Improving Mask Wearing by Group-Home Staff

By

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Abstract

Mask wearing is among the most recommended prevention strategies to slow the spread of SARS-COVID-2 (Centers for Disease Control and Prevention, 2021j). Mask wearing is especially important in settings where vulnerable populations (e.g., older adults, individuals with certain pre-existing conditions [e.g., type 2 diabetes], people living in congregate settings) live and work. Despite mask wearing being a behavior amenable to change, there are relatively few behavior-analytic studies addressing mask wearing, particularly in the workplace. Thus, the purpose of Study 1 was to collect baseline data on appropriate mask wearing by group-home staff to pilot the measurement system and identify participants for inclusion in Study 2. The purpose of Study 2 was to use the Performance Diagnostic Checklist-Human Services (PDC-HS; Carr et al., 2013) to determine reasons for low mask wearing and implement an indicated intervention to improve mask wearing by group-home staff. The PDC-HS revealed a lack of feedback or programmed consequences for mask-wearing adherence. An intervention involving feedback or feedback plus a monetary incentive effectively increased mask wearing for four participants. Overall, participants found that feedback or feedback plus a monetary incentive were acceptable, appropriate, and reasonable interventions to improve appropriate mask wearing. Results yielded from this study contribute to a sparse, but important, literature base to address health and safety in the workplace as it relates to COVID-19 and recommended practices.

Keywords: COVID-19, mask wearing, staff performance, performance management

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"Commit your work to the Lord and your plans will be established." Proverbs 16:3. I give the glory to God, but there are several people who have supported me throughout my journey.

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Finally, I dedicate my degree to my loving mother, who died during my first semester. I know you wanted nothing more than to see me earn this Ph.D. Hey, look mom, we made it!

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The World Health Organization declared SARS-COVID-2 an international emergency in January 2020 (Guner et al., 2020) and a pandemic in March 2020 (Cheng et al., 2020). The SARS-COVID-2 (hereafter referred to as "COVID-19") pandemic has been deemed one of the largest public health emergencies of our time (Gavin et al., 2020; Lades et al., 2020). As of September 14th, 2021, approximately 4,636,153 people have died as a result of COVID-19 worldwide (World Health Organization [WHO], 2021).

Hundreds of variants of coronaviruses exist among animals, such as bats and camels. Four coronavirus variants can cause mild-to-moderate symptoms in humans and three additional variants that can cause symptoms leading to death, one of which is COVID-19 (National Institute of Allergy and Infectious Disease, 2021). COVID-19 is a relatively new disease brought on by a new strand of coronavirus that spreads when an infected person is within 6 ft proximity of others who are not infected (Centers for Disease Control and Prevention [CDC], 2021h). COVID-19 spreads in three ways: (a) an uninfected person breathes in air with droplets from an infected person; (b) droplets from an infected person land on the eyes, nose, or mouth of an uninfected person; and (c) an uninfected person has the virus on their hands and then touches their eyes, nose, or mouth (CDC, 2021i).

Symptoms of COVID-19 can appear between 2-14 days after exposure and can range from mild to severe, including death (CDC, 2021h). COVID-19 symptoms include fever, chills, cough, shortness of breath, fatigue, body aches, headache, sudden loss of taste or smell, sore throat, runny nose or congestion, nausea or vomiting, and diarrhea (CDC, 2021a). Older adults, people with significant pre-existing conditions (e.g., diabetes, lung disease), pregnant women (Butler & Barrientos, 2020; CDC, 2021d), underrepresented minorities, such as Black and Latinx

individuals (Butler & Barrientos, 2020), and people with disabilities (Armitage & Nellums, 2020; CDC, 2021g) are at the highest risk for experiencing severe symptoms.

Effects of COVID-19

Although COVID-19 is still relatively new, numerous effects have impacted or are expected to impact the long-term physical and mental health of U.S. citizens. Additionally, restrictions associated with managing the pandemic have dramatically disrupted our daily lives and routines, mental health, social lives, and economies. Further, COVID-19 has produced several impactful indirect effects, which are described in further detail below.

The pandemic has had large-scale and profound effects that have rippled through various aspects of daily life (Haleem et al., 2020; Gavin et al., 2020; Lades et al., 2020). For example, 28% of adults in the United States reported that at least one member of their household lost their job and 33% of adults have markedly reduced income because of the pandemic (Pew Research Center, 2020), which has induced significant financial worry for families all over the nation (Tull et al., 2020). Thirty-five percent of adults who have continued to work throughout the pandemic report challenges managing childcare responsibilities (Pew Research Center, 2020). Moreover, many working adults assume risk of COVID-19 infection due to features of their employment settings, such as interacting with or treating the public (Griffith, 2020). Families have noted that changes in their routines (e.g., managing the responsibility of home-schooling their children, increased interactions with one's spouse throughout the day) contribute to additional stressors (Lades et al., 2020). These collective outcomes have the potential to pose significant threats to children over time as they can lead to parental burnout, and subsequently, child abuse and neglect (Griffith, 2020).

The COVID-19 pandemic has also impacted the mental health of U.S. citizens, including health care professionals. Increases in anxiety related to health (Tull et al., 2020) and depression (Saggioro de Figueiredo et al., 2021) have been reported. Experts expect a surge of mental illness diagnoses (e.g., anxiety, depression; Gavin et al., 2020; Saggioro de Figueiredo et al., 2021) and suicide (Gavin et al., 2020) after the pandemic. Mental health may deteriorate because of social isolation, stress caused by quarantines, and long-term changes to individuals' functioning levels (e.g., ability to remain active for lengthy periods of time, shortness of breath, hypoxia) due to a COVID-19 diagnosis (Bryson, 2021). The anticipated increase in mental health difficulties and diagnoses paired with potentially constrained mental healthcare services and resources may quickly become problematic (Gavin et al., 2020). Medical professionals may need to recover from the stress and trauma that took place throughout the pandemic (Bryson, 2021; Haleem et al., 2020). The mental health of quarantined children, adolescents, and adults should be closely monitored and treated as a public health issue as opposed to a short-lived phenomenon (Saggioro de Figueiredo et al., 2021).

COVID-19 has had tremendous effects on social life, possibly due to various widespread safety protocols (e.g., social distancing, travel bans, stay-at-home orders). Many people report feeling socially isolated and lonely, which may lead to heart disease, depression, and anxiety (Williams et al., 2021). Further, many report stress and difficulties managing the closures of restaurants and recreational facilities, cancelations of cultural or religious events, and cessations of gatherings (Haleem et al., 2020).

The impact of COVID-19 and the economy stretch far and wide, from high rates of unemployment, disruption to economic activity due to social distancing, significant decreases in tourism due to travel bans and stay-at-home orders, and investments (Goodell, 2020). Effects of

COVID-19 have involved and continue to involve low cash-flow, which leads to significant decreases in revenue and sometimes the closure of businesses (Haleem et al., 2020), especially women-owned businesses (Liu et al., 2021). Data suggest that the labor markets of the United States and Spain were the most negatively affected (Milani, 2021).

Perhaps the most widely discussed long-term health effect involves neurological disorders (e.g., stroke, smell- and taste-related disorders) which may be both directly and indirectly related to COVID-19. Indirect effects include symptoms associated with and outcomes of persistent neuroinflammatory responses (Butler & Barrientos, 2020; Ren et al., 2021). That is, there is a well-documented association between these responses and neurodegenerative diseases, such as Alzheimer's and dementia (Butler & Barrientos, 2020). Long-term indirect effects may involve deterioration of muscle mass (Kirwan et al., 2020) and impaired physical functioning that warrant immediate therapeutic or medical intervention (Belli et al., 2020) and rehabilitative services (Roy et al., 2020) due to reductions in physical activity caused by restrictions during the height of the pandemic (e.g., quarantine, isolation, social distancing). Finally, COVID-19 may cause permanent lung damage (Butler & Barrientos, 2020). Additional long-term effects may be forthcoming as research continues; experts warn that we may observe a spike in chronic medical conditions after the pandemic (Butler & Barrientos, 2020).

The impact of COVID-19 may be more substantial for certain members of our population. For example, people with disabilities are disproportionately affected by chronic health conditions and are more likely than individuals without disabilities to live in congregate settings, both of which put people at a higher risk for COVID-19 (Armitage & Nellums, 2020; CDC, 2021g). People who live in congregate settings may be at increased risk for COVID-19 for several reasons: these individuals (a) reside in close quarters with one another, (b) require being

in close proximity with various staff members for personal care (e.g., bathing, toileting, eating), (c) are under-privileged (e.g., have poorer accessibility) when it comes to personal protective equipment (Landes et al., 2020), and (d) often share transportation (Gleason et al., 2021). Individuals with intellectual and developmental disabilities (IDD) have increased risk of experiencing mental, emotional, psychological, and physical distress (Gulati et al., 2021). Further, individuals with IDD are more likely to experience barriers to equitable healthcare services and life-saving treatments (Armitage & Nellums, 2020; Gulati et al., 2021). Moreover, individuals with IDD may resist wearing masks (Gleason et al., 2021; CDC, 2021j) or lack the necessary skills to wear a mask, leaving them more susceptible to contracting COVID-19 (Sivaraman et al., 2020).

Strategies to Slow the Spread of COVID-19

Because of the rapid transmission of infections in March and April 2020, countries across the globe implemented several public health interventions to varying degrees. These interventions included, but are not limited to, border closures; rapid contact tracing; school closures; prohibition of mass gatherings; stay-at-home orders; and recommendations to practice hand hygiene, social distancing, and mask wearing (Cheng et al., 2020; Guner et al., 2020). Although the first vaccine was approved on an emergency basis in late 2020, at that time the CDC continued to recommend several practices to prevent the spread of COVID-19 including wearing a mask that covers the nose and mouth, staying 6 feet away from individuals with whom one does not share a household, getting a vaccine, avoiding crowded areas (especially those that are indoors) and frequent handwashing (CDC, 2021b).

The universal use of face masks possibly has the most positive impact on preventing the spread of COVID-19 in communities (MacIntyre & Chughtai, 2020). Masks help contain

droplets and prevent them from spreading from infected to uninfected people (Cheng et al., 2020; Guner et al., 2020; MacIntyre & Chughtai, 2020). Improper use of a mask may increase the risk of COVID-19 infection (Guner et al., 2020). Thus, the CDC offers specific guidelines regarding mask wearing. That is, masks should cover the nose and mouth, and fit against the face such that there are no gaps (CDC, 2021c). Individuals aged two or older should wear face masks in public settings or anywhere they will be around other people (CDC, 2021c; Guner et al., 2020).

Although those who are fully vaccinated (i.e., two weeks after a single-dose vaccine or two weeks after the second dose of a 2-dose COVID-19 vaccination) have started to engage in many activities again, the CDC recommends that people continue to wear masks in indoor public spaces as the vaccination status and severity of risks for others is unknown. Moreover, the CDC recommends that people working in healthcare settings should continue to engage in the suggested practices for unvaccinated individuals, especially when they are providing services or care for vaccinated individuals with compromised immune systems (CDC, 2021e). Guner et al. (2020) suggest that staff employed in places that require them to work in close proximity to others continue to wear masks.

Mask wearing is especially important for staff working with individuals in healthcare settings given that workplaces are considered high-risk areas for COVID-19 transmission (Guner et al., 2020). Therefore, the CDC recommends healthcare workers continue to follow practices for unvaccinated individuals (e.g., mask wearing; CDC, 2021f) for the safety of other employees and individuals in their care. Employees working with individuals with IDD living in congregate settings are considered to work within the health and human services field; and thus, it is important that employees adhere to the CDC's recommendations given that individuals served are at an increased risk for contracting and dying from COVID-19 (Gleason et al., 2021).

Several variables are responsible for a lack of adherence to mask-wearing mandates. Survey data reveal that respondents report that masks "look strange" and they have an aversion to wearing a mask (Rieger, 2020). He et al. (2021) evaluated comments made on a social media platform between January and October 2020. Variables influencing mask wearing were related to physical discomfort, assumed ineffectiveness, the appropriateness of masks for certain categories of people (e.g., healthy individuals, children, those with certain health conditions [anxiety, asthma] should not have to wear masks), under specific conditions (e.g., outdoors, riding in a car alone), political beliefs, a lack of mask-wearing culture, and beliefs about whether COVID-19 was a threat.

Unique Risks for Essential Workers

The term "essential worker" refers to an employee whose services are necessary or required for the continuance of critical infrastructure operations (Cybersecurity & Infrastructure Security Agency, n.d.). Examples of essential workers include, but are not limited to, medical professionals, direct support professionals (DSPs), and grocery store employees. Essential workers have experienced work-related challenges during the pandemic. For example, because essential workers must report to work given their roles, they are at heightened risk for contracting COVID-19 and further place their immediate families at risk. Krisberg (2020) described outbreaks that took place at a meatpacking plant in Utah in the early days of the pandemic, which occurred in similar facilities and varied employment settings in the United States throughout the pandemic. Another challenge involves labor shortages and supply chain disruptions that have emerged during the pandemic (Kamali & Wang, 2021). Labor shortages have resulted from baby-boomer retirements, a need for flexible work arrangements, and workers voluntarily leaving their positions (U.S. Bureau of Labor Statistics, 2021). Labor shortages could

produce at least two outcomes: (1) open positions requiring current employees to work more hours or longer shifts contributing to burnout, and (2) a revolving door of new employees thereby increasing the number of people current employees encounter and, thus, increasing the risk of exposure to COVID-19.

These and other challenges also affect the workforce serving individuals with IDD. For example, nurses working with individuals with IDD during the COVID-19 pandemic were asked to rate challenges they encountered within the context of their service provision; they reported experiencing stress and burn out, and simultaneously feeling guilty for not being able to do more for their patients (Desroches et al., 2020). Among the most significant issues noted in this survey, nurses reported being excluded from COVID-19 planning and described a lack of consistent access to appropriate personal protective equipment (PPE). The latter issue exacerbates the already heightened risk of contracting COVID-19 they experience by simply going to work.

