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Socialization, Education, and Learning For the Internet (SELFIE): A Pilot RCT of a
Social Media Skills Group Intervention for Autistic Adults

A dissertation submitted in partial satisfaction of the requirements for the degree Doctor of
Philosophy in Counseling, Clinical and School Psychology

by

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September 2022

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June 2022

Socialization, Education, and Learning For the Internet (SELFIE): A Pilot RCT of a Social
Media Skills Group Intervention for Autistic Adults

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by

Anthony Robert Osuna

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Osuna, A., Tagavi, D., Sabini, K., & Vernon, T (under review). Development and Pilot of a Social Media Skills Intervention for Autistic Adults: The Socialization, Education, and Learning For the Internet (SELFI) Program. Submitted to *Advances in Neurodevelopmental Disorders*.

Locke, J., **Osuna, A.,** Myrvold, R., Nehilla, L. , Kang-Yi, C., & Schoffer Closson, J. (under review). Supporting Autistic College Students: Examining the Mentoring, Organization and Social Support for Autism Inclusion on Campus (MOSSAIC) program. Submitted to *Autism*.

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Nauhaus, E., **Osuna, A.,** Tagavi, D., Shah-Hosseini, S., Simmons, S., Gerdt, J., & Thompson A. (in prep). Clinical Characteristics of Autistic Youth During Inpatient

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Hess, E., **Osuna, A.**, & Hutman, T. (2015, Aug.). *The Effects of Autism on Family Members* [Paper presentation]. The 123rd Annual Convention of The American Psychological Association, Toronto, Ontario, Canada.

Osuna, A. & Hutman, T. (2015, May). *Comparing Measures of Joint Attention in Infants at Risk for Autism Spectrum Disorder* [Poster presentation]. Stanford Undergraduate Psychology Conference, Stanford, CA, USA.

Osuna, A. & Wood, J.J. (2015, May). *Analysis of Multiple Measures of Personality Scores in Children with Autism Spectrum Disorder* [Poster presentation]. The 95th Annual Western Psychological Association Convention, Las Vegas, NV, USA.

Osuna, A., Schwartzman, B., Wood, J. J. (2015, Feb.). *Self-Reported Personality in Children with Autism Spectrum Disorder* [Poster presentation]. The Society for Personality and Social Psychology Symposium, Long Beach, CA, USA.

Osuna, A. & Wood, J. J. (2014, Nov.). *Comparing the Personality of Children with Autism Spectrum Disorder and One Parent on Using the Five Factor Model of Personality* [Paper

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Osuna, A. & Wood, J. J. (2014, July). *Multi-Method Approach to Assessing Personality in Children with Autism Spectrum Disorder* [Paper presentation]. National Ronald E. McNair Scholars Symposium, Berkeley, CA, USA.

Osuna, A. & Wood, J. J. (2014, July). *Observational Measures of Personality in Children with Autism Spectrum Disorder* [Paper presentation]. UCLA McNair Research Symposium, Los Angeles, CA, USA.

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2019 - 2021 Peer Mentorship Clinical Supervisor
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ABSTRACT

Socialization, Education, and Learning For the Internet (SEIFI): A Pilot RCT of a Social Media Skills Group Intervention for Autistic Adults

by

Anthony Robert Osuna

Social media use has become a popular tool for modern social communication. Many autistic adults report a preference for computer-mediated communication and experience a range of benefits from using social media, including increased happiness and closer friendships. While there are many potential positive consequences to an active online presence, autistic adults are at increased risk of challenges, including cyber-victimization. To date, no interventions exist that specifically support autistic adults with safe and effective social media use. The Socialization, Education, and Learning, For the Internet (SEIFI) program is a social media skills group intervention that was developed to support socially vulnerable individuals with online socialization. The present study utilized a pilot randomized controlled trial (RCT) to evaluate the preliminary feasibility, acceptability, and efficacy of the virtual group SEIFI program. A total of 26 autistic adults (mean age = 24.3 years) were randomized to the SEIFI program or an eight-week waitlist condition, with 19 participants completing the study. Results related to recruitment, attendance, and fidelity of implementation were collected and supported program feasibility. Attrition and surveys from

participants and peer mentors reflect treatment acceptability and provide feedback regarding intervention and study protocols. Preliminary results related to treatment outcomes support the SELFI program as efficacious as demonstrated by improvements in Facebook behavior and a reduction in difficulty related to individualized goals. These findings establish a promising foundation of evidence related to the innovative social media skills intervention for autistic adults.

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Introduction

Social media has changed the way that people socialize and communicate with each other. The proliferation of the internet has expanded socialization to online contexts and now approximately 72% of young adults in the U.S. are active on social media (Auxier et al., 2021). Online social communication is no longer just a supplement to in-person social communication – in many cases, relationships are initiated, maintained, and even exist entirely online (Reich et al., 2012). An active social media presence creates opportunities to develop and maintain social relationships with people who have similar interests, experiences, and identities. Using social media has been linked to improvements in one’s perceived social connectedness (Grieve et al., 2013). Other benefits to social media include an increased sense of social engagement, improved friendship quality, and decreased loneliness (Van Schalkwyk et al., 2017 Deters et al, 2013). Overall, there is an emerging body of research that highlights an array of benefits related to having an active and healthy online experience.

The skills and strategies used for online socialization differ significantly from those used during in-person social interactions. In-person interactions often depend on live interpretation of spoken language and non-verbal communication (gestures, body language, facial expressions, etc.). Online social interactions are often asynchronous and utilize a unique set of computer-mediated strategies, including writing and interpreting text messages, participating in group chats, sharing content (posts, pictures, videos), socialization tools (like, comment, following), and other platform-specific features (stories, filters, etc.). Similar to in-person socialization, each digital milieu has unique social rules and etiquette that influence how people engage and respond to each other. Although the internet is a relatively

unstructured space to socialize and communicate using preferred strategies, certain behavior and approaches are more likely to strengthen or distance relationships. For example, online behavior that has been demonstrated to bring peers closer together include posting updates, writing messages to friends, commenting on others' posts, sending private messages, offering support, and wishing peers happy birthday (McEwan et al., 2014). Social media behavior that distances relationships include oversharing, posting too frequently, tagging others in content they're not in, and posting offensive content -- especially if related to politics or uncivil behavior (Pham et al., 2019). To safely and effectively navigate social interactions online, one must have an appropriate understanding of the purpose and execution of these social media skills – they must develop *online social competency*. While social media skills may be related to in-person social competency, the discrepancy between in-person and digital social environments highlights the need for context-specific skills (Mazurek, 2013).

Autism is characterized by vulnerabilities in social communication and the presence of restricted and repetitive interests and behaviors (American Psychiatric Association, 2013). Autistic individuals often experience challenges initiating, developing, and maintaining social relationships. These individuals may struggle picking up on subtle social cues and tacit social rules, which influence difficulties within face-to-face interactions (Brownlow & O'Dell, 2006). While a wealth of research has explored autistic in-person socialization, very little is understood about autistic social media use and how in-person social vulnerabilities relate to online socialization. Considering the ubiquity of social media use, it is important that the field understands how to support the experiences of those most socially vulnerable.

Social media use amongst autistic adults has been associated with a range of benefits and challenges. Autistic adults that use social media report closer friendships, increased

friendship quality, higher levels of happiness and greater life satisfaction than those that do not socialize online (Mazurek et al., 2013; Ward et al., 2018; McEwan et al., 2014). Autistic adults report that social media helps them meet others with similar interests and participate in the neurodiversity movement (Wang et al., 2020; Kapp et al., 2013). Reported challenges that autistic individuals experience with social media use include increased anxiety, online harassment and drama, concerns about privacy, and greater risk of cyber-victimization (Wang et al., 2020; Triantafyllopoulou et al., 2021). Considering that those with in-person social vulnerability are more likely to engage in challenging behavior on social media (Milani et al., 2009), autistic individuals are especially vulnerable online and may benefit from targeted support.

To date, no programs exist that specifically focus on supporting autistic individuals with social media use. Although a few studies have piloted social media interventions for youth with developmental disabilities (Grace et al., 2014), acquired disabilities (Raghavendra et al., 2013), and emotional and behavioral disorders (Morgan et al., 2016), no program exists that meets the unique needs of autistic individuals. While some in-person social skills interventions, such as PEERS (Laugeson et al., 2015) and START (Vernon et al., 2018) address digital social communication (texting, video chatting, emailing, etc.) as a single lesson within their curriculum, no intervention has been developed that explicitly supports autistic individuals with the development of social media skills. Although it is possible that interventions for in-person social skills may translate to more effective online socialization, social skills are socially reinforced and context specific (Little et al., 2017). Therefore, a dedicated social media intervention may be necessary.

The Socialization, Education, and Learning For the Internet (SELFI) program is a social media skills intervention intended to help participants safely and effectively navigate social media. The SELFI program was developed using research on prosocial online behavior and utilizes evidence-based strategies commonly used to support autistic individuals with social skills. A pilot of the SELFI program explored the feasibility of intervention materials, procedures, and an 8-week curriculum with a small sample of six autistic adults (Osuna, in prep). Results from this pilot indicated preliminary feasibility as demonstrated by high treatment fidelity, high attendance, no attrition, and positive feedback from participants. In addition to treatment feasibility, the SELFI program also demonstrated signals of change regarding increases in Facebook behavior after participation in the intervention. However, given the pilot nature of this study, there were several limitations (research design, sample size, all male participants) that caution the conclusions that can be drawn from the data.

While results from the initial SELFI pilot are promising, there exist unanswered questions pertaining to the development and study of social media skills interventions. A larger sample with a more rigorous research design is needed for a deeper understanding of treatment feasibility, acceptability, and treatment effects. Additionally, it is important to explore whether the SELFI program can be delivered in a more accessible and efficient manner. While in-person SELFI sessions were feasible, recent developments due to COVID-19 have necessitated virtual treatment delivery to increase accessibility. Considering that social media itself is a remote activity, it makes sense to explore the remote delivery of SELFI. Since social skills group interventions have been demonstrated to be effective for supporting the development of social skills in autistic adults (Hotton & Coles, 2016), a redesign of SELFI for virtual group format should be explored.

The current study sought to pilot a redesigned SELFI program delivered virtually in a group format. Considering the novelty of this type of intervention, the study aims intended to 1) assess the feasibility of the SELFI program and study protocols 2) explore the acceptability of the SELFI program from the perspective of participants and peer mentors and 3) evaluate the preliminary efficacy of the SELFI program on social media behavior and individualized goals. It was hypothesized that the SELFI program would be feasible to implement as demonstrated by high recruitment, high attendance rates, and high levels of fidelity of treatment delivery. It was also hypothesized there would be limited study attrition and that participants and peer mentors would report satisfactory levels of treatment acceptability. Regarding treatment outcomes, it was hypothesized that participants assigned to the SELFI condition would demonstrate improvements and increases in overall Facebook activity and associated gains on individualized social media goals.

Relevant Research Literature

Social Media

Social media is defined as a collection of computer-mediated communication channels that allow users to engage in social interaction with broad and narrow audiences in real time and asynchronously (Bayer et al., 2020). Each social media *platform* creates a unique social ecosystem in which users can network and communicate with others over the internet. There exists great variability between these platforms and the fast-changing nature of social media makes it difficult to create a static description of the structure and tools embedded within these online environments. Existing definitions of social media tend to emphasize the expansion of social opportunities, including finding, observing, and interacting efficiently with others across time and space. A subclass of social media platforms are considered social networking sites (SNS), which are defined by having three elements: profile, network, and stream (feed, timeline, etc.). These platforms include familiar social media sites, including Facebook, Instagram, Twitter, and TikTok, which emphasize connecting and networking with others online. While there are several features that differentiate social media platforms, they all require utilization of computer-mediated communication and online social strategies.

Social media platforms are ubiquitous and have become a staple of the modern social experience. The internet is more accessible thanks to mobile devices and now approximately 96% of young adults aged 18 to 29 in the United States own a smartphone – an increase of 35% over the last eight years (Silver et al., 2019). With internet access easily accessible, socialization has expanded to online contexts and now approximately 72% of young adults in the U.S. are active on social media (Auxier et al., 2021). A similar pattern exists amongst

teenagers, with about 89% reporting that they access social media platforms daily (Hawk et al., 2018). Social media is transforming the way that people socially communicate with one another, and computer-mediated communication is replacing traditional forms of communication such as phone calls. In fact, about 70% of youth with smartphones opt for text messaging or social media tools as their primary mode of initiating contact with their peers (Lenhard, 2015). Recognizing this trend, it has become increasingly relevant that social media be considered as a critical dimension of modern social relationships.

In addition to attracting many users, social media is also consuming a significant portion of people's time. Young adults now report engaging with digital media more than any other activity (Coyne et al., 2013), for an average of approximately 9-12 hours each day (Alloy Media & Marketing, 2009). While not all this time is dedicated to social networking sites, it does acknowledge that adults are spending a significant amount of time online. When active on social media, young adults are engaging with multiple websites and tend to be active on several different social media platforms. Those that use social media tend to use several different apps with about 70% reporting active use of at least three social networking sites (Primack et al., 2017). Of the many social media platforms available, Facebook is the most popular amongst adults with about 68% of social media users reporting active use of this website (Greenwood et al., 2016). This being said, Facebook has been declining in popularity (Keach, 2018) and use of particular social media platforms depend on a range of factors, including generational trends.

Research related to the effects of social media use amongst the general population has produced mixed results. Although some studies have found no relationship between online and in-person social network size (Pollet et al. 2011), a range of other studies have

highlighted both positive and negative associations. Most people report using social media to interact with familiar people and that online socialization allows them to supplement face-to-face interactions (Reich et al., 2012). Those that use social media to maintain their existing relationships have increased opportunities to strengthen their relationships in cyberspace. Recognizing the social opportunities that exist online, it makes sense that social media use has been associated with decreased loneliness (Deters & Mehl, 2013), increased awareness of one's social network (Hampton & Sessions, 2011), and improved feelings of social connectedness (Grieve et al., 2013). In addition to helping folks feel better about their social experiences, social media use has been associated with improved friendship quality amongst adults (Ledbetter et al., 2011). While there might be concern that increased online socialization may limit one's desire or opportunities for in-person interaction, it appears that social media may be creating *more* face-to-face opportunities. A study by Jacobsen & Forste (2011) highlighted a positive association between online and offline interactions, noting that for every increased hour of social networking participants experienced an increase of 10-15 minutes of face-to-face interaction.

While there are several benefits to online socialization, there are also several challenges and negative consequences that folks experience on social media, including online conflict and harassment. Specific difficulties include cyberbullying, online threats, and requests for personal information (Gómez-Puerta & Chiner, 2021). Previous studies of young adults have highlighted associations between increased time spent on social media and decreased well-being (Vannucci et al., 2017). Increased social media use has been positively associated with symptoms of depression and anxiety (Primack et al., 2017). In some cases, difficulties on social media can be devastating. For example, victims of cyberbullying are

twice as likely to attempt suicide than those who experience face-to-face bullying (Hinduja et al., 2009). While social media may be a useful tool for socializing, it is important to be mindful of the potential harmful effects.

Despite these challenges, social media use appears to be especially beneficial for certain individuals. A range of studies have explored the differential effects of social media use for folks with social vulnerabilities. Although social anxiety and introversion have been associated with less use of social media (Tian, 2011; Valkenburg and Peter, 2007), it has suggested that social media may be especially helpful for those with social challenges. Introverted adults report a preference for computer-mediated communication and note that online socialization reduces their shyness (Goby, 2006, Peter et al., 2005). Some describe social media as acting like a *social lubricant*, providing courage to those less socially comfortable. Shy adults report increased levels of perceived interpersonal competence during online interactions compared to face-to-face socialization (Stritzke et al., 2004). Compared to non-shy individuals, social media use amongst shy individuals has been associated with increased closeness, friendship quality, and perceived social support (Baker & Oswald, 2010). These findings suggest that social media may be a more comfortable and less threatening social environment for socially vulnerable individuals.

The literature related to differential effects of social media use is particularly relevant for autistic individuals who experience vulnerability with social communication and high rates of social anxiety (Spain et al., 2018). Given that autistic individuals typically experience difficulties with spoken communication, use of asynchronous computer-mediated socialization may be preferable and more accessible. Considering findings from the general population, social media may hold promise for supporting social motivation, increased social

interactions, maintenance and enrichment of existing relationships, and improved quality of life for autistic individuals.

