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A Comparison Study of Naming

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Abstract

Bidirectional naming is the ability to acquire a listener response or tact for a stimulus and then emit the other operant without further training. Incidental naming refers to the ability to emit the listener response and tact for the item without direct reinforcement after just being exposed to the name of the item. The development of naming could allow a child to learn more readily from the natural environment. However, it is unclear if bidirectional naming and incidental naming are two separate skills, or if one is potentially a prerequisite for the other. For this project, procedures outlined by Greer & Ross (2008) were used to test incidental naming, while procedures outlined by degli Espinosa (2011) were used to test bidirectional naming to identify which types of naming the child displayed. The participant displayed half of naming for the incidental naming test. These results showed that after the child was exposed to the instructor labeling the items, she could identify pictures as a listener but could not tact them. The results of the bidirectional naming test showed that she displayed full naming, both listener responding and tacting after acquiring one operant. The implications of the results and future directions for research are discussed.

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Introduction

The ability to communicate is one of the most important skills for an individual, because it is how they convey their wants and needs. For typically developing individuals, this skill is acquired through day-to-day observation and imitation of others. Unfortunately, for those diagnosed with autism spectrum disorder, learning how to communicate can be far more difficult. In fact, persistent deficits in social communication and social interaction is one of the defining features of autism (American Psychiatric Association, 2013). Fortunately, behavior analysts have developed a variety of interventions that assist individuals with autism in acquiring effective communication abilities. One skill that behavior analysts have found to be especially beneficial during language-acquisition training is naming. Naming refers to the ability to acquire listener and speaker functions in regard to a stimulus, without direct instruction. In the literature, there has been some inconsistency with the terms behavior analysts have used to discuss different types of naming, and seemingly different skills have been referred to simply as naming (Hawkins, Gautreaux, & Chiesa, 2018). Utilizing similar language in the literature and identifying the subtype of naming targeted in research and in practice, may help behavior analysts to better identify how subtypes of naming develop and the prerequisite skills for each type. The framework proposed by Hawkins, Gautreaux, and Chiesa (2018) proposes two subtypes of common bidirectional naming: bidirectional naming and incidental bidirectional naming (referred to simply as incidental naming henceforth).

Bidirectional naming is the ability to acquire a listener response for a stimulus and then emit a speaker response for that same stimulus, without further training, and vice versa. For example, one might teach a child to touch a picture of an apple in the presence of the spoken word “apple” (listener response). If they can also say “apple” (speaker response) when shown a picture of an apple, without explicit training, they are demonstrating the speaker half of

bidirectional naming. If, when taught the speaker response for a stimulus, they are then able to emit the listener response without explicit training, they are said to have demonstrated the listener half of bidirectional naming. If the individual can do both, they are said to have demonstrated bidirectional naming, as there is a bidirectional relationship between the listener and speaker behavior.

Incidental naming refers to the ability to emit a listener and speaker response for a stimulus, after being exposed to the name of the item, without direct reinforcement of either response. For example, the instructor might say “apple” as they conduct matching-to-sample trials, without requiring the student to emit any response other than matching. If the student can then touch the apple in the presence of the spoken word “apple” and say “apple” when shown a picture of an apple, they are demonstrating incidental naming.

The development of either type of naming has a variety of benefits. For children who do not display bidirectional naming, the listener and speaker responses for a single item must be taught separately. If a student displays bidirectional naming, teaching time is essentially cut in half, as the speaker response will emerge without explicit instruction after the listener response is acquired through training, and vice versa. Incidental naming allows a child to learn more readily from the natural environment. That is, instead of requiring explicit instruction for all targets in a variety of verbal operants, they can acquire these operants through limited exposure to the names of stimuli. In turn, this broadens the individual’s vocabulary, and ultimately, allows them to communicate their wants and needs more effectively, as well as respond as a listener to the verbal instructions from others. Second, research has shown that naming assists individuals in expanding their reading, writing, and spelling abilities (Miguel, 2016). Therefore, in addition to improving one’s communication skills, it also increases their likelihood of academic success.

Finally, improved communication abilities have proven to reduce problematic behaviors in a variety of individuals; therefore, naming may play a key role in the reduction of these behaviors (Carr & Durand, 1985).