Unfortunately, research lacks direct information regarding personal challenges that DSPs working with individuals with IDD may experience given their status as essential workers. However, we may extrapolate from other literatures to draw some conclusions about unique challenges given their work settings and positions. The performance management literature reveals that ongoing support of DSPs in the form of observation, coaching, and feedback are necessary for their long-term effectiveness and retention as essential workers (Novak et al., 2019). This is especially important following the hiring process and initial training considering that many DSPs have challenges generalizing skills learned in contrived training settings to the settings in which they work (Novak et al., 2019). Unfortunately, efforts to maximize safety during the pandemic could produce unintended consequences of limiting the number of people

involved in supporting individuals with IDD. That is, organizations have restricted the number of people permitted to enter a service setting, such as a group home, to reduce potential COVID-19 exposure and thereby decreased the quality of training offered to DSPs. These conditions may contribute to a well-documented cycle of vacancies that lead to quick attempts to fill them with staff who often lack the appropriate skillsets (Gaventa, 2008). This situation can only worsen by conditions and restrictions of the COVID-19 pandemic. Further, with growing frustration regarding the lack of ongoing support, DSPs may be inclined to leave their positions during this most difficult time to hire and retain staff.

Another challenge experienced by DSPs relates to their low wages. The average wage for DSPs recently fell below the poverty level for a family of four with an average hourly rate of $10.72 per hour (Brandt, 2017). Additionally, DSPs often prefer not to participate in employer health care offerings to increase take-home pay (Strouse & DiGennaro Reed, 2021). Low wages and poor or absence of medical coverage place pressure on DSPs to continue working despite the risks to them and their families as they are unable to go without a paycheck. Additionally, DSPs are at higher risk for getting COVID-19 from consumers served or fellow DSPs by the nature of congregate settings (Armitage & Nellums, 2020), and then may have to manage appropriate healthcare to treat COVID-19 on poor medical benefits or may acquire medical debt from treatment.

These collective challenges underscore the importance of ensuring DSPs engage in recommended practices, such as wearing their masks, to reduce the risk of contracting COVID-19. Although there are a handful of studies targeting mask wearing by individuals with disabilities (Frank-Crawford et al., 2021; Halbur et al., 2021; Lillie et al., 2021; Sivaraman et al., 2020), only one published study has examined *employee* mask-wearing compliance. Datta et al.

(2021) used an interrupted time-series design to evaluate the effects of an intervention targeting mask-wearing compliance by medical professionals in a tertiary care center. Data were collected on COVID-19 and non-COVID-19 units between 8:00 a.m. and 6:00 p.m. on weekdays. Mask-wearing data were recorded before a person entered a patient's room, while they were in the room, and upon exiting the room. Mask wearing was scored as either compliant (undamaged mask covering nose and mouth) or noncompliant (damaged mask, mask not covering nose and mouth, no mask at all). Barriers and facilitators to mask wearing were assessed in an interview and researchers identified feedback, discussion, and increased communication with leadership as an appropriate intervention to improve mask-wearing compliance. Results showed an immediate and sustained improvement over the course of 14 weeks in intervention. Mask-wearing compliance increased by 10% after the implementation of the intervention.

Given the lack of research addressing employee mask-wearing compliance during this public health crisis, behavior analysts may be uniquely suited for identifying and addressing barriers to mask-wearing compliance. Identifying barriers could help identify functional interventions that produce desired outcomes, such as increasing mask-wearing compliance and reducing the spread of COVID-19 among DSPs and consumers. This assessment process within behavior analysis is known as performance diagnostics and is associated with a family of instruments to guide assessment. The Performance Diagnostic Checklist (PDC) and its variations are among the most employed assessments in the Organizational Behavior Management (OBM) literature (Fante et al., 2007; Johnson et al., 2014). The PDC is a 20-item interview assessing items across four categories (i.e., antecedents and information; equipment and processes; knowledge and skills; and consequences) and is used in a variety of settings (Gravina et al., 2021). To address performance barriers unique to the human-service setting, the PDC-Human

Services (PDC-HS) was developed (Carr et al., 2013). Like the PDC, the PDC-HS is a 20-item instrument conducted in an interview format (with direct observation components) examining potential barriers in four categories (i.e., training; task clarification and prompting; resources, materials, and processes; consequences, effort, and competition). Informants answer yes or no to a series of questions and responses are noted as either an opportunity for intervention (i.e., a potential barrier to ideal performance) or not. Similarly, the PDC-Safety (PDC-S) was developed to evaluate variables related to adherence to safety protocols and practices (Martinez-Onstott et al., 2016). The PDC-S is organized into the same four categories as the original PDC but uses a Likert-type scale versus providing the opportunity for the informant to answer yes or no questions. Finally, the PDC-Parent (PDC-P) was developed to identify variables contributing to difficulties parents experience when implementing interventions for their children (Hodges et al., 2020).

Research has demonstrated that the PDC and its variations can successfully identify the reasons for performance problems and lead to effective interventions across settings (Gravina et al., 2021). For example, the PDC-HS has been used to address a variety of target behaviors, such as correct implementation of an error-correction procedure (Bowe & Sellers, 2018), closing therapy room doors (Ditzian et al., 2015), and tardiness (Merritt et al., 2019), among others. The PDC-P has been used to identify an intervention to target parent implementation of a mand training protocol (Hodges et al., 2020). The PDC-S has been used to identify barriers to appropriate use of PPE by staff working at a university Grounds Department (Martinez-Onstott et al., 2016), and in a classroom for children with developmental disabilities (Pugliese et al., 2021). The PDC-S has also been used to address handwashing (Cruz et al., 2019). Taken together, these findings suggest an assessment involving one of the performance diagnostic

checklists may help identify barriers to mask wearing and inform the development of an effective intervention.

Examining barriers to mask wearing and implementing interventions that increase adherence to mask mandates is necessary to improve the safety of employees working in settings where risks for COVID-19 are high, such as in human-service settings. Given the potential risks to consumers with IDD and the lack of research on mask-wearing adherence, determining effective interventions to foster employee mask wearing is an important area of study. Thus, I conducted two studies to address these issues. The purpose of Study 1 was to collect baseline data on appropriate mask wearing for group-home staff to (a) pilot the measurement procedures, and (b) identify potential participants. The purpose of Study 2 was to use the PDC-HS (Carr et al., 2013) to determine reasons for low mask wearing and implement an indicated intervention to improve mask wearing by group-home staff.

Study 1

Method

Staff

The purpose of Study 1 was to pilot data collection procedures using the remote observation software and equipment developed by the agency (described below) and to identify employees (i.e., staff) in need of intervention to improve mask wearing. We collected data on 17 direct-support professionals (DSPs) employed at a not-for-profit organization that provides residential services to adults with IDD in the midwestern United States. The employer organization sought assistance with improving appropriate mask wearing by staff. Thus, these data were collected as part of a consultation arrangement that involved assessing the barriers to mask wearing and evaluating the effects of interventions on appropriate mask wearing. Staff

eligible for data collection were all DSPs employed at the agency who worked in a group home with remote observation capability. Demographic data are unavailable for most of the staff as they did not proceed to Study 2 (i.e., we collected demographic data for only those DSPs who completed intervention).

Setting and iLink Support Technology®

Staff worked in group homes serving three or four adults with IDD. The primary responsibilities of DSPs in these settings involved teaching skills and adaptive behaviors to increase the independence of persons served (i.e., consumers). Each group home employed between one or two DSPs during daytime hours (7:00 a.m. to 11:00 p.m.) who worked an 8- or 12-hr shift. Group homes had a shared living room, dining room, kitchen, and at least one shared bathroom. Additionally, each consumer had their own bedroom, and some of these consumers had their own bathroom.

The organization's service model supplemented in-home staffing with iLink Support Technology®. This smart-home technology combined passive (e.g., sensors) and active (e.g., video, intercom) monitoring agents with remote staff who continually monitored common spaces of the home (i.e., kitchen, living room, dining room, hallway). Remote monitoring did not occur in private areas of the home (i.e., bathrooms, bedrooms) or spaces where individuals did not spend time (e.g., closets). Cameras were positioned in the homes to permit a view of the living room, dining room, kitchen, and hallway. Cameras were placed on either the ceiling or on a uniquely designed shelf with a lamp-like fixture creating a "bird's-eye view" for remote staff. The remote staff could interact with DSPs and consumers in real time through an intercom system and offer supplemental support as needed. Additionally, the organization saved recorded video footage for up to five days on a HIPAA-compliant server.

State Mandates and Organizational Policies and Practices

Table 1 details relevant state mandates, organizational policies and practices, and data collection timelines. Data collection occurred between December 2020 and March 2021. The organization introduced various policies and mandates before data collection commenced. The organization released a series of letters addressing COVID-19 recommended practices and expectations for group-home staff between March 2020 and December 2020 via electronic mail to all staff with an internal e-mail address. On March 16, 2020, the president of the organization emailed a letter to all staff with internal email addresses announcing their implementation of a "soft quarantine" indicating that all non-emergency visits from people living outside of the group homes would be halted. The letter also indicated center-based day services would be discontinued; instead, day services would be provided at the group homes by group-home staff and that outings could take place only at approved locations. On March 30, 2020, the state of Kansas implemented a stay-at-home order for its residents such that individuals should only go out for essential tasks and items (e.g., food, medication).

On April 30, 2020, the organization announced that it would continue the stay-at-home order protocol through at least the end of May 2020 despite the phased re-opening by the state of Kansas beginning on May 4, 2020. On June 30, 2020, the president of the organization emailed all staff with internal email addresses the organization's strategic plan for reopening some of their day services for specific service recipients; all other consumers would continue to receive day services in their homes. Mask wearing was directly addressed as a required practice for all staff members working in group homes in this announcement (see Appendix A). The announcement indicated "Staff members are required to wear masks when they are in direct contact with clients or other staff." Furthermore, the organization announced that remote staff

would use iLink Support Technology® to monitor mask wearing and other safety precautions. The electronic communication did not include specific instructions for managers to disseminate the mask-wearing rules to DSPs, a schedule on which remote staff would monitor mask wearing, the consequences for mask-wearing compliance or noncompliance, or expectations with respect to whether persons served should wear masks.

In early- to mid-November 2020 (letter not dated), the organization announced a return to procedures like the original stay-at-home order (e.g., no visitors permitted into the home, community outings only outdoors [weather permitting], handwashing) given the record high numbers of positive COVID-19 cases in Kansas.

Finally, during ongoing consultation, the experimenter observed remote staff provide two types of feedback to DSPs. First, remote staff entered the names of DSPs who were observed cleaning, sanitizing, or wearing a mask into a weekly drawing. Winners received a small bag of candy in a coffee mug with the organization's logo or seasonal coffee mug and were entered into a monthly drawing for a $25 gift card. These drawings continued from March 2020 until February 2021. Winners of the weekly drawings were recognized on the organization's Workplace® website (i.e., similar to Facebook® for the organization where only employees have access). For example, a post might say "Our weekly iLink Support Technology® winners for wearing masks are [enter DSP name, county, and group home]. Thank you for all your hard work! We appreciate you!" It is unknown whether staff were notified if and when their name was added to the drawing. Although this was a procedure for which the organization programmed, the integrity to which the staff adhered and implemented this protocol is unknown.

Second, remote staff intermittently delivered vocal praise for mask wearing or prompted DSPs to wear their masks by using the iLink Support Technology® intercom system. Due to its

intermittency, it was not possible to monitor the provision of feedback. Several DSPs reported inconsistencies in the frequency with which remote staff deliver feedback. Moreover, on at least one occasion, the experimenter observed remote staff deliver a praise statement for appropriate mask wearing to a DSP who was wearing their mask inappropriately (i.e., the mask was not covering their nose). The primary researcher did not observe instances of corrective feedback.

Materials

Materials to complete an observation included access to iLink Support Technology®, recorded video footage of group homes, session data sheets (Appendix B), a copy of the organization's master schedule for each DSP (indicating the times of their shifts and the names of homes in which they will be working), and Google's random number generator. The organization saved recorded video footage for up to five days on a HIPAA-compliant server, which was its practice prior to the start of the study. In addition, the agency expected DSPs to wear masks (paid for at their own expense).

Dependent Variable and Data Collection

The dependent variable was appropriate mask wearing, which was defined as the mask covering the nose, extending below the mouth, secured behind the ears or head, combined with the absence of any other body parts touching the inside or outside of the mask. Examples of masks included face coverings that covered the nose, extended below the mouth and were secured behind the ears or head that were made of cloth or disposable materials. Non-examples of masks included bandanas, face sleeves, scarves, or similar clothing items.

Observers employed a 15-s momentary time sampling procedure for 3 min during four randomly selected hours of a participant's shift. That is, using a random number generator, I selected 2 hr during the first half of the shift and 2 hr during the second half of the shift for

observations. Data collection began at the top of each of the (four) randomly-selected hour and continued for a total of 3 min divided into 15-s intervals. Observers recorded data at the beginning of each interval. For example, suppose the random generator identified 8 AM, 10 AM, 3 PM, and 4 PM as the start times for observations. Observers would begin data collection at those start times. Data recording would begin at the top of each of those hours and take place every 15 s using a momentary time sampling procedure. Data collection would last for 3 min for each of the randomly selected hours. At the conclusion of data collection for that observation, observers would have collected data for 12 min total and recorded 48 intervals (four 15-s intervals per min x 3 min per hour x 4 hr). Thus, each data point included 48 15-s intervals sampled across participants' shifts[1].

Dependent variables were scored at the first second of the 15-s interval during which mask wearing could be observed. If a participant turned away from the camera or the visual acuity was too poor to score the dependent variables, I fast-forwarded the recording to the next opportunity to score and resumed data collection beginning at that second. If the participant was out of the home during the randomly selected observation hour and was gone for the entire hour, the random number generator was used to select a different observation-hour until the participant could be observed at some point during that 4-hr period or until there were no more opportunities to observe.

Procedures

Staff completed their work duties in the group homes as they typically would. That is, they engaged in both structured and unstructured activities during day service hours (e.g., art

[1] It was not possible to observe for 48 intervals during some observations due to community outings, staff schedule changes, etc. A minimum of 24 intervals were necessary to include the observations in our data analysis. Jane and Cindy had eight and nine observations with fewer than 48 intervals, respectively.

projects, music therapy, yoga, listened to music, watched television). Additionally, they assisted consumers with daily living tasks (e.g., cooking, cleaning, self-care routines, medication administration, toileting). Staff collected behavioral data, skill acquisition data, and completed daily documentation on consumers' wellbeing and health. Staff were expected to appropriately wear their mask on their nose and mouth for the duration of their shift. I did not provide programmed consequences for mask-wearing compliance or errors; however remote staff provided intermittent praise as described previously.

Results and Discussion

Figures 1, 2, and 3 depict the percentage of intervals with appropriate mask wearing for the DSPs for whom observations were completed. Nine staff (S1-9) had relatively high levels of appropriate mask wearing though some variability was observed. S12 showed increasing trends during the observation period. S10 and S11 demonstrated relatively low levels of appropriate mask wearing; however, variability was observed. S13-S17 demonstrated low levels of appropriate mask wearing.