Autism and Social Media

Autism is characterized by vulnerability with social communication and the presence of restricted and repetitive interests and behaviors (American Psychiatric Association, 2013). Autistic individuals often desire social relationships but experience challenges understanding or utilizing the skills necessary to build and maintain in-person relationships (Sterrett et al., 2017). To meet their interpersonal needs, autistic individuals are likely to explore online methods of socialization that might be better suited for their communication style. However, a dearth of research exists related to how autistic individuals engage with social media and navigate online interactions.

Research on social media use amongst autistic individuals is limited and has provided mixed findings. Given differences in social motivation and preferences, autistic adolescents are typically found engaging in solitary experiences, such as spending time on the computer and playing video games (Orsmond & Kuo, 2011). Autistic youth report spending significantly less time using social media than non-autistic peers (MacMullin et al. 2016; Mazurek & Wenstrup 2013). In a study of autistic adolescents, a majority reported (64.2%) engaging with non-social media (television, video games), while only 13.2% reported using the internet for social purposes such as email and chatting (Mazurek et al. 2012). The most common online activities for autistic adolescents include exploring websites (84%) and playing video games (78%), while only 23% prefer social networking sites (Kuo et al., 2014). This being said, social experiences vary across the autism spectrum and some presentations are more likely to engage online than others. In particular, autistic individuals with limited

verbal conversation abilities are less likely to use social media than those with spoken language (Mazurek et al. 2012). On the other hand, autistic females, Hispanics, and those with older age and higher cognitive abilities are more likely to have an affinity for social media use (Mazurek et al. 2012, Kuo et al., 2014). Recent studies have highlighted increased use of social media amongst autistic adults, including Mazurek (2013) who found that 79.6% of their sample used social networking sites for social connection. While autistic adults have been noted to use social media less than non-autistic peers (Gillespie-Lynch et al., 2014), a recent study of 102 autistic adults found that approximately 84% of their sample used social media (Ward et al., 2018). While research has demonstrated limited social media use amongst autistic individuals, online socialization appears to be increasing in popularity, particularly amongst those with older age, spoken language, and higher cognitive abilities.

Computer-mediated communication and online socialization appear to be more preferable and comfortable for autistic individuals. Noted preferences for social media include the fact that online communication does not rely on the same nonverbal social cues that are present in face-to-face interaction (Stendal et al., 2015). During live socialization, autistic individuals often have difficulty with efficiently decoding the flood of nonverbal and pragmatic communication messages and cues (i.e., eye-contact, gestures, intonation, and facial expressions) that often accompany verbal statements (Okdie et al., 2011). Processing social information can be difficult for autistic individuals due to challenges with efficiently processing social information (Hedvall et al., 2013). A benefit to computer-mediated communication is that response to online interactions usually has flexible timing, which allows users time to process information, consult if needed, draft and revise a response, and reply on their own time. Autistic individuals report that computer-mediated communication

offers them increased comprehension and control over interactions, giving them more time to think and practice interacting (Gillespie-Lynch et al., 2014). Social media allows individuals to communicate using diverse modes of expression (text, photo, video) and the pursuit of specialized and niche interests can be reinforcing. Autistic adults report leveraging their specialized interests to meet new people online and describe social media as beneficial and motivating (Gillespie-Lynch et al., 2014, Wang et al., 2020). Considering that autistic individuals enter adulthood with increased rates of isolation (Chamberlain et al., 2007), it is reasonable that autistic adults are using social media to maintain existing relationships and seek new friendships. Social media appears to be a more equitable and accessible modality of social communication for autistic adults.

Social media use is helping autistic individuals access more social opportunities which come with a range of benefits and challenges. Autistic adults that use social media report closer friendships, increased friendship quality, higher levels of happiness, and greater life satisfaction than those that do not socialize online (Mazurek et al., 2013; van Schalkwyk et al., 2017; Ward et al., 2018; McEwan et al., 2014). In addition to meeting others with similar interests (Wang et al., 2020), social media is often the primary space in which autistic individuals discover and participate in neurodiversity (Kapp et al., 2013). Autistic individuals report that socializing online allows them to be their true selves online (Gillespie-Lynch et al., 2014) and those who spend more time using social media are more likely to have close friends (Mazurek, 2013). Adolescents who are autistic that use social media to establish and maintain relationships report more positive friendships than those that do not – a relationship not experienced by non-autistic teens (van Schalkwyk et al., 2017). Taken altogether, autistic

individuals appear to be a unique subgroup that may benefit more from social media use than their less socially vulnerable peers.

While there are many benefits to increased social media use, navigating online socialization can be difficult. Social media offers opportunities to strengthen social relationships, however increased social media use puts autistic individuals at risk for the harmful consequences of online socialization such as internet addiction and cyberbullying (Gwynette et al., 2018). Effective social media use requires a range of unique social communication skills, including creating digital content, liking posts, using emojis, sending and accepting friend requests, following accounts, retweeting/reposting, and a range of evolving platform-specific features. While the execution and impact of these online social communication strategies may feel intuitive to some, autistic individuals may engage with these behaviors differently than the general population. Difficulty adhering to online social norms has been associated with higher rates of cyberbullying and online harassment (Patchin et al., 2006). Therefore, it is not surprising that autistic adults that use social media report increased anxiety, online harassment and drama, and concerns about privacy (Wang et al., 2020). Considering that those with in-person social vulnerability are more likely to engage in challenging behavior on social media (Milani et al., 2009), it is important to understand how to support autistic individuals with social media use.

Online Social Competence

Autistic individuals experience challenges with understanding, utilizing, and interpreting social skills. Since autistic individuals often face social rejection (Chamberlain et al., 2007), they often have fewer social opportunities. Limited social interactions and difficulty understanding social cues can make it challenging to develop *social competence*,

which is the mastery of social insight and social skills (Vernon et al., 2016). Although autistic social vulnerabilities can be attributed to their inherent neurodiversity, it is also understood that those with social challenges experience more difficulties due to the transactional nature of social development (e.g., Jones and Klin, 2009). Social competence is developed through reinforced social interactions where the individual establishes an understanding of appropriate socialization techniques within that context. For the general population, the accumulation of social interactions typically increases social awareness and use of social skills, which are critical for developing social competence. One's degree of social competency is important for safely and effectively navigating social interactions.

Social competency involves understanding which social skills are likely to elicit a desirable response within the context of a particular interaction. It requires awareness of social etiquette and expectations so that one's likelihood of peer acceptance is increased, and social rejection is reduced. When developing social competence, one typically learns that effective social communication depends on who and where the interaction is taking place. For example, while it may be appropriate to disclose personal information to a close friend, it may be less appropriate to share this information during a professional work meeting. While each individual has their own approach to abiding by social expectations, it is important that they are able to understand the consequences of their social behavior and utilize the skills that are likely to give them desired consequences. Most individuals develop social competence through trial and error and interpretation of their social feedback. However, autistic individuals often struggle with social awareness and experience difficulty understanding the social intent of others and which skills to utilize within certain contexts (Hanley et al, 2015). While differences in social competency amongst autistic individuals has

been well documented within in-person contexts, little is understood about social competency within online contexts, which will be referred to as *online social competence*.

Effective social media use requires a distinct set of social competencies that impact the consequences of online interactions. Social media involves navigating unique digital milieus that require understanding and utilization of a distinct set of computer-mediated communication and socialization strategies (Okdie et al., 2011). Skills typically required for fast-paced, rapidly unfolding in-person social interactions are less relevant online where communication is primarily exchanged asynchronously through posting and responding to text messages and multimedia (pictures and videos). Live in-person interactions depend on the ability to accurately and effectively decode the wealth of nonverbal cues and pragmatic information (i.e., eye-contact, gestures, intonation, and facial expressions) that often accompany each verbal statement. Messages exchanged online do not require these same skills. To achieve success on social media, individuals must learn to portray themselves desirably (relative to their milieu), converse using digital social communication strategies (including use of emojis, gifs, and memes), and understand the names and nuances of different online social actions, (i.e., “likes,” “retweets,” “friending” and “following”). While certain in-person social competencies may translate to online contexts, the discrepancy between in-person and digital social environments highlights the need for context-specific social skills and strategies (Mazurek, 2013). Given the challenges in social competence associated with autistic adults, these individuals are also likely to have difficulty with online social competence.

There exists limited research related to understanding the online social skills needed to successfully navigate social media. Bryant et al. (2012) interviewed college-aged adults

and identified 36 Facebook friendship “rules.” These guidelines were classified into five categories, including: communication channels, deception and control, relational maintenance, negative consequences for the self, and negative consequences for a friend. Specific rules clarified how to navigate the unspoken guidelines on posting etiquette, furthering relationships online, relationship maintenance, privacy, consequences of social media, and how to use specific Facebook features. Results from this study also emphasized that online social competence requires the ability to flexibly vary online behavior depending on the context. That is, people behave differently online depending on whether they are interacting with close friends, casual friends, or acquaintances. A literature review by Morgan et al. (2016) detailed important areas of online social skill development, including: having an appropriate online profile with appropriate content, introducing yourself to new people, responding to requests for personal information, associating with online groups, letting others know that you like them, responding to and refraining from cyberbullying, disagreeing with others, and understanding your audience (Barnes, 2006; Harman et al., 2005; Potter & Potter, 2001; Ducheneaut & Moore, 2005; Mitchell et al., 2009; Alapack et al., 2005; (Li, 2006; Privitera & Campbell, 2009; Boyd, 2008). Online behavior that has been demonstrated to bring peers closer together include posting updates, writing messages to friends’, commenting on others’ posts, sending private messages, offering support, and wishing peers happy birthday (McEwan et al., 2014). Social media behavior that may distance relationships, include oversharing, posting too frequently, tagging others in content they’re not in, and posting offensive content -- especially if related to politics or uncivil behavior (Pham et al., 2019). This literature establishes an emerging body of research related

to behaviors associated with online social competence and identifies social skills and strategies that have been noted to impact online interactions.

While the execution and impact of these online social communication strategies may feel intuitive to most, autistic individuals may engage with these behaviors differently. In particular, higher traits of autism have been associated with more inappropriate online behavior and social media use (Suzuki et al., 2021). Difficulty adhering to online social norms has been associated with higher rates of cyberbullying and online harassment (Patchin et al., 2006). Vulnerability with online social competence likely influences the increased risk of cyberbullying that autistic individuals face (Triantafyllopoulou et al., 2021). Given that individuals with in-person social skills challenges are also more likely to engage in socially inappropriate behavior online (Harman et al., 2005; Milani et al., 2009; Mitchell et al., 2009), this presents the need for targeted support for autistic individuals. To date, limited support exists related to developing social media skills. Although a few studies have explored social media interventions for youth with developmental disabilities (Grace et al., 2014), acquired disabilities (Raghavendra et al., 2013), and emotional and behavioral disorders (Morgan et al., 2016), no interventions have been developed for autistic individuals whose core vulnerabilities relate to differences in social approach. While some in-person social skills interventions, such as PEERS (Laugeson et al., 2015) and START (Vernon et al., 2018), address digital social communication (texting, video chatting, emailing, etc.) within their curriculum, specified support with social media use is limited. While it is possible that in-person social skills interventions may support more effective social media use, social skills are socially reinforced and context specific (Little et al., 2017) and therefore a social media specific intervention may be necessary. Considering that social skills group interventions

have been demonstrated to be effective at supporting the development of social competence for autistic individuals (Miller et al. 2014; National Autism Center 2009; Reichow et al. 2012; Vernon et al., 2016), this modality of support should be explored regarding social media use.

Development of the SELFI program

To address the gap in support and treatment regarding social media skills, Osuna et al. (under review) sought to develop a targeted social media skills intervention. This process included identifying behavior and skills in the literature that have been demonstrated to be effective at establishing relationships online. To understand specific socialization strategies, the research team consolidated the social media skills and goals that were described above, including the Facebook rules identified by Bryant & Marmo (2012) and the goals outlined by Morgan et al. (2016). These unspoken guidelines spanned a range of dimensions related to posting etiquette, relationship maintenance, and online privacy. Intervention development also emphasized supporting the development of social competence related to prosocial online behavior, including posting content, communicating with friends, leaving comments on others' posts, use of private messages, offering online support, and celebrating special occasions with peers (McEwan et al., 2014). Acknowledging that autistic individuals may have difficulty decoding which behaviors may have unintended consequences in certain contexts, the intervention also highlights behaviors to avoid, including oversharing, posting too much, tagging others in content they're not in, and posting offensive content (Pham et al., 2019).

In addition to identifying prosocial media behaviors and goals, intervention development included identifying strategies likely to support the development of social

media skills. Social skills interventions for autistic adults have utilized a variety of therapeutic techniques. Krasny et al. (2003) recommends that autistic social skills interventions include making abstract concepts more concrete, provide a predictable routine, organize participants by language ability, incorporate visual cues, use several modalities of communication, explain the purpose of social skills, support individualized goals, and encourage skill generalization through practice with multiple people across different contexts. Didactic lessons are another common component of social skills interventions for autistic individuals (Vernon et al., 2018, Laugeson et al., 2012; Webb et al., 2004; White et al., 2010), which involves systematic instruction to increase competency related to core social skills. Other effective components of group social skills interventions include individualized goal setting (Stahmer et al., 2011) and experiential learning (Kolb, 2014), which involves developing skills through authentic experiences followed by reflection on these interactions. These strategies provided a useful framework for supporting the development of online social competence within autistic adults.

To develop the piloted social media skills intervention program, Osuna et al. (under review) consolidated the social media goals and behaviors identified in the literature. The research team also brainstormed potential social situations that autistic individuals may need support with online (understanding when someone wants to be your friend). This process considered clinical experiences with autistic individuals who have sought support with social media use (i.e., responding to internet trolls). A final list of social media “rules” were then sorted into themes to develop an intervention curriculum. This process yielded eight lessons, including: Establishing an Online Presence, Respecting Others Online, Interpreting Online Social Intent, Responding to Others, Online Boundaries, Relationship Maintenance, Building

New Relationships, and Challenges, Consequences and Coping. Intervention materials (lesson plans and handouts) and procedures (didactic lessons and opportunities for experiential learning) were then developed in accordance with established in-person social skills interventions, using the Social Tools and Rules for Rules for Teens (START) program (Vernon et al., 2018) as a model. The final product included eight 50-minute intervention sessions that were organized to be delivered in order of most basic skills (setting up a social media profile) to more complex skills (making new friends online, dealing with online conflict). This intervention was called the Socialization, Education, and Learning For the Internet (SEIFI) program.

A small sample of six young autistic adult male participants (mean age = 23.7 years) participated in a single-case pre-post pilot study of the SEIFI program intended to evaluate the feasibility and acceptability of the social media skills intervention. These types of pilot studies serve as a “test run” of procedures to identify potential concerns and necessary modifications and to determine whether the intervention merits more rigorous testing (Czajkowski et al., 2015). Results from this test trial indicated preliminary feasibility and acceptability according to attendance, attrition, treatment fidelity, and participant experiences. All participants included in the pilot completed the SEIFI program and attended all eight intervention sessions. The intervention was delivered with high fidelity and the materials and procedures appeared feasible within the designated intervention structure. After completing the intervention, participants reported enjoying the intervention and believed that it helped them acquire skills related to social media. Additionally, most participants indicated that the program has helped them maintain their current in-person relationships over social media. Although not a primary objective of the study, participants demonstrated signals of

change regarding increased Facebook activity after participating in the SELFI program. From pre- to post-treatment, participants doubled their Facebook behavior from six actions to 12 actions per week. Noteworthy about increased Facebook activity is that gains were made in relation to both active (posting, commenting, adding friends) and passive behavior (liking and reacting to others' posted content). Although the frequency of Facebook behavior is not indicative of social success, social media posting has been linked to improved friendship quality (Subrahmanyam & Greenfield, 2008). While this data establishes preliminary evidence regarding the feasibility and acceptability of the SELFI program, its limited sample and methodological concerns limit generalizations that can be drawn from the data. Despite its limitations, this study established a foundation of promising intervention strategies to be refined and tested in future trials.

