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Effects of Choice of Work Tasks on On-Task, Aberrant, Happiness and Unhappiness Behaviours of Persons with Developmental Disabilities

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Abstract

Effects of choice versus no choice of work tasks on work performance, inappropriate behaviours, happiness and unhappiness indices were examined in three studies. Study 1 examined the effects of a choice between a high and a low preference task, versus the assignment of the high preference task. Study 2 was similar to Study 1 except that the tasks in the choice condition were equally and moderately preferred. Study 3 was conducted by the participants' instructors in their natural work settings. A total of five participants were involved across the three studies. Very few differences were found under the choice and no-choice conditions. More research is needed to examine the role of reinforcement history in establishing stimulus control effects of choice.

There is growing recognition that having opportunities to make choices is an important dimension of quality of life for people with developmental disabilities (e.g., Brown & Brown, 2003; Guess, Benson & Siegel-Causey, 1985; Hughes, Hwang, Kim, Eisenman & Killian, 1995; Renwick, Brown, & Raphael, 2000; Schalock, 1996; 1997; Shevin & Klein, 1984). In one area of research, choice versus no choice of vocational, academic, or domestic tasks has been examined as an antecedent intervention for its effects on various target behaviours. When no attempt has been made to equate the reinforcers available for performing the chosen tasks versus the assigned tasks in such studies, performance has often been better under the choice condition (e.g., Dibley & Lim, 1999; Ip, Szymanski, Johnston-Rodriguez & Karls, 1994). A possible explanation of such results is that participants may have performed better because the choice condition allowed them access to preferred tasks and reinforcers.

In some studies, investigators have attempted to separate the effects of choice from the effects of preferred tasks by studying performance when participants were given a choice between two tasks versus when they were assigned a previously chosen task, with the same reinforcers available in both conditions. Martin, Martin, Spevack, Verbeke and Yu (2002) reviewed seven such studies which, collectively, included children and adults with a range of diagnoses (e.g., profound, severe, and moderate intellectual disability, pervasive developmental disorders, emotional disturbance, and attention deficit hyperactivity disorder). Most of the studies involved academic or vocational activities. All of the studies included on-task behaviour as the primary dependent measure; two studies also included aberrant behaviour and one study included happiness behaviours (e.g., smiling or laughing) as a measure of preference for choice. Across all 7 studies, 14 participants did not show a choice effect, and 9 participants did show a choice effect. Of the 9 participants, 1 showed a choice effect on on-task and aberrant behaviours, 1 on on-task and happiness behaviours, and 7 showed the effect only for on-task behaviours.

Considering the inconsistent findings, the paucity of research, and the importance of choice making, both as a highly valued dimension of quality of life and as a means of improving behaviour for persons with developmental disabilities, further research is needed on the effects of choice as an antecedent for improving behaviour. Three studies were conducted to meet this need. The studies received ethical approval from the University of Manitoba and informed consent was obtained from the legal guardian for each participant. The names of the participants used in this paper are pseudonyms.

Study 1: Choice Between High and Low-Preference Tasks versus Assigned High-Preference Task

Method

Participants and setting

The participants were four adults with developmental disabilities at the St. Amant Centre, a residential and community training facility for persons with developmental disabilities. Lana was 29 years old and had been diagnosed with severe intellectual disabilities. Regi was 23 years old and had been diagnosed with profound intellectual disabilities. Tommy was 23 years old, and had been diagnosed with an unspecified level of developmental delay.

His adaptive behaviour assessment (Scales of Independent Behaviour-Revised, Bruininks, Woodcock, Weatherman & Hill, 1984) indicated that he was functioning at an age equivalent of approximately 21 months. Cass was 45 years old, and had been diagnosed with severe intellectual disabilities. All participants had demonstrated basic visual discriminations, which were required to perform the selected work tasks for the study (Stubbings & Martin, 1998).

All sessions were conducted at the St. Amant Centre, or its affiliated community residences. For Lana and Cass, sessions were conducted in an assessment room. Regi's sessions were conducted in his classroom and Tommy's were conducted in the dining room of his residence. In all cases, an experimenter served as the "instructor" and no other clients were present during a session. An observer was present during all sessions to collect data, and a second observer was present during some sessions to conduct reliability checks.