Thirteen DSPs (S1-S13) did not complete the study for one or more of the following reasons: the staff (a) transferred to a home that did not have sufficient visual acuity to continue observations (S11), (b) left the agency prior to obtaining consent (S10, S12, S13), or (c) had high levels of appropriate mask wearing during baseline and did not warrant intervention (S1-9). Thus, four staff (S14-17) were recruited for participation and completed Study 2.

The purpose of Study 1 was to pilot the data collection procedures using iLink Support Technology® and to identify staff in need of intervention to improve mask wearing. iLink Support Technology® provided adequate visual acuity for several group homes; however, visual acuity was challenging in other group homes. Some cameras were placed in only one location in

the home (i.e., a single camera captured activities in the dining room, kitchen, and living room), which made it difficult to record mask wearing for employees moving about the home. In addition, the footage was grainy or pixelated for some cameras, which made it difficult to discriminate appropriate mask wearing. Finally, other factors affected observers' ability to record in some homes, including the lighting or technological issues combined with rapid movements of participants (i.e., lagging footage). Despite these challenges, four staff were recruited for participation in Study 2.

Two limitations in Study 1 warrant mention and should be addressed in Study 2. First, identifying the types of mask-wearing errors made by participants could inform aspects of an intervention and may be valuable information from a public-health perspective. Second, the pilot procedures did not include interobserver agreement data, which should be measured for the experimental analysis in Study 2.

Study 2

Method

Participants, Setting, and Materials

I met individually with each of the four individuals for whom we received consent to use their data for research purposes. I indicated that their employer sought assistance with improving employee appropriate mask wearing as they anticipate requiring their employees to continue to wear masks despite the development and administration of vaccines. The DSPs were offered an opportunity to use their data for research purposes; each of them signed a consent form in agreement and were provided a copy of the form (Appendix C). Additionally, each of them completed a demographic questionnaire (Appendix D; see Table 2). Jane was a 32-year-old white woman with a high school diploma who worked for the organization for eight months at

the start of the study. Iris was a 37-year-old Black woman with a high school diploma who worked for the organization for one year and six months at the start of the study. Giselle was a 32-year-old Black woman with an Associate's degree in occupational studies who worked for the organization for four years at the start of the study. Cindy was a 28-year-old Hispanic/Latinx woman with a high school diploma who worked for the organization for one year at the start of the study.

Study 2 took place in the same group-home setting as described for Study 1. All materials used in Study 1 remained the same for Study 2 including iLink Support Technology®. Finally, the organization continued to save recorded video footage for up to five days on their HIPAA-compliant server.

State Mandates and Organizational Policies and Practices

Table 1 outlines relevant state mandates, organizational policies and practices, and data collection timelines. Data collection for Study 2 occurred between December 2020 and June 2021. In January 2021, the organization announced that it would provide access to the Pfizer COVID-19 vaccine and an incentive of $50 for becoming fully vaccinated (i.e., receiving both doses of the two-dose vaccination process). On February 24, 2021, the organization announced that beginning the first week of March 2021, it would begin lifting COVID-19 restrictions by allowing consumers to return to day centers, jobs, volunteering, and community activities. However, safety protocols such as mask wearing would remain in place. During May 2021, the state of Kansas allowed its indoor mask mandate to expire. Specifically, the state no longer required individuals over the age of two to wear masks in indoor spaces where social distancing was not possible.

On June 9, 2021, the organization announced that masks were optional for staff who were fully vaccinated and working in certain programs (i.e., excluding intermediate care facilities). That is, homes that were licensed separately for those individuals who were typically more medically fragile had to continue to wear masks regardless of vaccination status. Individuals who were not fully vaccinated were required to continue to wear masks. To my knowledge, at the time this guideline was implemented, the organization did not have specific consequences for staff who were following (or not following) the guideline and no way to track whether staff who were (or were not) wearing masks were those who were vaccinated (or unvaccinated).

When participants were able to attend center-based day services with consumers, they were generally out of the home between 9:00 a.m. and 3:00 p.m. In these instances, observations were arranged differently. Because participants were not present in the home for 8 hours, data were collected during the hours prior to the staff leaving for day services and continued as soon as they arrived home for as many intervals as needed to total 48 intervals.

Data Collection Procedures and Dependent Variables

The primary dependent variable was appropriate mask wearing and it was defined, measured, and calculated identically as Study 1. The secondary dependent variables included four types of omission or commission errors: (a) not wearing a mask (i.e., *no mask*), (b) a mask not covering the nose (i.e., *no nose*), (c) a mask not covering the mouth (i.e., *no mouth*), and (d) touching the mask (i.e., *touching*). *No mask* was defined as instances in which a mask was absent entirely (i.e., not on the participant's body or out of sight) or was present but not touching any part of the participant's face (e.g., mask was positioned on furniture in view of the camera, participant twirled the mask by the ear straps on their finger, mask was worn as a "necklace" around the neck, wearing items that were not considered a mask [e.g., scarf]). *No nose* was

defined as instances in which the mask was secured behind both ears and positioned on the face, but not fully covering the tip of the participant's nose (e.g., top of mask was positioned on the upper lip or below the nostrils). *No mouth* was defined as instances in which the mask was secured behind both ears and positioned on the face, but not covering the participant's mouth and chin (e.g., bottom of mask positioned directly below the lower lip, top of the mask positioned inside the mouth). *Touching* was defined as instances in which the mask was secured behind both ears and positioned on the face, but another body part made contact with the inside or outside of the mask (e.g., adjusting the nose-bridge wire, pulling the mask away from the nose or mouth by the front of the mask, resting head in palm of hand with elbow on the table with tips of fingers pointing upward). Touching did not include instances in which a participant touched the earpieces or head piece of the mask (i.e., the fabric by which the mask is secured to the head) to adjust, put on, or take off the mask.

Appropriate mask wearing was incompatible with the four types of omission and commission errors (i.e., they could not be scored during the same interval). *No mask* and the other mask-wearing errors also could not be scored in the same interval. However, *no nose, no mouth,* and *touching* could occur in the same interval. For example, both *no nose* and *no mouth* were scored when participants wore their masks hooked around their ears and pulled below their chin, or when participants wore their mask hooked only on one ear.

I calculated the percentage of intervals in which mask-wearing errors occurred for the last three data points in each phase (i.e., the most stable data). *No mask* was calculated by dividing the number of *no mask* intervals by the total number of intervals observed for the last three data points of each phase and multiplying by 100 to yield a percentage. A similar formula was used for the mask-wearing errors. That is, to determine the percentage for each error, I divided the

number of intervals in which that error was recorded by the total number of intervals with mask-wearing errors for the final three data points of each phase and multiplied by 100 to yield a percentage.

Interobserver Agreement

An independent, second observer collected data on all dependent variables for at least 29% of sessions for each phase of the study for all participants to calculate interobserver agreement (IOA). An agreement was scored when both observers recorded all the participant's mask wearing identically across each of the dependent variables (i.e., occurrence, nonoccurrence, mask-wearing errors). A disagreement was scored when observers did not record all of the participant's mask wearing identically across each of the dependent variables. For example, an agreement was scored if the primary and secondary observers both scored *no nose* and *no mouth* and did not score *touching*, appropriate mask wearing, nor *no mask*. Similarly, a disagreement, would have been scored if the primary observer scored *no nose* and *no mouth*, but the secondary observer only scored *no nose*, and did not score *no mouth*. Interobserver agreement was calculated on an interval-by-interval basis by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. Mean agreement was 95.6% (range, 89.6%-100%), 91.9% (range, 83.3%-95.8%), 96.7% (range, 87.5%-100%), and 85.8% (range, 61.5%-100%) for Iris, Giselle, Jane, and Cindy, respectively (Table 3). Cindy had notably lower IOA than other participants because *no mask* was difficult to discriminate for Cindy as she wore her mask near the tip of her nose. Upon discovering this pattern, the primary researcher completed retraining with the secondary observer, which improved IOA.

Procedures

A multiple baseline design across participants with an embedded withdrawal was employed to evaluate the effects of an indicated intervention on appropriate mask wearing by participants. The analysis included baseline, feedback, feedback + monetary incentive (if needed), and withdrawal probes. Data were collected on consecutive workdays for each participant.

Pre-intervention Assessment. I administered an adapted PDC-HS (Appendix E) on the phone to individual participants privately in an interview lasting approximately 15 min. Adaptations to the PDC-HS primarily involved changing the term "staff" to "you" and "the task" to "mask wearing" to help the primary experimenter sound natural during the interview. For example, in the training section the question "Has the employee received formal training on this task? If yes, check all applicable training methods" (Carr et al., 2013) was changed to "Have you received any formal training on how to wear your mask? If yes, please describe what that entailed." In another example, from the resources, materials, and processes section, I changed "Are there sufficient numbers of trained staff available in the program?" (Carr et al., 2013) to "Are there other people with whom you work that are trained to wear their masks?"

Figure 1 depicts the results of the PDC-HS for all participants. The data are organized by participant (i.e., y-axis) and PDC-HS item (x-axis). Red indicates a participant reported a barrier to appropriate mask wearing. Green indicates a participant did not report a barrier to appropriate mask wearing, and an "X" indicates that the PDC-HS item was not applicable. Figure 2 depicts the results of the PDC-HS for all participants in the form of a bar graph, aggregated by PDC-HS section. The x-axis represents the percentage of items indicated as a potential barrier to performance. The y-axis represents each of the PDC-HS sections. Considering the responses

across all four participants, the findings did not suggest a problem in the *training; task clarification and prompting; or resources, materials, and processes* sections of the PDC-HS. Responses suggested an intervention was indicated in the *performance consequences, effort, and competition* section of the PDC-HS. Specifically, participants reported a lack of feedback and consequences for mask-wearing compliance. The results for each participant are described in greater detail below.

The PDC-HS results for Jane identified four potential barriers in the *performance consequences, effort, and competition* section. First, although Jane noted that remote staff seemed to monitor and provide feedback using iLink Support Technology®, the feedback was infrequent and inconsistent. A potential issue was indicated in that her supervisor did not monitor or provide feedback for her mask wearing. She also noted that masks were effortful and difficult to wear, which Jane reported was primarily because of her sinus problems and her sensitive skin, which made the mask uncomfortable. Finally, Jane reported other responsibilities take precedence over mask wearing (e.g., consumers needing to see your face during positive interactions). Jane identified two additional potential barriers. First, Jane expressed concern that the mask became uncomfortable when she gets hot while working with consumers who require full physical assistance (e.g., lifting), which raised a potential barrier about whether the work-environment was well-suited for mask wearing (*task clarification and prompting*). Second, Jane's response revealed one barrier in the *resources, materials, and processes* section when she indicated that she thought mask wearing could potentially suffer from other competing activities (e.g., talking on the phone).

Giselle's PDC-HS responses revealed deficits in each of the questions asked in the *performance consequences, effort, and competition* section. Giselle indicated that her supervisor

did not monitor or receive feedback for her mask wearing. Giselle shared that iLink remote coaches provided some feedback, but that it was always corrective, infrequent (i.e., monthly), and inconsistent. Giselle revealed that she did not see positive effects from mask wearing because, although consumers in her home did not contract COVID-19, consumers did not wear masks and were allowed to visit their families and then return to the group home. Further, she assumed that when consumers with whom she worked visited with their families, they may not have worn masks around the person during their visit. Subsequently, she expressed that it was pointless to wear masks if other safety precautions (e.g., staying home unless absolutely necessary) were not followed consistently. Giselle also reported that masks were effortful and difficult to wear as she preferred things not touch her face. She also revealed a belief that a consumer being able to see her face during a positive interaction takes precedence over mask wearing. In addition, a barrier was identified in the *training* section. Although Giselle indicated that she had never been formally trained on how to wear a mask appropriately, she demonstrated correct mask-wearing during baseline observations suggesting training was unnecessary. Giselle also suggested that she sometimes needed to complete tasks that were incompatible with mask wearing (e.g., being on the phone, eating), which was a response to a question in the *resources, materials, and processes* section.

Iris' responses were similar to those of her peers in that barriers were in the *performance consequences, effort, and competition* section. Iris indicated that although iLink remote staff monitor and provide feedback for mask wearing using iLink Support Technology®, it is inconsistent, infrequent, and typically only corrective (i.e., did not involve praise). When asked, she also reported that mask wearing was effortful or difficult. Iris stated that mask wearing was "awful" because of the physical work associated with her job. Finally, a barrier was noted with

respect to responsibilities or other priorities (e.g., consumers seeing the mouth when talking) taking precedence over mask wearing. There was one potential barrier noted in the *task clarification and prompting section* regarding whether the work environment was well-suited for mask wearing. Iris shared that she finds that assisting with self-care (e.g., showers) makes mask wearing uncomfortable. Additionally, a barrier was identified in the *resources, materials and processes* section in that there are tasks Iris needed to do during her shift that were incompatible with mask wearing (e.g., being on the phone, eating), and thus, made mask wearing difficult.

Cindy's PDC-HS results identified the most significant deficits in the *performance consequences, effort, and competition* section. Like all her peers, Cindy reported that her supervisor does not monitor or provide feedback for mask wearing. She shared that iLink remote staff seem to monitor and provide feedback for mask wearing. Unlike her peers, however, Cindy stated that she got feedback almost daily at the beginning of her shift and that it was positive. Direct observations revealed that feedback was not occurring daily as Cindy originally reported during the interview portion of the PDC-HS. Cindy indicated that mask wearing was difficult and effortful, especially during cooking and exercising (one of the day service activities her consumers often chose). Finally, a barrier was identified in that other activities or priorities take precedence over mask wearing (e.g., a consumer needs to see her mouth when she uses sign language). Cindy reported never having been trained on how to wear a mask appropriately, but she demonstrated correct mask-wearing during baseline observations suggesting training was unnecessary. There were two potential barriers identified in the *task clarification and prompting* section. First, Cindy reported that there were no signs with verbal descriptions or pictures in the work environment that describe or demonstrate how to appropriately wear a mask. Second, she responded that her environment is not well-suited for mask wearing, especially when trying to do

activities in the home (e.g., exercise, cooking). She also identified two potential barriers in the *resources, materials, and processes* section. First, Cindy reported that masks are not readily available despite explicitly asking her manager to make them available to her for approximately two months prior to our discussion. Second, she indicated that mask wearing is suffering from other tasks or activities that need to be completed (e.g., eating, drinking, talking on the phone).

