 52, 7: 695–712.

9. David Coyle, Gavin Doherty, Mark Matthews, and John Sharry. 2007. Computers in talk-based mental health interventions. *Interacting with computers* 19, 4: 545–562.

10. M. Scott DeBerard, Glen Spielmans, and Deana Julka. 2004. Predictors of academic achievement and retention among college freshmen: A longitudinal study. *College student journal* 38, 1: 66–80.

11. Munmun De Choudhury, Scott Counts, and Eric Horvitz. 2013. Social Media As a Measurement Tool of Depression in Populations. In *Proceedings of the 5th Annual ACM Web Science Conference* (WebSci '13), 47–56.

12. J. P. Docherty. 1997. Barriers to the diagnosis of depression in primary care. *The Journal of clinical psychiatry* 58 Suppl 1: 5–10.

13. Elisabeth Eichhorn, Reto Wettach, and Eva Hornecker. 2008. A Stroking Device for Spatially Separated Couples. In *Proceedings of the 10th International Conference on Human Computer Interaction with Mobile Devices and Services* (MobileHCI '08), 303–306.

14. Daniel Eisenberg, Marilyn F. Downs, Ezra Golberstein, and Kara Zivin. 2009. Stigma and help seeking for mental health among college students. *Medical care research and review: MCRR* 66, 5: 522–541.

15. Gunther Eysenbach, John Powell, Marina Englesakis, Carlos Rizo, and Anita Stern. 2004. Health related virtual communities and electronic support groups: systematic review of the effects of online peer to peer interactions. *BMJ* 328, 7449: 1166.

16. A. F. Fontana, R. D. Kerns, R. L. Rosenberg, and K. L. Colonese. 1989. Support, stress, and recovery from coronary heart disease: a longitudinal causal model. *Health psychology: official journal of the Division of Health Psychology, American Psychological Association* 8, 2: 175–193.

17. B. Glasser and A. Strauss. 1967. The discovery grounded theory: strategies for qualitative inquiry. *Aldin, Chicago*.

18. B. M. Hagerty and R. A. Williams. 1999. The effects of sense of belonging, social support, conflict, and loneliness on depression. *Nursing research* 48, 4: 215–219.

19. Jennifer Hefner and Daniel Eisenberg. 2009. Social support and mental health among college students. *The American journal of orthopsychiatry* 79, 4: 491–499.

20. Charles W. Hennig, Craig R. Crabtree, and David Baum. 1998. Mental health CPR: Peer contracting as a response to potential suicide in adolescents. *Archives of suicide research: official journal of the International Academy for Suicide Research* 4, 2: 169–187.

21. Jameson K. Hirsch and Jon B. Ellis. 1996. Differences in life stress and reasons for living among college suicide ideators and non-ideators. *College student journal*. Retrieved from http://psycnet.apa.org/psycinfo/1997-07633-008

22. Marybeth Hoffman, Jayne Richmond, Jennifer Morrow, and Kandice Salomone. 2002. Investigating "Sense of Belonging" in First-Year College Students. *Journal of college student retention: research, theory & practice* 4, 3: 227–256.

23. Scott M. Hyman, Steven N. Gold, and Melissa A. Cott. 2003. Forms of Social Support That Moderate PTSD in Childhood Sexual Abuse Survivors. *Journal of family violence* 18, 5: 295–300.

24. F. Ebru Ikiz and Firdevs Savi Cakar. 2010. Perceived social support and self-esteem in adolescence. *Procedia - Social and Behavioral Sciences* 5, Supplement C: 2338–2342.

25. Sue Jamison-Powell, Conor Linehan, Laura Daley, Andrew Garbett, and Shaun Lawson. 2012. I can't get no sleep: discussing# insomnia on twitter. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 1501–1510.

26. Sandra Kerr, Vanessa K. Johnson, Susan E. Gans, and Jodi Krumrine. 2004. Predicting Adjustment During the Transition to College: Alexithymia, Perceived Stress, and Psychological Symptoms. *Journal of college student development* 45, 6: 593–611.

27. Ronald C. Kessler, Patricia Berglund, Olga Demler, Robert Jin, Kathleen R. Merikangas, and Ellen E. Walters. 2005. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of general psychiatry* 62, 6: 593–602.