The purpose of the present study was to assess the two aforementioned subtypes of naming (i.e., bidirectional and incidental) in a three-year-old girl on the autism spectrum. The results of this study may assist with identifying whether bidirectional naming and incidental naming are truly separate subtypes of naming. If the child can display one without the other, we could conclude that they are likely separate skills that may not emerge at the same time. Establishing that they are indeed separate skills is the first step that can benefit future research on how individuals acquire types of naming, the typical development of naming, if one type of naming is a prerequisite to another, and how best to teach each subtype of naming.

Methods

Participant

One 3-year-old female, diagnosed with autism spectrum disorder, was selected from an Early Childhood Special Education (ECSE) classroom. At the onset of the study, the participant exhibited reliable manding, tacting, listener responding, and emerging intraverbal abilities (Gilic & Greer, 2011).

Setting

The study was conducted in an ECSE classroom, in a 10 x 10 ft. cubicle, where participants and implementer sat across each other at a table.

Materials

Materials included paper data sheets for each naming test (see Appendix C & E), picture cards of cartoon characters, and highly preferred reinforcers (e.g., fish crackers, tablet, various toys).

Incidental Naming Test Procedure

The incidental naming test was based on procedures described by Greer and Ross (2008). The researcher identified three stimuli the participant could neither tact nor receptively identify and then conducted nine tact trials and nine trials of the listener responding (three for each stimulus). Then, 15 match-to-sample trials were conducted while the instructor tacted the stimuli. Following this, the listener responding and tacting trials were then conducted again to test for naming.

Bidirectional Naming Test Procedure

Probes were conducted to identify six stimuli the participant could neither tact nor receptively identify. The six selected targets were divided into two sets, one for teaching a tacting response and the other for teaching a receptive identification response. Each session began with two probe trials for all six targets, immediately followed by four teaching trials per target, totaling 12 (i.e., four tact-teaching trials for each of the three stimuli in the set and four receptive-identification-teaching trials for each of the three stimuli in the set). The teaching trials for tacts involved echoic prompts that were faded using a progressive time delay. The teaching trials for listener responses involved physical prompts faded using a progressive time delay. Mastery criterion was set at 100% accuracy during probe trials for two consecutive days. Once the mastery criterion was met, the tacting stimuli were tested for receptive identification and vice versa. If the participant exhibited the untrained verbal operant, they were said to have bi-

directional naming capabilities. Post-acquisition generalization probes were conducted for six novel targets. Maintenance probes were conducted weekly for three months post-intervention. A multiple-probe research design was utilized, with initial probe data as baseline.

Results

Overall, the results of this study showed that the child displayed bidirectional naming, but not incidental naming.

Bidirectional Naming

After acquisition of each set of stimuli for bidirectional naming, the participant was able to tact the listener responding set and emit listener responding for the tacting set. After 10 sessions, a tact probe was conducted for the listener responding set and the participant responded with 100% accuracy. For the tacting set, a listener responding probe was conducted after 12 sessions, and she responded with 100% accuracy. Thus, the participant displayed bidirectional naming, as she could emit the untrained response for each set of stimuli after acquiring the trained response.

Figure 1

Listener Responding

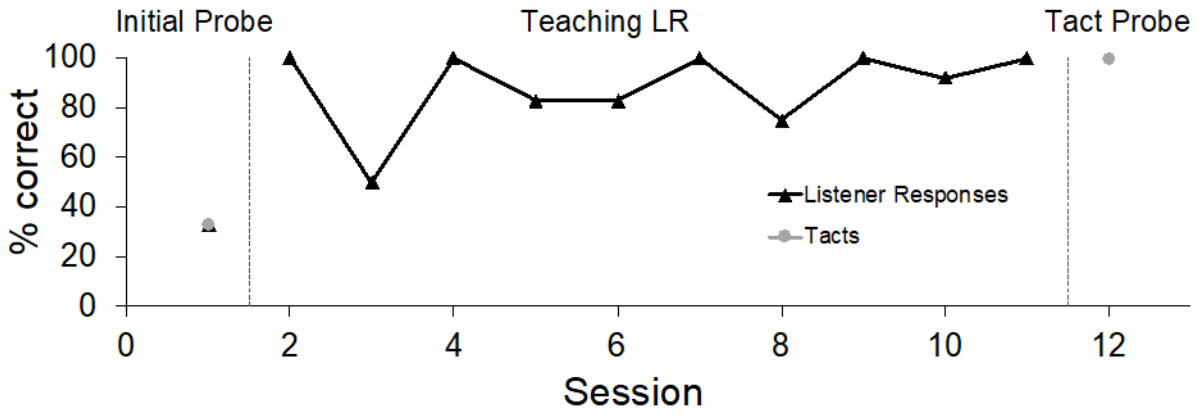
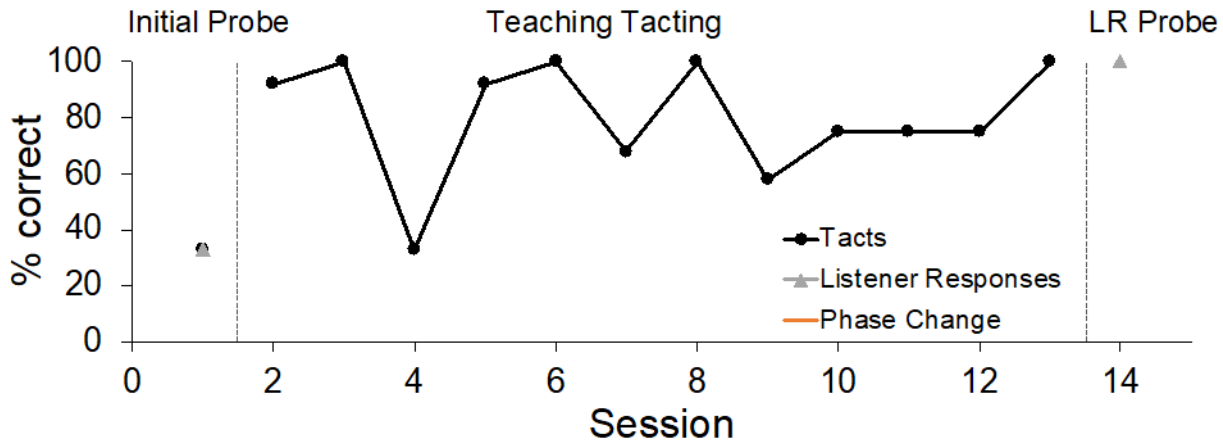


Figure 2

Tacting

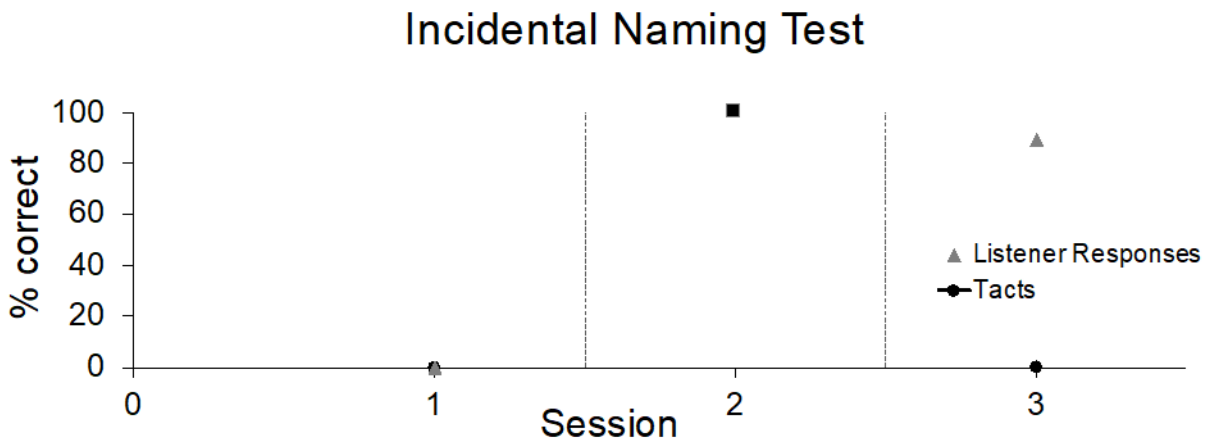


Incidental Naming

The participant responded with 0% accuracy on the initial tacting and listener responding probes for the set of stimuli. Once the initial probes were finished, 15 match-to-sample trials were conducted. After conducting match-to-sample with the set of stimuli, the listener responding and tacting probes were conducted again, and the participant could identify stimuli as a listener but could not tact them. This indicated that she only displayed the listener half of incidental naming but did not display the speaker half of incidental naming.

Figure 3

Incidental Naming Test



Discussion

The goal of this research was to test two types of naming with a 3-year-old diagnosed with autism. This is an important skill for individuals to learn to more effectively communicate. Not only does mastering naming help to improve effective communication skills, but it can help to improve academic success.

The original hypothesis of this study was that the participant would show both bidirectional and incidental naming. The results of the incidental naming test showed that the participant had only the listener responding half of incidental naming. Looking at the results of bidirectional naming test, the participant had bidirectional naming.

Throughout this study, there were some potential issues. These issues included an inconsistent schedule, because of illness, participant's absence, and school breaks. One limitation of the study was the number of participants, as this study only involved one participant. In the future, it would be beneficial to replicate this study with more children. Another limitation is the longitudinal effects. We cannot measure change or stability of the results over time. The addition of maintenance probes would be helpful in future research.

Naming is an important skill for individuals to acquire and can be especially important to explicitly teach the skill to individuals diagnosed with autism who may not acquire the skill without intervention. Naming can help these individuals gain future skills, and finding a successful procedure can benefit other individuals with autism.

The results of the current study indicate that bidirectional naming and incidental naming might be two separate skills. It is unclear whether one type of naming is a prerequisite for another. Future research should be conducted to investigate these issues and how to best teach each type of naming. Additionally, future studies could help professionals who work with individuals diagnosed with autism by helping to provide them with information they could use to implement a program for individuals to acquire these naming skills.

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Appendix A

Finding novel Stimuli

Phase 1/Phase 4 - Test Vocabulary

Tact

- SD: Hold up card and say "What is it?"
    - If participant tacts stimulus correctly (with best approximation) within 3 seconds of holding card, mark as correct. Do not reinforce.
    - If participant tacts stimulus incorrectly or does not respond within 3 seconds, mark as incorrect. Do not provide error correction.
- Test each stimulus twice.
- If participant responds correctly to at least one trial, select a new stimulus and repeat until you find 6 stimuli that unknown to the participant.

Listener Selection Response

- Use stimuli from the tact test.
- Place stimuli on table in an array of 3.
- SD: state the name of one stimulus
    - If participant touches the correct stimulus within 3 seconds of the SD, mark as correct. Do not reinforce.
    - If participant touches the incorrect stimulus or does not respond within 3 seconds of the SD, mark as incorrect. Do not provide error correction.
- Test each stimulus twice.
    - If participant responds correctly one at least one trial, select a new stimulus.
        - Go back and test using the tact testing procedure above.
        - If the participant cannot tact it, test if the participant can select it.
    - Repeat until you have 6 stimuli the participant cannot tact or select.

Appendix B

Procedure

Stage 1 - Bi-Directional Naming (BiN) Assessment

Phase 2 - Establish Independent Tact & Selection Responses

Tact

Probes: At the beginning of each day, probe tacts for each stimulus twice (6 trials total)
Mastery Criteria for Phase 2 Tacts: 2 consecutive days with 100%

Tact Subphase 2A (0 Second Delay)
Subphase Change Criteria: 1 session at 100% (12 trial sessions, 4 trials for each stimulus)

- SD: Hold up card and say "What is it?"
- Immediately provide vocal prompt (0 sec delay).
    - If participant tacts stimulus correctly (with best approximation) within 3 seconds of vocal prompt, mark as correct and reinforce.
    - If participant tacts stimulus incorrectly or does not respond within 3 seconds, mark as incorrect.
        - Provide vocal model of correct response up to 3 times until participant makes correct vocal response.
        - Present transfer trial.
        - Do not take data on transfer trial or consequate.

Tact Subphase 2B (3 Second Delay)
Subphase Change Criteria: 1 session at 92% or greater (12 trial sessions, 4 trials for each stimulus)
Subphase Regression Criteria: 1 session at 75% or lower, move to previous subphase

- SD: Hold up card and say "What is it?"
- Provide vocal prompt after 3 seconds if no response.
    - If participant tacts stimulus correctly (with best approximation) before the prompt, mark as independent (I) and reinforce.
    - If participant tacts stimulus correctly (with best approximation) within 3 seconds of vocal prompt, mark as correct (+) and reinforce.