Delivery Format: Virtual Social Skills Groups

In addition to increased sample size and more rigorous methodology, further research is needed regarding whether the SELFI program can be delivered in virtual and group format. While individualized treatment delivery has been demonstrated to be an effective mode of social skills intervention for autistic individuals, group format is the most widely utilized approach to address social vulnerabilities in autistic individuals (McMahon et al. 2013). Structured social skills groups provide participants with a supportive environment that offers individuals the opportunity to practice their social skills with others. These interventions allow for interpersonal immersion and create opportunities for social acceptance, which are critical for the development of social competence (Vernon et al., 2018). Access to group social contexts is especially beneficial for autistic individuals since many experience peer rejection, which may reduce social motivation and limit social success (Rotheram-Fuller,

2010). Findings from meta-analyses of available social skills groups emphasize that participants demonstrate improvement in social competence after targeted intervention (Gates et al., 2017; Miller et al., 2014). In fact, a meta-analysis on social skills groups support the approach as an evidence-based practice (EBP) (Reichow and Volkmar, 2010). Recognizing the popularity and effectiveness of social skills groups, further research is needed to understand whether social media skills can also be effectively targeted in group settings.

Adaption of the SELFI program to a group format requires an understanding of group social skills intervention characteristics. Gates et al. (2017) highlight that there appears to be wide variation in the content, type, structure, and therapeutic targets of these programs. Some range from 2 weeks, while others span over the course of several years (Kamps et al., 2015; Lopata et al., 2010). There is also variability in session length, ranging from about 40 minutes to 2 hours (Miller et al., 2014). Information available regarding social skills groups suggests that 60-minute SELFI sessions over the course of eight-weeks may be an acceptable structure. Krasny et al. (2003) recommends that these groups include making abstract concepts more concrete, providing a predictable routine, organizing participants by language ability, incorporating visual cues, using several modalities of communication, explaining the purpose of social skills, individualized goals, and encouraging skill generalization through practice with multiple people across different contexts. These recommendations were incorporated into the redesign of the SELFI program for virtual group format, including use of visual and verbal cues (i.e. PowerPoints, videos, etc.), setting individualized treatment goals, and providing explicit descriptions as to why certain skills may have social benefit.

Many existing social skills group interventions utilize didactic lessons to address the social needs associated with autism (e.g., Webb et al. 2004; White et al. 2010). This approach depends on systematic instruction to increase competency related to core social skills, such as conversation skills, humor, perspective-taking, and empathy (Vernon et al., 2018, Laugeson et al., 2012, Ozonoff and Miller, 2015; Webb et al., 2004; White et al., 2010). These interventions typically involve follow-up opportunities to practice skills taught during lessons. Since the social strategies required for online success are often abstract or unknown, autistic individuals may benefit from explicit instruction related to these competencies. Therefore, didactic lessons were included in the redesigned intervention.

While didactic instruction has been demonstrated to be an effective approach to improving social competence, development of these skills requires opportunities for practice and constructive feedback. Understanding this, the use of non-autistic peers in socialization groups with autistic individuals has become increasingly popular (Watkins et al., 2015). Incorporation of peer mentors in the treatment process provides opportunities for modeling, teaching, and the evaluation of appropriate use of social skills. These peers also provide insight into the other's perspectives related to social behavior, which can be difficult for autistic adults (Happe, 2015). Having positive interactions with peers that are open, interested, and forgiving of social challenges may provide autistic individuals with positive social experiences that facilitate social confidence and competency (Chang & Locke, 2016). Overall, meta-analyses point to peer-mediated social skills interventions as an effective approach to supporting social development for autistic adults (Watkins et al., 2015; Zhang & Wheeler, 2011; Wang, Cui, & Parrila, 2011; Chan et al., 2009). Considering this evidence,

the redesigned group SELFI program included non-autistic peer mentors that provided social and intervention support.

Another effective component of group social skills interventions is experiential learning. This approach involves developing skills through authentic experiences followed by reflection on these interactions (Kolb, 2014). Engaging in this active learning process allows participants to experiment with social strategies in ways that would not be possible during typical didactic lessons. Research has demonstrated that experiential learning can be used to improve socialization and conversational competence (Baker et al., 2012) and continues to be a primary component of empirically supported social skills groups for autistic individuals (Vernon et al., 2016). Autistic adults appear to benefit from engaging in natural experiences with non-autistic peers, which helps facilitate the development of social skills. Recognizing the benefit of experiential learning on in-person social skills, the redesigned SELFI program included opportunities for experiential learning.

Present Study

The present study sought to investigate the preliminary acceptability, feasibility, and efficacy of the Socialization, Education, and Learning for the Internet (SELFI) program when delivered virtually in group format. Modification of the intervention included use of visual cues, didactic lessons, experiential learning, and the inclusion of non-autistic peer mentors. This study had the following aims 1) assess the feasibility of the SELFI program and study protocols 2) explore the acceptability of the SELFI program from the perspective of participants and peer mentors and 3) evaluate the preliminary efficacy of the SELFI program on social media behavior and individualized goals. Results from this study will inform the future of social media skills interventions for autistic individuals.

Method

Experimental Design

The present study utilized a pilot randomized control trial (RCT) with a waitlist-control condition to examine the redesigned SELFI program. The purpose of pilot studies is to assess the key feasibility characteristics of a planned research methodology prior to engaging in a larger study (Moore et al., 2011; Thabane et al, 2010). These studies serve as a “test run” of procedures to identify potential concerns and necessary modifications and to determine whether the intervention merits more rigorous testing (Czajkowski et al., 2015). RCTs are utilized to reduce bias and provide rigorous tools to examine the cause-and-effect relationships between an intervention and participant outcome (Hariton et al, 2018). This research design was used to examine the feasibility and acceptability of the SELFI program and to begin to explore treatment efficacy.

Participants

The mean age of all participants was 24.3 years ($SD = 5.91$). Eleven participants identified as White, five as Asian/Asian-American, four as Latino, one as Black/African American, one as Middle Eastern, one as Portuguese, one as Egyptian, and two as multi-racial. Regarding highest academic attainment, two had some high school education, 10 had a high school education, 11 had some college experience, two had college degrees, and one obtained a graduate degree. Participants were generally low-income with 16 reporting making less than \$25,000, five between \$25,000 - \$49,000, one between \$75,000 - \$99,000, three between \$100,000 - \$149,000, and one over \$150,000. Twenty-three reported being single, two were in a committed relationship, and one was married. The average years of social media experience was 7.04 years ($SD = 5.37$). All participants reported using

Facebook. Other reported social media platforms included: Instagram (7), snapchat (6), Pinterest (6), TikTok (4), and Meetup (1). See Table 1 for a summary of participant demographic characteristics.

Table 1. *Participant Demographic Characteristics*

Variable	Treatment (n= 13)				Waitlist (n=13)			
	<i>n</i>	%	<i>Mean</i>	<i>(SD)</i>	<i>n</i>	%	<i>Mean</i>	<i>(SD)</i>
Female	3	23%			4	31%		
Male	10	77%			9	69%		
Age (years)			24.77	6.95			23.92	4.90
KBIT-2 Verbal Score			88.8	11.8			88.3	8.4
Ethnicity								
White	6	46.1%			5	38.5%		
African American/Black	0				1	7.7%		
Asian American/Asian	1	7.7%			4	30.8%		
Hispanic/Latino(a)	2	15.4%			3	23%		
Multiracial	2	15.4%			0			
Other	2	15.4%			0			
Education								
Graduate Degree	1	7.7%			0			
College Degree	1	7.7%			1	7.7%		
Some College	5	38.5%			6	46.1%		
GED	6	46.1%			6	46.1%		
Income								
Less than \$25K	8	61.5%			8	61.5%		
\$25K-\$49K	2	15.4%			3	23%		
\$75K-\$99K	1	7.7%			0			
\$100K-\$149K	1	7.7%			2	15.4%		
\$150K+	1	7.7%			0			
Relationship Status								

Single	11	84.6%	12	92.3%
Relationship	1	7.7%	1	7.7%
Married	1	7.7%	0	

Procedure

Peer Mentor Recruitment and Training

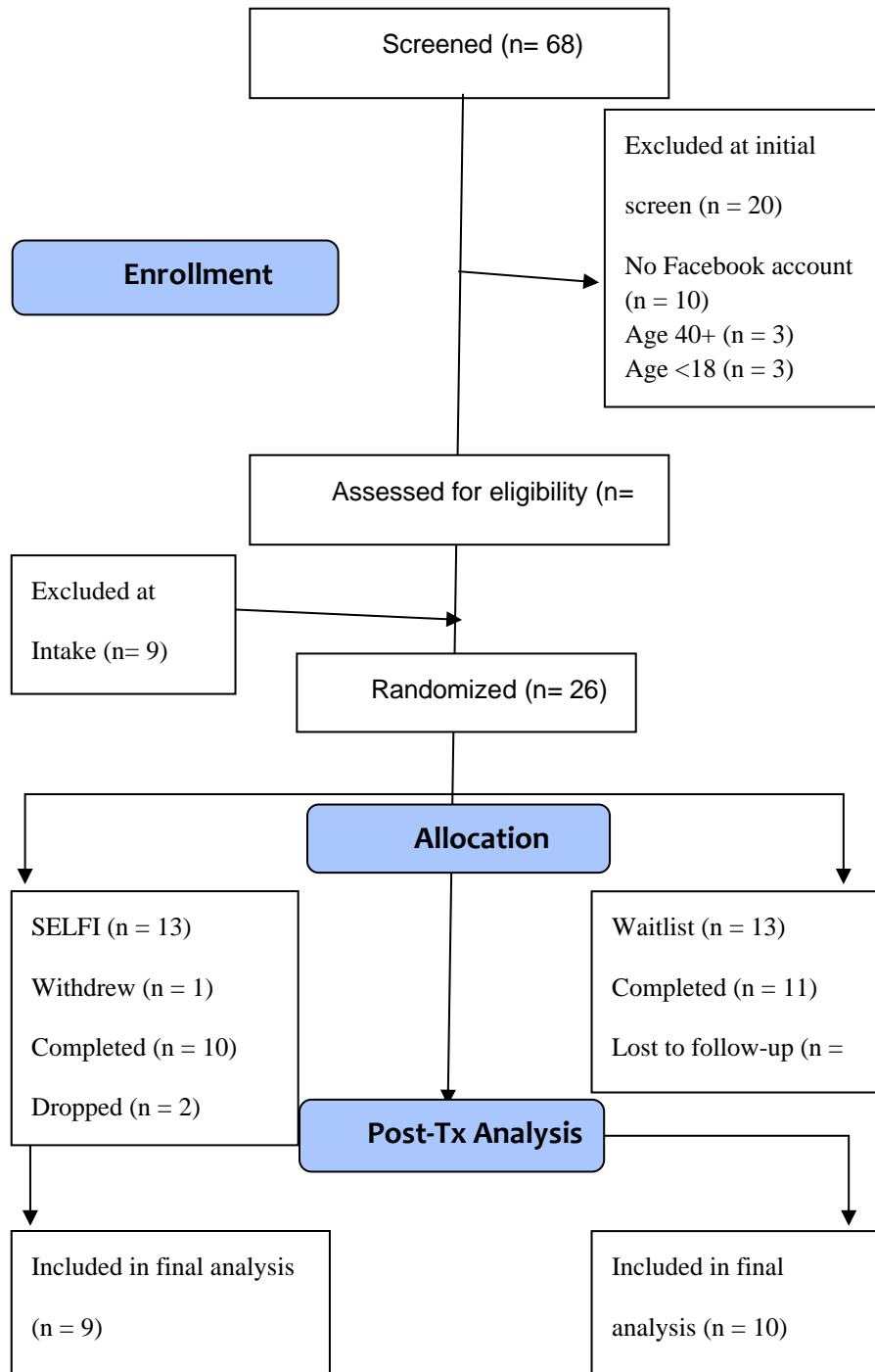
To support the SELFI program, undergraduate research assistants were recruited to serve as peer mentors. All SELFI peer mentors were recruited through a peer mentorship program intended to support autistic adults that was already established at the university’s autism center. SELFI peer mentors were recruited from this source due to these students having previous training, experience, and supervision related to providing peer support to autistic adults. Qualifications to participate in the established peer mentorship program included training related to confidentiality, boundaries, autism in adulthood, and peer-mediated techniques to improve outcomes for autistic adults. Peer mentorship training was conducted by a licensed clinical psychologist and doctoral students in clinical psychology, including the principal investigator. This process of training peer mentors will be used as a model for future SELFI peer mentor training. Training specific to the SELFI program included an additional 2-hour orientation to review the objectives of the intervention, outline of the curriculum and intervention strategies, and coordination of peer mentorship assignments (treatment vs. waitlist, mentee match, availability for specific groups).

Participant Recruitment

A recruitment goal of 24 participants was chosen in consideration of Julious (2005), who recommends that pilot studies attempt to include at least 12 participants per treatment group to assess differences on continuous variables. Participant recruitment for the SELFI

program was entirely digital. A recruitment email was circulated and included a description of the study, virtual flier, and link to an online survey which was used to screen participants for initial eligibility. The flier was made on Canva.com and was free to create (Appendix 1). The online survey included the following questions: email, name, phone number, date of birth, school and year (if applicable), documented diagnosis of autism spectrum disorder, treatment Facebook account, location (for scheduling purposes). All individuals that passed the initial screen within the recruitment window were contacted for an intake session. The recruitment period closed after the target goal of 24 was reached. See Figure 1 for a CONSORT flow diagram detailing recruitment, enrollment, and completion numbers.

Figure 1. SELFI CONSORT Flow Diagram



Intake Session

Individuals that passed the initial screen were contacted via phone (1st method), text (2nd method), or email (3rd method) to schedule an intake session. All participants that completed intakes within the recruitment period were eligible for inclusion. The intake session took place virtually over Zoom with a trained research assistant. During this process, participants provided informed consent verbally and in writing using an online form. Intake also consisted of completing the verbal subtests of the KBIT-2 to assess verbal language ability. Standard scores were calculated after the intake and a verbal cutoff of 70 was used to determine eligibility. Participants were called and informed whether they met inclusion criteria. Those that did not qualify for the study were emailed an online resource for social support.

In addition to determining eligibility criteria, participants completed intake measures. This process consisted of an online questionnaire including demographic questions. Participants also provided a 7-day sample of their Facebook behavior using a feature native to the website called *Download Your Information* (<https://www.facebook.com/dyi>). To upload this data, participants were asked to use this feature to request a download of their last 7-days of activity, excluding private messages. After requesting this download from Facebook, a zip file was created and available for download by the user after a few hours. Participants were asked to email this zipped file to the research team prior to randomization. These Facebook data files were then transferred to a secure, encrypted Box cloud digital storage service for subsequent analysis.

Participant Characterization Measures

Kaufman Brief Intelligence Test Second Edition. Cognitive ability was assessed using the verbal scale of the KBIT-2; (Kaufman & Kaufman, 2005). The KBIT-2 is a brief cognitive assessment that takes about 30-45 minutes to administer. The verbal scale of the KBIT-2 consists of two subtests, Verbal Knowledge and Riddles. Psychometric estimates place internal reliability for the Verbal scale at 0.91 and a test-retest reliability ranging from .88-.89 (Kaufman & Kaufman, 2005). The KBIT-2 was administered virtually over Zoom. Administration modifications included presenting participants with scanned images via screen share for the Verbal Knowledge subtest instead of using an easel. The Riddles subtest is presented verbally, and items can be repeated, therefore no modifications were needed.

Group Randomization

Qualifying participants were randomly assigned using stratified random sampling due to control for gender differences between the two conditions. This method was chosen due to its ability to produce balanced gendered samples across treatment groups (Kim et al, 2014). Three females were randomized to the treatment condition while four were assigned to the waitlist. Ten males were randomized to the treatment condition while nine were assigned to the waitlist.

Group Scheduling

After randomization, participants were contacted to identify preference for group times. Meeting times needed to be considerate of participants in different time zones and variable schedules. Based on availability, participants were divided into three groups of three or four. One participant could not attend any weekly meeting times and withdrew prior to the start of the program.

The SELFI Program

Program Overview. The SELFI program consisted of eight 60-minute weekly sessions that followed an established curriculum related to common topics related to online socialization. All sessions took place over Zoom and utilized breakout rooms for peer mentorship. Intervention components were based on empirically based strategies for social media skill acquisition. All participants completed the same group curriculum; however, peer mentors were used to integrate individualized support regarding self-identified goals. Session format was adapted using a format similar to the START program (Vernon et al. 2018), a peer-mediated social skills group intervention for autistic individuals. Each session consisted of a check-in with peer mentors, group video discussion, didactic topic discussion, practice activity, and check-out. Practice activities utilized experiential learning using instruction, modeling, rehearsal, and feedback (Leaf et al. 2015). Group “homework assignments” were announced at the end of each group and were discussed during check-outs to explore potential areas of further skill development. Homework completion was not formally tracked and was primarily used to encourage practice between sessions. Participants were encouraged to keep their cameras on during sessions but were allowed to turn them off if they preferred. Groups consisted of 3-4 participants, one group facilitator, and two peer mentors. Peer mentors were undergraduate students. The group facilitator was the principal investigator, a graduate student in clinical psychology.