Preference assessments

Preference assessments were conducted on six work tasks using a paired presentation procedure (Mithaug & Hanawalt, 1978). The work tasks were typical tasks available in the adult work classroom that the participants attended (e.g., removing golf tees from a peg board, stringing beads, placing skewer sticks in a container, counting and packaging napkins, and counting coins using a tray). On each trial, two tasks were presented to the participant, who was prompted to choose the task that he/she preferred. When the participant touched one of the two tasks, he/she was then asked to perform that task for two minutes. Each trial was followed by a two-minute intertrial interval. In all, each task was paired with every other task an equal number of times, for a total of 90 trials. The most and least frequently chosen tasks, with a difference of at least 60%, were respectively designated the high and low-preference tasks. Those two tasks were used in the next phase.

Research design and conditions

The choice and no-choice conditions were presented in an alternating treatments design with both conditions presented several times during each session (Martin & Pear, 2003). The order of the conditions was counterbalanced within and across session days. Fifteen sessions were presented for each condition. Between consecutive choice and no-choice conditions within a session, there was an intercondition interval of

approximately two minutes, during which the experimenter talked quietly to the participant and arranged the task materials for the next trial.

During the choice condition, the high and low-preference task materials were presented in front of and at equal distance to the participant, and the participant was asked to choose one work task. A choice was defined as the participant touching or pointing to one of the tasks. Each participant then worked on the chosen task for approximately 2.5 minutes. During the no-choice condition, the participant was presented with the high-preference task and was asked to work on the task for approximately 2.5 minutes. The experimenter thanked and praised the participant for their work at the end of each session in both conditions. During each session, the experimenter would periodically praise the participants for their work and provided a prompt if the participant was not working on the task. The experimenter attempted to interact with each participant at approximately the same rate in both conditions.

Observation procedures and dependent measures

During each session and both conditions, a 5 s observe 10 s record, partial interval observation and recording procedure was used (Martin & Pear, 2003). Each session included 10 observation intervals. Prerecorded beeps from an audiotape signaled each interval. An occurrence for a target behaviour was scored for an observation interval if the participant engaged in the behaviour during at least a portion of the interval regardless of duration or frequency. Dependent measures included on-task, aberrant, happiness and unhappiness behaviours. Prior to data collection, observers were trained to observe and record using the partial interval procedure until 80% agreement or better occurred on each dependent measure for three consecutive sessions (the interobserver assessment procedure is described later).

On-task behaviours were defined as any behaviours that the participant was required to perform in order to complete the task. Aberrant behaviours were defined as inappropriate behaviours, such as vocal or motor stereotypy, disruptive behaviours (e.g., throwing task materials), or aggressive behaviours towards others. Happiness behaviours were defined as "any facial expression or vocalization typically considered an indicator of happiness among people without disabilities, including smiling, laughing, and yelling while smiling" (Green & Reid, 1999, p. 284). As well, staff members familiar with the participants were consulted to identify idiosyncratic behaviours for each participant when he/she appeared to be happy (e.g., clapping hands, circular head movements or loud shrieking).

Unhappiness behaviours were defined as "any facial expression or vocalization typically considered an indicator of unhappiness among people without disabilities, such as frowning, grimacing, crying, and yelling without smiling" (Green & Reid, 1999, p. 284). Staff members were also consulted to identify idiosyncratic behaviours for each participant when he or she appeared to be unhappy.