In summary, all four participants had clear results indicating several potential barriers in the area of *performance consequences, effort, and competition* with minimal barriers identified in other categories (up to two for only one participant). Because we cannot control individual comfort level and wearing a mask was a mandate by organizational leaders, proposed interventions did not tackle mask-wearing discomfort. In addition, direct observations revealed that participants regularly took breaks during which they removed their masks (e.g., stepped outside to smoke a cigarette); thus, the intervention did not include scheduled breaks. Indicated interventions include feedback and potentially other consequences (e.g., feedback plus a monetary incentive), if necessary.

Baseline and Withdrawal. Baseline conditions were identical to Study 1. That is, during baseline participants engaged in both structured and unstructured activities during day service hours (e.g., art projects, music therapy, yoga, listened to music, watched television). Additionally, they assisted consumers with daily living tasks (e.g., cooking, cleaning, self-care routines, medication administration, toileting). They collected behavioral data, skill acquisition data, and completed daily documentation on consumers' wellbeing and health. Participants were expected to appropriately wear their mask on their nose and mouth for the duration of their shift. During the withdrawal, I conducted intermittent probes at one, three, and six weeks after

criterion was met during the previous phase. I did not provide programmed consequences for mask-wearing compliance or errors during baseline or withdrawal.

Feedback. The purpose of this phase was to evaluate the effects of feedback (i.e., an indicated intervention) on appropriate mask wearing. I scheduled a phone call meeting with participants at the start of this phase to introduce participants to the procedures using a script (Appendix F). Specifically, I summarized details from their PDC-HS interview that were helpful in designing the feedback intervention, described components of the intervention, and obtained their cell phone number for ongoing correspondence. Participants were also instructed to respond to the text message within 2 hr or the researcher would call them to ensure feedback was delivered.

The intervention included text-message feedback (Ruby & DiGennaro Reed, 2021) delivered via a cell phone. Before the first day of intervention, I sent a text message to participants reminding them of the intervention procedures. After each shift, I sent feedback via text message. Specific text-message components included a greeting with the participant's name (e.g., "Hello Sally"), a well wish (e.g., "I hope your day is going well"), a statement describing the appropriate mask-wearing percentage (e.g., "You wore your mask appropriately during 100% of my check-ins today"), a statement indicating whether this is a decrease or an increase from the previous observation (e.g., "This is an increase from yesterday"), a praise statement if performance is 100% or an increase from the previous shift (e.g., "Excellent job!") and a concluding well wish (e.g., "I hope you enjoy the rest of your shift!"). If a participant showed an increase in appropriate mask wearing by at least 10%, an emoji (e.g., thumbs up, smiley face) was included in the message after the praise statement. Additionally, if the participant showed a decrease in their percentage of appropriate mask wearing, I included a statement reminding

participants of mask wearing requirements (i.e., “Remember to wear your mask over your nose and mouth, and try not to touch it.”).

For any participants who demonstrated a pattern of distinct mask-wearing errors during intervention, I delivered specific text-message feedback related to these errors (i.e., recommended wearing a mask with a better fit to a participant who kept touching their mask because it frequently fell below their nose [Giselle], provided pictures of myself to demonstrate when the mask was “covering the nose” versus when it was not from both forward-facing and side-facing views [Cindy]). This feedback supplemented the previously described feedback and took place only once. The feedback phase continued until participant performance was 75% or higher across three consecutive observations. Participants received feedback on the third consecutive observations at or above 75% and were informed via text message that they would no longer receive feedback. The message content also included a statement thanking them for improving their mask wearing.

Feedback + Monetary Incentive. The purpose of this phase was to evaluate the effects of a monetary incentive (i.e., a $25 Visa gift card) combined with feedback on appropriate mask wearing. I introduced a monetary incentive if feedback alone did not produce mastery-level responding for several consecutive work weeks. To introduce this intervention, I texted participants and one staff “I’m excited to share some awesome news with you! Regarding the goal of improving mask wearing, I will continue to do my random check-ins each shift to observe your mask-wearing performance. Beginning (enter next scheduled workday), you will have an opportunity to earn a bonus for appropriate mask wearing! Remember that appropriate mask wearing means that you are wearing your mask over your nose and mouth, and trying not to touch it. If you have appropriate mask wearing during 90% of my check-ins for three

consecutive workdays, you will earn a $25 gift card! I know you can do it! Let me know if you have any questions!"

During this phase, feedback continued to be delivered in the same manner as the previous phase. That is, toward the end of each shift, I sent a text message that provided the participant feedback about their percentage of appropriate mask wearing, a statement about whether it was an improvement from the previous observation, praise for improvements (with an emoji if the improvement was greater than 10%), or a reminder to appropriately wear their mask (i.e., over their nose, mouth, and not touching the mask) if there was a decrease in performance. Feedback continued until participant performance was 90% or higher across three consecutive observations. Participants received feedback on the third consecutive observation at or above 90% and were informed via text message that they would no longer receive feedback. Additionally, the message content included a statement of gratitude for improving their mask wearing. Finally, the participant was notified that they had earned the $25 gift card and the participant and researcher identified a mutually agreeable time for the researcher to deliver it.

Procedural Integrity

An independent observer collected procedural integrity data on the introduction of feedback for all participants, which involved a scripted phone call (Appendix G). Procedural integrity data were also collected for all participants on 100% of text message feedback delivered using permanent products of text messages and phone call logs (Appendix H).

An independent observer collected data on the presence or absence of the researcher's intervention behaviors. Procedural integrity was calculated by dividing the number of correctly implemented behaviors by the number of correctly and incorrectly implemented and multiplying by 100. Procedural integrity involving the phone calls to introduce the feedback phase was 100%

for all participants. Procedural integrity for text-message feedback was 93% (range, 50%-100%), 92.7% (range, 50%-100%), 100%, and 97.1% (range, 75%-100%) for Iris, Giselle, Jane, and Cindy, respectively (Table 4). On one occasion, the text message screenshot for Iris was cut off and, thus, the secondary observer could not determine whether the experimenter included the percentage of appropriate mask wearing. In that same text message, a celebratory emoji was not provided in accordance with the procedures. For Giselle, there was one occasion on which an emoji was not provided and the experimenter did not call them after not responding to the text message within 2 hr.

Social Validity

At the end of the study, I distributed a social validity questionnaire to each participant, which was adapted from the Intervention Rating Profile-15 (Martens et al., 1985), to rate the acceptability of the intervention. The questionnaire contained 15 items and was rated on a six-point Likert-type scale (1 = *strongly disagree*; 6 = *strongly agree*) where higher scores represent higher acceptability (Appendix I). Each participant completed the questionnaire anonymously and in a private space. Participants were instructed to refrain from writing identifying information on the paper and to seal it in the provided envelope when it was completed. I opened the four sealed envelopes after the entire study was complete.

Results and Discussion

Intervals of Appropriate Mask Wearing

Figure 3 depicts the percentage of intervals with appropriate mask wearing for all participants. During baseline, Iris had 0% of intervals with appropriate mask wearing during three of four workdays (M = 10.5%; range, 0%-42%). After the introduction of feedback, Iris increased the percentage of intervals in which they wore their mask appropriately (M = 68.2%;

range, 44%-88%). They met criterion (i.e., 75% or higher across three consecutive observations) after 13 observations. Iris demonstrated immediate reductions in appropriate mask wearing upon withdrawal of the intervention. They wore their mask appropriately during 0%, 4%, and 6% of intervals for the one-, three-, and six-week probes respectively (M = 3.3%).

Giselle wore their mask appropriately during an average of 15.5% of intervals (range, 10%-23%) during baseline. After the introduction of feedback, Giselle showed gradual and steady increases in appropriate mask wearing. They met criterion after 13 observations (M = 64.7%; range, 21%-100%). During the withdrawal phase, Giselle showed similar levels to baseline. They wore their mask appropriately during 10%, 10%, and 27% of intervals for the one-, three-, and six-week probes, respectively (M = 15.6%).

During baseline, Jane had 0% intervals appropriate mask wearing across six observations. Upon the introduction of feedback, their appropriate mask wearing showed an immediately change in level, trend, and variability. Jane met criterion within six observations (M = 85.1%; range, 67%-100%). Their appropriate mask wearing maintained at high levels during the withdrawal phase. Jane demonstrated appropriate mask wearing during 100%, 100%, and 83% of intervals during the one-, three-, and six-week probes, respectively.

Cindy demonstrated variability in appropriate mask wearing during baseline and showed a decreasing trend (M = 28%; range, 6%-67%). After the introduction of feedback, Cindy's appropriate mask wearing remained highly variable with high overlap with baseline (M = 51.4%; range, 21% - 91%). As a result, I introduced a monetary incentive in addition to feedback. Cindy's behavior changed immediately upon introduction of the incentive. They wore their mask appropriately during a mean of 97.3% of intervals and met criterion in three observations. During

the withdrawal phase, Cindy wore their mask appropriately during 0% of intervals for all three probes, which was lower than the original baseline.

Secondary Dependent Variables

Figure 6 depicts the mean percentage of intervals of *no mask* for the last three data points for each phase and participant. These data suggest that for most phases, participants did not engage in *no mask*. That is, low levels of appropriate mask wearing were not due to the participants simply not wearing their mask. Increases in *no mask* were observed during the withdrawal phase (Iris M = 25%, Giselle M = 21.7%, Jane M = 3.7%, Cindy M = 75%).

Figure 7 depicts the mean percentage of intervals of the three mask-wearing errors for the last three data points for each phase and participant. Iris' mask-wearing errors included *no nose* and *no mouth.* Giselle also had relatively higher percentages of *no nose* and *no mouth.* Jane made errors during the baseline and withdrawal phases only; their most common error was *no nose.* During all phases, Cindy's most common error was *no nose*. They showed reductions in the percentage of intervals with errors during the monetary incentive + feedback and withdrawal phases.

Intervention Acceptability

Table 5 depicts the intervention acceptability data for each participant. In general, three of four participants found the intervention to be acceptable, appropriate, and effective. Participants had the highest ratings (M = 5.75; range 5-6) for questions regarding whether they would be willing to use the intervention again, and that the intervention would not result in negative side effects, would be appropriate for a variety of staff, is consistent with those they have experienced while working in their group home, is a fair way to manage inappropriate mask wearing by staff, is reasonable for inappropriate mask wearing, is a good way to manage

inappropriate mask wearing by staff, and would be beneficial overall. The lowest-rated item inquired about whether participants liked the procedures (*M* = 3.75; range 1-6). Overall, intervention acceptability results indicate that most participants found the intervention to be appropriate, fair, and reasonable.

Although several aspects of the intervention were rated as "strongly agree" (e.g., reasonable, appropriate), two participants provided lower ratings for how well they liked the intervention (i.e., 1 [strongly disagree] and 3 [slightly agree]). Although two participants rated this item lower, I hypothesize that they may acknowledge the importance of improving mask wearing, potentially leading to higher scores on other items. At least two participants reported to their supervisors toward the beginning of the study that they "did not appreciate feeling like they were being watched" and that they would prefer if I "would catch them being good." Interestingly, iLink Support Technology® had been in place years prior to the present studies and participants were regularly watched using this technology. Additionally, based on their baseline data, opportunities to "catch them being good" were few. Thus, as mentioned previously, I suspect that some participants did not like experiencing programmed consequences for mask-wearing compliance.

A more direct measure of social validity is to measure mask wearing when the intervention is no longer in effect (i.e., during the withdrawal phase). Presumably, participants who found mask wearing socially valid would continue to wear their mask when the intervention is discontinued. Three of the four participants did not maintain high levels of appropriate mask wearing suggesting they may not find mask wearing a socially valid behavior. To remedy this, future research may involve additional assessment of participants' preferences on aspects of mask wearing. For example, we did not assist participants in identifying masks that may have

been more comfortable (e.g., various types of cloth masks, surgical masks, “duckbill” masks). Although it is possible that most face masks are uncomfortable, future research should consider completing a more formal preference assessment with various types of masks to address comfort level and other concerns DSPs have about wearing masks around consumers. For example, some DSPs may prefer a transparent mask so communication partners can see their facial expressions. Additionally, it would be beneficial to determine if a correlation exists between mask comfort and mask-wearing adherence. I did not address this issue because participants were free to wear a mask that maximized comfort, but other variables, such as cost, may have made it difficult for them to identify a comfortable mask.

The purpose of the present study was to identify barriers to mask wearing by group-home staff and implement an intervention to address identified barriers. Results of the PDC-HS revealed that poor adherence to mask-wearing standards was due to a lack of performance consequences and feedback. An indicated intervention that included text-message feedback improved appropriate mask-wearing for three of four participants. The fourth participant required feedback plus a monetary incentive to meet the mastery criterion.

General Discussion

The purpose of Study 1 was to collect baseline data on appropriate mask wearing by group-home staff such that I could pilot the measurement procedures and identify participants for Study 2. Results of this study revealed that the measurement procedures could be adequately implemented in many programs using iLink Support Technology, some staff wear their masks appropriately and do not warrant intervention, and other staff engage in variable or low levels of appropriate mask wearing. The purpose of Study 2 was to use the PDC-HS (Carr et al., 2013) to identify variables responsible for low mask wearing and implement an indicated intervention to

increase mask wearing by group-home staff. The PDC-HS results suggested that participants could benefit from an intervention that incorporated feedback or other programmed consequences. Therefore, an intervention involving text-message feedback was implemented. Three of the four participants' mask wearing improved to criterion levels with feedback alone. One participant did not demonstrate increases in mask wearing after receiving feedback; thus, an intervention comprised of feedback and a monetary incentive was introduced. The packaged intervention produced immediate increases in mask wearing for this participant. Overall, participants found that feedback or feedback plus a monetary incentive were acceptable, appropriate, and reasonable interventions to improve appropriate mask wearing.

The present studies contribute to a sparse literature on employee mask wearing in several ways. First, these studies are among the first to address employee mask-wearing adherence due to health concerns in the workplace. Considering that workplaces are high-risk areas for transmission of COVID-19, documenting that a purely remote assessment and intervention (i.e., remote observations, text-message feedback, monetary incentives) produced desired outcomes is worthwhile.

Moreover, text-message feedback has been used in a small number of studies with mixed effects (e.g., Warrilow et al., 2020; Ruby & DiGennaro Reed, 2021). Warrilow et al. (2020) used a between-group repeated measures design to examine the effects of four conditions (i.e., no feedback, computer-delivered feedback, text-message feedback, and face-to-face feedback) on the completion of a check-proofing task by college students in a laboratory setting. In Study 2, text-message feedback produced similar performance levels as no feedback; any performance gains were likely due to practice effects.