Pre-Group Meeting. Group facilitators and peer mentors met for 1-hour prior to each SELFI meeting to review session material. Peer mentors were emailed a copy of the lesson plan prior to each session. Pre-group meetings consisted of screensharing a copy of the lesson slides and reviewing the group presentation. Examples were brainstormed by peer

mentors and an outline was made regarding the moderation of the virtual discussion. This meeting was also used for supervision and support related to peer mentorship.

Intervention Materials. Each session utilized three main pieces of material: weekly lesson plan, presentation slide deck, and lesson handout. These materials were developed by the principal investigator and shared with peer mentors prior to each session. Each lesson plan contained an in-depth overview of the weekly curriculum including detailed social media “rules,” check-in prompts, background information regarding social media use, suggestions for administration, discussion prompts, links to videos, considerations for autistic adults, and instructions for practice activities. See Appendix 2 for an example SELFI lesson plan. A presentation slide deck was prepared to guide the didactic lesson. All required intervention components were included in the slides and presented using screen share to support adherence to treatment protocol and to provide participants with visual cues. Lesson plans and slides were intended only for administration use and were not shared with participants. Participants were emailed a lesson handout with a summary of main points after each session. See Appendix 3 for an example lesson handout.

Peer Mentor Assignment. Each participant was assigned to a peer mentor who provided them with personalized support throughout the intervention. To control group size, one peer mentor was assigned to support two participants. Peer mentorship assignment was consistent throughout the program. If peer mentors were absent, the group facilitator stepped in and supported check-ins, practice activities, and check-out. This process was chosen to reduce the introduction of new facilitators? to the group throughout the course of treatment.

Check-in. The first 5 minutes of the group were dedicated to a check-in between participants and peer mentor. This check-in took place in a Zoom breakout room. These brief

check-ins provided an opportunity to build rapport, discuss personalized social media experiences, and review homework objectives from the previous week. A discussion of perceived difficulties and successes took place. Participants were also primed for the upcoming lesson and encouraged to brainstorm and share relevant experiences.

Video Discussion. Ten minutes was dedicated to a video discussion related to the weekly lesson. Each weekly topic discussion included an online video (pulled from YouTube, BuzzFeed, Ellen, etc.) that was chosen to provide a casual introduction to group material. Videos were reviewed for inappropriate imagery and language. Each video was about 2-5 minutes in length and the remaining time was devoted to group discussion.

Interactive Topic Discussion. Video discussion was followed by a 30-minute interactive topic discussion regarding the weekly topic. Before discussing new material, a slide was presented outlining the previous week's lesson for review. The topic discussion included presenting slides with social media "rules" related to safe and effective social media use. Each lesson had 3 main highlights related to the topic. Each "rule" had three sub-points that provided guidance regarding skill use. For example, Rule #1 of Establishing an Online Presence states "Treat your social media account like a friendship resume." This rule was followed by Rule 1.1 (project yourself honestly and authentically), Rule 1.2 (be intentional about what you share), and 1.3 (remove information that may make you look bad). In addition to presenting social media "rules," the group facilitator encouraged participants to ask questions and provide examples of appropriate and inappropriate skill use. Peer mentors were also invited to provide examples but were encouraged to wait until participants had a chance to respond first. An outline of key points and sample scripts was used to guide group discussions. See Table 2 for an outline of the eight piloted SELFI lessons.

Table 2*Weekly SELFI Lessons*

Week	Topic	Description
1	Establishing an Online Presence	Establishing an appropriate online presence that reflects authentic self, maintains safety, and encourage friendships with other users
2	Being a Good Internet Friend	Discussing tips and strategies on how to be a good internet friend through social media engagement, respectful actions, and posts that are mindful of oneself and others
3	Engaging with Different Types of Internet Friends	Understanding nuances of different social media relationships and how to uniquely engage, knowing who to follow and friend, and learning the degrees of social media intimacy
4	Responding Online	Detailing unique social media communication strategies for knowing when and how to respond to others in ways that are safe and advance the development of friendships
5	Challenges, Consequences, and Coping	Outlining potential challenges online, understanding consequences from online behavior that can be translated to the real world, and offering appropriate coping strategies to help manage unique social media stressors
6	Relationship Maintenance	Detailing how to use social media as a tool to maintain relationships that were established in-person
7	Making New Friends Online	Providing tips and strategies regarding how to navigate relationships initiated, maintained, and that exist entirely online
8	Romance and Online Dating	Exploring the unique social communication strategies used to navigate romance and dating online while recognizing the diverse experiences in sex, gender, and sexuality

Practice Activity. Ten minutes was dedicated to allowing participants to apply the related skill using practice activities. These activities took place within breakout rooms with peer mentors. Peer mentors were encouraged to participate in experiential activities to model and scaffold skill use. Peer mentors provided in-vivo feedback when participants were willing to share their screen during activity. Participants returned to the main group for

activity debriefing prior to check-out. Practice activities and lessons were tested with research assistants for social validity and ease of administration prior to use.

Check-Out. The final 5 minutes of each session consisted of a check-out session between participants and peer mentors. Participants used this time to discuss their group experiences and shared how they will practice their identified target skill. Peer mentors also reminded participants of the weekly homework assignment and to attend the next week's group.

Post-group Debrief. After each group, the group facilitator and peer mentor dedicated time for a debrief session, typically lasting 15-30 minutes. This time was used to discuss any challenges and successes within the group. Peer mentors were also encouraged to provide feedback for future sessions.

SELFI Graduation and Post-Group Data Collection

After the completion of the eight-week SELFI program, participants were invited to attend a SELFI graduation. This graduation took place one week following the completion of the final SELFI lesson. The graduation ceremony took place over Zoom and only included group participants, peer mentors, and the group facilitator. This final meeting was intended to serve as a celebration of intervention completion and to collect post-intervention data. Prior to graduation ceremonies, participants and peer mentors were put into breakout rooms to complete the post-group data collection process, including exit surveys, and providing another 7-day sample of Facebook activity. Graduation activities included a game overviews the completed SELFI program (SELFI Jeopardy), an award ceremony where peer mentors provided individualized acknowledgement to each participant, and time for participants to add each other on social media if they desired.

Waitlist Treatment Condition

All participants assigned to the waitlist condition were contacted to provide another 7-day sample of their Facebook behavior after an eight-week waiting period. These participants were then offered the opportunity to enroll in the SELFI program to ensure all participants were offered access to the experimental social media educational curriculum.

Measures

Feasibility Measures

Recruitment. Information was collected from recruitment using an online screening questionnaire that recorded participant interest and preliminary study criteria. Data was also recorded from the research team regarding recruitment efforts, including agencies that were sent emails, listservs that were contacted, and Facebook pages that were posted on. To characterize the resulting sample characteristics, descriptive statistics were calculated for age and verbal standard scores on the KBIT-2. Independent-samples t-tests were used to assess group differences related to these variables.

Attendance. Group facilitators recorded weekly attendance and dropout from the eight-week SELFI program. Participants were called and reminded to attend if they were not present within the first 5 minutes of the session. Attendance was calculated by dividing the total number of attended sessions by the total number of total possible sessions attended by participants who completed the intervention.

Fidelity. All SELFI sessions were recorded and 20% were reviewed by research assistants for treatment fidelity. Fidelity training was led by the principal investigator and included a thorough review of the curriculum and use of fidelity checklists containing outlines of the specific events that should have occurred during each treatment session. The

research assistants selected “yes” if the event happened during the session and “no” if it was omitted. Practice fidelity took place over two weeks and included reviewing 20% of recorded videos and reaching 100% interrater reliability with the primary investigator. Discrepancies in training were resolved before research assistants scored 20% of remaining videos for fidelity. Fidelity was calculated by dividing the number of successfully delivered intervention components by the number of specific events that should have occurred during each treatment session. This calculation produced a percentage of fidelity met.

Acceptability Measures

Attrition. Study attrition included participants who dropped from the program, were lost to follow-up, or did not provide exit data. When possible, participants were contacted to understand the reason for attrition, however not all participants could be reached for explanation. Attrition was calculated by dividing the number of lost participants by the total number that enrolled in the study.

Participant Feedback Survey. A feedback survey was administered to participants after completion of the 8-week SELFI program. The survey was administered online and took approximately 30 minutes to complete. Survey questions asked participants to rate their experience on a 5-point scale ranging from (1 = strongly disagree, 2 = somewhat disagree, 3 = neither agree nor disagree, 4 = somewhat agree, and 5 = strongly agree). Survey questions that required Likert scale responses were analyzed by calculating the mean of each item. Open-ended questions were asked to collect data regarding the acceptability of intervention materials and procedures. Open-ended questions were summarized and grouped into themes that emerged from the data.

Rating questions included:

- I enjoyed participating in this program
- I learned new skills by participating in this program
- I am more active on social media because of this program
- I feel more confident online because of this program
- This program has helped me feel more safe online
- I have used the skills discussed in this program during my online interactions
- This program has helped me maintain my current relationships using social media
- This program has helped me make new friends online
- This program has helped me feel more comfortable navigating romance online
- This program helped me work on my individual social media goals
- I am satisfied with my participation in this program

Open-ended questions included:

- What aspect of this program did you find most helpful? (check-ins, group discussion, PowerPoint, handouts, practice activities, peer mentors, etc.)
- What was your favorite part of the program?
- What part of this program was your least favorite?
- Are there any topics that we didn't discuss in the program that you think would be helpful to include in the future?
- What suggestions do you have for improving this program in the future?

Peer Mentor Feedback Survey. A feedback survey was provided to peer mentors who supported the delivery of the SELFI program. This survey was anonymous and intended to gain feedback from critical end-users of the program. Survey questions asked peer mentors

to rate their experience on a 5-point scale ranging from (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree). Rating questions included:

- I enjoyed being a social media mentor with SELFI
- I think my participants benefited from the intervention

Open-ended questions were asked to collect data regarding intervention materials and procedures. These questions included:

- What aspects did you like about the program and being a social media mentor?
- What aspects did you dislike about the program and being a social media mentor?
- What strategies did you use that you found most effective with your participants?

Treatment Efficacy Measures

Participants submitted 7-day samples of their Facebook activity using a downloadable file native to the platform. This file contained data related to participant behavior, including posts, likes, and comments. Participants were instructed to select an option excluding personal messages so that this private data was not shared. These Facebook files presented static information that could not be manipulated afterward. This data was collected at pre-intervention and post-intervention for both treatment conditions.

Facebook Behavior Frequency. Analysis of Facebook activity differentiated between two types of social media use, *active* and *passive* behavior. This distinction was made in line with the suggestion of Verduyn et al. (2020) who found that the two behaviors yield different effects on social wellbeing. *Passive* Facebook use refers to the monitoring of other people's lives by viewing their content and profiles. *Active* Facebook refers to interactions between users in a private or public setting (comments, posts, messages). Two research assistants unfamiliar with participant treatment conditions reviewed Facebook data

and coded for frequency of behaviors. Likes and reactions were coded as passive behavior and posts and comments were coded as active behavior. Since the purpose of pilot studies is to gather preliminary efficacy data to inform future fully-powered RCT, a mixed ANOVA was not used due to a limited sample. Independent-samples t-tests were run to assess mean group differences of active and passive Facebook behavior at intake. Paired-samples t-tests were run to determine if there were differences in the frequency of active and passive Facebook behavior across timepoints. Participants with frequency data greater than 2 standard deviations were considered outliers and excluded from analysis.

Facebook Improvement Ratings. To assess improvements in online social competency, the Facebook behavior of participants was rated for perceived level of improvement. To do this, an online survey was created containing the Facebook behavior of each participant. Each page of the survey presented screenshot images of the likes, comments, and posts of each participant before and after the eight-week trial. To control for participants who had high frequencies of certain Facebook behavior, total frequencies were reported at the top of each presented dataset, however only a maximum of 10 likes, 10 comments, and 10 posts were displayed since the focus was on the overall level of improvement, rather than quantity of specific actions. Within the survey, all data were randomly presented and counterbalanced.

Research assistants masked to the study's hypotheses and participant conditions were used to review intake and post social media activity and provide improvement ratings. Raters provided an improvement rating for each participant using a 7-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = neither agree nor disagree, 5 = somewhat agree, 6 = agree, 7 = strongly agree). To obtain a diverse range of perspectives

regarding perceptions of social media improvement, a total of three autistic males, three autistic females, three non-autistic males, and three non-autistic females provided improvement ratings. This process was chosen so that the autistic perspective of social media improvement was weighted as equally as the non-autistic raters. The mean age of all raters was 23.1 years. The mean improvement score of each participant was calculated using the scores of all 12 raters. Independent-samples t-tests were run to determine if there were differences in improvement ratings across treatment and waitlist conditions.

Individual Goals. Treatment participants were asked to identify individualized treatment goals from a list, including: feeling confident on social media, maintaining relationships on social media, building an online presence/personality, understanding boundaries of social media, monitoring/up keeping of online presence, utilizing privacy online, choosing appropriate content to post, using social media to strengthen offline friendships, understanding drawbacks and dangers of social media, navigating online romance and dating. Participants rated their level of difficulty related to their goal on a scale from 1 to 7 (1 – Very Easy, 2 – Easy, 3 – Somewhat Easy, 4 – Neutral, 5 – Somewhat Difficult, 6- Difficult, 7- Very Difficult) before and after the intervention. Participants identified an individualized treatment goal and rated their level of difficulty achieving this goal on a scale from 1 (very easy) to 7 (very difficult) at pre- and post-treatment. The frequency of specific individualized goals are reported. A paired-samples t-test was used to compare level of difficulty at pre- and post-treatment.

Results

Treatment Feasibility

Recruitment

A total of 86 individuals and agencies were sent a study recruitment email from a dedicated study email account. The cultivated list of email addresses was inclusive of relevant agencies throughout the United States, including autism centers, university disability services programs, university departments, regional centers, autism-related agencies, hospitals, learning centers, providers of autism services, and other autism research labs and institutions. Emails were also circulated on six listservs including the university's autism center, Tri Counties Regional Center, and other community agencies (i.e., Holding Hands, an adaptive skills program for adults). Advertisement material was also posted on 24 different Facebook groups relevant to autism, including support groups and self-advocate groups. All interested participants needed to complete the online survey to be considered for inclusion.

A total of 68 individuals completed the online interest form. As interested individuals completed the online survey, the principal investigator reviewed all entries for age, location, and autistic self-identification, and Facebook use. Individuals were disqualified from eligibility if they were older than 40 years, were younger than 18 years, were not in the United States, were non-autistic, or did not use Facebook. Individuals who met initial criteria were called by the principal investigator to schedule an intake. Intakes were scheduled until the recruitment goal of 24 was met. Those who did not meet criteria were called to inform them that they did not meet criteria to be included in the present study. Of the 68 that were screened, 20 total were ineligible due to the following reasons: no Facebook account (10), age 40+ years (3), age <18 years (3), outside the U.S. (1), and non-autistic (3). Of the 48 who passed the initial screen, 10 could not be reached within three attempts to schedule an intake. Three individuals were contacted to schedule an intake but withdrew interest. Intakes were conducted with 35 interested autistic adults to review informed consent and assess verbal

ability using the KBIT-2. Eight participants who completed intakes fell below the verbal ability cutoff and were referred to alternative resources. Twenty-seven participants met study inclusion criteria before the recruitment period was closed. All 27 were considered for randomization, however one fully eligible participant withdrew prior to randomization when called to discuss potential group session times. Twenty-six participants were randomized. Recruitment remained open for 30 days. See Figure 1 (above) for an outline of recruitment and screening efforts.

Thirteen participants were randomized to the SELFI (treatment) group, and 13 were randomized to the waitlist control group. Average age was not significantly different ($t(24) = 0.35, p = .72$) between treatment ($M = 24.77, SD = 6.95$) and waitlist participant groups ($M = 23.92, SD = 4.90$). Verbal standard scores were also not significantly different ($t(24) = .115, p = .91$) between treatment ($M = 88.77, SD = 11.79$) and waitlist groups ($M = 88.31, SD = 8.42$).

Attendance

Regarding attendance, six of the nine participants in the treatment condition attended all eight sessions. Two participants missed one session and one participant missed three sessions. The mean attendance rate for all nine participants that completed the course of treatment was 93%.