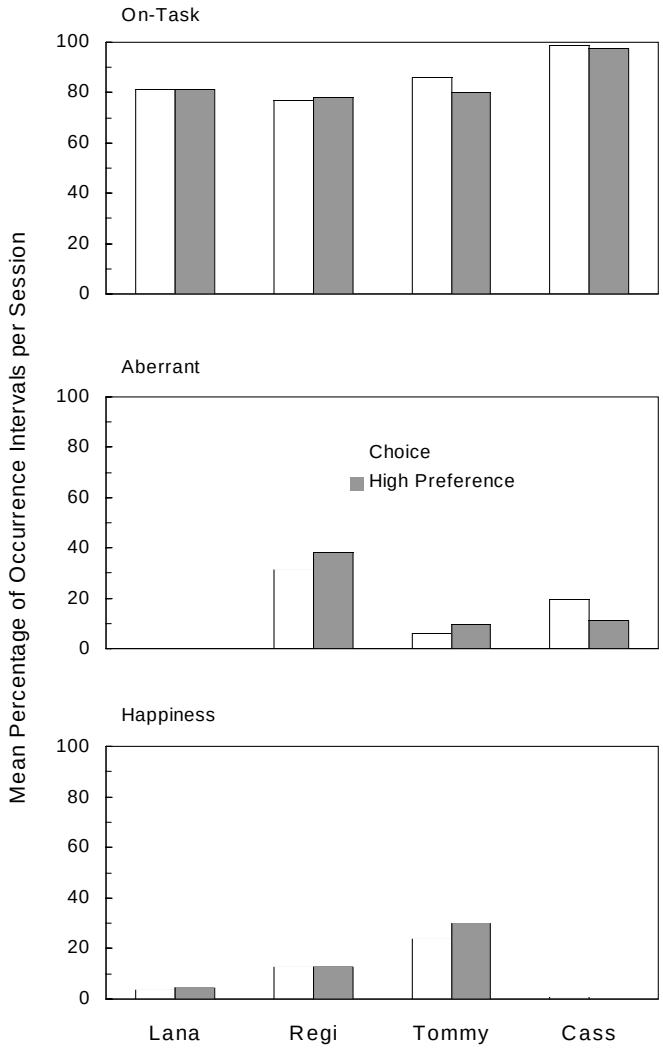
Interobserver reliability

During the preference assessments, a trial was scored as an agreement if the experimenter and an independent observer both recorded the same choice response; otherwise, it was a disagreement. Interobserver agreement was calculated for each session by dividing the number of agreements by the total trials and multiplying by 100%. Reliability checks were conducted on 58% of the preference assessment sessions, and agreement was 100% in all instances.

During 36% of the choice and no-choice sessions, a primary observer recorded the participant's target behaviours during each session. For each target behaviour, an interval was considered an agreement if both the primary and a second observer independently recorded it as an occurrence or as a nonoccurrence. An interval was considered a disagreement if the recordings differed. An agreement score for a target behaviour for each session was determined by dividing the number of agreement intervals by the total intervals and multiplying by 100%. Interobserver (IOR) agreement averaged 82% (range: 50-100%) for on-task, 86% (range: 50-100%) for aberrant, 95% (range: 63-100%) for happiness, and 100% for unhappiness behaviours.

When examined on a per-participant basis, Lana's IOR agreement was 80% (range: 50-100%) for on-task behaviour, 85% (range: 56-100%) for aberrant behaviour, 99% (range: 88-100%), and 100% for unhappiness behaviours. Regi's IOR agreement was 83% (range: 50-100%) for on-task behaviour, 87% (range: 67-100%) for aberrant behaviour, 93% (range: 70-100%), and 100% for unhappiness behaviours. Tommy's IOR agreement was 79% (range: 50-100%) for on-task behaviour, 76% (range: 50-100%) for aberrant behaviour, 88% (range: 70-100%), and 100% for unhappiness behaviours. For Cass, the IOR agreement was 92% (range: 80-100%) for on-task behaviour, 90% (range: 70-100%) for aberrant behaviour, 98% (range: 90-100%), and 100% for unhappiness behaviours. In each case of low IOR agreement, there was one instance of low agreement, and the remaining scores were much higher.

Figure 1. Mean percentage of occurrence intervals per session during choice between high and low preference tasks and assignment of the high preference task.



Results and Discussion

Figure 1 shows the mean percentage of occurrence intervals per session in each condition, for each target behaviour and participant. Unhappiness behaviour has been excluded because it was virtually nonexistent. Because there were so few sessions with the low preference task in the choice condition, performance during those sessions is not discussed further. Given that the participants selected their high-preference tasks almost exclusively during the choice condition, ranging from 94% to 100% across participants, comparison between the high-preference choice and high-preference assigned task conditions offered an evaluation of a choice effect, independent of task preference.

In general, differences between choice versus assigned conditions were small across all measures and participants. For on-task behaviours, all participants showed high and very similar rates between the high-preference choice and high-preference assigned conditions. For aberrant behaviours, Lana showed no aberrant behaviours in either condition. Regi and Tommy both showed slightly higher rates of aberrant behaviours during the assigned condition and Cass showed the reverse. For happiness behaviours, Lana, Regi and Cass showed similar, low levels in both conditions. Tommy showed moderate levels of happiness, and had slightly higher levels of happiness in the assigned condition.

All participants showed high rates of on-task behaviours while working at high preference tasks. If the effects of choice on on-task behaviours are small, they may have been masked in Study 1 by the high response rates. Would a choice effect be observed if the tasks were equally and moderately preferred? We investigated this in Study 2.

Study 2: Choice Between Equally and Moderately Preferred Tasks versus Assignment of those Tasks

Method

Participants and setting

Lana, Regi, and Tommy from Study 1 took part in this study. Paul, who did not participate in Study 1, served as the fourth participant. Paul was 28 years old, ambulatory, and had been diagnosed with severe intellectual disabilities. He demonstrated visual matching-to-sample discrimination skills, which

were required by the tasks used in the study. Paul's sessions were conducted in the dining room of his residence, and sessions for the other participants occurred in the same settings as described for Study 1. Similar to Study 1, an experimenter served as the "instructor" and no other clients were present during a session. One or two observers were present to conduct observations and reliability assessments.

Preference assessment

Participants were assessed using the same procedures as in Study 1. The two tasks that were selected for each participant met two conditions. First, they were chosen with approximately equal frequencies (differing no more than 3% for any participant) when presented together during the preference assessment. Second, both tasks were moderately preferred relative to the other tasks. The preference for the tasks that were selected for Study 2 ranged from 50% to 70% across participants.

Research design and conditions

The design and conditions were similar to Study 1 except that the two tasks were moderately and approximately equally preferred in the choice condition. In the no-choice condition, presentation of the two tasks alternated across trials. Thirty-six sessions were conducted for Tommy, with 18 sessions each for the choice and no-choice conditions, and 40 sessions were conducted for each of the other three participants, with 20 sessions each for choice and no-choice conditions.

Observation procedures, dependent measures, interobserver reliability and interactions

The observation procedures and dependent measures were the same as in Study 1. Interobserver reliability checks were conducted for 83% of the preference assessment sessions and 53% of the work sessions. Mean agreement score for the preference assessment was 100%. For work sessions, mean agreement scores were 88% (range: 50 to 100%) for on-task behaviour, 89% (range: 60 to 100%) for aberrant behaviours, and 97% (range: 56 to 100%) for happiness behaviours. Unhappiness behaviours were nonexistent.

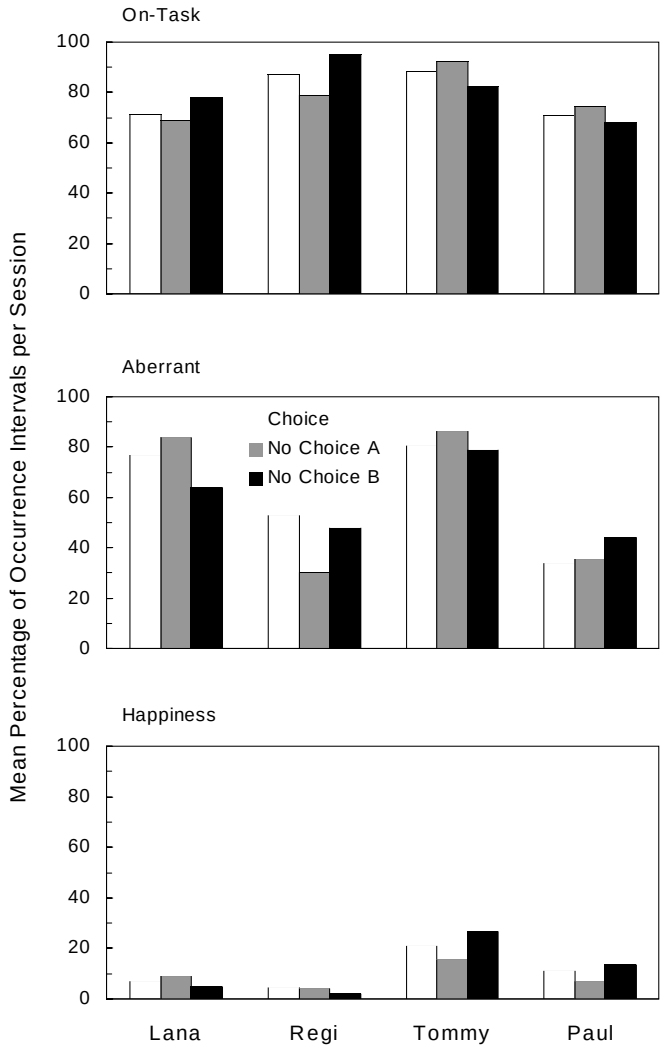
When the IOR agreement is looked at on a per-participant basis, agreement for Lana was 85% (range: 50 to 100%) for on-task behaviour, 89% (range: 70 to 100%) for aberrant behaviours, 97% (range: 80 to 100%) for happiness behaviours, and 100% for unhappiness behaviours. Tommy's agreement scores were 78% (range: 56 to 100%) for on-task behaviour, 82% (range: 67 to 100%) for aberrant behaviours, 80% (range: 56 to 100%) for happiness behaviours, and 100% for unhappiness behaviours. Agreement scores for Paul were 93% (range: 70 to 100%) for on-task behaviour, 90% (range: 70 to 100%) for aberrant behaviours, 99% (range: 80 to 100%) for happiness behaviours, and 100% for unhappiness behaviours. Regi's agreement score were 85% (range: 67 to 100%) for on-task behaviour, 90% (range: 50 to 100%) for aberrant behaviours, 97% (range: 60 to 100%) for happiness behaviours, and 100% for unhappiness behaviours. In each case of low IOR agreement, there was one instance of low agreement, and the remaining scores were much higher.

Results and Discussion

Figure 2 shows the mean percentage of occurrence intervals per session in each condition, for each target behaviour and participant. For on-task behaviour, there was no appreciable difference between choice and at least one of the no-choice conditions across participants. Percentages of occurrence intervals ranged from 71% to 95% across conditions and participants. For aberrant behaviour, there were no consistent and appreciable differences between choice and at least one of the no-choice conditions across the participants. For happiness behaviours, Lana, Paul and Regi showed similar, low levels across conditions. Like Study 1, Tommy showed moderate levels of happiness behaviours, but showed little difference between choice and at least one of the no-choice conditions.

Although the tasks were assessed to be approximately equal in preference during the preference assessment, the frequencies with which the tasks were chosen during the choice condition were uneven for three of the four participants. Lana, Regi, and Paul each selected the same task on 70%, 80%, and 80% of the trials, respectively. This suggests that a preference may have developed as the study progressed. Nevertheless, there were no obvious trends in the results of these three participants that would support either a choice or a task effect. Tommy selected the two tasks with equal frequencies during the choice condition; his results favoured neither condition.

Figure 2. Mean percentage of occurrence intervals per session during choice between equally and moderately preferred tasks and assignment of the same tasks.



It is interesting to note that, for the three participants who were involved in both Studies 1 and 2, aberrant behaviour was much higher in Study 2 than Study 1 for Lana and Tommy, and somewhat higher for Regi. This may have been a reflection of the fact that Study 1 involved a highly preferred task, while Study 2 involved moderately preferred tasks. Martin et al. (2002) and others have speculated that choice effects are probably acquired through a history of differential reinforcement between conditions of choice and no choice. If this assumption is correct, perhaps the effects of choice would be stronger in settings that have been associated with a more extensive history of reinforcement for choice, as opposed to highly structured settings involving one-on-one training. Therefore, a third study was conducted with the participants in their natural work environments in which the choices were presented by their regular instructor, as opposed to the experimenter.

Study 3: Choice versus No-Choice in the Natural Work Setting

Method

Participants and setting

Lana and Regi from the first two studies, Cass from Study 1, and Paul from Study 2 participated in Study 3. All observations occurred in the Adult Day Services classrooms that the participants attended during the study. The classrooms typically included six to 10 clients performing vocational, pre-vocational, instructional, or leisure activities, supervised by two to five staff and volunteers. At the beginning of the study, the participants had been attending their respective classrooms for an average of 47 months, ranging from 30 to 90 months. One participant, Cass, changed classrooms during the study, and because of this, sessions with her ceased at that point.

Each participant's regular instructor in the classroom, as opposed to the experimenter, presented the choices and task assignments. The instructors were 1 male and 5 females, and they had worked with the participants for an average of 29 months, ranging from 0 to 108 months. Both Regi and Paul worked with a new instructor briefly during the study. This new instructor conducted several of the sessions, but in both cases the majority of sessions were presented by instructors with a minimum of 24 months of experience with the participants. Lana was assigned a new instructor part way through the study, and sessions with her ceased at that time.

Research design and experimental conditions

An alternating treatments design was used to evaluate the effects of the choice and no-choice conditions. Participants were observed during naturally occurring sessions of choice of work tasks and assignment of previously chosen tasks. A maximum of two sessions were observed per day for each participant. Sessions alternated in a pseudo random fashion by allowing the instructor to present the different conditions as they saw fit. However, if one condition was presented too often or too seldom, the instructor was prompted about which condition to present, in order to achieve a balanced alternation of conditions and sampling of tasks over time. In all, Lana was observed for 9 sessions, Regi for 30 sessions, Cass for 12 sessions, and Paul for 26 sessions, with approximately an equal number of sessions in the choice and no-choice conditions.

During the choice condition, the instructor presented the participant with a choice of activities by placing the task materials in front of him or her, or by using pictures to approximate the items, and presenting a verbal cue such as, "Which one would you like to do?" A choice response was defined as an unambiguous gesture towards one of the items (or pictures), or naming one of the two options. For the no-choice condition, sessions were observed during which the instructor presented the task that was selected during the previous choice session, or during the majority of previous choice conditions. When a task was assigned in the no choice condition, the instructor presented the participant with a task to perform, either by placing it in front of him or her or by positioning the participant in front of the workstation for a task.

Observation procedures, dependent measures, and reliability

Participants were observed from a distance that permitted observation of facial expressions, while enabling observers to be unobtrusive. A 5 s observe 10 s record, partial interval recording system similar to those from the previous studies was used. Each session began as soon as the participant was presented with a choice or a task assignment, and continued to a maximum of 20 observation intervals.

The dependent measures included on-task, aberrant, happiness, and unhappiness behaviours as defined in the previous studies. Instructor-participant interactions were also recorded, including praise statements directed at the participant, prompts for the participant to continue working, or redirecting the participant back to a task.

Interobserver reliability checks were conducted on an average of 25% of observed intervals for all participants. In these instances, an observer and the experimenter made independent observations of the participant. Definitions of agreements and disagreements and method of calculation were the same as in the previous studies. Agreement scores averaged 95% (range: 89% to 99%) for on-task performance, 86% (range: 79% to 97%) for aberrant behaviours, 96% (range: 88% to 100%) for happiness indicators, 99% (range: 97% to 100%) for unhappiness indicators, and 93% (ranged 91% to 97%) for staff-participant interactions.

Results and Discussion

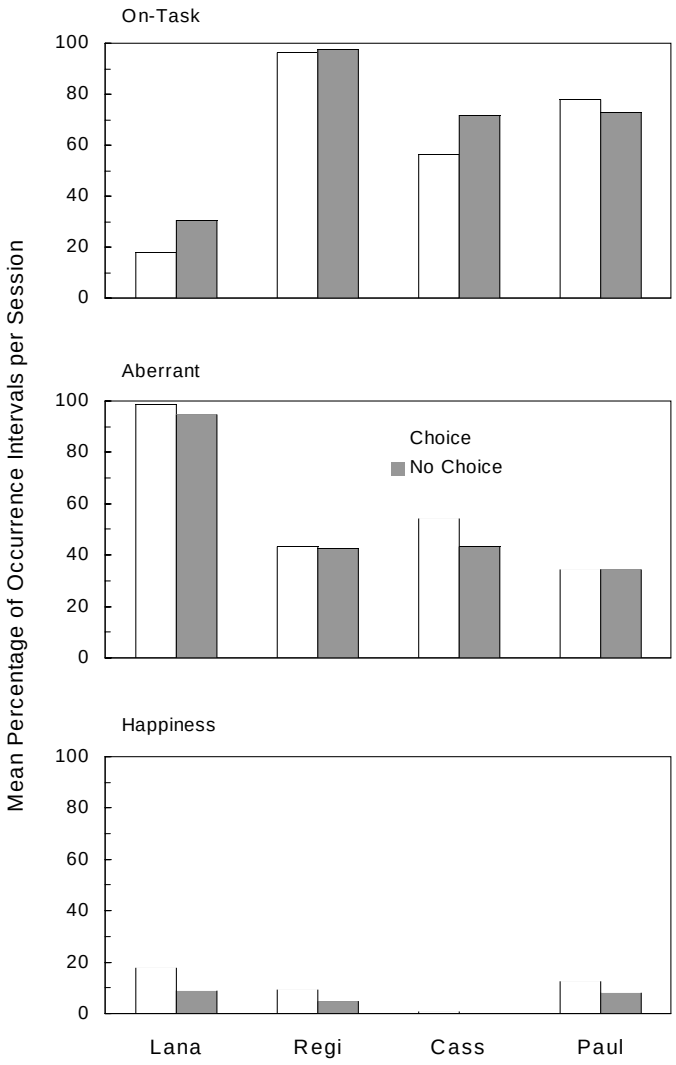
Figure 3 shows the mean percentage of occurrence intervals per session for on-task, aberrant, and happiness behaviours. Unhappiness behaviours have been excluded because all participants showed few if any of them during either condition.

Regi and Paul showed on-task behaviours ranging from 73% to 98% of the observation intervals with little difference between choice and no-choice conditions. Lana and Cass both showed higher on-task behaviours in the no-choice conditions in comparison to the choice conditions (31% vs. 18% and 72% vs. 56%, respectively). Aberrant behaviours were almost identical in both conditions for Lana, Regi and Paul, and were 9% higher in the choice condition for Cass.

Although happiness behaviours were low for all participants, Regi's, Lana's and Paul's mean levels of happiness were nearly twice as high in the choice condition as in the no-choice condition (9% vs. 5%, 18% vs. 9%, and 13% vs. 8%, respectively). However, the differences were accounted for largely by two sessions in each case. There was no substantial difference between conditions when the outliers were removed.

There were no consistent differences in instructor-participant interactions between the choice and no-choice conditions. The mean interactions per session for the choice and no-choice conditions, respectively, were: 9% versus 6% for Lana, 1% versus 1% for Regi, 35% versus 21% for Cass, and 7% versus 11% for Paul. Therefore, observed differences between conditions were not likely due to differences in social consequences provided by staff.

Figure 3. Mean percentage of occurrence intervals during choice and assignment of the previously selected task in the natural work setting.



General Discussion

None of the participants showed any consistent effects in favour of either choice or no-choice as an antecedent condition. There were some small effects for individual participants, but none of them were consistent across all three dependent variables within a study. For example, Cass, in Study 3, showed a small effect on on-task behaviour in favour of no-choice, a small effect on aberrant behaviour in favour of choice, and no effect for either condition on happiness. The lack of a consistent choice effect was observed even though we attempted to separate the effects of choice from the effects of preferred tasks by studying performance when participants were given a choice between two tasks versus when they were assigned a previously chosen task, with the same reinforcers available in both conditions.