In another study, Ruby and DiGennaro Reed (2021) evaluated the effects of a technology-based self-monitoring intervention on positive interactions between staff and consumers in group homes. Results showed that self-monitoring was an effective intervention to improve staff-consumer positive interactions. Text-message feedback was introduced for two participants when they did not meet mastery criterion. Upon the introduction of text-message feedback, both participants met mastery criterion within four to six sessions.

Text-message feedback has several potential benefits. Given the increased risk for COVID-19 transmission during face-to-face interactions, text-message feedback may be a safer option by which to provide feedback (compared to in-person feedback) as to avoid risking transmission, especially in a setting serving an at-risk population. Further, text messages may be preferred for other reasons, such as their convenience, cost-effectiveness, and response effort (Ruby & DiGennaro Reed, 2021). For example, sending feedback via text messages may be considered less effortful than arranging a face-to-face meeting that requires driving to another location, or making a phone call if one's availability is unknown. Finally, text messages may be preferred over other forms of communication, especially by relatively young staff and after lengthy shifts requiring physical effort.

Feedback may function in several ways depending on how and when it is implemented (Sleiman et al., 2020). It may function as a reinforcer or punisher, a prompt, an instruction, or a rule. Because the text-message feedback was delayed (i.e., >60 s), it is likely that an indirect-acting contingency was in effect. That is, participants likely generated rules for which consequences were likely to follow appropriate mask wearing. Participants may have generated a rule that appropriate mask wearing would produce approval by the researcher. Similarly, participants may have generated a rule that mask-wearing errors would produce disappointment

by the researcher. Although these mask-wearing behaviors may produce a certain consequence, the delay to feedback made it so that feedback did not directly reinforce or punish mask wearing. Feedback could also have functioned as a prompt to wear a mask at the next opportunity (i.e., the next shift).

Although I did not formally evaluate the function of feedback, it is possible that both positive and negative reinforcement contingencies were operating. Participants may have increased appropriate mask wearing to contact praise. Moreover, participants may have decreased inappropriate mask wearing to avoid corrective feedback. Because the delay to feedback exceeded 60 s, it is unlikely a direct-acting contingency was in effect.

This study could also inform future emergency preparedness for human services organizations serving at-risk individuals (e.g., older adults, adults with disabilities), especially those living in congregate settings. Given that individuals with disabilities living in congregate settings are among those most likely to die from COVID-19 (Landes, 2020), mask-wearing adherence warrants additional attention and resources to maintain the health and safety of both consumers and staff. The pandemic continues to impact the lives of Americans, particularly those who are medically fragile or at risk. Moreover, experts suggest that future pandemics are inevitable and chances for their occurrence are increasing (Dodds, 2019). Thus, identifying feasible and valid assessments to inform effective interventions is worthwhile. Relatedly, encouraging staff to wear masks may be helpful to prevent the spread of other illnesses aside from COVID-19, such as influenza. For example, organization leaders may be interested in implementing mask mandates on an annual basis during flu season.

A final contribution involves the finding that one participant (Jane) maintained high levels of appropriate mask wearing during the withdrawal phase of Study 2. Although

preliminary, these data suggest that appropriate mask wearing may be maintained at high levels for some staff after the withdrawal of an intervention. Identifying the variables that contributed to this outcome could have long-term benefits. It is likely that Jane's mask wearing contacted naturally occurring reinforcement (i.e., a behavior trap). Jane could also have developed a rule that governed her behavior. Future research should attempt to identify the process by which staff's behavior may maintain so that organizational leaders can leverage these for the betterment of all staff and consumers.

Relatedly, future research should identify the variables contributing to low levels of mask wearing during the withdrawal phase. The overjustification effect may explain the finding that three of four participants had lower mask-wearing percentages when the intervention was withdrawn compared to baseline. The overjustification effect proposes that the use of extrinsic rewards reduces intrinsic motivation to engage in a behavior that produced those rewards (Levy et al., 2017; Peters & Vollmer, 2014). Participants in Study 2 received putative reinforcement in the form of praise, feedback, and money (for one participant) for appropriate mask wearing. Once they met criterion, these extrinsic rewards were abruptly removed. Subsequently, appropriate mask wearing reduced to below baseline levels, which may be evidence of the overjustification effect. Another explanation for these findings involves successive behavioral contrast (Roane et al., 2003), which occurs when a change in the reinforcement schedule in one phase (i.e., feedback or feedback plus monetary incentive) affects the performance level of the target behavior in another phase (i.e., mask-wearing percentages during the withdrawal). It should be noted that the overjustification effect is not reliably demonstrated when extrinsic rewards are used; that is, research on the overjustification effect is mixed. Regardless, one way to prevent the effect is to use schedule thinning or dynamic fading of the putative reinforcer, rather

that abrupt withdrawal of the intervention as was adopted in Study 2. Future research should examine this issue more fully.

Despite the contributions, several limitations are worthy of note. Limitations involving the text-message feedback and monetary incentive should be addressed in future research. Although text-message feedback is potentially less resource intensive than other feedback modalities, it may not be as effective or preferred as other modalities. For example, Warrilow et al. (2020) evaluated various feedback modalities (i.e., no feedback, computer feedback, text feedback, face-to-face feedback) in a laboratory setting using a check-proofing task. Researchers found that the face-to-face feedback group had the greatest increase in initial performance and was the only feedback modality that had a significant difference in performance when compared to the no feedback group. Researchers should also determine preference for one feedback modality over another and conduct a cost analysis to determine whether text-message feedback is indeed resource efficient. Additionally, researchers should consider assessing individual preferences of feedback characteristics (e.g., vocal vs. written, immediate vs. delayed) before designing an intervention. Future researchers might also wish to evaluate a fading procedure after participants meet a mastery criterion to avoid abruptly withdrawing the intervention given the present findings. Previous research has shown interventionists can successfully fade a staff-level intervention and maintain high adherence (e.g., DiGennaro et al., 2007). Identifying ways to accomplish this across an entire workforce would be a contribution to the literature. An additional limitation involves the use of monetary incentives as they may be somewhat difficult for organizations to provide across many people and over time. Thus, we recommend future researchers further examine the use of lottery-based financial incentives (e.g., Luiselli et al.,

2009) for mask-wearing adherence and examine the effects of incentive magnitude on performance.

To prevent transmission of COVID-19, per university and organization regulations, research could not be conducted in person. Additionally, the organization was restricting visitors in group homes throughout the duration of the study. Although I was able to conduct research using iLink Technology®, several challenges impacted data collection, which are limitations to this study. Visual acuity was poor at times, making observations difficult. Uncontrolled variables—patterns on the mask, color of the mask matching skin tone, or participants wearing glasses—interacted with the iLink Technology and made it difficult to conduct observations. In these instances, I discontinued data collection either by removing a potential participant from the study or by adjusting when data collection occurred (i.e., fast-forward the recording until visual acuity was better). In addition, depending on where participants were positioned in the homes, observers may not have been able to determine whether they wore their masks appropriately. Although remote observations potentially limited reactivity, they were not without their challenges.

It is possible that the experimental design employed posed limitations. Specifically, I delivered a monetary incentive to one participant (Cindy) after they failed to meet criterion during the feedback phase. Cindy could have shared this information with other participants, which could have impacted their data. For example, knowledge that Cindy earned an incentive could have resulted in lower performance for Iris and Giselle during the withdrawal. The opposite effect could also take place. That is, perhaps Jane maintained high levels of appropriate mask wearing during the withdrawal having learned that a monetary incentive was possible. I tried to ensure that participants did not have opportunities to share information with one another;

for example, the four participants worked in three different homes. The two participants who worked together changed phases simultaneously. Furthermore, participants did not attend day services throughout the course of the study, which is the most likely place they would have had an opportunity to share information.

Although it would have been my preference to transition the procedures to the organization and assist them in organizing supports to maintain the intervention, I was unable to do so because local and organizational mask-wearing policies changed approximately one week after the withdrawal phase. Future studies should consider programming for maintenance and generalization. One option for the present study would have been to ask management teams and support departments (e.g., behavior analysts) who complete treatment integrity checks to simply note whether a staff wore their mask appropriately during observations.

Notwithstanding these limitations, the study's main findings suggest that an indicated intervention comprised of performance feedback (and, in one case, a monetary incentive) can be an effective way to increase appropriate mask wearing by staff working in group homes. This study contributes to the nearly nonexistent literature on mask wearing of human services staff.

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Table 1.

Date	*State Mandates, Organizational Policy and Practice, Research Dates*
March 16, 2020	The organization implemented a "soft quarantine", (e.g., halted all non-emergency visits from people living outside of the group homes, discontinued center-based day services, [day services provided at the group homes by group-home staff]), and DSPs were required to obtain approval for any outings.
March 30, 2020	The state of KS implemented stay-at-home orders for its residents; individuals were permitted to enter the community for essential tasks and items (e.g., food, medication).
March 2020 – February 2021	The organization implemented a weekly drawing for DSPs who appropriately cleaned, sanitized, and wore masks; remote staff provided vocal-verbal feedback to DSPs via iLink®.
April 30, 2020	The organization announced a continued implementation of the stay-at-home order protocol through at least end of May 2020 despite the planned phased re-opening by the state of KS beginning on May 4, 2020.
June 30, 2020	The organization announced their plan for reopening day service programs for specific service recipients; all other consumers continued to receive day services in their homes. **Mask wearing was directly addressed as a required practice for all staff members working in group homes**. Finally, the organization announced that their remote staff would use iLink Support Technology® to monitor mask wearing and other safety precautions.
"Early November" (letter not dated)	The organization announced their return to procedures identical to the original stay-at-home order (e.g., no visitors permitted into group homes, community outings only outdoors [weather permitting], handwashing).
December 2020	Researchers started data collection.
January 2021	The organization offered the Pfizer vaccine with a monetary incentive for receiving both doses.
February 24, 2021	The organization announced that during the first week of March 2021, all consumers could return to day services, jobs, volunteering, and community activities. Safety protocols (e.g., mask wearing) remained in place.

May 2021	The state of KS allowed the indoor mask mandate to expire. The consultation team learned that the organization was in discussion about lifting their mask mandate.
June 9, 2021	The organization announced that masks were optional for fully vaccinated staff in certain programs. The consultation team/researchers discontinued data collection.

Table 2.

Participant Demographics	Age	Sex	Race/ Ethnicity	Education level	Degree obtained	Employment length
Jane	32	Female	White	High school	N/A	8 months
Iris	37	Female	Black	High school	N/A	1 year, 6 months
Giselle	32	Female	Black	Associate's Degree	Occupational Studies	4 years
Cindy	28	Female	Hispanic/ Latinx	High school	N/A	1 year

Table 3.

Interobserver Agreement	Mean % of Sessions	Mean % IOA
Iris	45%	95.6%
Giselle	40%	91.9%
Jane	29.4%	96.7%
Cindy	39.1%	85.8%

Table 4.

Procedural Integrity	Feedback Introduction Call	Text Message Feedback
Iris	100%	93%
Giselle	100%	92.7%
Jane	100%	100%
Cindy	100%	97.1%

Table 5.

Social Validity Score by Question (Aggregated)	Mean Scores (1-6)
This would be an acceptable intervention for inappropriate mask wearing by staff.	4
Most staff would find this intervention appropriate to address inappropriate mask wearing.	5.5
This intervention should prove effective in changing inappropriate mask wearing by staff.	4
I would suggest the use of this intervention to other staff.	4.5
Staff wearing their mask inappropriately warrants the use of this intervention.	4.25
Most staff would find this intervention suitable for inappropriate mask wearing.	4.75
I would be willing to use this intervention again.	5.75
This intervention would not result in negative side effects.	5.75
This intervention would be appropriate for a variety of staff.	5.75
This intervention is consistent with those I've experienced while working in this group home.	5.75
This intervention is a fair way to manage inappropriate mask wearing by staff.	5.75
This intervention is reasonable for inappropriate mask wearing by staff.	5.75
I liked the procedures used in this intervention.	3.75
This intervention is a good way to manage inappropriate mask wearing by staff.	5.75
Overall, this intervention would be beneficial for the staff.	5.75

Figure 1.

Percentage of Intervals with Appropriate Mask Wearing (S1 - S6)

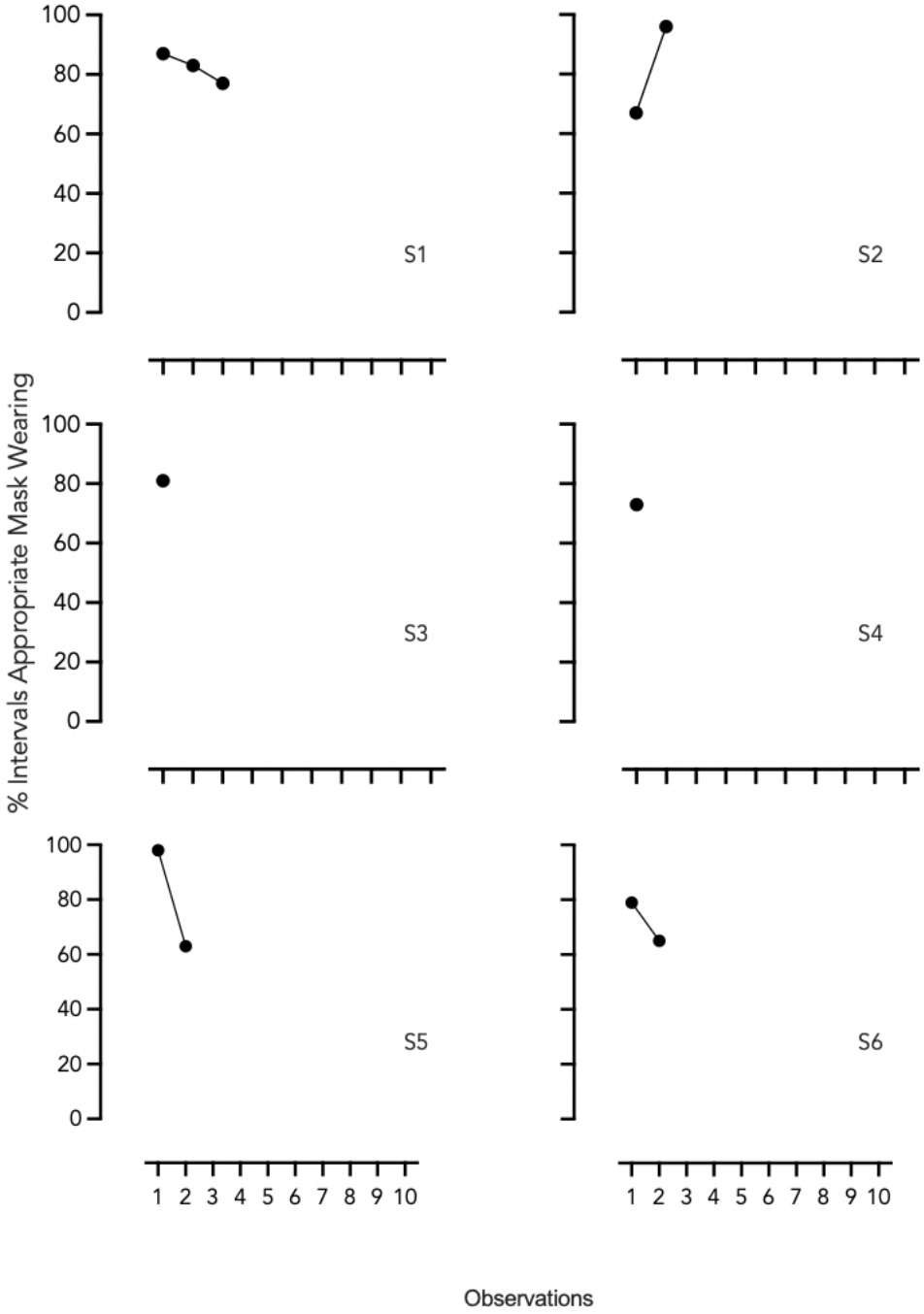


Figure 2.

