

Module: Reinforcement

Steps for Implementation: Negative Reinforcement

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Reinforcement is an evidence-based practice used to increase appropriate behavior and teach new skills (e.g., replacement behavior in place of an interfering behavior). This document outlines the steps for implementing negative reinforcement with learners with ASD. *Negative reinforcement* is the removal of a stimulus (i.e., something that is aversive to the learner) after a learner with ASD uses a target skill/behavior or skill. When used effectively, negative reinforcement increases a learner's use and/or maintenance of the target skill/behavior (Alberto & Troutman, 1999; Zirpoli, 2005). ***It is important to note that negative reinforcement is not the same as punishment. The difference between the two is that negative reinforcement is used to increase the target skill/behavior, whereas punishment is used to decrease a behavior.*** Negative reinforcement is used to teach self-help skills and replacement behaviors to take the place of interfering behaviors (e.g., repetitive, stereotypical, disruptive). Negative reinforcement is often used only after other reinforcement strategies, such as positive reinforcement and differential reinforcement, have not been effective in increasing the target skill/behavior.

When planning for and implementing negative reinforcement with learners with ASD, the following steps are recommended.

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Step 1. Identifying the Target skill/Behavior

In Step 1, teachers/practitioners identify a target skill/behavior for a learner with ASD that they would like to increase.

1. Teachers/practitioners define the target skill/behavior in observable and measurable terms.

The following are examples of target skills/behaviors that could be addressed using negative reinforcement.

Example: Taylor will take five bites of food at meals before leaving the table.

Describing the target skill/behavior in measurable and observable terms allows teachers and other practitioners to collect accurate and reliable baseline data, remove reinforcement when the learner uses the target skill/behavior correctly, and ensures that all staff members understand what the target skill/behavior looks like so that reinforcement can be removed consistently across classes and activities.

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Step 2. Collecting Baseline Data

Once the target skill/behavior is identified, teachers/practitioners collect baseline data to determine how often the learner with ASD is currently using the target skill/behavior.

1. Teachers/practitioners measure a learner's use of the target skill/behavior before implementing negative reinforcement by collecting one of the following:
 - a. *frequency data*. Frequency data measures how often a learner engages in a particular behavior. Two methods are used to collect frequency data: time sampling and event sampling. With *time sampling*, data on a particular behavior are collected after a certain amount of time (e.g., every five minutes). If a learner is engaging in the behavior at that time, then teachers/practitioners record this on the data sheet. This sampling technique is best used to monitor high frequency behaviors such as drooling and staying seated during class. *Event sampling* is used to record every instance of the behavior and typically focuses on low frequency behaviors such as taking a bite of food, hitting, and using the toilet. Both sampling techniques are used to evaluate patterns of learners' behavior over a period of days or weeks. Tables 11 and 12 provide examples of both frequency data collection methods.

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Table 11. Example of Time Sampling Data Collection Sheet

Date	Time							Before, during, or after reinforcement
	9:00	9:05	9:10	9:15	9:20	9:25	Total	
7/26/08	X		X				2	Before
7/27/08	X	X					2	Before
7/28/08	X	X		X		X	4	Before
7/29/08		X	X	X		X	4	Before

Table 12. Example of Event Sampling Data Collection Sheet

Date	Takes toy from peer	Total	Before, during, or after reinforcement
7/26/08		X	1
7/27/08		X	1
7/28/08		X	1
7/29/08		XXX	3

- b. *duration data.* Duration data are used to record how long a learner engages in a particular behavior. For example, a teacher might collect data on how long a learner with ASD stays in his seat or how long a young child stays engaged in parallel play. Table 9 provides an example of a duration data collection sheet.

Table 13. Example of Duration Data Collection Sheet for “Staying on Task”

Date	Start time	End Time	Total minutes	Setting/activity	Before, during, or after reinforcement
7/26/08	9:00	9:01	1	Reading	Before
7/27/08	9:05	9:06	1	Math	Before
7/28/08	9:00	9:02	2	Science	Before
7/29/08	9:10	9:12	2	Resource room	Before

Baseline data give teachers/practitioners a starting point from which they can evaluate whether the target skill/behavior increases as a result of negative reinforcement.

2. Teachers/practitioners collect baseline data for a minimum of four days before implementing negative reinforcement.
3. Teachers/practitioners collect baseline data in numerous settings and/or activities.

It often is useful to have more than one practitioner collect baseline data over the course of several days to compare findings. Also, by collecting data over the course of several days in multiple settings, teachers/practitioners can potentially recognize patterns of behavior. For example, does the learner use the target skill/behavior more often in one setting than another? This kind of information helps teachers/practitioners identify activities or settings where reinforcement can be used to increase the target skill/behavior.

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Step 3. Establishing Program Goals and Performance Criteria

In Step 3, teachers/practitioners identify goals for the target skill/behavior and determine what criteria will be used to evaluate whether negative reinforcement is effective.

1. Teachers/practitioners establish a program goal for each target skill/behavior that is age and developmentally appropriate for the learner with ASD.

The following are examples of program goals for learners with ASD.

Example: Taylor will take five bites of food before leaving the table at meal times.

Example: Mike will trace his name five times each day without adult assistance.

Performance criteria also are established for each target skill/behavior so that teachers/practitioners can monitor learner progress and adjust/fade negative reinforcement as learners acquire target skills/behaviors. The initial criterion should be easily attained so that the learner is successful without much effort and acquires the identified reinforcer more easily. This also helps the learner establish a clear connection between the target skill/behavior and subsequent reinforcement. For example, a teacher might decide that an initial criterion for “taking five bites of food” is one bite of food for three consecutive days. The teacher would then collect frequency data to monitor learner progress. When the learner with ASD meets this criterion, the teacher gradually increases the number of bites the learner must take until the program goal is acquired.

2. Teachers/practitioners establish at least three different performance criteria for each program goal to monitor learner progress.

The following table outlines a program goal and performance criteria developed for a learner with ASD.

Table 14. Example of Program Goal and Performance Criteria

Program Goal: Taylor will take five bites of food before leaving the table at meal times.	
Performance Criterion	Behavior
Phase 1	Taylor will take one bite of food before leaving the table for three consecutive days.
Phase 2	Taylor will take two bites of food before leaving the table for three consecutive days.
Phase 3	Taylor will take five bites of food before leaving the table every day.

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Step 4. Identifying Negative Reinforcers

In Step 4, teachers/practitioners identify activities, events, or items that are mildly aversive and can be used as negative reinforcers for learners with ASD. It is important to note that mildly aversive stimuli often occur naturally in the environment and do not cause harm to learners with ASD. For example, a learner with ASD may be bothered by bright lights in a classroom or a non-preferred activity. When using negative reinforcement, identification of mildly aversive stimuli for individual learners is imperative because learning will not take place unless they are motivated to use the target skill/behavior to get rid of the aversive stimulus that is serving as the negative reinforcer. When beginning a negative reinforcement program, teachers/practitioners conduct a negative reinforcement assessment of preferred and nonpreferred activities and items. Through this process, teachers/practitioners identify negative reinforcers that can be used during teaching activities.

1. Teachers/practitioners conduct a negative reinforcement assessment that identifies preferred/nonpreferred:
 - a. Activities, events, and
 - b. items.

To identify preferred and nonpreferred activities and items, teachers practitioners identify the types of activities that produce positive and negative reactions in the learner with ASD.

2. To identify preferred/nonpreferred activities, teachers/practitioners:
 - a. select a variety of daily activities that are demanding for the learner (e.g., washing hands, turning on water faucet, buttoning shirt, writing name, staying seated) and say to the learner, “Learner’s name, time to (activity).”
 - b. wait 15 seconds for the learner to initiate engagement in the activity.
 - c. repeat the instructions if the learner does not begin the activity, waiting an additional 15 seconds until the learner initiates the activity, makes evasive movements/negative vocalizations (e.g., turning away, physically resisting, crying, screaming, dropping to the floor, yelling), or engages in interfering behaviors (e.g., self-injury, aggression, disruption, trying to leave).
 - d. allow the learner to leave the activity if he/she makes evasive movements/negative vocalizations or engages in interfering behaviors.
3. To identify preferred/nonpreferred items, teachers/practitioners:
 - a. select a variety of classroom items and objects (e.g., computer, comic books, squishy ball, pencils) and say to the learner, “Here, (learner’s name)” while handing the object to the learner.
 - b. wait 15 seconds for the learner to take the item.
 - c. repeat the instructions if the learner does not take the item, waiting an additional 15 second, until the learner takes the item, makes evasive movements/negative vocalizations (e.g., turning away, physically resisting, crying, screaming, dropping to

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- the floor, yelling), or engages in interfering behaviors (e.g., self-injury, aggression, disruption, trying to leave).
- d. take the item away if he/she makes evasive movements/negative vocalizations or engages in interfering behaviors.
 - e. observe if the behavior decreases when the aversive event is removed.

Table 15 provides an example data collection sheet that can be used when conducting a negative reinforcement assessment.

Table 15. Example of Data Collection Sheet for Negative Reinforcement Assessments

Activity/Item	Positive Response (please describe)	Negative Response (please describe)
Asked to wash tables		Started screaming and pulling her hair
Offered a comic book	Smiled and took book	
Asked to sweep floor		Started yelling "No way"

With preferred activities/items, the learner initiates engagement with them without making evasive movements/negative vocalizations or engaging in interfering behaviors. On the other hand, if the learner engages in an interfering behavior or makes evasive movements/negative vocalizations with a particular activity/item, it would be identified as nonpreferred. Nonpreferred activities/items can then be used as potential negative reinforcers during teaching activities that focus on the learner's use of the target skill/behavior or skill (Reichle, Drager, & Davis, 2002; Zarcone, Crosland, Fisher, Worsdell, & Herman, 1999). Table 16 provides a list of potential items and activities that could be used during a negative reinforcement assessment.

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Table 16. Potential Activities and Items for a Negative Reinforcement Assessment

Activities	Items
<ul style="list-style-type: none"> • Doing self-care tasks (e.g., brushing teeth, toileting) • Doing school work (e.g., completing math problems, writing name, taking part in social skills group) • Doing work around the classroom (e.g., sweeping, erasing the board, handing out papers) • Transitioning from one activity to another (e.g., going to gym class, walking the halls) • Work that requires a lot of steps or demands • Remaining in seat for a long period • Remaining in area that is noisy and/or crowded 	<ul style="list-style-type: none"> • Squishy ball • Pencil and paper • Play dough • Computer • Rocking chair • Comic books • Hand lotion

Adapted from Zarcone, Crosland, Fisher, Worsdell, & Herman (1999)

Step 5. Selecting Instructions

When using negative reinforcement, teachers/practitioners select appropriate instructions that signal the learner with ASD to use the target skill/behavior.

1. Teachers/practitioners select one of the following types of instruction to begin the teaching activity:
 - a. *Pictorial.* Presenting the learner with a picture depicting the target skill (e.g., person sitting in his seat raising his hand),

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Example of pictorial instruction



Stay in seat. Raise hand.

When using pictorial instructions, teachers/practitioners also verbally state the instructions for the learner with ASD. For example, the teacher would say, "Stay in seat. Raise hand." while presenting the learner with the picture card.

- b. *Written.* Providing the learner with written instructions telling him to use the target skill/behavior, or

Example of written instruction

When you stay in your chair until you are finished, you can leave.

- c. *Verbal.* Verbally telling the learner what is expected of him/her (e.g., staying seated until work is completed, taking a bite of food before leaving the table)

Example of verbal instruction: "You have to stay at the table until you take a bite."

Instructions should be clear, complete, specific, and aimed at learners' skill and interest levels. When providing instructions, teachers/practitioners also should ensure that the information conveys the following information: "If you want X, then you have to Y." In the written instruction above, for example, it essentially tells the learner with ASD that if he wants to leave his seat, he needs to finish his work. When learners understand that there is going to be a reinforcer for completing something unpleasant, they will be more likely to finish the task.

Step 6. Implementing Negative Reinforcement

In Step 6, teachers/practitioners implement negative reinforcement by providing the identified instructions to the learner with ASD while simultaneously delivering the negative reinforcer.

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Teachers/practitioners do not remove the negative reinforcer until the learner with ASD uses the target skill or behavior.

1. Teachers/practitioners use one of the following types of instructions to cue the learner to use the target skill/behavior:
 - a. pictorial,
 - b. written, or
 - c. verbal.

Example: Teacher says to a learner with ASD, “You must stay in your seat until you finish five math problems” when the learner sits down in his chair at the beginning of individual work time.

Example: Teacher presents a picture showing a child taking a bite of food to the learner with ASD while saying, “Stay at table. Take a bite.”

Example: Teacher hands a broom to the learner with ASD while saying, “No yelling. Ask for break.”

2. Teachers/practitioners simultaneously deliver the identified negative reinforcer with the instructions.

Example: When a learner sits down in his seat for individualized instruction, the practitioner says, “You must stay in your seat until you finish five math problems.”

In this instance, finishing five math problems is the target skill/behavior and the negative reinforcer is being allowed to leave after completing his work.

Example: A young child with ASD sits down at the table for snack time. The teacher says, “Stay at table. Take a bite” while pointing to the food on the learner’s plate.

In this example, the target skill/behavior is to stay at the table and take a bite of the food. The negative reinforcer is being allowed to leave after eating snack.

Example: A teacher hands the learner with ASD a broom and says, “Sweep floor without yelling. Ask for break.”

In this example, the target skill/behavior is to ask for a break. Getting a break after asking for it is the negative reinforcer.

3. If the learner uses the target skill/behavior, teachers/practitioners immediately remove the negative reinforcer.

Example: The learner with ASD raises her hand instead of talking out in class (target skill/behavior). At the end of the five minutes, the teacher removes the negative reinforcer (i.e., staying seated) and tells the learner she can take a break.

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Example: A young child with ASD takes a bite of food on his plate (target skill/behavior). As soon as the learner takes a bite, the teacher removes the negative reinforcer (i.e., sitting at the table) and says, “All done.”