28. Julie A. Kientz, Shwetak N. Patel, Brian Jones, Ed Price, Elizabeth D. Mynatt, and Gregory D. Abowd. 2008. The Georgia Tech Aware Home. In *CHI '08 Extended Abstracts on Human Factors in Computing*

Systems (CHI EA '08), 3675–3680.

29. Martha Anne Kitzrow. 2003. The Mental Health Needs of Today's College Students: Challenges and Recommendations. *NASPA Journal* 41, 1: 167–181.

30. Predrag Klasnja and Wanda Pratt. 2012. Healthcare in the pocket: mapping the space of mobile-phone health interventions. *Journal of biomedical informatics* 45, 1: 184–198.

31. James P. Kohn and Gregory H. Frazer. 1986. An Academic Stress Scale: Identification and Rated Importance of Academic Stressors. *Psychological reports* 59, 2: 415–426.

32. A. M. La Greca and N. Lopez. 1998. Social anxiety among adolescents: linkages with peer relations and friendships. *Journal of abnormal child psychology* 26, 2: 83–94.

33. Reeva Lederman, Greg Wadley, John Gleeson, Sarah Bendall, and Mario Álvarez-Jiménez. 2014. Moderated Online Social Therapy: Designing and Evaluating Technology for Mental Health. *ACM Trans. Comput. -Hum. Interact.* 21, 1: 5:1–5:26.

34. Sunmin Lee, Hee-Soon Juon, Genevieve Martinez, Chiehwen E. Hsu, E. Stephanie Robinson, Julie Bawa, and Grace X. Ma. 2009. Model minority at risk: expressed needs of mental health by Asian American young adults. *Journal of community health* 34, 2: 144–152.

35. Morton A. Lieberman, Mitch Golant, Janine Giese-Davis, Andy Winzlenberg, Harold Benjamin, Keith Humphreys, Carol Kronenwetter, Stefani Russo, and David Spiegel. 2003. Electronic support groups for breast carcinoma. *Cancer* 97, 4: 920–925.

36. N. Lin, R. S. Simeone, W. M. Ensel, and W. Kuo. 1979. Social support, stressful life events, and illness: a model and an empirical test. *Journal of health and social behavior* 20, 2: 108–119.

37. Danielle Lottridge, Nicolas Masson, and Wendy Mackay. 2009. Sharing Empty Moments: Design for Remote Couples. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI '09), 2329–2338.

38. L. Lu. 1994. University transition: major and minor life stressors, personality characteristics and mental health. *Psychological medicine* 24, 1: 81–87.

39. Deborah Lupton. 2014. Self-tracking Cultures: Towards a Sociology of Personal Informatics. In *Proceedings of the 26th Australian Computer-Human Interaction Conference on Designing Futures: The Future of Design* (OzCHI '14), 77–86.

40. Jonathan F. Mattanah, Jean F. Ayers, Bethany L. Brand, Leonie J. Brooks, Julie L. Quimby, and Scot W. McNary. 2010. A Social Support Intervention to Ease the College Transition: Exploring Main Effects and Moderators. *Journal of college student development* 51, 1: 93–108.

41. Shery Mead and Cheryl MacNeil. 2006. Peer support: What makes it unique. *International Journal of Psychosocial Rehabilitation* 10, 2: 29–37.

42. Sharon L. Mitchell, Mahrin Kader, Melinda Z. Haggerty, Yogesh D. Bakhai, and Calvert G. Warren. 2013. College Student Utilization of a Comprehensive Psychiatric Emergency Program. *Journal of College Counseling* 16, 1: 49–63.

43. S. Anne Moorhead, Diane E. Hazlett, Laura Harrison, Jennifer K. Carroll, Anthea Irwin, and Ciska Hoving. 2013. A new dimension of health care: systematic review of the uses, benefits, and limitations of social media for health communication. *Journal of medical Internet research* 15, 4: e85.

44. Rudolf H. Moos and Jeanne A. Schaefer. 1993. Coping resources and processes: Current concepts and measures. *Handbook of stress: Theoretical and clinical aspects*: 234–257.

45. Elizabeth D. Mynatt, Irfan Essa, and Wendy Rogers. 2000. Increasing the Opportunities for Aging in Place. In *Proceedings on the 2000 Conference on Universal Usability* (CUU '00), 65–71.

46. Elizabeth D. Mynatt, Jim Rowan, Sarah Craighill, and Annie Jacobs. 2001. Digital Family Portraits: Supporting Peace of Mind for Extended Family Members. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI '01), 333–340.

47. Kenneth M. Nowack and Alan L. Hanson. 1983. The relationship between stress, job performance, and burnout in college student resident assistants. *Journal of College Student Personnel*. Retrieved from http://doi.apa.org/psycinfo/1984-18773-001

48. Fatih Ozbay, Douglas C. Johnson, Eleni Dimoulas, C. A. Morgan, Dennis Charney, and Steven Southwick. 2007. Social support and resilience to stress: from neurobiology to clinical practice. *Psychiatry* 4, 5: 35–40.

49. Igor Pantic, Aleksandar Damjanovic, Jovana Todorovic, Dubravka Topalovic, Dragana Bojovic-Jovic, Sinisa Ristic, and Senka Pantic. 2012. Association between online social networking and depression in high school students: behavioral physiology viewpoint. *Psychiatria Danubina* 24, 1: 90–93.

50. Justin W. Patchin and Sameer Hinduja. 2006. Bullies move beyond the schoolyard: A preliminary look at cyberbullying. *Youth violence and juvenile justice* 4, 2: 148–169.

51. Yael Perry, Aliza Werner-Seidler, Alison L. Calear, and Helen Christensen. 2016. Web-Based and Mobile Suicide Prevention Interventions for Young People: A Systematic Review. *Journal of the Canadian Academy of Child and Adolescent Psychiatry = Journal de l'Academie canadienne de psychiatrie de l'enfant et de l'adolescent* 25, 2: 73–79.

52. Jeremy W. Pettit, Robert E. Roberts, Peter M. Lewinsohn, John R. Seeley, and Ilya Yaroslavsky. 2011. Developmental relations between perceived

social support and depressive symptoms through emerging adulthood: blood is thicker than water. *Journal of family psychology: JFP: journal of the Division of Family Psychology of the American*

Psychological Association 25, 1: 127–136.

53. Julie Repper and Tim Carter. 2011. A review of the literature on peer support in mental health services. *Journal of mental health* 20, 4: 392–411.

54. Jan Risser, Alice Cates, Hafeez Rehman, and William Risser. 2010. Gender differences in social support and depression among injection drug users in Houston, Texas. *The American journal of drug and alcohol abuse* 36, 1: 18–24.

55. Shannon E. Ross, Bradley C. Niebling, and Teresa M. Heckert. 1999. Sources of stress among college students. *Social psychology* 61, 5: 841–846.

56. Jim Rowan and Elizabeth D. Mynatt. 2005. Digital Family Portrait Field Trial: Support for Aging in Place. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI '05), 521–530.

57. C. A. Shively, T. B. Clarkson, and J. R. Kaplan. 1989. Social deprivation and coronary artery atherosclerosis in female cynomolgus monkeys. *Atherosclerosis* 77, 1: 69–76.

58. Melanie Swan. 2009. Emerging patient-driven health care models: an examination of health social networks, consumer personalized medicine and quantified self-tracking. *International journal of environmental research and public health* 6, 2: 492–525.

59. Sarah E. Ullman, Stephanie M. Townsend, Henrietta H. Filipas, and Laura L. Starzynski. 2007. Structural Models of the Relations of Assault Severity, Social Support, Avoidance Coping, Self-Blame, and PTSD Among Sexual Assault Survivors. *Psychology of women quarterly* 31, 1: 23–37.

60. Patti M. Valkenburg, Jochen Peter, and Alexander P. Schouten. 2006. Friend networking sites and their relationship to adolescents' well-being and social self-esteem. *Cyberpsychology & behavior: the impact of the Internet, multimedia and virtual reality on behavior and society* 9, 5: 584–590.

61. 2014. WHO | The global burden of disease: 2004 update. Retrieved July 16, 2017 from http://www.who.int/healthinfo/global_burden_disease/2004_report_update/en/

62. NCI Dictionary of Cancer Terms. *National Cancer Institute*. Retrieved September 18, 2017 from https://www.cancer.gov/publications/dictionaries/cancer-terms?cdrid=440116