Percentage of Intervals with Appropriate Mask Wearing (S7 – S12)

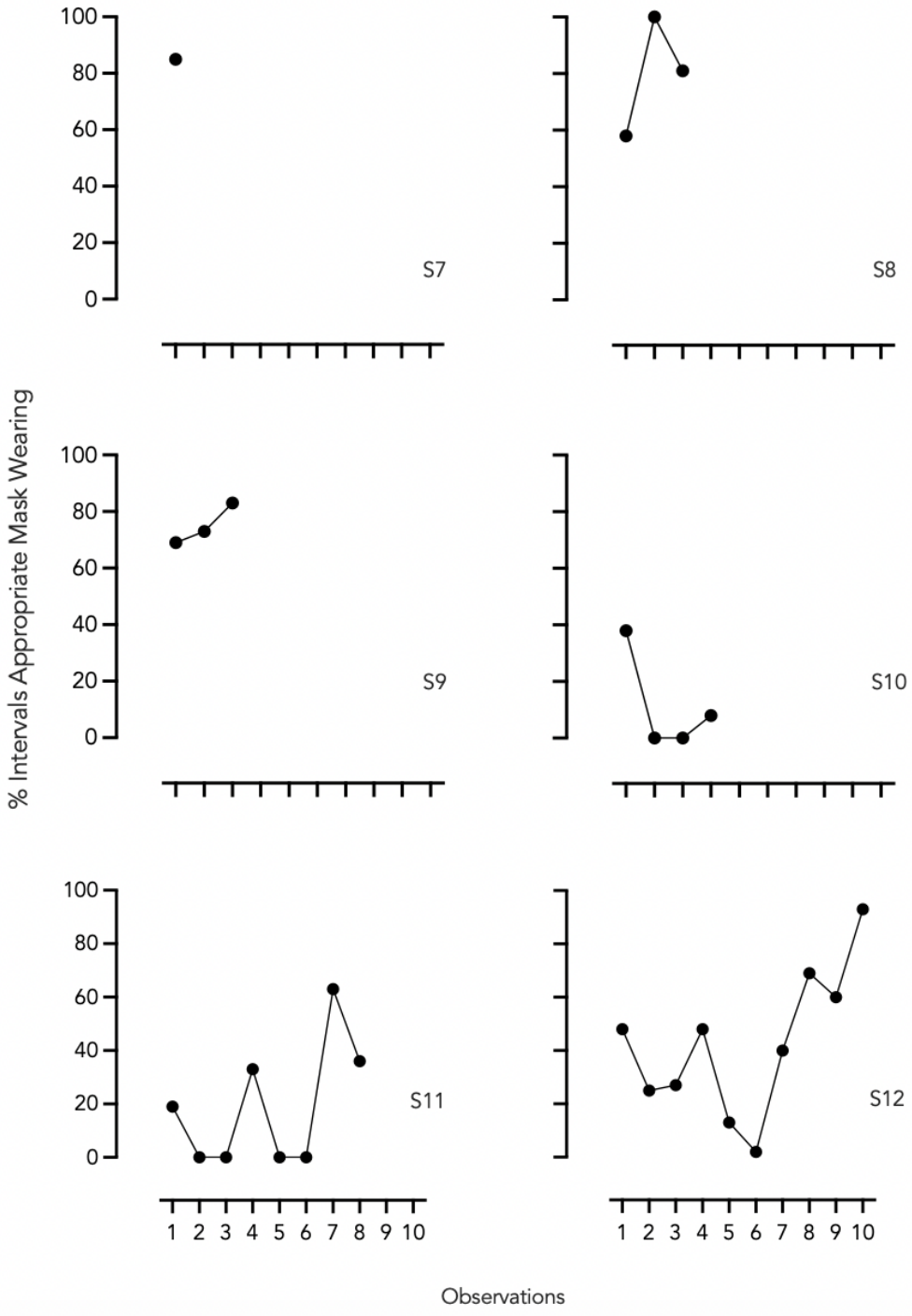


Figure 3.

Percentage of Intervals with Appropriate Mask Wearing (S13 – S17)

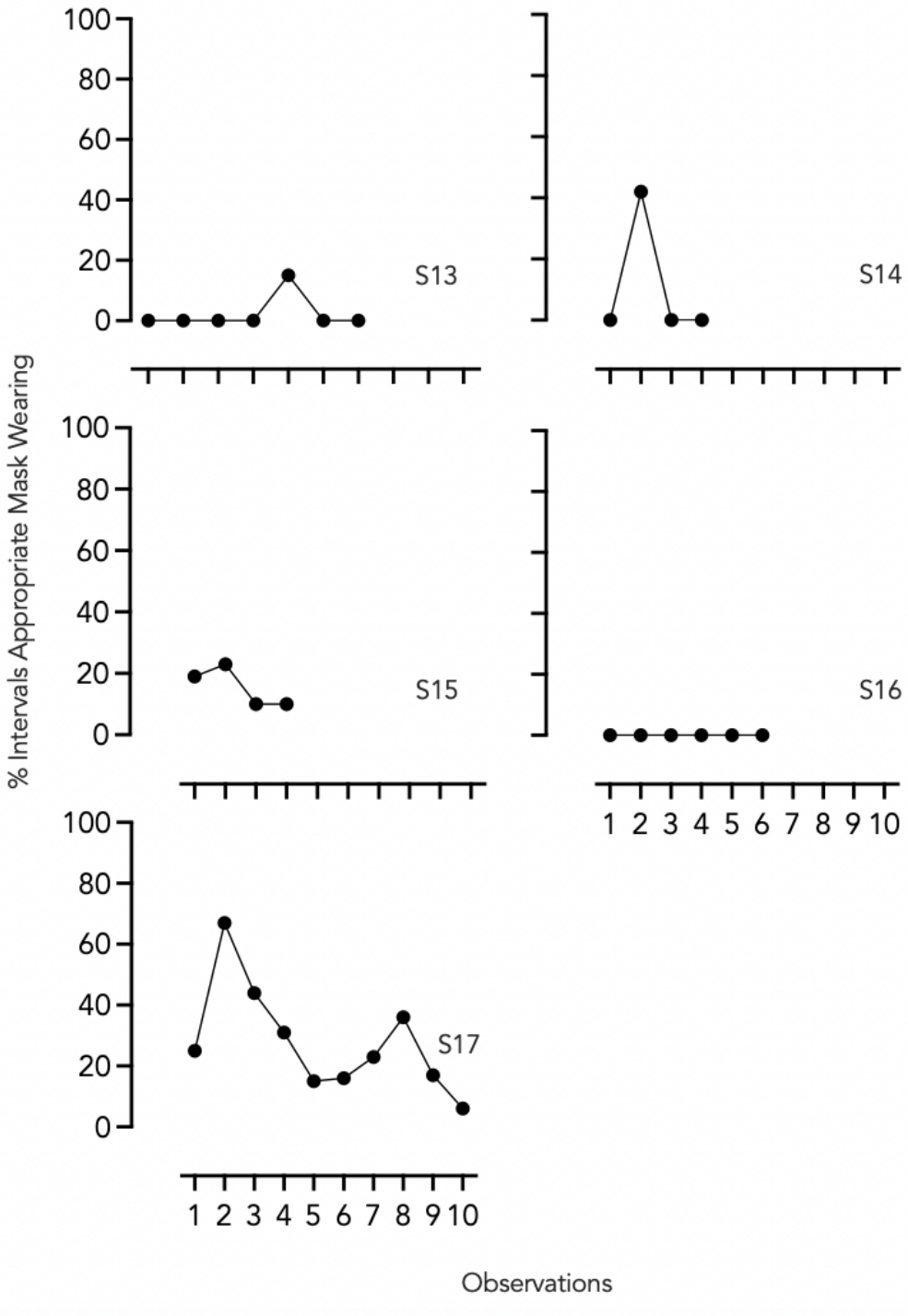


Figure 4.

PDC-HS(A) Results for All Participants

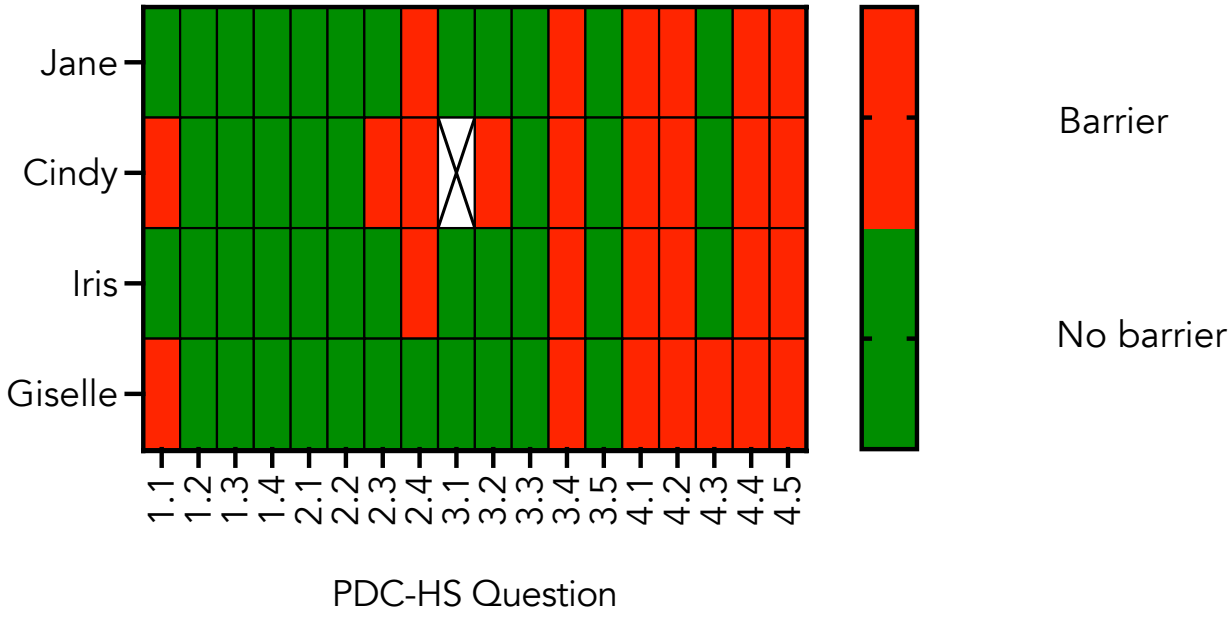


Figure 5.

PDC-HS(A) Results for All Participants (bar graph)

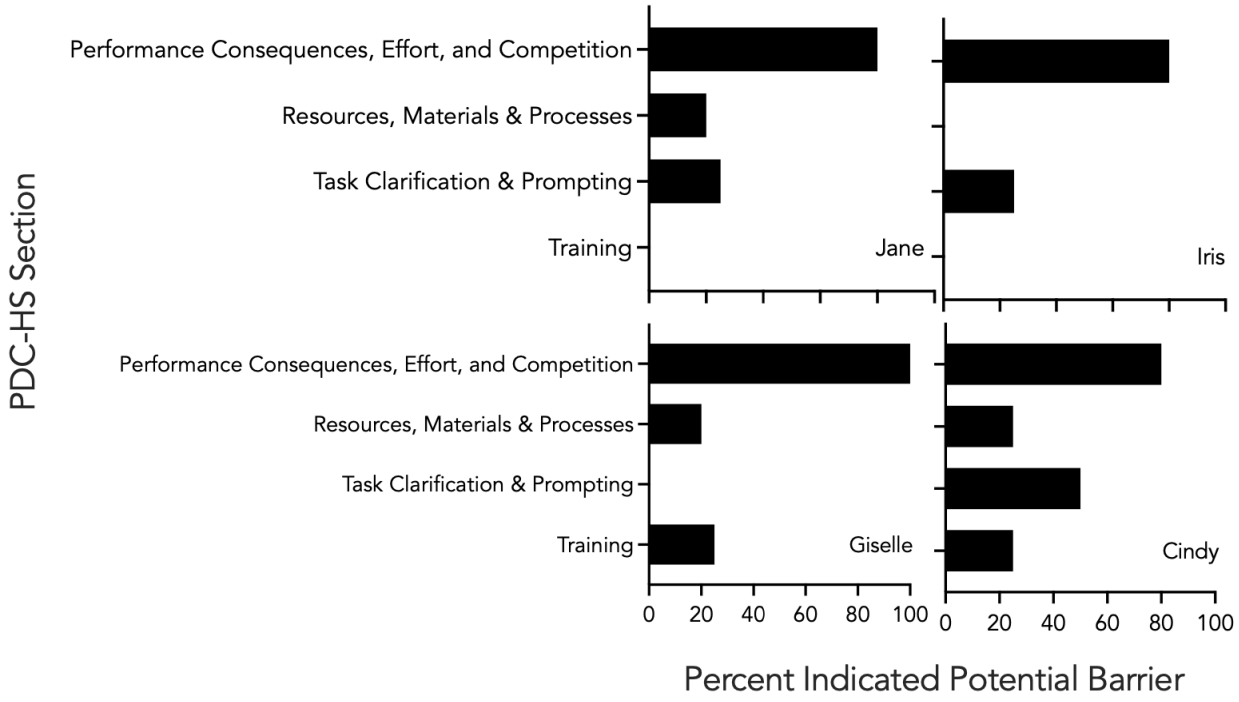


Figure 6.