- If participant tacts stimulus incorrectly or does not respond within 3 seconds of vocal prompt, mark as incorrect (-).
    - Provide vocal model of correct response up to 3 times until participant makes correct vocal response.
    - Present transfer trial.
    - Do not take data on transfer trial or consequate

Tact Subphase 2C (Independent)
Continue this subphase until mastery criteria on probes is met for phase
Subphase Regression Criteria: 1 session at 50% or lower, move to previous subphase

- SD: Hold up card and say "What is it?"
    - If participant tacts stimulus correctly (with best approximation) within 3 seconds of SD, mark as correct and reinforce.
    - If participant tacts stimulus incorrectly or does not respond within 3 seconds of SD, mark as incorrect (minus)
        - Provide vocal model of correct response up to 3 times until participant makes correct vocal response.
        - Present transfer trial.
        - Do not take data on transfer trial or consequate

<u>Listener Selection Response</u>

Probes: At the beginning of each day, probe selection for each stimulus twice (6 trials total)
Mastery Criteria for Phase 2 LSR: 2 consecutive days with 100%

LSR Subphase 2A (0 Second Delay)
Subphase Change Criteria: 1 session at 100% (12 trial sessions, 4 trials for each stimulus)

- Place 3 stimuli on table
- SD: State the name of the stimulus.
- Immediately provide gestural prompt.
    - If participant touches the correct stimulus within 3 seconds of SD, mark as correct and reinforce.
    - If the participant touches the incorrect stimulus or does not respond within 3 seconds of the SD, mark as incorrect.
        - Provide most-to-least error correction until participant touches the correct stimulus.
        - Present transfer trial.
        - Do not take data on transfer trial or consequate.

LSR Subphase 2B (3 Second Delay)
Subphase Change Criteria: 1 session at 92% (12 trial sessions, 4 trials for each stimulus)
Subphase Regression Criteria: 1 session at 75% or lower, move to previous subphase

- Place 3 stimuli on table
- SD: State the name of the stimulus
- Provide gestural prompt after 3 seconds if no response.
    - If participant touches the correct stimulus before the gestural prompt, mark as independent (I) and reinforce.
    - If participant touches the correct stimulus within 3 seconds of gestural prompt, mark as correct (+) and reinforce.
    - If the participant touches the incorrect stimulus or does not respond within 3 seconds of the gestural prompt, mark as incorrect (-).
        - Provide most-to-least error correction until participant touches the correct stimulus.
        - Present transfer trial.
        - Do not take data on transfer trial or consequate.

LSR Subphase 2C (Independent)
Continue this subphase until mastery criteria on probes is met for phase
Subphase Regression Criteria: 1 session at 50% or lower, move to previous subphase

- Place 3 stimuli on table
- SD: State the name of the stimulus
    - If participant touches the correct stimulus within 3 seconds of SD, mark as correct (+) and reinforce.
    - If the participant touches the incorrect stimulus or does not respond within 3 seconds of the SD, mark as incorrect (-).
        - Provide most-to-least error correction until participant touches the correct stimulus.
        - Present transfer trial.
        - Do not take data on transfer trial or consequate.

Appendix C

Daily probe data sheet

Stage 1: Phase 2 - Daily Probes

Participant:	Type (Tact or LSR):

	Target	Data	
1			Inst.
2			
3			Date
4			
5			
6			
		%	

	Target	Data	
1			Inst.
2			
3			Date
4			
5			
6			
		%	

	Target	Data	
1			Inst.
2			
3			Date
4			
5			
6			
		%	

	Target	Data	
1			Inst.
2			
3			Date
4			
5			
6			
		%	

	Target	Data	
1			Inst.
2			
3			Date
4			
5			
6			
		%	

	Target	Data	
1			Inst.
2			
3			Date
4			
5			
6			
		%	

	Target	Data	
1			Inst.
2			
3			Date
4			
5			
6			
		%	

	Target	Data	
1			Inst.
2			
3			Date
4			
5			
6			
		%	

	Target	Data	
1			Inst.
2			
3			Date
4			
5			
6			
		%	

	Target	Data	
1			Inst.
2			
3			Date
4			
5			
6			
		%	

	Target	Data	
1			Inst.
2			
3			Date
4			
5			
6			
		%	

	Target	Data	
1			Inst.
2			
3			Date
4			
5			
6			
		%	

Appendix D

Tacting and Listener Responding data sheets

Stage 1: Phase 2 - Subphases - Establishing Tacts & Selections

Participant:	Type (Tact or LSR):