Example: The learner with ASD asks for a break (target skill/behavior) while sweeping the floor (negative reinforcer). The teacher immediately allows her to take a break.

4. If the learner with ASD does not use the target skill/behavior or engages in the interfering behavior, teachers/practitioners ignore the interfering behavior, repeat the instructions, and do *not* remove the identified negative reinforcer.

Example: A young child with ASD tries to leave the snack table without taking a bite of food. The teacher redirects the child back to his seat and repeats the instructions, “Stay at table. Take a bite.”

Example: The learner with ASD tries to leave his seat before he has completed five math problems. The practitioner directs him back to his seat and says, “You must stay in your seat until you finish five math problems.”

If the learner with ASD uses the target skill/behavior/behavior, teachers/practitioners immediately remove the negative reinforcer. If the learner with ASD does not use the target skill/behavior/behavior or begins engaging in an interfering behavior, teachers/practitioners repeat the instructions and do not remove the identified negative reinforcer until the learner with ASD uses the target skill/behavior/behavior. Extinction, another evidence-based strategy, is often used in conjunction with negative reinforcement when learners engage in interfering behaviors during nonpreferred activities. With extinction, teachers/practitioners ignore the interfering behavior while still placing demands on the learner with ASD to use the target skill/behavior. For example, a learner with ASD might start screaming while sweeping the floor instead of asking for a break. The teacher would repeat the instructions, “Sweep floor without yelling. Ask for break” while still requiring the learner with ASD to sweep the floor. The negative reinforce (i.e., sweeping the floor) is not removed until the learner uses the target skill/behavior (i.e., asking for a break). Please access the *Extinction Brief* to learn more about this practice and how to use it in classrooms and other settings.

Step 7. Monitoring Learner Progress

In Step 7, teachers/practitioners monitor learner progress so that negative reinforcement can be faded to promote generalization and maintenance of skills.

1. Teachers/practitioners use progress monitoring data to determine the learner’s mastery of the target skill/behavior.

The same data collection sheets that were used to collect baseline data can be used to track learner progress.

2. As learners with ASD meet performance criteria for a target skill/behavior, teachers/practitioners fade the use of negative reinforcement.

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This is often accomplished by increasing the performance criteria for a target skill/behavior (see Step 3). For example, the teacher could gradually increase the amount of time that the learner sweeps the floor before a break is granted. Alternatively, a teacher could increase the number of bites of food the learner with ASD must take or the number of math problems that the learner with ASD must complete before being allowed to leave the table.

3. Teachers/practitioners use progress monitoring data to adjust reinforcement strategies if the target skill/behavior does not increase.

If a target skill/behavior is not increasing, teachers/practitioners must try to identify potential reasons for this. The following questions may be helpful during this problem-solving process.

- Is the target skill/behavior well defined? That is, is it observable and measurable?
- Are there too many reinforcers?
- Are there too few reinforcers?
- Are the reinforcers aversive enough that the learner with ASD wants to get rid of them?
- Are all staff using reinforcement in a consistent manner?

The same data collection sheets that were used before the intervention began are used to monitor learner progress. By using the same data collection sheets, teachers/practitioners are able to track a learner's use of the target skill/behavior before and after negative reinforcement is implemented. The following tables provide examples of how teachers/practitioners can use these data sheets before, during, and after intervention.

Table 17. Example of Time Sampling Data Collection Sheet

Date	Time							Before, during, or after reinforcement
	9:00	9:05	9:10	9:15	9:20	9:25	Total	
7/26/08	X		X				2	Before
7/27/08	X	X					2	Before
7/28/08	X	X		X		X	4	Before
7/29/08		X	X	X		X	4	Before
7/30/08	X	X	X	X	X		5	During
7/31/08	X		X	X	X	X	5	During
8/01/08	X	X	X	X	X	X	6	During

Table 18. Example of Event Sampling Data Collection Sheet

Date	Takes toy from peer	Total	Before, during, or after reinforcement
7/26/08	X	1	Before
7/27/08	X	1	Before
7/28/08	X	1	Before
7/29/08	XXX	3	Before
7/30/08	XX	2	During

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7/31/08		XXX	3	During
8/01/08		XXXX	4	During

Table 19. Example of Duration Data Collection Sheet for "Staying on Task"

Date	Start time	End Time	Total minutes	Setting/activity	Before, during, or after reinforcement
7/26/08	9:00	9:01	1	Reading	Before
7/27/08	9:05	9:06	1	Math	Before
7/28/08	9:00	9:02	2	Science	Before
7/29/08	9:10	9:12	2	Resource room	Before
7/30/08	9:10	9:14	4	Science	During
7/31/08	9:15	9:20	5	Resource room	During
8/01/08	9:05	9:10	5	Reading	During

References

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