Fidelity

Adherence to weekly session protocol (percentage of completed objectives) was at 100% for the four reviewed recordings. All intended treatment objectives were completed within these sessions.

Treatment Acceptability

Attrition

Of the 26 participants that enrolled in the study, seven were lost to attrition. One participant in the active condition withdrew from the study prior to starting the course of treatment due to work conflict that limited his ability to attend weekly group meetings. Of the twelve treatment participants that initiated group treatment, two dropped out after week 4 of the program. One participant cited a work conflict and the other cited social anxiety. Ten participants remained in the study throughout the entire 8-week program, however one participant in the treatment group did not attend the graduation in which exit data was collected. Therefore, his data were not included in the final analysis. A total of nine participants in the treatment condition provided pre- and post-intervention data. Of the 13 participants assigned to the waitlist condition, three participants were lost to follow-up and could not be reached for post-waitlist data collection. A total of 10 participants in the waitlist condition provided pre- and post-intervention data. In total, 19 of the 26 randomized participants (73%) completed all study protocols and were included in the final analysis. Total attrition from the study was 27%.

Participant Feedback Survey

The mean rating (1 = strongly disagree, 3 = neither agree nor disagree, and 5 = strongly agree) for program enjoyment was 3.88 (SD = 1.75). The mean rating for learned new skills was 4.11 (SD = 1.85), and 3.22 (SD = 1.41) for being more active on social media. The mean rating for feeling more confident online was 4.0 (SD = 1.60) and 3.44 (SD = 1.59) for feeling safer online. The mean rating for using skills discussed in the program was 3.88 (SD = 1.55) and 3.22 (SD = 1.64) for helping maintain current relationships. The mean rating for making new friends online was 3.33 (SD = 1.66) and 3.11 (SD = 1.19) for helping

increase comfort with online romance. The mean rating for supporting individual social media goals was 3.77 (SD = 1.75) and overall treatment satisfaction was 3.88 (SD = 1.49).

Regarding the most helpful aspects of the program, three participants noted the PowerPoint presentations and one noted the handouts as most beneficial. One participant specified that the PowerPoint slides “provided a visual of the different things that we were learning.” Two listed the group discussion as most helpful while one noted “socializing.” One participant found peer mentorship most helpful, and specified their peer mentor in the response. One participant found opportunities to practice as most helpful while one listed “learning.”

Participants noted a range of favorite components of the program. Three participants described learning how to be more active on social media as their favorite. Two participants listed specific lessons, including “Being a Good Internet Friend” and “Romance and Online Dating.” Participants enjoyed the visual aides, including videos and powerpoints, and having group members share their experiences. One participant noted that their favorite part was going out into breakout rooms with peer mentors and working on activities together. Regarding least favorite aspects, two participants noted frustration with study procedures related to data collection. One participant described filling out the exit survey as their least favorite while one participant disliked needing to submit Facebook data. One participant described difficulty processing all of the information all at once.

For topics that weren’t discussed in the program but should be included in the future, participants would like support regarding scheduling time to use social media within the scope of his other responsibilities. This participant noted understanding the components of social media but having difficulty implementing his social media goals due to time

constraints. Another participant reported that future programs should include support related to small talk within chat messages. He noted being long-winded within chat and having difficulty with non-formal communication, stating:

“Everything I say even in quick messages is almost worded as if it's a business message, which isn't necessarily bad but occasionally I get super casually worded messages with a lot of emojis and things and I don't exactly know the best response.”

Suggestions for future programs included the inclusion of an anonymous discussion forum where “you can participate in discussions anonymously and don't have to fear repercussions.” Another suggestion was to include a longer program so that more topics could be explored or expanded upon and the inclusion of more videos for discussion. The main feedback regarding research procedures was to shorten the survey and focus less on Facebook.

Peer Mentor Feedback Survey

The mean rating (1 = strongly disagree, 3 = neither agree nor disagree, and 5 = strongly agree) for enjoying the program as a peer mentor was (4.83). The mean rating for thinking that their mentee benefited from the intervention was (4.83). Six peer mentors noted enjoying building a relationship with their mentee within breakout rooms. Regarding dislikes, two participants noted inconsistent participant attendance as a least favorite aspect. One peer mentor disliked the limited interaction between mentees and mentors. One peer mentor would have liked to have practiced using the skills on a variety of social media platforms.

For most effective strategies, peer mentors described establishing rapport and building a relationship with their mentee. Descriptions of effective rapport building

approaches included: casual check-ins, inviting mentees to share about their unique online presence, checking in regarding preferred and non-preferred lessons, asking mentees to identify things they learned within each session, and “not pushing an agenda onto them.” Peer mentors reported sharing personal experiences and summarizing the lesson in the breakout rooms, which allowed them to catch up on information that might have been missed. During breakout activities, they invited participants to share their screen so that they could get individualized feedback. There were several suggestions for improving the SELFI program, including adding “think, pair, share” activities, making more use of the chat function within sessions, encouraging participants to share by calling on them one by one to share and elaborate if they feel comfortable, and including more about a range of social media platforms.

Treatment Efficacy

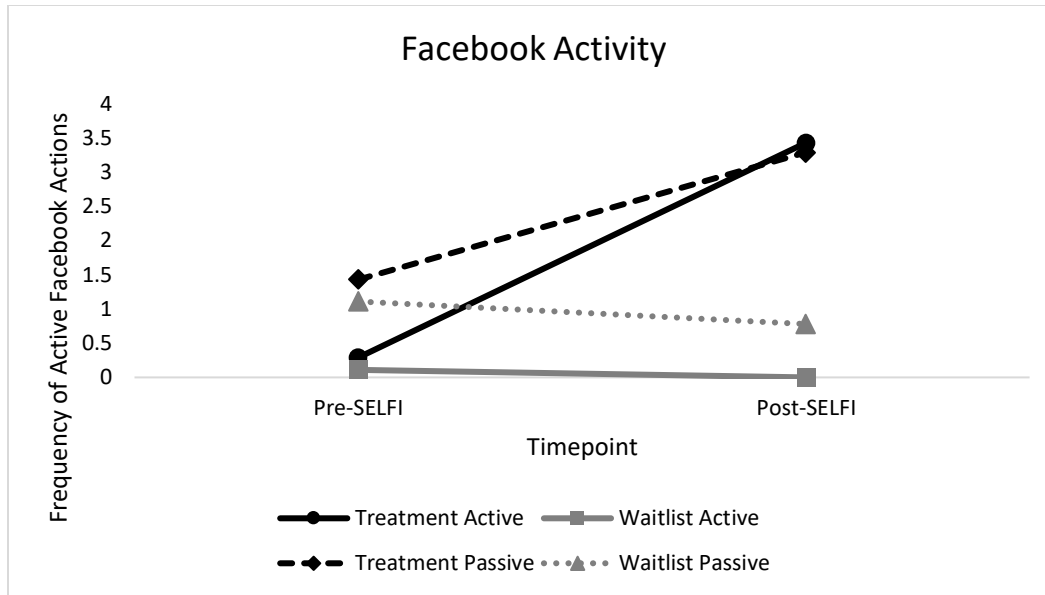
Facebook Behavior Frequency

There were nine treatments and 10 waitlist participants included in the final analysis. The Facebook data of three participants were excluded from analysis due to being outliers greater than 2 standard deviations from the mean. Two participants (one in each condition) had over 60 passive behaviors at intake, while one participant in the treatment condition had over 1300 passive behaviors at exit. Final analysis of Facebook frequencies included 7 treatment participants and 9 waitlist participants. An independent-samples t-test was run to determine if there were differences in active and passive Facebook behaviors at pre-intervention. Assumptions of normal distribution were violated for certain variables; however, analysis was continued due to t-tests being robust to deviations from normality and other tests being inappropriate for the present analysis.

Pre-intervention *Active* Facebook behavior was not significantly different ($t(10.14) = 0.81, p = .43$) between treatment participants ($M = 0.29, SD = 0.48$) and waitlist participants ($M = 0.11, SD = 0.33$). Similarly, pre-intervention *Passive* Facebook behavior was not significantly different ($t(12.12) = 0.17, p = .86$) between treatment participants ($M = 1.43, SD = 3.78$) and waitlist participants ($M = 1.11, SD = 3.33$).

A paired-samples t-test was used to determine whether there was a statistically significant mean difference between the frequency of *Active* and *Passive* Facebook after completion of the trial. Participants in the treatment condition engaged in more *Active* Facebook behavior ($M = 3.43, SD = 4.82$) at exit than at intake ($M = 0.29, SD = 0.48$), a non-significant trending mean increase of 3.14, $t(6) = 1.63, p = .07, d = 0.61$. Treatment participants also engaged in more *Passive* Facebook behavior ($M = 3.29, SD = 3.86$) at exit than at intake ($M = 1.43, SD = 3.78$), a non-significant trending mean increase of 1.85, $t(6) = 1.09, p = 0.15, d = 0.41$. Participants in the waitlist condition engaged in about the same frequency of *Active* Facebook behavior ($M = 0.11, SD = 0.33$) at exit than at intake ($M = 0.00, SD = 0.00$), a non-significant decrease of 0.11, $t(8) = -1.0, p = .17, d = -0.33$. Waitlist participants engaged in about the same frequency of *Passive* Facebook behavior ($M = 0.78, SD = 1.98$) at exit than at intake ($M = 1.11, SD = 3.33$), a non-significant decrease of 0.33, $t(8) = -0.26, p = 0.40, d = -0.08$. The treatment group experienced changes associated with small to medium effects across both *Active* ($d = 0.41$) and *Passive* ($d = 0.61$) Facebook behavior. These data are depicted in Figure 2.

Figure 2. *Frequency of Facebook Behavior*



Facebook Improvement Ratings

There were nine treatment participants and 10 waitlist participants included in the final analysis. An independent-samples t-test was run to determine if there were differences in Facebook improvement between treatment and waitlist conditions. There were no outliers in the data, as assessed by inspection of a boxplot. Improvement scores for each were normally distributed for the treatment condition ($p = .03$) but not for the waitlist condition ($p = .15$) as assessed by Shapiro-Wilk's test. There was no homogeneity of variances, as assessed by Levene's test for equality of variances ($p = .01$). Facebook improvement ratings were higher for the treatment condition ($M = 4.69$, $SD = 1.60$) than the waitlist condition ($M = 3.28$, $SD = 0.72$), a statistically significant difference, $M = 1.40$, 95% CI [0.11, 2.68], $t(10.85) = 2.40$, $p = .035$, $d = 1.14$. The treatment group experienced improvement scores associated with a large effect size ($d = 1.14$).

Individual Goals

At pre-intervention, four participants identified an individualized goal related to maintaining an online presence, three identified online romance and dating, one identified

maintaining relationships, and one identified feeling confident on social media. Seven treatment participants recorded both pre- and post- data related to individual goals. Two participants had missing data at post-treatment. A paired-samples t-test was used to determine whether there was a difference between difficulty with individualized goals at pre- and post-treatment. There were no outliers in the data, as assessed by inspection of a boxplot. The assumption of normality was not violated, as assessed by Shapiro-Wilk's test ($p = .711$). Participants rated their goals as significantly less challenging at post-treatment ($M = 2.85$, $SD = 1.57$) compared to pre-treatment ($M = 5.78$, $SD = 1.14$), a statistically significant mean decrease of 2.92 points 95% CI [1.37, 4.53], $t(6) = 4.44$, $p = .004$, $d = 1.68$. The treatment group experienced decreased challenges associated with a large effect size ($d = 1.68$).

Discussion

The present study used a randomized controlled trial to pilot the redesigned virtual group SELFI program with autistic adults to explore preliminary feasibility, acceptability, and efficacy. Intervention feasibility was assessed through exploration of recruitment, attendance, and fidelity of delivery. Intervention acceptability was assessed through attrition and using feedback from participants and peer mentors in the program. Treatment efficacy explored the impact of the intervention on the frequency of Facebook activity, perception of improved Facebook behavior, and progress toward individualized goals. Results from this pilot study support the redesigned SELFI program as feasible as demonstrated by adequate recruitment, high attendance, and high fidelity of treatment delivery. Findings also support the acceptability of the piloted SELFI program as demonstrated by limited attrition, high treatment satisfaction, and positive feedback from participants and peer mentors. Although limited by a small sample size, findings from the RCT provide preliminary support for the

efficacy of the SELFI program as evidenced by improvements in Facebook use, a reduction in difficulty related to individualized goals, and trending increases in Facebook activity compared to a waitlist control condition. These results establish a foundation of evidence supporting the SELFI program as a promising intervention to support social media use in autistic adults. The implications of these findings on future studies and iterations of the SELFI program are discussed below.

Feasibility

The main purpose of feasibility studies is to explore one main question, “can it work?” (Orsmond & Cohn, 2015). While interest from clinical patients and a preliminary pilot (Osuna, in prep) informed the pursuit of a social media skills group intervention, the level of interest from autistic adults outside the research team’s clinical network was limited. Considering the novelty of this study, there were important questions related to methods of soliciting participants, recruitment timeline, and the resulting sample characteristics. Since all study components were conducted remotely, an emphasis was placed on advertisement via email and social media. This process was used with the understanding that internet use was a prerequisite for study participation and that solicitation online would increase the likelihood of identifying the desired target population.

The recruitment process started off by compiling a list of agencies and individuals related to supporting autistic adults. Since recruitment emails are sometimes not responded to, sent to invalided addresses, or unclear regarding distribution to the intended audience, a broad and comprehensive list of sources was considered. Sources of solicitation included autism centers, university offices of disability and accessibility services, university departments, hospitals, learning academies, community clinics, adult education providers,

and support networks. Regarding social media solicitation, a decision was made to focus recruitment efforts on posting in targeted Facebook groups due to use of this platform being an inclusion criteria. Most emails and Facebook advertisements were posted within the first week of recruitment with sustained efforts to identify new sources of recruitment. A total of 68 interested individuals completed the interest form within a month of active recruitment, indicating that these targeted efforts are feasible for recruiting autistic adults to participate in this type of study. However, it must be noted that only about 40% of screened individuals ended up being completely eligible for inclusion. Of the 35 who passed the initial screening and were provided intakes, about 77% met full eligibility criteria and were enrolled in the study. These findings highlight the benefit of using an online screener since ineligible individuals were able to be excluded without requiring any significant resources (research staff). Therefore, these recruitment and screening efforts appear feasible for recruitment of a virtual social skills group. Unfortunately, data was not collected regarding sources of recruitment, which would be helpful to include in future studies for an understanding of successful sources of referral.

Regarding the recruitment timeline, it was estimated that recruitment would take approximately two months to complete, however expectations were flexible considering limited experience and literature related to completely remote intervention studies for autistic individuals. Once recruitment opened, the interest survey received consistent responses and intakes were scheduled for the next several weeks. Flexible timing was important for scheduling intakes since participants often had variable school and work schedules and sometimes relied on others (parents, siblings, etc.) to coordinate meetings for them. Multiple research assistants were trained in providing informed consent and the virtual administration

of the KBIT-2 verbal subtests so that there was flexibility regarding participant scheduling needs. During this process, it was important that all individuals that were scheduled for an intake had the opportunity to participate in the study if eligible. Because of this, scheduled intakes were still honored even after new intakes were discontinued from being scheduled, resulting in 27 fully eligible participants. The entire recruitment process spanned 30 days, which was faster than expected.

Considering the novel approach to recruiting using these methods, it was important to understand the characteristics of the recruited sample. Although detailed data were not collected from screened participants, the included sample's mean age (24.3 years) skewed toward the younger end of the study's age range of 18-40 years. Interest from younger participants for social media support should not be surprising considering generational differences in overall social media use. Although there is variability regarding adherence to generational trends in social media use, Generation X (aged around 40-60 years) have been noted to use less Facebook than Millennials (aged 25-40 years) (Fietkiewicz et al., 2016). Facebook use has also been trending downward for Generation Z (aged 10-25 years) with many in this age group showing preference for newer platforms like Snapchat and Instagram (Criteo, 2017). It appears that the present version of SELFI that prioritized Facebook use may be feasible for recruiting the desired age range for this study. There was also interest from a few adolescents and adults older than 40, which indicates that a SELFI program for different age groups may be warranted. Similarly, there was interest in this study from individuals with verbal abilities that fell below the inclusion cutoff, which indicates that a SELFI program for individuals with intellectual disabilities may also be needed. While the piloted recruitment strategy demonstrated feasibility for recruiting the desired sample for this study,

more research is needed to understand the feasibility of recruitment participants with different characteristics (autistic adolescents, older autistic adults, non-Facebook users, autistics with intellectual disabilities).

Most participants that completed the study attended all eight sessions of the intervention. Although attendance was high, one issue with treatment feasibility was the consequence of dropouts on group size. When initiating this study, the objective was to include 6 participants per group, in congruence with related social skills groups for autistic adults (Vernon et al., 2018). While this group size was preferable, the present study found it challenging to coordinate 2 times that worked for all 13 participants due to variances in work, school, and time zone. In consideration of participant schedules, three group times were chosen, two in the evening (Tuesdays at 4pm and 5:30pm PST) and one in the afternoon (Wednesdays at 1pm PST). Participants were assigned a specific group meeting to attend but were offered flexibility if there were changes to their schedule. After scheduling challenges were resolved, four participants were assigned to the 4pm group, four to the 5:30pm group, and five to the 1pm group. One participant dropped from the 5:30pm group (work conflict) but was replaced by a participant in the 1pm group due to school scheduling – resulting in group sizes of four, three, and five. While unbalanced participants did not alter the program's delivery across groups, it was challenging when participants were absent or dropped from smaller groups. For example, when two participants were absent from the 5:30pm sessions, the “group” discussion was limited to the two? participants, peer mentors, and group facilitators. Once these participants officially dropped from the study, the remaining participants needed to be reassigned to the 4pm group to accommodate for the desired group-component of the interventions. Feedback from peer mentors described participant absences

as a challenging aspect of the program that made it difficult to establish rapport. While findings from participant attendance indicate feasibility, adaptations to group size may help increase treatment acceptability so that individual absences are less clinically impactful. Data related to participant tardiness was not collected, however it would have shed light on the feasibility of independently attending virtual social groups on time. Since several participants needed to be called due to being late to the session, it is unclear how scaffolding impacted these findings. Therefore, future studies should explore larger group sizes (6-8 per group) due to potential absences and collection of more nuanced data regarding attendance.

Considering the novelty of the virtual social media skills group intervention format, another important question of treatment feasibility related to the fidelity of delivery. This aim assessed whether the intended intervention could be reliably delivered within expectation. Treatment fidelity was met at 100% which means that sessions were consistently delivered in accordance with the treatment plan. Although there should be skepticism regarding the ability to consistently provide fidelity at 100% across the course of a study, these results make sense considering that all intended treatment components were included within the lesson slides that were shared on the screen during intervention sessions. The lesson slides served as a visual aide to prompt the group facilitator and peer mentors to discuss certain lesson points, share planned videos, and engage in practice activities. Noteworthy about fidelity was that none of the lessons went overtime or needed to be cut short without completing any intended procedures. It appears that the outlined strategies and curriculum can be delivered within the 60-minute session with consistency. Taken altogether, these data provide strong support for the feasibility of the present intervention study.

Acceptability

In addition to “can it be done,” it was important to assess the social validity of the piloted protocols. Social validity refers to decisions regarding the social importance of the intervention. According to Wolf (1978) social validity encompasses three levels 1) objectives of the treatment must be socially significant in which desired outcomes are important and pertinent 2) treatment procedures must be deemed as socially appropriate and 3) effects of the treatment should have clinical significance. Social validity research has primarily focused on an area of research known as treatment *acceptability*, which Kazdin (1980) defines as “judgments of treatments by actual or potential consumers of treatments, such as nonprofessionals, clients, laypersons, and others.” To assess the acceptability of the piloted SELFI program, the present study analyzed study attrition and feedback from participants (potential consumers) and peer mentors (non-professionals). Feedback related to acceptability provides valuable information for further refinement of the SELFI program and future studies.

The remote nature of the study made study attrition a critical question to address regarding study acceptability. Of the 26 participants that enrolled in the study, seven were lost at various points of the process. It is important to note that not all circumstances around attrition are equal and that different conclusions can be drawn from each lost case regarding feasibility. Three participants in the waitlist condition were lost to follow-up, which is to be expected in RCT’s that require participants to wait several months before initiating an advertised treatment. Executing this study during the COVID-19 pandemic made scheduling weekly sessions with participants who worked in-person jobs especially challenging due to the variable nature of working conditions. One dropped participant was assigned to the treatment group but could not attend any sessions due to a variable work schedule. This

participant expressed a strong desire to receive support with social media use and was offered the opportunity to receive the SELFI lessons in 1:1 format. This participant was very motivated to receive social media support and attended all eight offered individualized sessions. Considering this data, this case of attrition appears to be related to study procedures (scheduling) rather than intervention components. Two treatment participants dropped throughout the course of treatment. Each occurred after week 4 (Responding to Others) of the program with one participant citing work conflict and another citing social anxiety. The participant who dropped out due to work conflict showed up late to two of the four lessons attended and needed to be called and reminded to attend sessions. After being a no-show for the fifth and sixth sessions, this participant indicated that he could not continue with the study due to consistent work conflict. The participant with social anxiety attended three of the first four sessions. The one absence was reportedly due to illness. After being a no-show to the fourth and fifth sessions, this participant expressed no longer wanting to participate due to feeling uncomfortable talking about her social media experiences within group contexts. These data indicate that the study procedures and piloted intervention may be less acceptable for participants with variable work schedules that make it difficult to attend a consistent weekly meeting and those with anxiety related to group participation. More research is needed to understand if there were any elements of the study or intervention that influenced dropout, including the possibility of week 4 (i.e., the specific lesson, length of the program) being particularly unfeasible or undesirable.

One participant was lost to attrition after attending all eight weekly sessions but failing to participate in the post-treatment data collection process. This participant demonstrated consistent challenges independently initiating and participating in intervention

procedures and fell on the lower end of the verbal ability cutoff (Verbal standard score = 74). This participant was late to every session and needed a phone call to be reminded to attend group meetings. His phone calls were often answered by his sister who helped coordinate his appointments and set up Zoom for him. Within sessions, this participant often had difficulty following-along with the fast-paced verbally-loaded lesson and appeared to struggle understanding complex concepts. After being a no-show to the graduation ceremony, the research team made three unsuccessful attempts at contacting this participant to gather post-treatment data. Related to participant factors, the piloted study protocols may be less acceptable for autistic adults with lower cognitive abilities. Although little is known about the social media use of autistic adults with intellectual and developmental disabilities (IDD), support workers of adults with IDD report that those in their care face challenges related to cyberbullying, online threats, and requests for personal information (Gomez-Puerta & Chiner, 2021). They also express concern about the lack of training regarding internet safety. While autistic adults with lower cognitive abilities need support with social media use, different approaches may be needed for SELFI to be feasible for use with this population. Future studies of the SELFI program should explore a redesign that considers the needs and perspectives of autistic adults with IDD.

Another important aspect of establishing the acceptability of a novel social program is making it enjoyable. An emphasis was placed on establishing rapport with participants and providing an environment that was fun and supportive of participant needs. To make the program more entertaining, pop culture videos from YouTube, like Ellen and BuzzFeed, were incorporated into lessons and were chosen for being informative and interesting. Didactic lessons framed social media “rules” in relatable ways and provided personal examples that

were intended to make lessons more memorable. Participants were encouraged to ask questions and share personal experiences during lessons so that varied perspectives were considered throughout the intervention. To mainstream the flow of discussion and to vet appropriate examples, the group facilitator and peer mentors brainstormed and outlined a plan during the pre-group meetings. This preparation ensured that peer mentors weren't competing for time and that they were always prepared to contribute to the discussion if participants did not respond to any prompt. Practice activities were also intended to be enjoyable while also facilitating experiential learning. Activities included updating profile information, going on Facebook, and adding friends from past experiences (i.e., former classmates, teammates, distant relatives), and joining online groups (Facebook, reddit, etc.). These practice activities were done in breakout rooms with peer mentors to increase privacy and leverage the therapeutic relationship to facilitate participation. Peer mentors were encouraged to share their screen and participate in the activity themselves and invited participants to also share their screen if they wanted support. These efforts likely contributed to the overall acceptability of the SELFI program with feedback from participants (3.88/5) and peer mentors (4.83/5) supporting the intervention as being mostly enjoyable and participants indicating a high level of treatment satisfaction (3.88/5).

Participants were surveyed to understand acceptable and unacceptable aspects of the research protocol. One commonly cited aspect of acceptable treatment elements was the inclusion of visual aids, such as slide desks (PowerPoints), videos, and handouts. Participants expressed that screensharing the slides provided a visual cue that outlined the didactic lesson and helped organize the points that were made within lessons. Considering that visual cues are a common learning accommodation requested by autistic students (Gillespie-Lynch et al.,

2017), delivering intervention material using computer-mediated communication tools, such as screen sharing slides, should be considered acceptable components of virtual social skills interventions. Several participants expressed content with peer mentorship and engaging in practice activities in breakout rooms.

Regarding unfavorable aspects of the study, one participant reported annoyance with the exit survey, likely due to its length. Upon reflection, it was likely frustrating to have to complete a lengthy survey prior to the “graduation” session. Future studies should prioritize brief measures that do not exhaust, bore, or annoy participants. Another participant noted discomfort with providing samples of Facebook data. Recognizing the discomfort that participants may feel sharing personal social media data, alternative treatment outcomes should be explored that do not require providing samples of social media behavior, including self-report measures. Moving away from Facebook as a target platform would open the intervention to other types of social media platforms and increase acceptability from autistic individuals who may not use Facebook.

Suggestions to improve the acceptability of future studies of the SELFI program include discussion of other factors impacting social media use (i.e., time management) and adding content to support small talk within chat conversations. Since not all participants may feel comfortable sharing aloud or publicly in the Zoom chat, the addition of an anonymous discussion forum should be explored. Furthermore, while the eight-week SELFI program appears feasible and acceptable, there may be demand or benefit to a longer program in which more topics could be explored in-depth. Regarding the dosage of elements, the SELFI program may benefit from more videos and increased interaction between participants and peer mentors. Overall, these data highlight significant promise regarding the acceptability of

the piloted SELFI program and study protocols, however further refinement is needed for future research.

Treatment Efficacy

The final research question involved evaluating the efficacy of the SELFI program, which meant investigating whether it was effective at improving online social competence. To be frank, deciding on treatment outcomes for a social media skills intervention was challenging because it required an assessment of social validity. Considering the limited research on social media skills interventions and that most autism social skills interventions focus on behavioral outcomes (i.e., conversation skills; Vernon et al, 2018) there wasn't an obvious outcome measure to choose from. Previous social media research have explored a range of outcomes including time spent online (Mazurek et al., 2012), number of online friends (Mazurek, 2013), time spent on social media sites (Mazurek, 2013), and number of social media apps used (Sallafranque-St-Louis, 2017). While those outcomes provide data related to social media use, they are not the most socially valid measures of online social competence. Therefore, more socially valid outcomes of online social competence were explored.

The process of selecting treatment outcomes required a deeper understanding of *social competence*, which can be further broken down into the mastery of *social insight* and *social skills* (Vernon et al. 2016). Social insight involves an understanding of underlying principles that influence positive social interactions and relates to *social cognition*, which is the ability to make sense of the social world through feedback from others (Frith, 2007). Social cognition encompasses several complex processes, including face processing (Farroni et al., 2005), joint attention (Carpenter et al., 1998), empathy and theory of mind (Schurz,

2021), problem-solving skills (Rubin & Krasnor, 2014), and executive functioning (Blakemore & Choudhury, 2006). Social skills relate to concrete behaviors that are utilized in the appropriate context and time to promote a successful interaction (Bellini et al. 2007). Social skills encompass a range of behavior including making good impressions, asking questions, and making comments in conversation, showing interest, choosing relevant topics for discussion, expressing empathy, complimenting others, respectfully disagreeing, understanding and using appropriate humor and sarcasm, and having social courage (Vernon, 2018). With this framework of social competence in mind, *online social competence* must involve *online social insight* (ability to understand the underlying principles of online socialization) and *online social skills* (concrete online behaviors that influence desired social consequences). Since SELFI was designed as a social media *skills* intervention, an emphasis was placed on exploring outcomes related to relevant online behavior.

After narrowing the lens of efficacy outcomes to online social skills, the next step involved identifying appropriate behavior to assess. This was challenging because the execution and consequences of social media behavior vary dramatically across platforms. For example, how does a *share* on Facebook compare to a *retweet* on Twitter? What about posting a video to TikTok vs. sharing a photo on Instagram? So much regarding social media behavior depends on the context and not all online social behavior are equal in weight and consequence. Recognizing the variability of social media behavior across platforms, it was important to standardize the data collection process. While it was understood that participants would likely use several social media websites (Greenwood et al., 2016), Facebook was chosen as the target platform it offered a reliable collection of social media behavior.

The next step in this process included identifying which Facebook behavior would be relevant to study. A few considerations were to explore quantitative measures of social engagement, including number of likes, comments, and friends. While these measures may be relevant to certain users, they were not considered valid indicators of online social competence since these values can be influenced by factors other than online social competence. For example, the number of Facebook *likes* that a certain post receives can be impacted by the user's number of friends, time of posting, privacy settings, use of bots or inflationary tools, or going viral. Therefore, it was important to focus our attention on the use of specific social media behaviors, rather than Facebook's gamified system of measuring attention. Social media behavior can broadly be classified into either *producing* or *consuming content*, which Verduyn et al. (2020) operationalize as *active* and *passive* behavior. As outlined in the literature review, there are specific active and passive social media behaviors that are more and less supportive of cultivating relationships. Since a reliable chronological log of executed likes/reactions, comments, and posts are accessible through Facebook, these behaviors served as viable treatment outcomes to be coded and explored as measures of online social competence.

Results from this study indicate that SELFI was not effective at significantly increasing either active or passive Facebook behavior. This being said, statistical significance should not be expected from an analysis of 16 participants, which did not have the sample size to yield the statistical power needed to observe small group differences. While statistical significance was not met, increases in Facebook activity for the treatment condition were trending in a positive direction and there may be clinical significance to subtle increases in Facebook activity. After completing the SELFI program, treatment participants increased

their *active* and *passive* Facebook behavior from almost no activity to a few actions per week. A similar increase was not observed by the waitlist group, which experienced limited change in active behavior without targeted support. Since active and passive Facebook behavior serves as a proxy for online social engagement, these findings indicate that participants were having a few more social media interactions after completing the SELFI program. To socialize online, it takes more than just having a social media account to develop friendships – you must be socially active. By increasing social engagement with peers, participants may have more opportunities to develop and maintain social relationships, which may lead to more positive social outcomes (Vernon et al., 2012). Noteworthy about these treatment outcomes is that the effect sizes of these differences are considered small to medium, indicating practical significance regarding increases in Facebook activity. This data is promising regarding the potential efficacy of the SELFI program and establishes a foundation of data for future research.

Since effective social media use depends on more than just the frequency of certain behaviors, an attempt was made to assess the effect of the SELFI program on the participant's overall level of online social competence. Much of the consequence of social media behavior depends on the overall presence of the account's activity. Just like how the impact of in-person social interactions rely on the integration of several skills (eye contact, gesture use, conversation skills, tone of voice, etc.), online interactions are influenced by the combination of several online social factors (overall activity, type of posted content, online presence, etc.). Similar to finding a behavioral treatment outcome, it was difficult assessing the most appropriate approach to assessing improvements in online social competency. This process was challenging because it required making judgments regarding what may be

considered “effective” and “ineffective” social media behavior and needed extrapolations about the potential perception and effect of Facebook activity. The initial research plan was to assess participant Facebook behavior on the level of perceived “appropriateness” and “desirability.” This plan also considered collecting social media data from a non-autistic sample to assess how participants in the SELFI program used Facebook in comparison to their non-autistic peers – essentially using non-autistic social media use as the standard of desirable. While these outcomes were considered as possibilities, increased awareness and research into neurodiversity suggested that judgment of autistic behavior based on non-autistic standards may be unintentionally harmful toward efforts of inclusion by “other-ing” alternative approaches to social communication. These approaches to data analysis proved to be controversial since judgments of appropriate and inappropriate behavior can be at odds with the neurodiversity movement (Schuck et al., 2021). Therefore, alternative treatment outcomes were considered.

An alternative approach to assessing online social competence included comparing each participants' pre- and post-treatment behavior for overall level of improvement. This method was considered more inclusive of individual differences because it used the individual's pre-study self as a post-study comparison, as opposed to another frame of reference (i.e., non-autistic peers). Assessing the level of *improvement* was considered less-stigmatizing than evaluating for *appropriateness* or *desirable* behavior and shifted the frame of reference to increasing online social competence rather than increasing social conformity. It was important that assessments of improvement included both autistic and non-autistic raters so that effective social media behavior was considered from diverse perspectives. To be inclusive of varied approaches to social media behavior, an even ratio of male and female

autistic and non-autistic research assistants were recruited to be raters. This process was determined by the research team to be a more inclusive approach to assessing improvements in overall online social competency.