Percentage of Intervals with Appropriate Mask Wearing

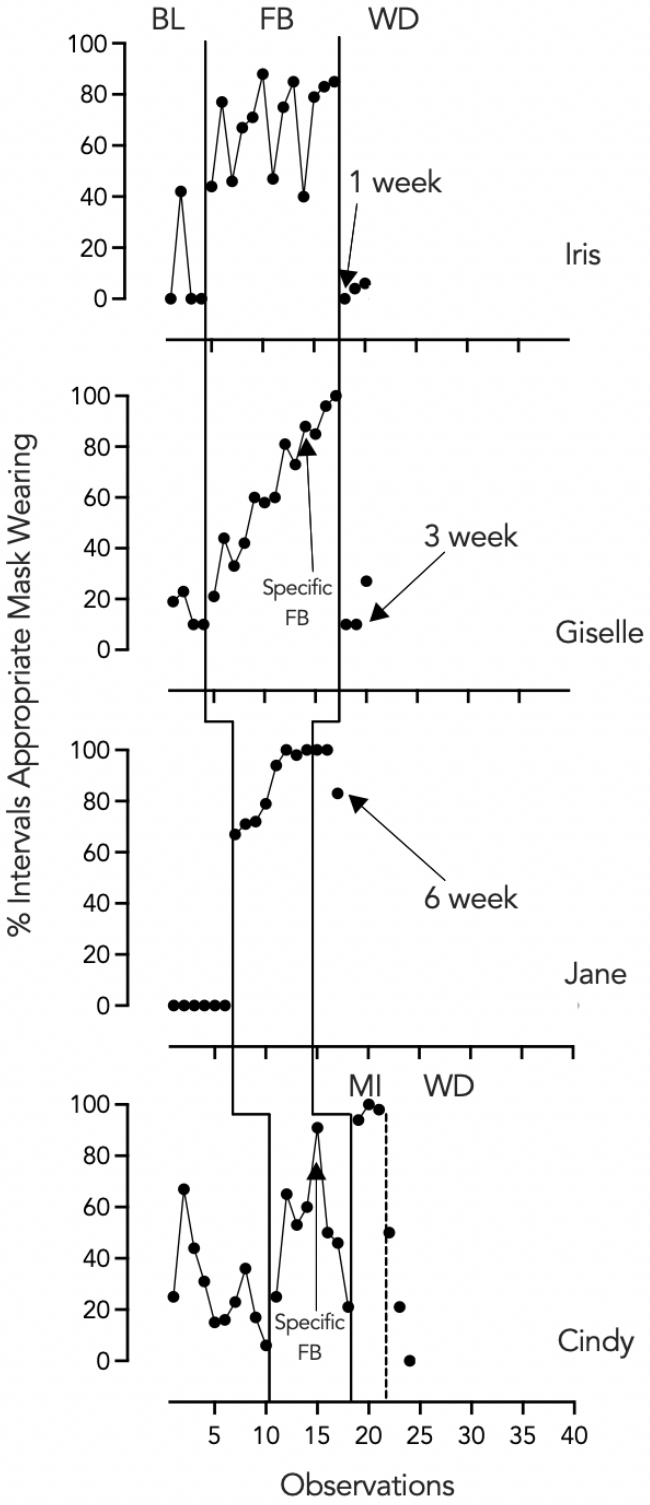


Figure 7.

Average Percentage of Intervals "No Mask"

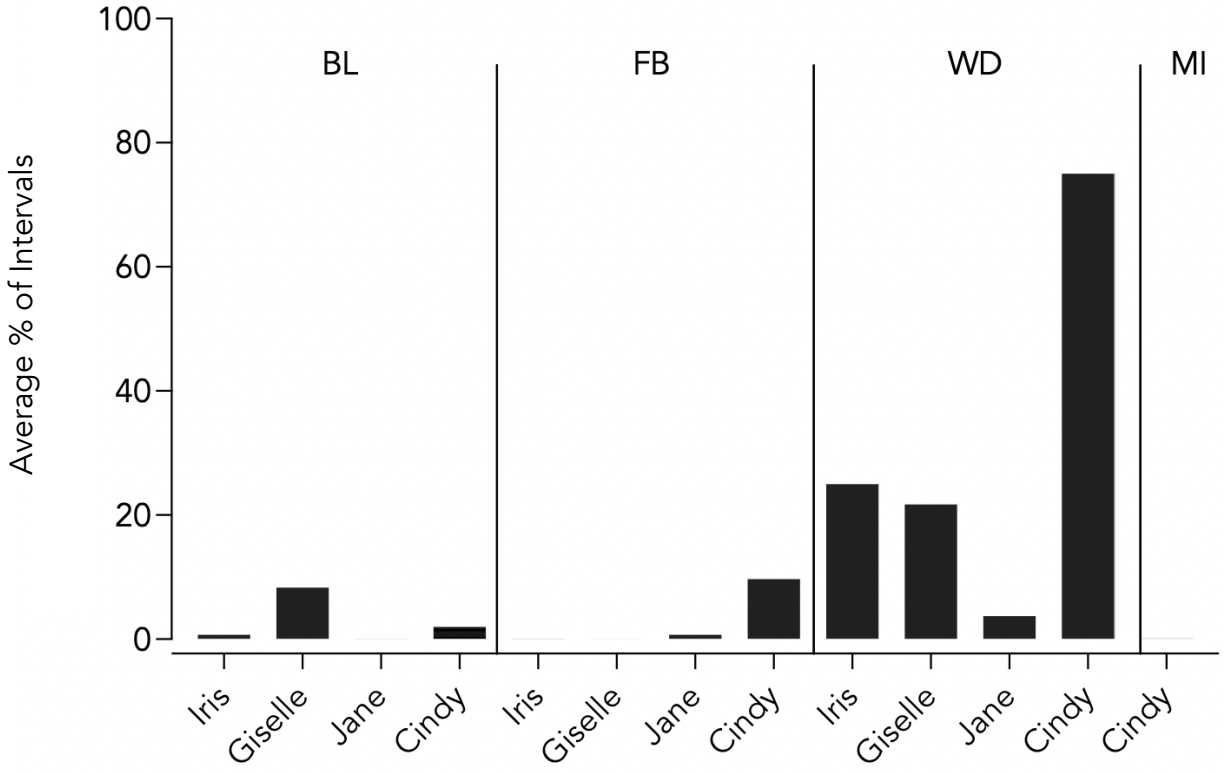
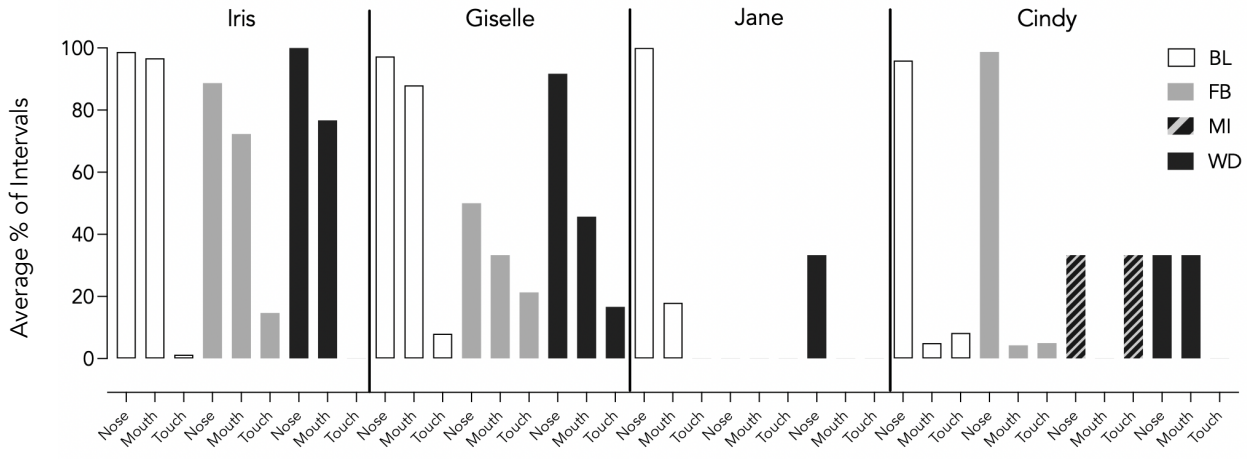


Figure 8.

Average Percentage of Intervals with Mask Errors



Appendix A

President of Organization Letter to Employees

June 30, 2020

XXX Friends and Families,
Many of our individuals are eager to get back to a sense of normalcy and we've had many questions about what that looks like as the State continues the reopening of Kansas. I wanted to reach out directly and provide some important information about what you can expect from XXX.

We have been closely monitoring the COVID-19 data as businesses have reopened and as people have returned to typical activities. The data shows that COVID-19 cases, and more importantly, hospitalizations and deaths are increasing. This is very concerning for us as a provider since many of the individuals we serve are at higher risk of severe complications or even death due to COVID-19. In fact, several I/DD providers (such as Kansas Neurological Institute) are experiencing significant numbers of positive cases. Since March we have been researching ways to access widespread and ongoing testing for staff and clients, but testing remains limited and difficult to access. All that being said, we feel like it is prudent that we continue to take an aggressive approach to keep those we serve safe as spikes in cases are occurring now and as we anticipate a second wave in the fall/winter.

For individuals currently living in one of XXX's residential homes who participate in XXX day services, day services will continue to be provided from within each home--though, there will be safe, planned community outings and activities to approved places, such as XXX and places where it is easy to maintain distancing.

XXX residential clients that received day services from an outside day services provider prior to COVID-19 will continue day services from XXX. This will be in effect through 8/1. This strategy is consistent with what all other long-term residential/day providers are doing in our region. We know this is not ideal, but individuals going to different providers and working with multiple staff increases the risk and spread of exposure exponentially. We are limiting the number of staff who work in a home and limiting group sizes all in an effort to reduce the number of people who could potentially create an exposure. (Day Program Director) and her team have been providing day activities to provide engagement, learning, and opportunities so that individuals feel a sense of community and connectedness. We have had a great response by the individuals and staff and are happy to share photos and a list of activities for those who are curious to see how we have been doing this since March.

We will continue to limit visitors to the homes to direct care staff and home managers to reduce the risk of exposure to individuals and staff. Staff members will be required to have a temperature check and complete our symptoms questionnaire prior to entry. Staff members are required to wear masks when they are in direct contact with

clients or other staff. iLink remote coaches will be monitoring mask usage, handwashing, disinfecting, and cleaning schedules to ensure they are occurring per protocol. For families that are eager to visit the homes, we encourage them to contact home managers to arrange for a virtual tour of the home via facetime or google meet. We understand that families want to continue to go on outings with their loved ones, but we do ask that you consider the activity and follow CDC recommendations to reduce exposure. All travel will be assessed and decisions on return will be made based on the risk of the type of travel and destination.

Of course, our first priority is protecting the individuals and staff who are essential to providing care. The increase in COVID-19 cases is beginning to hit home for I/DD services, as most people we serve cannot easily follow CDC guidelines for social distancing or other safeguards. Unfortunately, COVID-19 indicators are not moving in the right direction and we need to be cautious. We will continue to monitor risks and develop plans for spikes and waves of the predicted outbreak in the coming months. We are grateful that those we serve have remained healthy and happy through all of this. Thank you for your help.

Best Regards,

XXX President/CEO

Appendix B

Session Data Sheet

<u>Instructions</u>: Circle the data codes according to the key using momentary time sampling. Mark all that apply. An interval is skipped when visual acuity is poor.
<u>Appropriate mask-wearing</u>: the mask covers the tip of the nose over the nostrils extending around the corners of and below the mouth while remaining secure behind the ears without extremities or objects touching the inside (e.g., touching the nose with fingers, wiping upper-lip with hand, using pen to scratch chin) or outside (e.g., pulling the mask away from face, wiping mask with arm or shoulder) of the mask. Participants must wear designated masks provided (non-examples of masks include bandanas, face sleeves, scarves).
<u>Key:</u> + = appropriate mask wearing, N = Mask not on nose, X= interval skipped, 0 = no mask , M = Mask not on mouth, T = Touching mask

+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T
+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T
+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T
+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T	+ N X 0 M T

Notes:

Total intervals:

Total intervals appropriate:

Total intervals 0 mask:

Total intervals with any errors (excl. 0 mask & appropriate mask):
N=
M=
T=

Appendix C

Adult Informed Consent Statement

An Evaluation of the Performance Diagnostic Checklist-Human Services on Mask Wearing by Staff Working in Group Homes

KEY INFORMATION

- This project is studying mask wearing for staff working in group homes.
- Although staff at XX will experience video observation, assessment of mask wearing, and intervention to improve mask wearing, your consent to allow the primary researcher to use your data in this research project is completely voluntary.
- Your participation will not take any time outside of your normal working hours at your job on a regular basis as you will be observed during your normal shift using video observations (i.e., iLink Support Technology®. However, participants may be asked to participate in a brief interview or supplemental discussion regarding mask wearing and may be asked to attend a training, receive feedback, or participate in other activities based on the staff interview. Research activities will last up to, approximately, nine months (all during your regular work shifts).
- You will be asked to do the following procedures:
    - Attend normal scheduled shifts at XX;
    - Answer questions about mask-wearing; and
    - Attend a training about mask wearing, receive feedback, or participate in other activities as indicated by the staff interview.
- Confidentiality of participants will be protected to the fullest extent of the law, XX, and XX. All identifiable, personal, or video files will be maintained by XX in a HIPAA compliant storage file. Participant data sheets will be de-identified and stored in a locked cabinet within a locked office.
- Although all eligible staff at XX will experience the procedures of this study, your alternative to consenting for the primary researcher to use your data is not to consent for the primary researcher to use your data for the purposes of the study. Not consenting to the research does not change XX's expectations that your employment involves being observed, participating in discussions about your job responsibilities, and participating in activities to foster desired work performance (such as training, feedback, etc).