	Target	Data	
1			Inst.
2			
3			Date
4			
5			SubPh
6			
7			Prompt Delay
8			
9			
10			
11			
12			
		%	

	Target	Data	
1			Inst.
2			
3			Date
4			
5			SubPh
6			
7			Prompt Delay
8			
9			
10			
11			
12			
		%	

	Target	Data	
1			Inst.
2			
3			Date
4			
5			SubPh
6			
7			Prompt Delay
8			
9			
10			
11			
12			
		%	

	Target	Data	
1			Inst.
2			
3			Date
4			
5			SubPh
6			
7			Prompt Delay
8			
9			
10			
11			
12			
		%	

	Target	Data	
1			Inst.
2			
3			Date
4			
5			SubPh
6			
7			Prompt Delay
8			
9			
10			
11			
12			
		%	

	Target	Data	
1			Inst.
2			
3			Date
4			
5			SubPh
6			
7			Prompt Delay
8			
9			
10			
11			
12			
		%	

	Target	Data	
1			Inst.
2			
3			Date
4			
5			
6			
7			
8			
9			
10			
11			
12			
		%	

	Target	Data	
1			Inst.
2			
3			Date
4			
5			
6			
7			
8			
9			
10			
11			
12			
		%	

	Target	Data	
1			Inst.
2			
3			Date
4			
5			
6			
7			
8			
9			
10			
11			
12			
		%	

Appendix E

Stage 1 - Bi-Directional Naming (BiN) Assessment

Phase 3 - Test Tacting of Selection Stimuli and Selection of Tact Stimuli

Testing Tacting of Selection Stimuli

- Use stimuli that were previously used during selection trials.
- SD: Hold up card and say "What is it?"
    - If participant tacts stimulus correctly (with best approximation) within 3 seconds of holding card, mark as correct. Do not reinforce.
    - If participant tacts stimulus incorrectly or does not respond within 3 seconds, mark as incorrect. Do not provide error correction.
- Test each stimulus twice.

Mix in other mastered trials and reinforce in order to maintain compliance throughout probe session.

Test Selection of Tact Stimuli

- Use stimuli that were previously used during tact trials.
- Place stimuli on table in an array of 3.
- SD: state the name of one stimulus
    - If participant touches the correct stimulus within 3 seconds of the SD, mark as correct. Do not reinforce.
    - If participant touches the incorrect stimulus or does not respond within 3 seconds of the SD, mark as incorrect. Do not provide error correction.
- Test each stimulus twice.

Mix in other mastered trials and reinforce in order to maintain compliance throughout probe session.

Inclusion Criteria: Participants who perform at 50% correct or lower on tact and/or selection probes will be included in the rest of the study.

Appendix D

Test Tacting of Selection Stimuli and Select

Stage 1: Phase 3 - Transfer Probe Sheet

Participant:	Date:

Selection of Tact Stimuli

	Target	Data	
1			Inst.
2			
3			Date
4			
5			
6			
		%	

Tacting of Selection Stimuli

	Target	Data	
1			Inst.
2			
3			Date
4			
5			
6			
		%	

Appendix E

NAMING TEST

Data

Correct	O
Incorrect	X

Stimuli

A	
B	
C	

Date:
Instructor:
Participant:

PROBES

TACT

B	B	A	B	C	C	A	A	C	%
1	2	3	4	5	6	7	8	9	

LISTENER

C	A	C	B	B	A	A	C	B	%
1	2	3	4	5	6	7	8	9	

MTS

B	B	C	C	B	C	A	B	C	A
1	2	3	4	5	6	7	8	9	10

B	A	A	C	A	%
11	12	13	14	15	

TEST

TACT

C	A	C	C	B	A	B	B	A	%
1	2	3	4	5	6	7	8	9	

LISTENER

A	C	A	B	C	B	C	A	B	%
1	2	3	4	5	6	7	8	9	