Outcomes from Facebook improvement ratings support the SELFI program as being efficacious for improving social media use. Participants in the active treatment condition demonstrated a modest improvement in Facebook behavior, reflective of increased online social competence. Participants in the waitlist condition got slightly worse, despite presumably knowing that their Facebook activity would be observed again and could have altered their behavior in anticipation. Use of an RCT design allows for the extrapolation that it was participation in the SELFI program that increased Facebook improvement, rather than simply enrolling in the study or being mindful of social media use. These findings are meaningful because they indicate that the SELFI program was effective at increasing social competence, which aligns with the intention of the intervention. Noteworthy about the increase in Facebook improvement is that the effect size of this difference is considered high, which supports the SELFI program as having a potentially significant impact on online social competence. It is also important to note the clinical implications of these data. From a practical standpoint, it is socially significant that treatment participants exhibited an improvement score trending in the positive direction. Considering the increase in active and passive Facebook behavior for the treatment condition, and the relatively unchanged behavior of active and passive behavior for the waitlist, overall Facebook activity likely impacted these ratings. However, considering that the differences in frequencies between active and waitlist groups was not statistically significant, there are likely other factors that impacted perceptions of improvements in Facebook use. While it may be concerning that

participants in the waitlist condition demonstrated a reduction in improvement ratings, this change should not be considered a regression in online social competence. Facebook behavior and the overall impact of our social media presence varies between weeks, especially without targeted support. These findings reflect an overall improvement in online social competence and establish preliminary efficacy regarding the SELFI program, however more research is needed to understand the impact of certain social media behavior on improvement ratings. Future research should also collect follow-up data to assess if the impact of the SELFI program on online social competence persists.

In addition to assessing overall improvements in online social competence, it was important to understand if participants demonstrated improvement toward their individualized goals. Considering the range of purposes for using social media, the SELFI program sought to support participants with their personalized challenges. At the beginning of the intervention, participants identified a personalized goal and rated their level of difficulty. These goals were not intentionally targeted within the SELFI intervention, but were considered by peer mentors when supporting participants within breakout rooms and during practice activities. Considering this broad approach to supporting personalized needs, it is exciting that participants demonstrated a reduction of challenges. These findings recognize the benefit of peer mentors and collaborative goal setting, which are evidence-based approaches (Costa et al., 2017). The effect size of this change is considered high, indicating that participants experienced a practical reduction of challenges related to their personalized needs. Focusing on individualized goals is more aligned with the values of neurodiversity and acknowledges the importance of client-centered approaches to treatment. While standardized behavioral outcomes provide valuable data related to social competency,

improvement toward individualized goals is clinically relevant and should be valued within intervention programs. Supplementing these findings with results from Facebook improvement ratings provide a promising base of evidence supporting the efficacy of the SELFI program.

Implications

The present research has several implications and contributes novel findings to the body of literature. First, this study expands on previous research related to social skills interventions by specifically targeting social media use, which has been under-addressed within established intervention programs. There is a strong body of research that supports in-person social skills and these programs tend to be popular and effective (Spain & Blainey, 2015). While in-person social skills programs have been widely researched, this study is one of the first to explore a social media skills group intervention for autistic adults with online delivery. Considering that online socialization is a common component of modern socialization and that there are benefits and challenges to increased social media use (Primack et al., 2017), it is important that programs exist that specifically support online socialization. In addition to specifically targeting social media skills, this study expands on previous work related to social skills interventions by exploring the feasibility and acceptability of delivering virtual group interventions to autistic adults. Since offering services over telehealth has been associated with increased access to intervention (Sutherland et al, 2018), the redesigned SELFI program may be more accessible for autistic adults – especially those with lower resources and more barriers to treatment. This study provides a useful framework for future virtual social skills group interventions.

Findings from this study also provide implications regarding potential treatment outcomes for social media skills interventions. Being one of the first studies of online social competence, this pilot explored three potential treatment outcomes including the frequency of certain prosocial online behavior, perceived level of improvement, and progress toward individualized goals. Each treatment outcome offered unique insight into the social media use of participants, which provides relevant data regarding online social competence. Use of a randomized controlled trial allowed for the exploration of treatment efficacy which yielded promising results regarding improvements in online social competence. Despite the study's limited sample size, treatment outcomes demonstrated promising results that may hold clinical significance regarding increased social engagement. This study is one of the first to establish behavioral treatment outcomes for social media use after participation in a targeted intervention. The implications of this study will become increasingly relevant as the study of online socialization expands.

This study also addresses a significant gap in research and treatment regarding autistic adults who have typically been under-studied and underserved. With increased rates of individuals being diagnosed with autism, it is critical that appropriate social support exists throughout the lifespan. Considering that the rise in autism prevalence can be partially attributed to increased identification of autistic adults and those with at least average cognitive abilities (Baio, 2014), there's an increased urgency to support the unique needs of those with this presentation. While there has been a significant body of literature dedicated to developing interventions for autistic children, very little has been done regarding interventions for those with older age. The SELFI program holds promise regarding supporting the unique needs of autistic adults, who remain under-supported.

Limitations and Future Directions

The present study has several limitations that should be acknowledged. First, the study included a small sample size that limited statistical power and the ability to generalize findings. Adequate group sizes are needed when comparing group differences in an RCT and due to attrition and outliers, results related to treatment outcomes should be considered with caution. Data was lost due to several reasons, which reduced the number of participants included in the analysis. In addition to expected attrition due to participant dropout, additional data was lost due to errors in data collection at post-treatment (individual goals) and excluding extreme outliers (Facebook frequency). Considering the pilot nature of this study, it was expected that these analyses would be underpowered and the lack of statistically significant results is not surprising. Future studies should include a larger sample size to further explore treatment efficacy.

In addition to a small sample size, this sample is also limited due to only including a specific presentation of autistic adults. First, most of the sample identified as male and all participants identified with binary genders (male/female). Of the 26 that initially enrolled in the study, only seven identified as female and none identified as non-gender-conforming. Although an approximate ratio of 4:1 should be expected for samples of autistic individuals (Loomes et al., 2017), females and non-gender conforming folks often have unique approaches and needs regarding online socialization (Zheng et al., 2016). Since autistic individuals are more likely to identify as trans or non-binary (Warrier et al., 2020), it is important that social skills interventions include gender diverse samples and understand unique gender demands regarding social media use. Considering that females are more likely than their male counterparts to experience riskier online interactions (Padilla-Walker et al.,

2010), incidences of cyberbullying (Wang et al. 2019), cyberstalking (Reyns et al., 2018) and unwanted sexual solicitation (Baumgartner et al., 2010), specific support may be needed for autistic females. Future research related to autistic social media use should make targeted efforts to understand and support the unique needs of autistic individuals who identify as female or non-gender conforming. Additionally, the included sample were majority White, which limits generalizations to other cultural groups. Since social media use is influenced by culture (Sheldon et al., 2020), it is important that future studies of autistic social media use include a more ethnically diverse group of participants. Another issue with the sample was the exclusion of participants with lower verbal abilities due guidance indicating that autistic participants should be grouped by skill level (Krasny et al., 2003). Considering the unique needs of autistic adults with IDD, more research is needed to explore the impact of the SELFI program on adults with more limited verbal abilities.

Another major limitation of this study is that the SELFI program was developed without input from autistic self-advocates. Interventions for autistic individuals have traditionally been developed without the perspectives of neurodivergent folks who receive these treatments. As a result, these interventions have sometimes led to unintended negative consequences and can be potentially harmful to autistic people (Chapman & Bovell, 2020). The SELFI program was conceived in consideration of autistic needs, however autistic individuals were never consulted regarding intervention or study procedures. For SELFI to be more inclusive of neurodiversity, future studies must collaborate with and integrate the perspectives of end-users and relevant stakeholders. Efforts to improve intervention practices include centering autistic voices, supporting an autistic “way of being,” assessing social and ecological validity, prioritizing participatory research, and using adaptive treatment designs

(Schuck et al., 2021). These approaches must be prioritized in future studies of the SELFI program and social skills interventions more broadly.

Conclusion

We live in an increasingly digital world that increasingly depends on computer-mediated communication and online socialization. Safe and effective social media use is critical to successful platonic, romantic, and professional relationships and individuals with social vulnerabilities may benefit from targeted support. While there has been significant progress toward supporting the social experiences of autistic individuals, few interventions have been developed that specifically address social media use. The SELFI program is one of the first social media skills interventions designed specifically to support autistic adults with online socialization. Findings from this pilot RCT establish a promising foundation of evidence supporting the feasibility, acceptability, and efficacy of the virtual group SELFI program. While these findings indicate significant promise regarding a novel approach to supporting online socialization, further research is needed to further refine the SELFI intervention and study protocols. This study represents an exciting step forward in the emerging field of online social competency and interventions designed to support autistic adults with online socialization.

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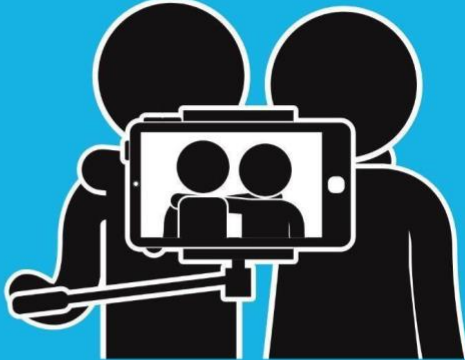
Appendix 1

SELFI Recruitment Flier

WANT TO IMPROVE YOUR SOCIAL MEDIA SKILLS?


The Koegel Autism Center is offering a new **FREE** program that teaches online social communication skills to adults with ASD.

The **SELFI** Program is a social skills group that provides participants with the skills necessary to make and maintain friendships using social media.



This 8-week virtual program meets weekly over Zoom to discuss social media use. Groups include lessons about appropriate social media use and practice using the tools needed to be successful online.

Individuals may participate if they are between 18 - 40 yrs, have average verbal ability, Speak English, and have a Facebook account. Participation is open to individuals across all U.S. states.



If interested, complete this form:
<https://forms.gle/BUYAZiJsyDjRBMkd8>
or email selfi.ucsb@gmail.com

Appendix 2

Example SELFI Lesson (Establishing an Online Presence)

Establishing an Online Presence Group SELFI Curriculum: Week 1

Description of Lesson

Your social media profile is a special place because it's one of the only places where you get to decide what you want other people to know about you. When you post something on social media, it's with the understanding that you are sharing it with your *friends* and *followers*. If you want someone to see or know something about you, then you should post about it. If you don't want other people to know something, then don't post it. It seems simple, but sometimes we forget how much control we have over our image online. What we share (and don't share) on social media has a big impact on our social relationships.

Social media accounts are used to create and maintain friendships with people we do know and don't know in-person. How we communicate and share ourselves on the internet will impact how people think about us and may influence whether people want to be "friends" with us online. Since our online personality is an extension of ourselves, how we behave on social media also has an impact on how people will see us in-person! Therefore, we must be intentional about how we communicate and share ourselves online. We call this process: *establishing an online presence*.

We should consider our social media accounts like a "*friendship resume*" because they share a snapshot of our experiences and how we'd like to be seen by other people. Just like a resume, you should always project yourself honestly and positively online because you're trying to convince others that you're a good person to "follow" and be friends with. This first lesson will discuss how we establish an appropriate online presence that reflects our authentic self, keeps us safe, and makes people want to be friends with us!

Highlights

- **Treat your social media accounts like a "friendship resume"**
 - Project yourself authentically and positively
 - Be intentional about what you share
 - Remove information that may make you look bad
- **Post on your social media accounts to appear interesting (and authentic)**
 - Profile picture should be clear, recent, and identifiable
 - Profile display name should be clear, recent, and identifiable
 - Use your account to share information about who you are
 - Post on social media to tell others about what you like
- **People will judge you based on what you share**
 - People will friend/unfriend you based on the content you share
 - Be mindful of the appropriateness/relevance of topics liked/posted
 - Monitor the frequency of your posts

Check-in: Each participant will be paired up with a “social media mentor” that will be the same person doing the check-ins and check-outs. These check-ins will be a chance to build rapport, prime the participant for the upcoming lesson, and troubleshoot any issues. Since this is the first meeting, take some time to introduce yourselves and discuss goals. Orient them to the program by introducing your role and letting them know that they will check in with you before each group meeting. Exchange the following info:

- **Name**
- **Location**
- **What social media platforms you each use**

First group check-in

- **What do you hope to learn from this experience?**
- Ask them to identify a TOP GOAL using this form:
<https://drive.google.com/file/d/1m2mhsMr9ip82IUbaJSqiEZgTIDLD-S7C/view?usp=sharing>
 - Enter the goal and score on this form:
<https://docs.google.com/spreadsheets/d/10BQws8bW3HQ992IQMDy6vfBKcGUlzdLGdqQ-jgYVMIQ/edit#gid=1037328931>

Introductions

Since this is the first meeting, participants may be feeling uncomfortable or self-conscious about sharing their experiences to the group. Acknowledge that it may feel uncomfortable at times but that the social media mentors are here to support them in any way that we can. Feeling comfortable in this first session is important because it may decide if they want to come back or drop from the program! Have everyone in the group share the following information. Before the group, delegate 1 social media mentor to lead the introductions. That one person will call on participants one at a time to share. Peer mentors should go last and keep their responses brief so that the focus is on the participants.

- **Name**
- **Location (city, state)**
- **What social media platforms you use**

Role-Play/ Video: Are you living an Insta-lie?

<https://ucsb.box.com/s/8o4k32lg3k36mr3bxod4idkwhe9jj6g3>

- Discussion prompts
 - **What did you notice?**
 - **What does this tell you about how people portray themselves online?**

Take home point: **The video showed that people may behave differently online than in-person. So how do we decide what to post on social media? We’ll find out in today’s lesson about establishing an online presence.**

Social Media Account Profiles

Social media profiles tend to have a few basic sections that are useful in communicating information about ourselves to others. Profiles look different across social media platforms,

but there tend to be consistent features that allow us to establish an identity online. See below the anatomy and purpose of social media profiles features:

- **Profile picture:** A single photo that everyone will see when they interact with you online
- **Bio/About Me:** A brief introduction to who you are, where you live, what interests you
 - Could be open ended (like Instagram/Twitter/TikTok)
 - Facebook has designated info you can provide (work, education, places lived, etc.)

Differences Across Social Media Platforms

Different social media platforms have different approaches to sharing information on your profile -- see below key similarities and differences.

Facebook:

- Profile picture
- Cover photo, brief bio (160 characters)
- Option to include additional information
 - Work
 - Education
 - Places Lived
 - Contact information
 - Family and Relationships
 - Life events



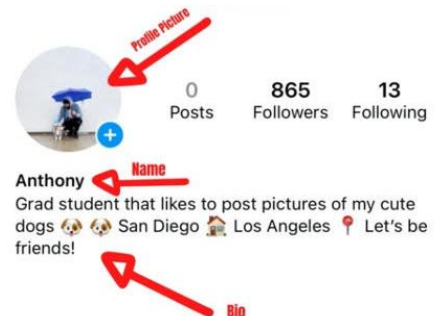
Twitter:

- Profile picture
- Cover photo
- Brief bio (160 characters)
- Link in bio



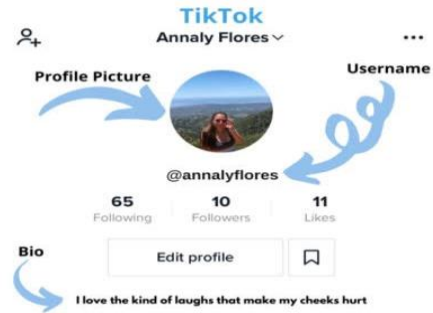
Instagram:

- Profile picture
- No Cover photo
- Open ended bio (150 characters)



TikTok:

- Profile picture
- No Cover photo
- Brief bio (80 characters)
- Link in bio



Rule #1: Treat your social media accounts like a “friendship resume”

Our social media accounts provide others with a snapshot of who we are through the pictures, videos, stories, and information that we share. There are a lot of things that happen in our lives, but we only post a small fraction of our experiences on the internet. ***Just like a resume, people online like to highlight the good things about themselves and minimize the negative experiences that they’ve had.***

Rule # 1.1: Project yourself positively and authentically

You should always try to project yourself in a positive way. **Just like how your resume doesn’t list the bad experiences you’ve had, your social media account shouldn’t include any information that might make you look like an undesirable friend. Because of this, social profiles tend to look like a highlight tape, rather than a play by play of thoughts and experiences.** Remember, your social media profile is meant to show people that you are a nice and interesting person so that they want to further their friendship with you!

The important part here is that you want to protect yourself positively and *authentically*. **Show yourself in a positive way, but don’t try to be someone that you’re not. Avoid lying and exaggerating things about yourself to appear more attractive.** Our friends like authenticity and it's easy to tell when someone is lying, faking, or “trying too hard” to look cool.

To be positive online, try your best to project yourself in a way that you would want to be associated with. Ask yourself: Do you want to be seen as the supportive friend or the person that gets into disagreements with others? Below are some quick guidelines:

- Avoid controversial topics (ex. politics, religion, etc.)
- Post things that you think your friends/family would find interesting
- Avoid posting about only one topic as it leads others to believe you only have one interest
- Avoid sharing sexually explicit or provocative content
- Avoid excessive boasting or bragging on social media, it is okay to share good news occasionally, but do so in a way that feels genuine

Rule # 1.2: Be intentional about what you share

- **Just like a job resume, you have a limited amount of space to share a lot of information about yourself. Be selective about what you share.** Before you post

anything, think to yourself, “why am I sharing this on social media?” You should always think about the impact that your posts have on your online reputation.

- Sometimes we **share information to let others learn more about us**. Therefore, it’s helpful to share your location, education, and employment history. This information tells others about our experiences and interests!
- **We should avoid sharing information that might make people uncomfortable or might make us look bad.**
 - For example, if we get into an argument with our parents, we shouldn’t rant about it on Facebook because it might make our friends think that we might do the same to them someday. You should also avoid sharing information that is *too* personal, such as your address, phone number, or other confidential information.

Rule # 1.3: Remove information that may make you look bad

Just because you share information online does not mean that it needs to stay posted online. **If there is anything that you later realize is undesirable online, then delete it as soon as possible.** The point isn’t to be secretive about our lives, rather it’s important to make sure that the information shared about us on social media reflects who we want others to know.

Sometimes our friends share inappropriate pictures or posts about us online. If this ever happens to you, you have a few options:

- Ask your friend to remove it
- Untag yourself
- Unfriend/Block the other person (if they refuse to remove content that compromises your image, damages your reputation, could have consequences)

Rule # 2: Post on your social media accounts to appear interesting (and authentic)

There are 2 main reasons why we share things online 1) to show people who we are and 2) to show people what we like. We are connecting with our friends online when we share pictures and videos, tell stories about our experiences, and repost content that we find interesting.

People want to be friends with (or follow) you online because you are an interesting or important person to them. If you don’t post on your social media accounts, your friends will not be able to form a connection with you and your friendship will not be strong. **Try posting about 1-3 times a week so that you create opportunities to strengthen your relationships!**

Rule # 2.1: Profile picture should be clear, recent, and identifiable

Your profile will be the first thing that your friends see online when they interact with you. The image and name that you choose is important because it represents YOU online. It’s the face of your brand, like your social media logo. **Make sure your profile name and picture look clean and are a good reflection of who you are. Whenever possible, your display name should be your real name and your profile picture should be a recent picture of you that is clear and one that makes it easy to identify who you are.**

Here are some tips for profile pictures:

- **Clear:** Should be taken in good lighting where your face is clearly visible

- **Recent:** The photo should be from within the last 1-3 years
- **Identifiable:** If your physical appearance has not changed much then you can keep it but, if you change your hairstyle or facial hair, consider changing your profile picture to reflect what you look like now.
 - If you don't look like your profile photo, people may not be able to tell who you are on social media and may not friend/follow you or be unwilling to accept your friend requests

Rule # 2.2: Profile display name should be clear, recent, and identifiable

Here are some tips for usernames and display names:

- **Identifiable:** Your display name should be your name (or nickname). You can be creative but be mindful when customizing your display name since you want others to know who you are.
- **Creative:** Your username or “handle” on social media accounts can be creative but still reflective of who you are. It doesn't have to be associated with your real name if you don't want it to be (ex. @Gamer805) but you should avoid random numbers in your username, since it may lead people to think your account is fake or a “bot” (ex. @Gamer81122444556036).
- **Context:** Consider if your profile is going to be used in a professional context (ex. Facebook vs. YouTube). If you are going to use it for professional context, create a professional username (ex. firstname_lastname)

Rule # 2.3: Use your account to share information about who you are

Use your profile picture, cover photo, bio, and other “about me” features to share personal information about yourself to your friends. You only need to share what you feel comfortable with, but also share enough information to appear authentic.. Include things like your location, school, job, favorite movies/music, etc. Do NOT include personal information such as your phone number and exact address. Bios and background information make you appear authentic and give your friends information to connect with you over the internet.

Common information that is safe to post online is:

- **Location:** Listing your hometown or current location is a way to let others know where you are or have been. It makes you look more interesting if your friends know that you were born in San Diego but currently live in New York for work. Just make sure to choose a location that is big enough that you are not easily located. **List your city and state, but not your actual address.**
- **School:** Education history is a good way to share your experiences with others. People like to connect with others over shared backgrounds, which may include schools in familiar places.
- **Relationships:** Sometimes people share their important relationships online. This is not necessary but can communicate to others whether they are interested in finding romance online. If an account has a romantic partner listed on their profile, this is their way of communicating to others that they are likely *not* looking for another partner. Therefore, you should respect their boundaries and *not* pursue them romantically or sexually (in-person or online).

- **Work history:** People make friends at work and usually end up following and friending each other online. It's safe to list your employer but refrain from providing too detailed information where others would be able to access your workplace. You can list that you work as a manager at In-N-Out -- you don't need to share that you work at the Santa Monica location on 4th Street.

Rule # 2.4: Post on social media to tell others about what you like

What we post on social media tells others about what interests us. The photos, videos, stories, statuses, and experiences that we share online tell others about the type of person we are. When we share a picture of our family vacation to Hawaii, we're showing them that we like to travel, spend time with family, and like the beach. While we experience these things for our own enjoyment, we decide to share them online because we want our friends to know what makes us happy.

Because our accounts are like a "friendship resume," what we post online markets ourselves to new/prospective friends. Just like you do in verbal conversations, you should use your space online to show others what makes you laugh and feel good. When you share things, it creates opportunities for others to share their shared experiences and that's how friendships are made stronger! Even people we've met in-person are still deciding if they want to further their relationship with us online. What you share (pictures, videos, captions, texts, reposts, etc.) forms your "online personality." This personality is what people can use to decide if they would like to pursue or end friendships. We should use our posts as an opportunity for current friends/family to learn more about you and maintain their connection with you. Below are some standard things that people share on social media to show what we like:

- **Photos:** Posting photos is an easy way to share our experiences with others. When we share pictures of our dogs on Instagram, we're inviting others to start conversations with us, which ultimately leads to stronger connections online. People want to follow and be friends with other people that appear interesting. Pictures are a great way to show others the things that make you happy!
- **Videos:** Like photos, videos are a good way to share experiences with your friends. Recording your most cherished moments allows others to understand the life that you live and the experiences that you enjoy the most.
- **Status Updates:** These posts contain text (but may also include photos or videos) that communicates an update to others. We use status updates to tell others about our thoughts and feelings, experiences we've had, upcoming events, and important life changes (children, marriages, employment changes, etc.)
- **Reshare/Repost/Retweet:** You don't have to create the content yourself, you can easily reshare or retweet other people's content.

Rule #3: People will judge you based on how you behave online

Just because you are "friends" with someone online does not mean that they are your actual friend. Friendships require everyone to mutually enjoy each other's company and a maintenance of connection over time. **Our interactions with each other influence whether our friends want to get closer or drift further away from us.** During in-person

friendships, most of the judgement from others comes during in-person interactions, which happen infrequently. Online friendships are unique because people have more access to our thoughts, feelings, and experiences than in-person. **Therefore, online judgment comes not only from one's interactions with a particular account, but also observations of the other person's visible interactions with others.** Recognizing increased online visibility means that we should be mindful that others can make judgements about us regarding any of our online behavior. Our online actions have real world consequences.

Rule #3.1: People will friend/unfriend you based on the content you share

- **Avoid Conflict:** If you post controversial content, people may decide not to friend/follow you, even if you know each other in-person
- **Be appropriate:** People may unfollow you based on what you share online. Be mindful of the appropriateness of your posts. You don't have to change your beliefs to appease your friends but remember that the point of social media is to connect with others. Don't share anything that may distance people from you.
- **Post quality content:** Try to only post your best content. Just like a resume, you don't need to list everything you've done -- just post the highlights! Avoid posting blurry or pixelated photos, links from unreliable sources, click bait, etc. Don't over-edit your photos -- the point is to look interesting and authentic, not perfect.

Rule #3.2: Be mindful of who and what you engage with

- **Appropriate:** What you post should be appropriate and relevant to the context. Avoid controversial topics unless the other person is asking for your perspective. No one wins online arguments since both parties end up looking like an uncompromising friend online. In most cases, avoid posting unsolicited opinions about politics, religion, and social justice issues. It's ok to partake in social discord, but make sure you do so in a kind and respectful way.
- **Visible Likes:** Some social media platforms show what you comment/like on your friend's timelines! You should "like" what you enjoy online, but think whether you want others to see what you're interested in. It's ok to enjoy content that others may think is inappropriate, however just know that others may judge you based on your online tastes. If you want to "like" or share certain content, consider doing so on an alternative account. Remember: you can like something in real life without "liking" it online.

Rule #3.3: Monitor the frequency of your posts: Post as much as you'd like but consider how many posts your audience wants to see. If you'd like to post a lot of information, consider sharing on alternative places online (blog posts, making a YouTube video, etc.)

- **Frequent:** We should try posting about 1-3 posts (photos, stories, status updates, etc.) per week on our social media platforms. By posting we create opportunities to strengthen our friendships. More posting means more chances to connect with others!
- **But not too much:** Excessive posting can feel like spam and people don't like to see the same person posting on their feed all the time. Different apps have different norms regarding posting frequency, but you should refrain from posting more than 3 times per day. If you want to share multiple pieces of content, post them within 1 post rather than multiple so it looks more attractive to our friends.

- **Diverse:** It's ok to express your preferred interests online. In fact, people like to follow and friend people online that have similar interests and expertise! There is an online community for everything and a place for your interests to be expressed. **Make sure you find the most appropriate medium to share your interests and diversify what you share.** Some social media sites are better for marketing our personal experiences (Facebook, Twitter), while others are better for expressing our interests (YouTube, TikTok, Instagram, Tumblr). Make sure you're mindful of what your online audience is there for. Are they there to learn about your interests (Instagram) or to further their friendship with you (Facebook)? Understand the standard posting frequency of each app that you're on and try to stick to that rate.

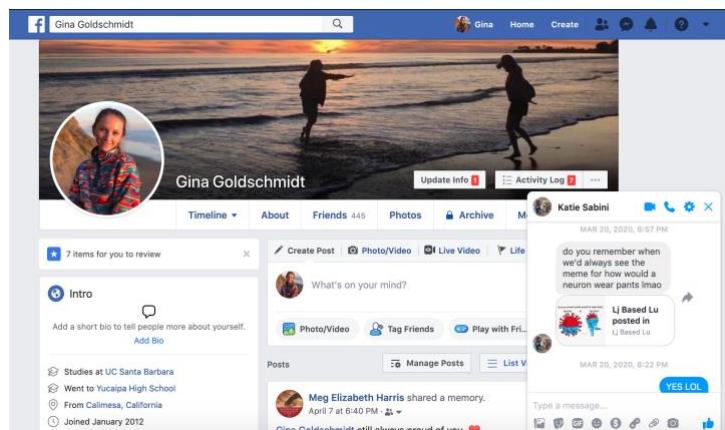
Considerations for Week 1:

- The emphasis of this first session is to build rapport. We want to make participants feel safe and excited to come back for the next 7 weeks so being open, friendly, and safe is the most important part of this week's group.
- Keep in mind that some participants may have little to no information on their current profiles. Reassure them by informing them that this is a perfect opportunity to increase and improve their online presence.
- Remind participants that it's ok if they're currently doing things that we're saying not to do. Let them know that this is a learning opportunity and that we can always edit and delete information that we would like to change.
- Personal anecdotes and examples are going to be powerful here. Use funny and personal stories that will remind the participants that this is a learning experience. We've all had blunders online and that's ok! The more personal and casual we share our stories, the stronger this information is going to stick with our participants.

Practice Opportunity

Show examples of Facebook profile pages and have the group decide if these profiles are good or need more work. Make this more discussion based than task based. Have participants share their observations.

What do you notice?



Appendix 3

Example Participant Lesson Handout (Establishing an Online Presence)

Establishing an Online Presence Group SELFI Curriculum: Week 1

This week's Role-Play/ Video: Are you living an Insta-lie?
<https://ucsb.box.com/s/8o4k32lg3k36mr3bxod4idkwhe9jj6g3>

Social Media Account Profiles

Social media profiles tend to have a few basic sections that are useful in communicating information about ourselves to others. Profiles look different across social media platforms, but there tend to be consistent features that allow us to establish an identity online.



- **Profile picture:** A single photo that everyone will see when they interact with you online
- **Bio/About Me:** A brief introduction to who you are, where you live, what interests you

Rule #1: Treat your social media accounts like a “friendship resume”

Just like a resume, people online like to highlight the good things about themselves and minimize the negative experiences that they’ve had.

Rule # 1.1: Project yourself positively and authentically

Show yourself in a positive way, but don’t try to be someone that you’re not. Avoid lying and exaggerating things about yourself to appear more attractive.

Rule # 1.2: Be intentional about what you share

Think about the impact that your posts have on your online reputation. Avoid sharing information that might make people uncomfortable or might make us look bad.

Rule # 1.3: Remove information that may make you look bad

Just because we share information online does not mean that it needs to stay posted online. If there is anything that we later realize is undesirable online, then delete it as soon as possible.

Rule # 2: Post on your social media accounts to appear interesting (and authentic)

People want to be friends with (or follow) you online because you are an interesting or important person to them. If you don’t post on your social media accounts, your friends will not be able to form a connection with you and your friendship will not be strong. Try posting about 1-3 times a week so that you create opportunities to strengthen your relationships!

Rule # 2.1: Profile picture should be clear, recent, and identifiable

The image and name that you choose is important because it represents YOU online. It's the face of your brand, like your social media logo. Make sure your profile picture is *clear, recent, and identifiable*

Rule # 2.2: Profile display name should be clear, recent, and identifiable

Your display name and social media usernames also represent who you are online. The best display and usernames are *identifiable, creative, and appropriate* for the context.

Rule # 2.3: Use your account to share information about who you are

Use your profile picture, cover photo, bio, and other "about me" features to share personal information about yourself to your friends. Bios and background information make you appear authentic and give your friends information to connect with you over. Common areas of information that is safe to post online are: location, school, work history, and relationships.

Rule # 2.4: Post on social media to tell others about what we like

What we post on social media tells others about what interests us. Because our accounts are like a "friendship resume," what we post online markets ourselves to new/prospective friends. Use your account to share photos, videos, status updates, and to reshare content.

Rule #3: People will judge you based on how you behave online

Just because you are "friends" with someone online does not mean that they are your actual friend. Online judgment comes not only from your interactions with another account, but also through observations of your visible interactions with others. Our online actions have real world consequences.

Rule #3.1: People will friend/unfriend you based on the content you share

If you post undesirable content, people may decide not to friend/follow you, even if you know each other in-person. To avoid being unfriended, avoid conflict, post appropriate content and only share high quality content.

Rule #3.2: Be mindful of who and what you engage with

Some social media platforms show who you follow and what you comment/like on your friend's timelines! It's important to know that others may judge you based on your online tastes. Avoid "liking" content that may reflect poorly on you. If you want to "like" or share certain content, consider doing so on an alternative account or using a private feature (DMs).

Rule #3.3: Monitor the frequency of your posts

We should try posting about 1-3 posts (photos, stories, status updates, etc.) per week on our social media platforms. By posting we create opportunities to strengthen our

friendships. More posting means more chances to connect with others! Try being unique online and avoid posting too much so that people want to befriend you online!

Weekly Goal: Update your social media profiles and make sure that they include:

- An up-to-date profile picture
- Background information
- Bio