In their review of seven similar studies, Martin et al. (2002) reported that 9 of 23 participants did show a choice effect on at least one dependent measure. Why was a consistent choice effect not demonstrated with at least one participant in these three experiments?

One possibility is that choice simply does not result in better performance on the outcome measures used in these studies, or perhaps even with other outcome measures. There may be other explanations, though.

Martin et al. (2002) suggested that positive effects of choice opportunities on subsequent behaviours may be acquired through a history of differential reinforcement for selecting and working on preferred tasks when choices are available, compared to less favourable contingencies when the tasks are assigned without a choice. With repeated exposure to choice versus no-choice contingencies in the natural environment, the stimuli associated with the presentation of choices may become cues for higher on-task behaviour, cues for aberrant behaviour, and eliciting stimuli for happiness indices. Examples of such stimuli might include words (e.g., "Which of these two would you prefer?") and specific visual stimuli (e.g., being shown two objects or tasks). Considering that the participants in this study were assessed at the level of profound or severe developmental disability, perhaps they had not experienced sufficient natural contingencies with choice versus no-choice opportunities, prior to Study 1, in order for us to observe a choice effect. Historically, individuals with severe developmental disabilities typically are provided with few choice opportunities (Kishi, Teelucksingh, Zollers, Park-Lee & Meyer, 1988).

If the above interpretation is correct, the results of the present research raises the question of how much training is needed for a choice effect to be established. By the end of Study 2, Lana, Regi, and Tommy each had received approximately 35 choice sessions and 35 no-choice sessions in the one-to-one structured setting with the experimenter and none showed a choice effect. Future research may determine ways to establish a choice effect more rapidly.

Although a consistent choice effect was not demonstrated for any of the participants within a study, a couple of interesting differences emerged between studies. Lana, Regi, and Tommy all participated in Studies 1 and 2. Within each participant, similar levels of on-task behaviour and happiness were observed in the two studies. However, all three participants showed more aberrant behaviour in Study 2 than in Study 1, and for Lana and Tommy, the difference was substantial. Study 1 involved sessions where participants experienced a choice of a high preference versus a low preference task, or they were assigned the high preference task. Study 2 replicated Study 1 except that the tasks were approximately equally and moderately preferred. Thus, although there was no difference during the choice versus no-choice conditions in Studies 1 and 2, there was much less aberrant behaviour in Study 1 that involved a high preference task than in Study 2 where the tasks were moderately preferred.

Another notable difference between experiments occurred for Lana. In Study 1, Lana showed high on-task behaviour and 0 instances of aberrant behaviour. In Study 3, Lana showed low levels of on-task behaviour, and very high levels of aberrant behaviour. There were two main procedural differences between Studies 1 and 3. First, Study 1 was conducted with the experimenter in a private room while Study 3 was conducted by a regular instructor in Lana's classroom, with other residents and many more distractions. Second, in Study 1, a paired comparison assessment of training tasks enabled the experimenter to choose a high-preferred task versus a low-preferred task for the study, while in Study 3, tasks were subjectively selected by the instructor. It is not possible to determine which of these differences might have accounted for the large differences in performance that Lana displayed between Study 1 and Study 3.

When the results of this research are combined with the seven studies reviewed by Martin et al. (2002) that examined the effects of choice, independent of task preference, as an antecedent intervention to improve behaviours, a choice effect has been demonstrated for 9 of 28 participants. While many studies have shown that choice-making can be used to assess

preference and to determine effective reinforcers for persons with developmental disabilities (e.g., Green et al., 1988; Green, Reid, Canipe & Gardner, 1991; Fisher, Piazza, Bowman & Amari, 1996; Parsons & Reid, 1990; Windsor, Piche & Locke, 1994; Wacker, Berg, Wiggins, Muldoon & Cavanaugh, 1985) the effects of choice opportunities on subsequent behaviours in persons with developmental disabilities are not yet well understood.

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