DETAILED INFORMATION

INTRODUCTION

The Department of XX at the University of XX supports the practice of protection for human subjects participating in research. The following information is provided for you to decide whether you wish to participate in the present study. You may refuse to sign this form and not participate in this study. You should be aware that even if you agree to participate, you are free to withdraw at any time. If you do withdraw from this study, it will not affect your relationship with this unit, the services it may provide to you, or the University of XX.

The purpose of this study is to evaluate the use of the Performance Diagnostic Checklist-Human Services assessment on mask wearing for staff working in group homes serving adults with intellectual and developmental disabilities.

PROCEDURES

You will be asked to continue to report to work and perform your responsibilities as you typically do. The Performance Diagnostic Checklist-Human Services is an assessment tool developed to help employees in human services settings improve their performance. This assessment tool uses an interview format that takes approximately 15 minutes. Following completion of the interview, the researchers will develop supports to help you with wearing your mask. Possible interventions may include performance feedback, training, task clarification, and other research-supported techniques. Supports implemented will depend upon the results of the assessment tool. Video recordings will be used for data collection during this study. Videos are maintained and stored by XX and will not be paired with any documentation with your name on it. After five days, XX's system automatically deletes the recording. However, for the purposes of this study, recordings of data will be maintained on a HIPAA compliant server at XX and will be destroyed after the study is complete.

RISKS

Minimal risks are anticipated with participation in this study. We believe that participation will not cause levels of risk or anticipated harm greater than what you experience in your daily life. This study will involve video and audio footage. Although these files are maintained on HIPAA compliant servers and operated by XX, you may be identifiable. Further, collecting data on your performance may impact employability if released. Finally, you may experience discomfort associated with mask wearing.

To remedy the risks discussed above, all identifiable, personal, or sensitive video files will remain on a HIPAA compliant server operated and maintained by XX. De-identified data sheets will be kept and will be coded prior to transmission onto XX server storage, which is also HIPAA compliant. Your performance will not influence your employability at XX. Specifically, participation in this study, data collected by researchers, and responses provided during interviews will not affect your employment with XX. Researchers will not share identifiable data with XX supervisors. However, in order to safeguard consumers, XX reserves the right to investigate allegations of abuse or neglect that are discovered as a part of the study, which may result in termination of employment pending outcomes of an investigation.

BENEFITS

Your participation in this study will provide direct benefits to you because it will help improve your mask wearing at work. Your participation in this study will benefit society by providing information around the utility of the Performance Diagnostic Checklist-Human Services.

PAYMENT TO PARTICIPANTS

Participants will not receive compensation for their participation in this study.

PARTICIPANT CONFIDENTIALITY

Your name will not be associated in any publication or presentation with the information collected about you or with the research findings from this study. Instead, the researcher(s) will use a pseudonym rather than your name. Your identifiable information will not be shared unless (a) it is required by law or university policy, or (b) you give written permission.

Permission granted on this date to use and disclose your information remains in effect indefinitely. By signing this form, you give permission for the use and disclosure of your information for purposes of this study at any time in the future.

REFUSAL TO SIGN CONSENT AND AUTHORIZATION
You are not required to sign this Consent and Authorization form and you may refuse to do so without affecting your right to any services you are receiving or may receive from the University of XX or to participate in any programs or events of the University of XX. However, if you refuse to sign, you cannot participate in this study.

CANCELLING THIS CONSENT AND AUTHORIZATION
You may withdraw your consent to participate in this study at any time. You also have the right to cancel your permission to use and disclose further information collected about you, in writing, at any time, by sending your written request to:
Marren Leon-Barajas
4085 Dole Human Development Center
University of Kansas
1000 Sunnyside Avenue
Lawrence, KS 66045

If you cancel permission to use your information, the researchers will stop collecting additional information about you. However, the research team may use and disclose information that was gathered before they received your cancellation, as described above.

QUESTIONS ABOUT PARTICIPATION
Questions about procedures should be directed to the researcher(s) listed at the end of this consent form.

PARTICIPANT CERTIFICATION:
I have read this Consent and Authorization form. I have had the opportunity to ask, and I have received answers to, any questions I had regarding the study. I understand that if I have any additional questions about my rights as a research participant, I may call (785) 864-7429 or (785) 864-7385, write the Human Research Protection Program (HRPP), University of Kansas, 2385 Irving Hill Road, Lawrence, Kansas 66045-7568, or email irb@ku.edu.

I agree to take part in this study as a research participant. By checking the box below, I affirm that I am at least 18 years old and that I have received a copy of this Consent and Authorization form.

☐ By checking this box, I consent to allow the researcher to use my data in this research project.

Researcher Contact Information

Marren Leon-Barajas
Principal Investigator
Department of Applied Behavioral Science
4085 Dole Human Development Center
University of Kansas
Lawrence, KS 66045
913-XXX-XXXX

Dr. Florence DiGennaro Reed
Faculty Supervisor
Department of Applied Behavioral Science
4020 Dole Human Development Center
University of Kansas
Lawrence, KS 66045
785-XXX-XXXX

Appendix D

Demographic Questionnaire

Participant ID: _____

Age: _____

Gender:

- ☐ Man
- ☐ Woman
- ☐ Transgender man
- ☐ Transgender woman
- ☐ Gender variant/ Non-conforming
- ☐ Not listed _____
- ☐ Prefer not to respond

Race/ethnic background:

- ☐ White/ Caucasian
- ☐ Black/African American
- ☐ Hispanic/ Latinx
- ☐ Asian
- ☐ Native American
- ☐ Pacific Islander
- ☐ Mixed
- ☐ Other

What is your highest level of education?

- ☐ High school/ GED
- ☐ Some college, but did not obtain a degree
- ☐ Associate's degree
- ☐ Bachelor's degree
- ☐ Master's degree
- ☐ Doctorate

If you obtained a degree, what was your major or field of study? _____

How long have you been employed at GoodLife Innovations Inc.? _____

Appendix E

Performance Diagnostic Checklist-Human Services (Adapted)

PDC-HS(A) *Performance Diagnostic Checklist–Human Services (Adapted)*

Employee's Name: Interviewer: Date:

Start time: End time:

Introductory Script:

- My name is Marren and I'm a behavior analyst working in XX's HCBS homes in Johnson County. I also work with the performance management center through XX's partnership with XX to help improve training and workplace conditions for employees. Recently, XX noticed various mask-wearing errors made by staff working in the homes and asked us to help. Your knowledge and input on this topic are essential in helping us find an appropriate solution to improve mask-wearing. Anything you tell me will remain confidential. I'll ensure that XX doesn't know which staff members made which comments. I'll ask you several yes/no questions on which you can provide additional information if you want. Do you have any questions before we begin?

SECTION 1: TRAINING

1	❍ Yes ❍ No	Have you received any formal training on how to wear your mask? If yes, please describe what that entailed. Comments:
2	❍ Yes ❍ No	Can you tell me why GoodLife would be concerned about employees appropriately wearing their mask? Comments:

3	❍ Yes ❍ No	Show me how to wear your mask appropriately. (If person demonstrates appropriate mask wearing, mark yes. If person does not demonstrate appropriate mask wearing, mark no).
4	❍ Yes ❍ No	Sometimes you may need to put your mask on quickly… say if it accidentally falls off and you're in a room with consumers. If you need to put your mask on quickly, are you able to do so? Show me. If person does not demonstrate appropriate mask wearing, mark no.

SECTION 2: TASK CLARIFICATION & PROMPTING

1	❍ Yes ❍ No	Have you been told that you are expected to wear your mask? If so, by whom? And by what mode of communication (e.g., signs, emails, staff communication book). Comments:
2	❍ Yes ❍ No	What is the purpose of mask wearing? Comments:
3	❍ Yes ❍ No	Are there signs with verbal descriptions and/or pictures in your work environment that describe or show how to wear your mask? If so, what do they look like? Comments:
4	❍ Yes ❍ No	Is your work environment well-suited for mask wearing (e.g., comfortable temperature)? If not, what factors in your environment affect your ability or desire to wear your mask appropriately? Comments:

SECTION 3: RESOURCES, MATERIALS, & PROCESSES

1	❍ Yes ❍ No	Are there other people with whom you work that are trained to wear their masks?
2	❍ Yes ❍ No	Are masks readily available (e.g., easy to find, nearby) to you for regular use during your work shifts? Comments:
3	❍ Yes ❍ No	Are masks that you wear to work well-made for use during your work shift?
4	❍ Yes ❍ No	Is appropriate mask wearing suffering from other activities you need to complete such as eating, drinking, talking on the phone, etc.? If so, what specific things? Comments:
5	❍ Yes ❍ No	If you answered YES for Question 5, are other employees able to step in to help you maintain appropriate mask wearing? Comments:

SECTION 4: PERFORMANCE CONSEQUENCES, EFFORT, & COMPETITION

1	❍ Yes ❍ No	Is your mask wearing ever directly monitored by a supervisor? If so, how often? ❍ Hourly ❍ Daily ❍ Weekly ❍ Monthly ❍ Other:
2	❍ Yes ❍ No	Do you ever receive feedback about wearing a mask? If yes, indicate below. By whom?: How often?: Delay from event?: Check all that apply: Feedback Focus: ❍ Positive ❍ Corrective Feedback Type: ❍ Written ❍ Verbal ❍ Graphed ❍ Other:

3	❍ Yes ❍ No	Do you ever see the effects of appropriate mask wearing (e.g., consumers do not contract COVID-19)? If yes, how?
4	❍ Yes ❍ No	Do you think wearing a mask is particularly effortful or difficult? If yes, why?
5	❍ Yes ❍ No	Do other things take precedence over mask wearing (e.g., comfort, consumers being able to see you smile during positive interaction)? If yes, indicate below. Comments: _____

Is there any other information you want to share with me that would be helpful? Any other variables I should consider?

Appendix F

Introduction to Feedback Phone Call Script

Hello (staff name), its Marren from the Performance Management Center through XX's partnership with KU. We spoke briefly a couple of weeks ago and you graciously shared some of your thoughts and experiences regarding mask wearing. Your input was very helpful and aligned with other DSPs' feedback. We heard you all loud and clear that folks feel like they are only getting feedback from iLink and that it is often only to tell you that you're doing something wrong. While maintaining all staffs' anonymity, we shared the most common comments we received with the President and Senior Vice President and they support us in improving barriers to mask wearing based on DSP input. Because your and others' input involved a lack of feedback, that's one thing we would like to focus on doing for you all. Do you have any questions before I talk to you about what the feedback will look like?

We will be starting a new routine with a small group of staff prior to doing it with a larger group. This will involve receiving feedback about mask wearing at the end of each shift. We toyed around with the idea of doing phone calls, but we think people would find it more convenient if it was a simple text message that describes your mask-wearing performance. What we will be looking for is that you are wearing your mask over your nose, over your mouth, and that you are not touching it 100% of the time when I complete four random check-ins. Your text message feedback will tell you the percentage of appropriate mask wearing and whether it was an increase or decrease from your previous shift. We want to celebrate with you when you do a great job and we want to provide reminders when you need some extra support. My hope is that you will let me know that you received the feedback by sending a "thumbs up" emoji or a quick reply such as "got it". If you don't send a reply within about an hour, I will call you to provide the feedback.

Could you please give me your cell phone number? Just to let you know, on the morning of your first shift on which I will provide feedback, I'm going to send you a reminder text to let you know that I'm starting feedback that day. Thanks for input again, so excited.

Appendix G

Introduction to Feedback Phone Call Checklist

Instructions: Circle "yes" if the researcher completed the step. Circle "no" if the researcher did not complete the step.

Secondary Observer: _____

Integrity Checklist on Feedback Intervention Discussion:

		Step completed?
1	Marren states that feedback will be provided via text message at the end of the shift.	Yes No
2	Marren states that the expectation is that staff wear their masks over the nose and mouth and that they do not touch it 100% of the time.	Yes No
3	Marren states that feedback will involve telling them what their percentage of appropriate mask wearing was.	Yes No
4	Marren states that feedback will involve telling them whether there was an increase or decrease from the previous shift.	Yes No
5	Marren requests the staff to respond to the feedback.	Yes No
6	Marren states that she will send a text message just prior to the staff's first shift with feedback to remind them that feedback starts that day.	Yes No

Comments:

Appendix H

Feedback Text Message/ Phone Call Integrity Checklist

Instructions: Circle "yes" if the researcher completed the step. Circle "no" if the researcher did not complete the step.

Observer: _____ Participant: _____

Integrity Checklist on Text Messages/Phone Call (if applicable):

DATE:		
1	States participant had appropriate mask wearing during X% of check-ins.	Yes No
2	States whether it was an increase or decrease from previous observation	Yes No
3	If increase, makes praise statement (with celebratory emoji for 10% or greater increase/ If decrease, states reminder to wear mask over nose, mouth, not to touch it.	Yes No
4	If no response (text back, text reaction), corresponding outgoing phone call within approximately 2 hours	Yes No N/A

Comments:

Appendix I

Social Validity Questionnaire

The purpose of this questionnaire is to gather information that will help in the selection of interventions for staff inappropriately wearing masks. Please circle the number which best describes your agreement or disagreement with each statement.

1 – strongly disagree 2 - disagree 3 – slightly disagree 4 – slightly agree 5 - agree 6 – strongly agree

This would be an acceptable intervention for inappropriate mask wearing by staff.
1 2 3 4 5 6

Most staff would find this intervention appropriate to address inappropriate mask wearing.
1 2 3 4 5 6

This intervention should prove effective in changing inappropriate mask wearing by staff.
1 2 3 4 5 6

I would suggest the use of this intervention to other staff.
1 2 3 4 5 6

Staff wearing their mask inappropriately warrants the use of this intervention.
1 2 3 4 5 6

Most staff would find this intervention suitable for inappropriate mask wearing.
1 2 3 4 5 6

I would be willing to use this intervention again.
1 2 3 4 5 6

This intervention would not result in negative side effects.
1 2 3 4 5 6

This intervention would be appropriate for a variety of staff.
1 2 3 4 5 6

This intervention is consistent with those I've experienced while working in this group home.
1 2 3 4 5 6

This intervention is a fair way to manage inappropriate mask wearing by staff.
1 2 3 4 5 6

This intervention is reasonable for inappropriate mask wearing by staff.
1 2 3 4 5 6

I liked the procedures used in this intervention.
1 2 3 4 5 6

This intervention is a good way to manage inappropriate mask wearing by staff.
1 2 3 4 5 6

Overall, this intervention would be beneficial for the staff.
1 2 3 4 5 6

Comments regarding this form: