Interdependent Group-Oriented Bonus Rewards: Enhance Math Performance and On-Task Levels Contingencies in Classrooms

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Me

Qualifiers –

1. I agreed to come
2. Have done lots of research on topic
3. I taught EBD in self contained school – math and social/behavioral problems were big.
4. Consultation practica for 29 years (describe)
5. Negative correlation between spelling and intelligence

Disqualifiers

1. Not sure this topic will meet your needs, but could not do reading for 6 hrs.
2. Was a lousy EBD teacher until students shaped me up.
3. Consultation practica is not the same as real world, teachers want to help my students – often not successful but keep trying
4. Until I got to grad school, I was a bad student –lots of smarter people than me. I could not get into my own program

I stand on the shoulders of giants (I work with teachers and my students). I had great professors including Lentz, Shapiro, Browder, Starky, Suppa…).

My EBD students shaped my behavior.

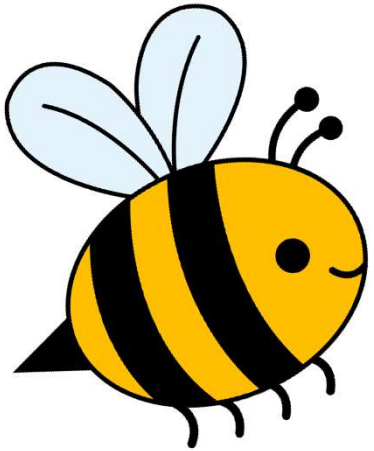
I. Objectives

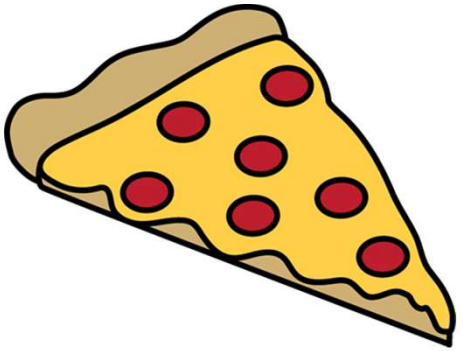
1. Learn strengths and weaknesses of different contingencies (negative and positive side effects)
2. Generate a pool of group rewards
3. Learn procedures to minimize negative side effects of interdependent bonus rewards targeting math.
4. Learn procedures to maximize direct effects and positive side effects of group contingencies.
5. Learn why it may be poor advice to strive for consistency, as opposed to employing random selection of contingency components.

II. Introduction

New Sentinel - Knoxville - Sunday March 4, 2007.

While preparing to do a workshop, I found three interesting related things in my local newspaper:



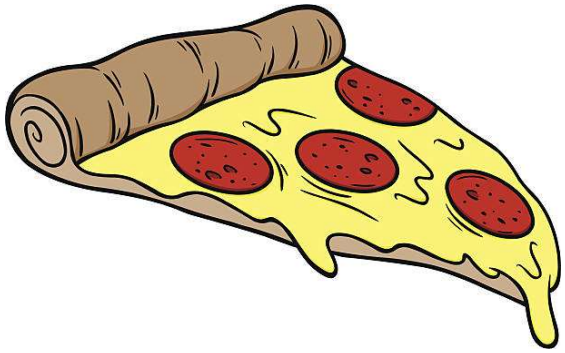


1. **Book It** Program article (Pizza Hut).

2. Spelling B word - **grundyism.**

3. **UT basketball coaches** - painted orange and cheering.

These are all related to my workshop.



II. Introduction

Front Section (pg. A-16):

BOOK IT - Pizza Hut Program was attacked as a reading program due to rewarding reading with pizza.

Susan Lin (Harvard Psychologist) - "wrong, junk food, corporate sponsors, undermines parents by positioning Pizza Hut as integral component for raising literate children"

Alphie Kohn (Author) - "makes students see reading as way to get pizza or prize, less interested in reading for itself"

"choose easier books to get through them faster"

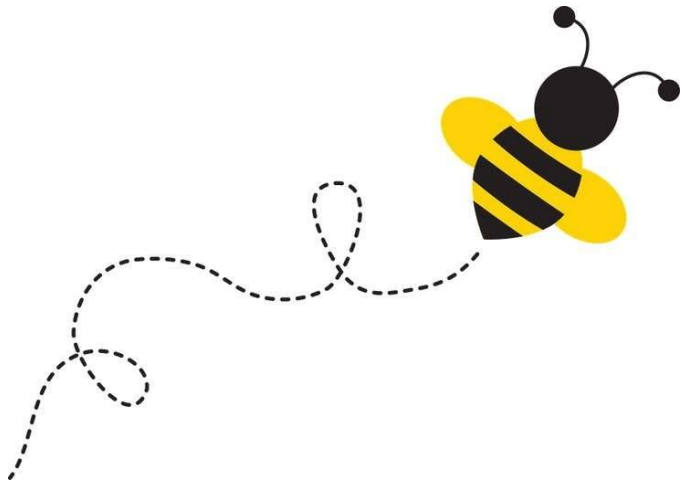
Practitioners: Principals Lucille Coghill and Chris Carney- nothing negative to say about program. Encourages students to read.

Where do I fall on this?

II. Introduction

Local Section (pg B-1):

Spelling B results: Eighth-grader wins. The word she spelled was **grundyism -** meaning to have a prudish adherence to conventionality.



II. Introduction

Sports Section (pg D-2): Basketball coaches

Reader survey- "Which coach had a better performance at Thompson-Boling?

- Bruce Pearl = 43.4 (painted himself orange, shirtless)
- Pat Summitt = 56.6 (cheerleader outfit, pyramid, sang rocky top)

Comments from readers:

"Both coaches were awesome"

"There is not a men's or women's coach in the world I would trade out coaches for."

"Show me another school with this type of support… great exposure… makes me proud to call myself a Volunteer."

I will visit each of these issues as I progress through this workshop.

III. Contingency

Describes an if-then relationship between behavior and consequence (if you do this - then this happens).

<u>Contingency components</u>

- Student (who)
- Antecedent (when)
- Target behavior (what)
- Criteria (how little, how much)
- Consequent (if ____ then _____)

Example of Individual Contingency: Contingency Contract

- I, _____, will complete and score 80% of higher on 8 of my next 10 homework assignments. Each day the teacher will record my score on her score card.

- My teacher will give me ice cream on Friday (August, 28th) if I meet this goal.

Teacher Signature:_____ Date

Student Signature:_____ Date

Reinforcement and punishment

R+: stimuli delivered (*contingent on behavior*) and strengthens behavior

R-: stimuli removed and strengthens behavior (*contingent skipping*)

P+: stimuli delivered and weakens behavior (*paddle*)

P-: stimuli removed and weakens behavior (*fine*)

Activity numbers 1 and 2; handout pgs 2 & 3:

Activity number 1:

- Call out specific rewards.
- List as many as possible in 2 minutes.

Activity number 2:

- Call out target behaviors.
- List as many as possible in 2 minutes Please try to list specific target behaviors, thus rather than writing “bad attitude,” write_____.

Individual and Group Contingencies

Contingencies can enhance (reinforce), reduce (punish), or have no effect on future occurrences of target behavior.

Also, contingencies can be broken down into individual and group contingencies.

Group-Oriented Contingencies:

1. independent
2. interdependent
3. dependent

Individual Contingency

I. Student: 1 student.

Individual contingency means the student gets (receives access or opportunity to engage in behavior) and is reinforced or punished for **his/her own behavior**.

II. Antecedent:

- Student told about program (typically)
- Often specific antecedent indicates (e.g. when given a direction, a student will begin to comply to the request within 5s, 90% of the time)

III. Target behavior:

- Just that student's behavior
- Can customize target behavior for individual student
  - (i.e., idiosyncratic target behaviors): *remediation*
- Behaviors can vary widely- academic and social

Individual Contingency

IV. Criteria:

Identifies:

- Target behavior
- Level or criteria (90% of time)
- Typically includes a temporal criteria also (5s)

V. Consequence:

What floats specific child's boat?

- Example: contingency contract (ice cream)

Individual Contingency: Advantages

1. Tailor consequence
2. Tailor criteria (adjust as improves at own rate)
3. Tailor antecedent stimuli (academic task)
4. Many teachers familiar with use

Individual Contingency: Disadvantages

1. Time consuming
2. Difficult to manage 20 different contingencies

Individual Contingency: Disadvantages Cont.

Social Side Effects

3. Unfair, peer perception:
   - Squeaky wheel effect on peers- screw up to get extra reinforcement
   - Belittle target student, reinforcer, or behavior:
     - "*Of course the baby needs his ice cream.*"
     - *"Is Ralph working hard to meet his goal?"*
4. Students label this person (dumb, bad, etc.)

You guys got any more??????

Individual Contingency: Solutions

1. Text tells you to explain to peers that an individual needs extra.
   - *Bull dinky*: structure unjust world - teach unjust world

2. Punishment for poor performers.
   - *Bull dinky*: one can only ratchet up punishment so much before they opt out – e.g., stop going to school to avoid aversive consequences

3. Don't tell anyone – should share success with others, not keep quiet – Will they keep quiet?

4. Reinforce at home (home notes, Kelly).
   - Contract could be that mom delivers ice cream (this works, but again is difficult to manage).

5. Group-oriented contingencies.

Group Oriented Contingencies

Independent group: same contingency for all, same target behavior, criteria, consequence – access to consequence based on own behaviors, thus independent of peers.

Interdependent group: consequence based on aspect of group behavior, thus interdependency, i.e. where my access is dependent upon my own and classmates behavior. (Same consequence, delivered to *all or none*)

Dependent group: all get consequences based on individual student behavior.

Independent Group Contingencies

All have same target behavior, antecedents, criteria, and consequences.

Example: school or classroom rule, grades

I. **Students:** all students targeted.

II. **Antecedents:** much time and energy spent developing and explaining contingencies.

Examples:

- Teacher teaches class rules
- School board and attorneys develop and have approved Zero-tolerance policies
- Courts alter zero-tolerance policies

Independent Group Contingencies (continued)

III. Target behaviors:

Because addressing all students, more typical target behaviors such as:

- Completing assignments
- Attending school
- Bringing weapons to school
- 90% average on tests

IV. Criteria:

Held constant across students as with target behaviors

- All get C for 70-79% accurate
- All expelled for bringing drugs to school

V. Consequence: again, the same for everyone

Independent Group Contingencies: Advantages

1. Less time consuming
2. Easier to manage than 20 different contingencies
3. Considered fair: no squeaky wheel effect on peers
4. Considered fair by others (due process and equal protection)
5. Many teachers familiar with use

Independent Group Contingencies: Disadvantages

1. Public success and failure:

When all have same contingency, then peers know:

- What the criteria was
- Whether a peer met it based on whether they get access to consequence.

Public feedback: peers know…

- Who did well (look around and see who got reward)
- Who did poorly (look around and see who got punished)

Students label this person (dumb, bad, etc.)

- Social classes: nerds & geeks (r+ haves)
- bad kids: get punished
- dumb kids (r+ have nots)

Independent Group Contingencies: Disadvantages

2. **Reward have *nots*, tend to demean rewards:**

   a. *Only babies like ice cream*

   b. Behavior, and students who get them (when you earn rewards others should be patting you on the back not demeaning the accomplishment or rewards).

3. **Students steal kids rewards:**

   – Steal fancy lead pencil from peer who earned it.

4. **Students who earn rewards share them:**

   – This is a huge problem: why should you work to earn rewards if a peer will share?

   – However, are teachers to tell peers not to share or punish them for sharing?

5. **Common target behavior and criteria:**

   – Students who try really hard but do not meet criteria do not get reward (peers may share and teachers give in)

Independent Group Contingencies: Disadvantages

6. **Can't tailor rewards:** (some kids hate _____)
   - May screw up to avoid access to consequence.

7. **Student may also find it reinforcing to prevent peers from earning rewards**
   - Sabotage their peers.

8. **When can no longer meet criteria, no reason to try:**
   - Student who fights on Monday has no chance to earn Fridays reward
   - College student bombs first 2 tests and can not pass, stops attending, studying, or begs professor to change criteria

9. **Can't tailor antecedent stimuli: (academic task)**
   - Unfair if Tom just has to do 3 easy problems

10. **Some students rarely gain access to r+ : (dead men)**
    - Give up, learned helplessness

Misuse of Independent Group Contingency

Scenario:

A class of EBD students (8 students) plan to go on a canoe trip.

Much planning involved: 6 canoes, 12 adults, guides to all volunteer their time.

Teacher sees Dr. BIS (Behaviorism Is Simple) who suggests that this activity would make an excellent reinforcer. Thus, BIS and teacher decide that only those students who do not fight for next two weeks get to go on the trip.

1. **Students**: each person in class
2. **Behavior**: fighting
3. **Antecedent**: tell about contingency
4. **Criteria**: none for two weeks
5. **Consequence**: get to go on canoe trip

Misuse of Independent Group Contingency

Students:

#1: *Quick Draw (QD):*

- Generally gets along with peers and teachers
- Often helps peers and adults
- But is prone to occasional impulsive outburst
- Feels genuine remorse when hurts someone
- Psychologist has hung about every diagnostic category or label on this child.

Misuse of Independent Group Contingency

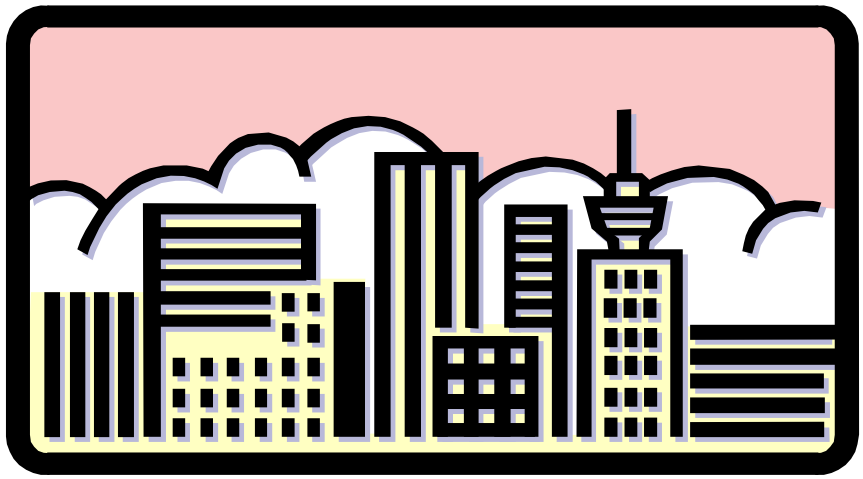
#2: *Timmy Loaner (TL):*

- Quiet child who does not fit in
- Dresses funny, poor social skills
- Odd behavior symptom of childhood schizo.
- All classmates reject him except QD:
  - Considers QD his best friend,
  - QD often picks him for games or initiates social interaction with him.

Misuse of Independent Group Contingency

#3: *City Boy (CB):*

- A tough kid from the city
- Has high social status in the room
- Aggressive and defensive
- Considered conduct disordered
- Often picks on "hicks" in the room



Misuse of Independent Group Contingency

#4: ***Boy Scout (BS):***

- A kid from the sticks
- Hunts, fishes, and loves the outdoors
- History of child abuse
- Has attachment disorder

***Other four students merely bit players in our drama.**

Misuse of Independent Group Contingency

Canoe trip results: Four children earn trip, however…

#1: QD (Quick Draw) fires fast, fights 2 days after contingency is described.

For the next 12 days he continues to fight and act out, belittle the trip:

"Sissies going down the big, bad river,"

"Careful, you might drown,"

" You should tip Dr. BIS's canoe"

The teacher no longer has trip as a motivator.

Of course Dr. BIS says he learned a good lesson, this will teach him that his behaviors have consequences.

Teacher does not much care as she is on her way to the hospital to have her nose re-set (she has had to restrain *QD* daily since he lost his chance to go canoeing).

Misuse of Independent Group Contingency

#2. ***Tl (Timmy Loaner):***

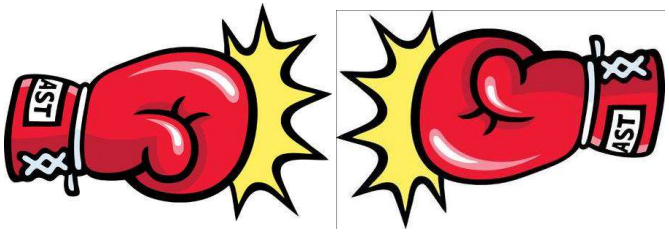
- Was scared about trip to begin with
- Really does not want to go after *QD* gets in fight
- Mild overdose two days before trip, is hospitalized.

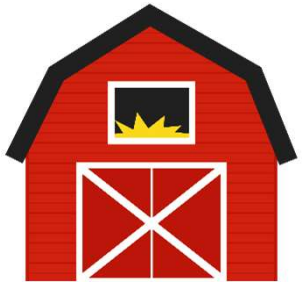
Teacher is horrified, but Dr. BIS re-frames and sees bright side:

"Thank God we found out how disturbed he is before the trip."

#3. ***CB (City Boy):*** a tough kid from the city who has high social status in the room does not earn the trip. In fact, he got in a fight with *BS.*

#4. ***BS (Boy Scout):*** a kid from the sticks who hunts, fishes, and loves the outdoors. They fight three days before the trip.





Misuse of Independent Group Contingency

Circumstances of fight:

BS really wanted to go canoeing, quiet kid who gets little attention from peers and feels less sophisticated than the conduct disordered ***A players*** in the class.

CB is considered the toughest kid in the class, but he can't swim, is afraid of snakes, and has never been in a boat in his life.

Thus, *CB* starts the fight with *BS* (baits him) and low and behold neither are allowed to go on trip.

*Note: for *CB,* trip was a punisher; but for *BS,* it was a reinforcer.

**What else could go wrong?: let's hear from you guys!

Why Cover This?

Group contingencies are complex interventions that can have a variety of impacts in complex environments like classrooms.

I know Ph.D. faculty who think behaviorism is simple and merely common sense.

THEY ARE WRONG.

Independent v Interdependent Group Contingencies for Math Success

Contingency	Target Student(s)	Target Behavior	Criteria	Consequence
Independent Group-oriented Reward	All first-grade students in Mrs. Smith's class	Math Assignment 10 single digit addition problems	Each student in the class who scores 90% correct on the assignment	Each student who meet criteria receives a Letter grade of A and a sticker
Interdependent Group-oriented Reward	All first-grade students in Mrs. Smith's class	Math Assignment 10 single digit addition problems	Class average of 90% correct on the math assignment 10	All students in the class get 5 min of bonus recess

Independent v Interdependent Group Contingencies for Math Success

With **independent group-oriented bonus** rewards, the same reward is delivered to each student contingent upon their own performance on that same task (e.g., assignment, exam) meeting the same criterion (e.g., 90%). Learned helpless with rewards.

Limitation of Independent for Academics:

Same assignment and criteria for earning reward for class, thus *some students give up* because can not meet criteria for earning their own rewards

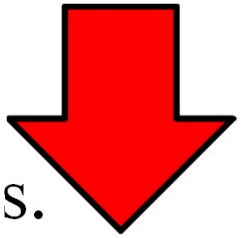
Independent v Interdependent Group Contingencies for Math Success

Solutions

1. Personalized systems of instruction: individual target behaviors, rewards, criteria for each student.

Works BUT HARD TO IMPLEMENT.

2. Assign easier work (water down curriculum) or set low criteria (lower expectations) for group.



May retard learning of many students in the class.

Interdependent Group Bonus Rewards

Keep current structures (independent group contingencies, grade honors privileges) in place and supplement with interdependent bonus rewards.

With *inter*dependent bonus rewards, all students in the class get reward contingent upon the meeting some group criteria.

Example: all students get 5 min of extra free time if the class averages 85% of higher on an assignment or exam.

Interdependent Group Bonus Rewards

Interdependent Group-oriented Reward	All first-grade students in Mrs. Smith's class	Math Assignment 10 single digit addition problems	Class average of 90% correct on the math assignment 10	All students in the class get 5 min of bonus recess

Interdependent Group Bonus Rewards

Some general characteristics:

1. The intertwining of fates (earning rewards depends on your performance and your classmates) can cause students to encourage, prompt, teach, and praise one another.

2. *But*, it can also cause them to blame and threaten one another.

4. At least two rewards, the teacher delivered reward (free time) and the group winning (social celebration). Have you even been part of a winning team!

Structuring IGBR

UNFAIRNESS AND BONUS REWARDS

These are considered unfair because:

1. A student can do very well and not earn a reward, because his classmates did poorly.
2. A student can do poorly and earn a reward because his classmates did well.

Structuring IGBR

ADDRESSING UNFAIRNESS

1. **Avoid high stakes rewards that include grades.**
   - Do you want to explain to a parent that their child did not get into a preferred college, get a scholarship, or get into AP course because they got a weak grade that was based on their classmates performance – not their own?

Grades are high stakes, they also provide an indication that the students has developed some skills of knowledge.

Do you want to explain to another teacher why A-average math students does not have skills necessary to succeed in the next class?

Structuring IGBR

ADDRESSING UNFAIRNESS CONT.

2. Introduce contingency as a chance to earn bonus rewards.

My students with EBD complained and I responded:

- OK, we will cease the program. When the program has no cost and only allows students to earn bonus (extra rewards), they will not want to stop.

- Also, remind them that this is for the *group* (class) and that the other rewards they earn for their *own* behavior.
- Also, remind them why learning math is important (use math every day, career….).

Structuring IGBR

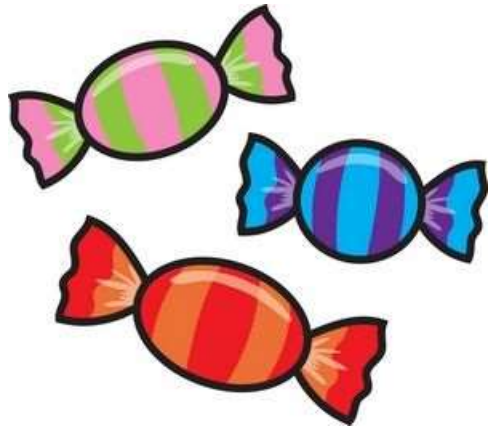
SELECTING REWARDS

All or none get same reward:

- Easier to implement than delivering to some but not others.
- Less reward stealing, sharing, or purchasing
- Less belittling reward or behavior that cause rewards
  - *"Is Ralph working hard to earn his ice cream?"*
- No feedback to classmates on how peers did on math assignment
  - less labeling as dumb, stupid or lazy.

Structuring IGBR

SELECTING REWARDS



Challenges:

Reinforcers are idiosyncratic:

Candy = high quality reward for John

Candy = a moderate quality reward for Jane

Candy = a low quality reward for Jim

Reinforcer quality may not be stable:

For John, candy may be a high quality reward, *except* after trick or treating.

Structuring IGBR

SELECTING REWARDS

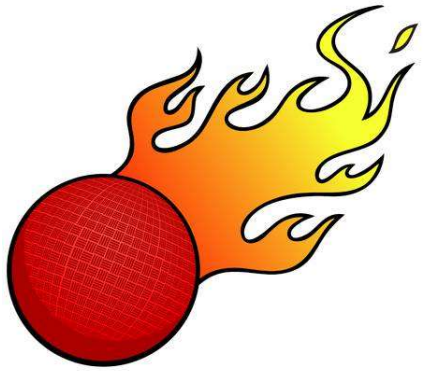
Challenges:

- Some consequences are reinforcing for some students but punishing for others.

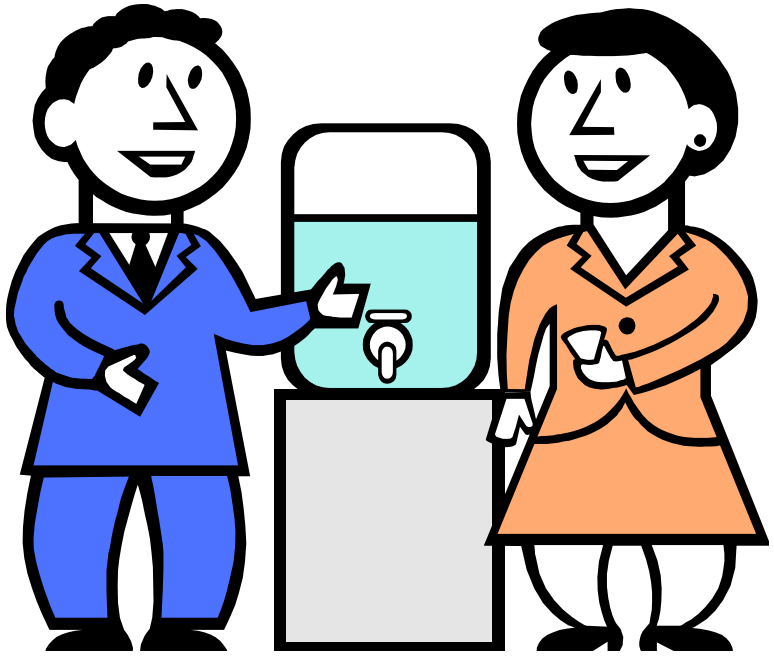
In the group, a consequence is a punisher for Jim. He…

1. may be reinforced for doing poorly
2. may be reinforced for sabotaging the group by causing others to do poorly.

Examples: River trip, dodge ball



Break!



Welcome Back!

At this point, I have know idea where we are. While preparing the slides– I kept moving breaks and slides.

I think we have shifted the focus to interdependent group rewards to academic performance and are about to focus on math studies.

Structuring IGBR

GUIDELINES FOR SELECTING REWARDS

David Premak encouraged us to think about rewards as opportunity to engage in preferred behaviors.

Extra free time, recess time, and computer time each allows student to choose to engage in their own preferred behavior.

Recess time: shoot hoops, chat with friends…

Structuring IGBR

GUIDELINES FOR SELECTING REWARDS CONT.

Tangibles and edibles:

- Edibles get consumed and once finished may be desired again. Thus, a small piece of candy can remain a reinforce over time.

Tangibles – for the same reason I like:

- Cheap plastic trinkets that break (new one now a reinforcer)
- Collectables– different colored mechanical pencils
- Consumable school supplies

Structuring IGBR

GUIDELINES FOR SELECTING REWARDS CONT.

Scarcity breeds demand, as opposed to Grundyism or adherence to convention – think outside the box.

If a bonus reward is not typically available (many are not) it really feels like a bonus reward.

Examples: a) Extra recess at overgrown playground, b) gum or candy during independent seat work, c) listening to music during independent seat work, d) pushing teacher around in chair, e) shoot waste paper baskets, f) wearing hats in class, pajama day, elephant ears.

Activities you would normally not get to do in school.

Structuring IGBR

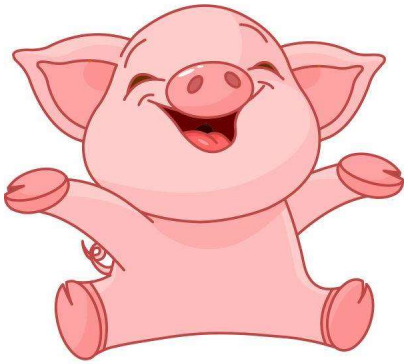
GUIDELINES FOR SELECTING REWARDS CONT.

Scarcity breeds demand- If a bonus reward is not typically available it really feels like a bonus reward**.**

Embarrassing Behavior Examples

a) Teacher sings students a song, waits on students during lunch, dresses as Pippy Longstockings, rides around the school one time for every book read over summer.

b) Principal in dunking booth, duct taped to wall, kissing pig.



YOU GUYS GIVE ME SOME?

NOTE: NOT FOR EVEYONE!

Structuring IGBR

GUIDELINES FOR SELECTING REWARDS CONT.

Activity rewards are often free!

- Things, activities, and embarrassing behaviors can all serve as rewards.
- Some activity rewards we do not consider because we typically use individual and independent group contingencies because they are difficult to deliver to some and not others.

Examples:

- Extra outside recess time– who supervises those who did not earn (teacher next door?)
- Listening to music during independent seat work. Put ear plugs in students who did not earn?

Structuring IGBR

GUIDELINES FOR SELECTING REWARDS CONT.

Avoid activities that are incompatible with school work:

- Watching a 90 min movie (Gremlins) reduces teaching and learning time.
- School work not interrupted with gum, candy, school supplies, or listening to music during independent seat work.

I have always liked music; have come to appreciate edibles.

Structuring IGBR

REWARDS FOR EVERYONE:

Recommendation: Develop a pool of rewards and randomly select them.

- *Idiosyncratic* – likely to have high quality reward for each student in the pool, although not same reward across students.
- *Immediacy* – more immediate rewards are more powerful. Can have some that can be delivered immediately (candy) and some that are delayed (extra recess after lunch).
- *Compatible with school work* – many can be compatible but only including a few that are not (gremlins) may really motivate students, without taking too much time from teaching and learning.

Structuring IGBR

GUIDELINES FOR DEVELOPING REWARD POOL

Suggestion box (shoe box) and index cards.

Provide some rules:

1) something everyone likes
2) Takes little time away from teaching and learning
3) Does not violate school rules or laws

Give examples, then review suggestions after school, keep ones you like, announce them the next day and see what the class thinks and add to the pool (or just add)

IGNORE INAPPORPIATE SUGGESTIONS – **PAJAMA DAY EXAMPLE.**

Structuring IGBR

SETTING CRITERIA

Problem – we do not have a science of criteria setting – what we have suggests:

1. 10% improvement in lots of texts.

   No data to support – distrust round numbers, trust Pi.

2. Exceed previous day (any improvement).

   Pro – often meet early, thus priming the pump.

   Con - when you get real high it is hard to earn

3. Shape – start low and gradually improve.

   Pro – often meet early, thus priming the pump.

   Con – how much to increase each time (no data)

   Con – slow growth when you may have gotten much more rapid increase with another procedure.

Structuring IGBR

SETTING CRITERIA

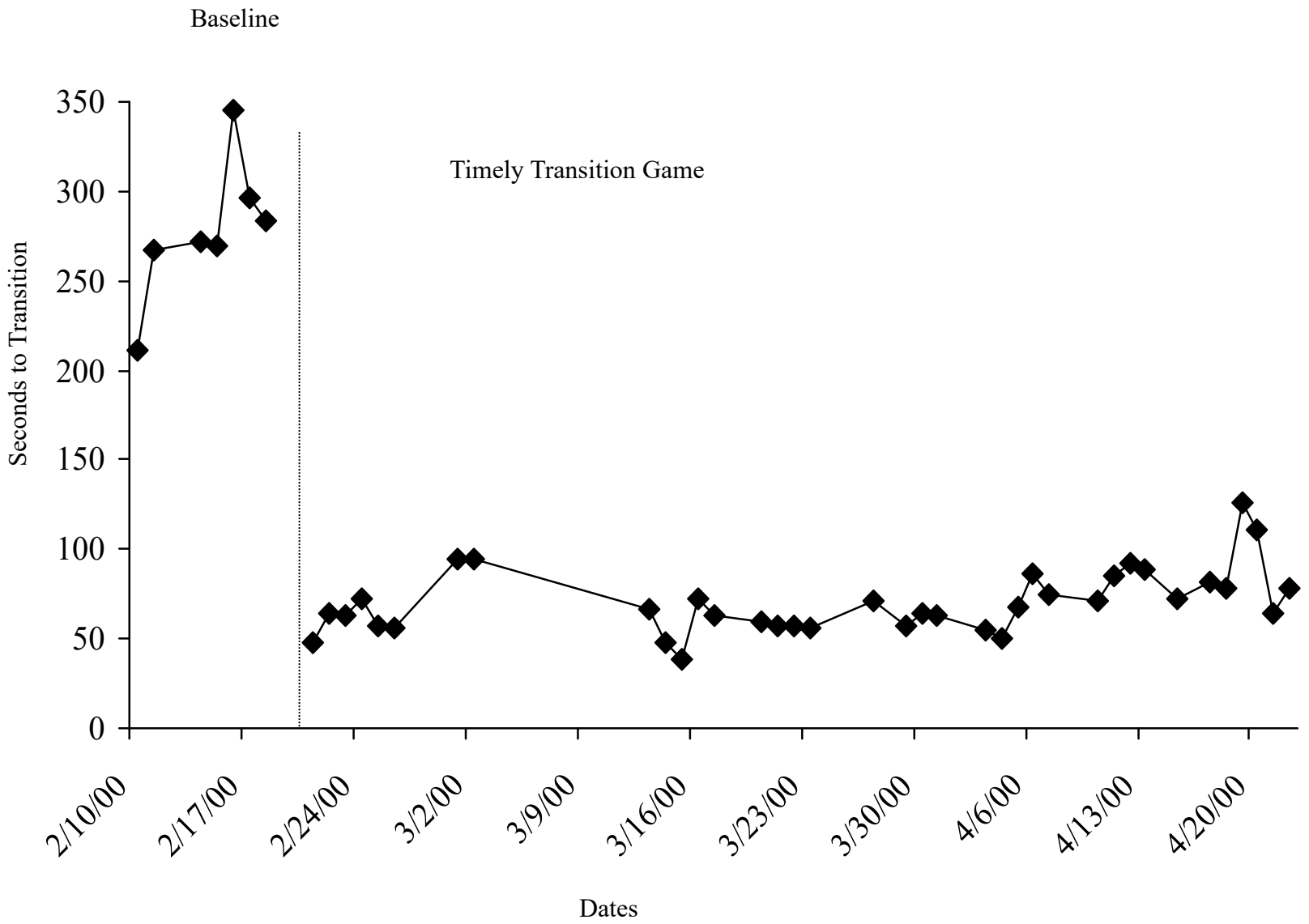
Recommend – randomly selecting criteria. Thus, it is unknown:

- When we do not know how well we have to do, we do our best.
- If we can't set criteria based on science for individuals how can we do it for a group?

Example: Popkin and Skinner developed a pool of class-average, percent-correct criteria which were written on slips of paper. The 30 criteria included one slip with 25%, one with 40%, three with 50%, three with 70%, four with 75%, four with 80%, four with 85%, five with 90%, and five with 95%.

- Get Maximum Increase First Day.
- Prime the pump by rigging (palming) the reward selection.

Example of Rapid Improvement with Random Selection of Criteria


Baseline
Timely Transition Game
Seconds to Transition
350
300
250
200
150
100
50
0
2/10/00
2/17/00
2/24/00
3/2/00
3/9/00
3/16/00
3/23/00
3/30/00
4/6/00
4/13/00
4/20/00
Dates

Structuring IGBR

TARGET BEHAVIORS

Interdependent group bonus rewards have been used to increase on-task, assignment completion, prosocial behaviors. They have also been delivered contingent upon lower levels of off-task or inappropriate/disruptive behaviors.

Public v Private:

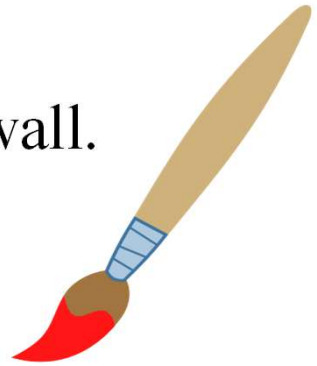
- Students may blame or aggress against classmates that they perceive as causing them to fail to earn rewards.
- **Public disruptive** – more likely to cause this blaming, aggressing.

Structuring IGBR

Public v Private target behaviors:

Academics – assignments and exams often private, may help avoid this.

– An exception is Art, since they hang it on the wall.



Also, by second grade students learn that:

- The way to decrease inappropriate behaviors is to threaten with punishment.
- The way to enhance academics is to teach (prompt, encourage, demonstrate).

WHO DO THEY LEARN THIS FROM?

Structuring IGBR

Target Behaviors

Academics – assignment completion not as powerful as percent correct, with incorrect scores as error.

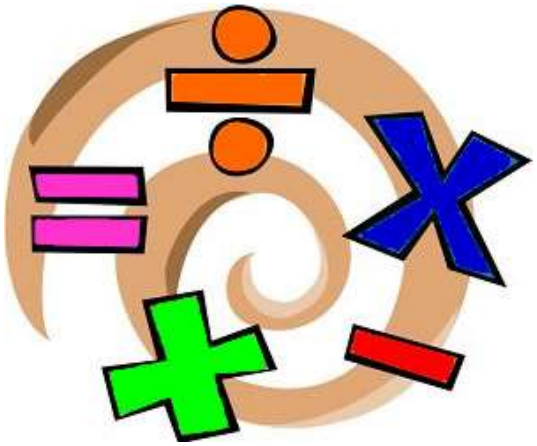
On-task – may be appropriate, but be careful because off-task behavior is often disruptive and will catch classmates attention and cause blaming.

We will review examples:

- Heering and Wilder is a good example. Wilder attended a workshop very much like this one, but longer.

SHOW ME THE DATA

- I am going to concentrate on math studies.
- Will review reading later.



WHY MATH?

1. Working on it now for papers, grants

2. Read papers about all math pedagogy (new math, touch math, math manipulative, and all things technology). Turns out, not so great. I believe I have something better that will not require teachers to change everything about how they teach, but merely supplement what they are already doing with interdependent bonus rewards.

Math Examples

- **Study 1:** Winett, R. A., Battersby, C. D., & Edwards, S. M. (1975). The effects of architectural change, individualized instruction, and group contingencies on the academic performance and social behavior of sixth graders.

Study	Class	Assignments	Criterion	Rewards	DVs	TCP	BGR	Gain
Winett, 1975	6th gr GE	In-class, low, med, high	Fix – 90% complete	Extra recess	% comp % corr	54% 40%	92% 67%	38% 27%

Math Examples Cont.

Winett et al (1975).

Target Math and Language Arts – I will focus on Math.

Class:

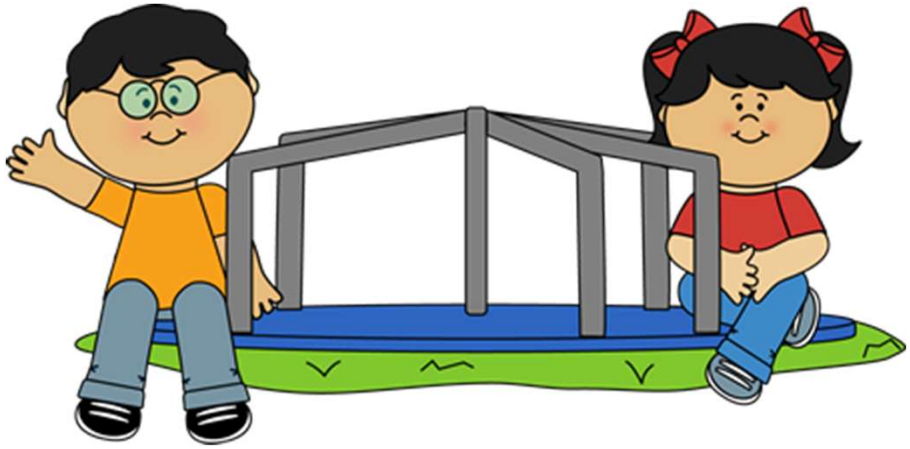
27 6th grade student. GE class.

Typical Classroom Procedures (TCP)

- Math, three groups: low, medium, and high.
- Worksheet based on ability
- TCP Performance: 54% complete, 40% correct.

Math Examples Cont.

Winett et al (1975).



Two intervention components:

1. More individualized instruction
2. Interdependent bonus reward where:
   - Entire class received extra outside recess time (Reward)
   - Contingent upon 90% of the students turning in complete in-class worksheets (criteria and target behaviors).

Completion went from 54% to 92% (38% increase)

% Correct went from 40% to 67% (27% increase)

Math Examples Cont.

Winett et al (1975).

Limitations:

1. Applied individual instruction and rewards at same time, what caused the increase?
2. Accuracy only went up to 67%, still not acceptable. This may have been caused by reinforcing assignment completion as opposed to accuracy.
3. Would take a long time to grade 27 papers for accuracy; completion was easier to grade.

Scott et al. study addressed many concerns.

Math Examples

- **Scott et al., (2017).** Evaluating and comparing the effects of group contingencies on mathematics accuracy in a first-grade classroom: Class average criteria versus unknown small-group average criteria. *School Psychology Review, 46,* 262–271.

Scott 2017	**1st gr GE**	**In-class**	**R - % corr Class/ table**	**R - edibles**	**% corr**	**63% 63%**	**83 84**	**20 21**

Math Examples

Scott et al (2017).

Target Math Assignments

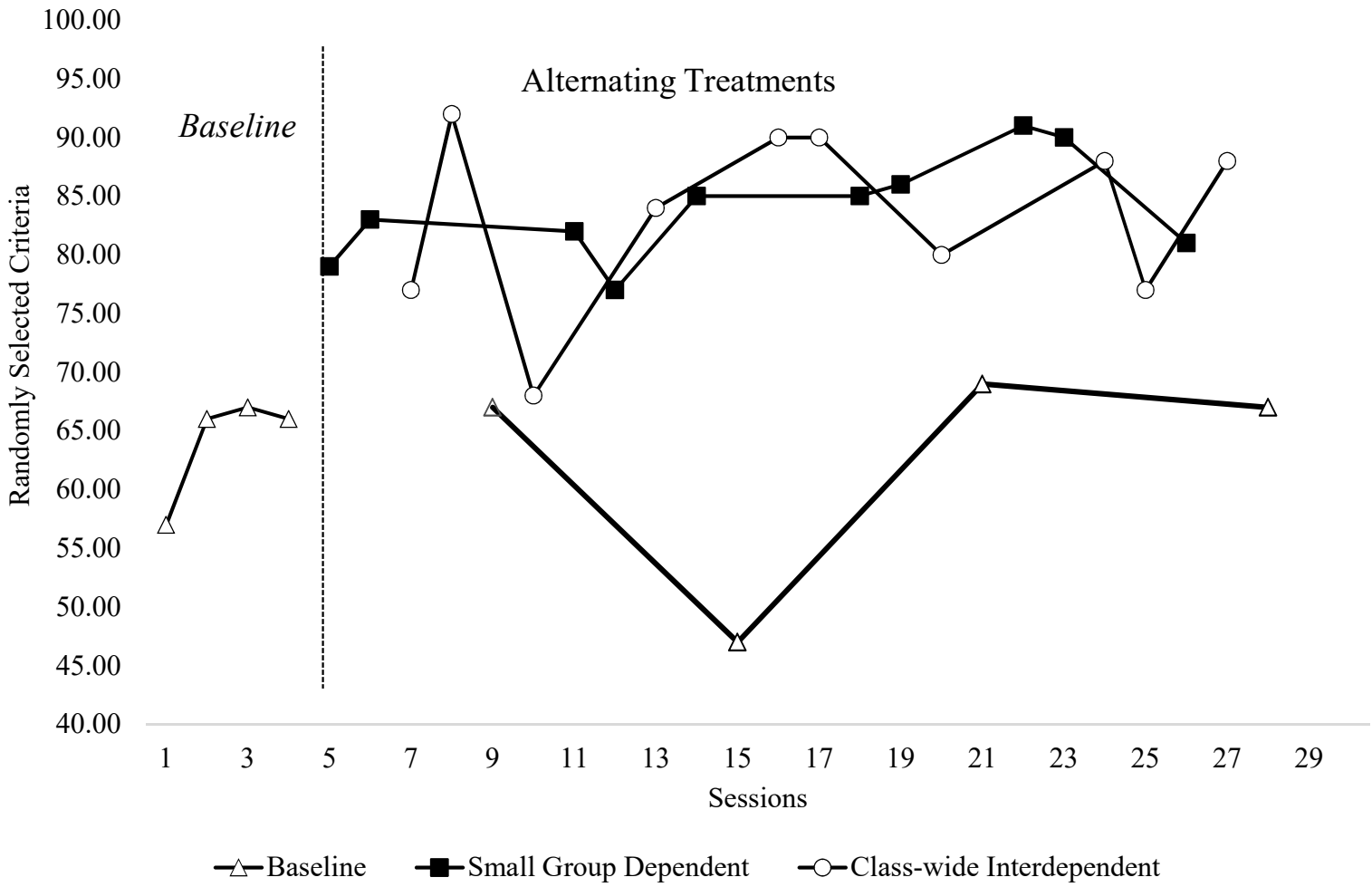
Class: 16 1st grade student. GE class. Seat 4 students to a table.

Typical Classroom Procedures (TCP)

- All student get math assignments to start day, while teacher goes to Tier 3 instruction.
- Work for about 20 min.
- Turn in and back and work later
- Student earn extra free time at end of day 90% correct.
- Those who did not earn work on math

TCP Performance: 63% correct after morning time

Scott et al Results



Interpreting the Figure

- Notice immediate increase.
- Notice no difference between two treatments.
- Notice no effect on TCP when we returned to it during intervention – in other words, providing R+ did not hurt there performance when it was withdrawn.

TCP average 63% increased to 83% and 84% (table and class).

Scott et al., Descriptive Statistics

	TCP:BL	*SGC*	*CWC*	*TCP:AT*
	M (SD) *Range* [Letter Grade]	**M** (SD) *Range* [Letter Grade]	**M** (SD) *Range* [Letter Grade]	**M** (SD) *Range* [Letter Grade]
Class-wide Average	**64.0%** (4.7) *57%-67%* [D]	**83.9%** (4.5) *77%-91%* [B]	**83.4%** (7.7) *68%-92%* [B]	**62.5%** (10.4) *47%-69%* [D]
Group 1	**59.3%** (9.6) *50%-68%* [F]	**82.7%** (12.1) *60%-98%* [B]	**81.2%** (12.1) *67%-99%* [B]	**53.0%** (19.4) *30%-71%* [F]
Group 2	**48.8%** (7.8) *39%-56%* [F]	**67.0%** (13.3) *50%-93%* [D]	**71.3%** (11.9) *50%-87%* [C]	**38.0%** (19.3) *12%-55%* [F]
Group 3	**79.8%** (11.3) *64%-90%* [C]	**94.0%** (7.2) *78%-100%* [A]	**93.7%** (6.0) *83%-100%* [A]	**87.75%** (9.3) *75%-97%* [B]
Group 4	**70.3%** (12.7) *61%-88%* [C]	**90.3%** (12.0) *63%-100%* [A]	**84.6%** (16.5) *42%-100%* [B]	**71.0%** (8.2) *65%-83%* [C]

Note. TCP: BL = typical classroom procedures, baseline data phase; SGC = Small Group Condition data; CWC = Class-wide condition data; TCP: AT = typical control procedures: alternating treatment phase.

Comparisons

Mean differences, Pooled Standard Deviations, effect sizes, and PND across baseline and alternating treatment phases

Comparisons	Mean Difference	Pooled SD	Hedge's G	PND
TCP:BL - SGC	-19.90	4.60	4.37	100%
TCP:BL -CWC	-19.40	6.38	2.74	100%
TCP:BL - TCP:AT	1.50	8.07	0.19	25%
TCP:AT-SGC	-21.40	8.01	3.29	100%
TCP:AT-CWC	-20.90	9.15	2.47	90%
SGC-CWC	0.50	6.31	0.08	10%

Note. TCP: BL = typical classroom procedures, baseline phase; SGC = Small Group Condition data; CWC = Class-wide condition data; TCP: AT = typical control procedures: alternating treatment phase; PND = percentage nonoverlapping data.

Within-Student Analyses

- TCP-BL to intervention: average math performance higher for 14 of 16 students in SGC (88%) and 13 of 16 students in the CWC (81%)
- 12 of 16 students (75%) increased letter grades under SGC (4 students had no change)
- 10 of 16 (63%) students increased letter grades under the CWC condition

Within-Student Analysis

Students	**TCP:BL Mean** [Letter Grade]	**Mean** (SD **TCP:AT** [Letter Grade]	**Mean** (SD) **SGC** [Letter Grade]	**Mean** (SD) **CWC** [Letter Grade]
1	**62** [D]	**78** [C]	**88** [B]	**64** [D]
2	**100** [A]	**89** [B]	**98** [A]	**100** [A]
3	**71** [C]	**49** [F]	**78** [C]	**84** [B]
4	**6** [F]	**14** [F]	**72** [C]	**60** [D]
5	**87** [B]	**81** [B]	**96** [A]	**89** [B]
6	**18** [F]	**39** [F]	**53** [F]	**79** [C]
7	**18** [F]	**9** [F]	**45** [F]	**70** [C]
8	**73** [C]	**25** [F]	**66** [F]	**51** [F]

(continued)

9	80 [C]	74 [C]	98 [A]	98 [A]
10	95 [A]	77 [C]	83 [B]	85 [B]
11	82 [B]	100 [A]	98 [A]	94 [A]
12	64 [D]	100 [A]	96 [A]	98 [A]
13	12 [F]	62 [D]	81 [B]	81 [B]
14	91 [A]	89 [B]	99 [A]	95 [A]
15	69 [D]	73 [C]	93 [A]	75 [C]
16	78 [C]	59 [F]	90 [A]	89 [B]

Note. TCP: BL = typical classroom procedures, baseline phase; SGC = Small Group Condition data; CWC = Class-wide condition data; TCP: AT = typical control procedures: alternating treatment phase.

Student Acceptability

	Small Group Condition Frequency (%)	Class-wide Condition Frequency (%)
1. Which condition did you prefer?	10 (71.4%)	4 (28.6%)
2. Which condition did you peers prefer?	9 (64.3%)	5 (35.7%)

Student Acceptability

Why prefer?

- Perhaps because of the additional random component.

Scott et al.

1. Both table and class-wide equally effective.
2. By table is easier, less and quicker scoring (more immediate reinforcement)
   – Preferred by teacher and students
   –Student, another random component- I just love mystery table day.
3. Randomly selected unknown table
   –Announce winning table but never the losing table.
4. Target % correct got large increases (Winett targeted % complete).
5. Largest increase in failing students

Those scoring below 60% showed a 48% improvement

Those scoring above 89% still showed improvement

Scott et al.

Note:

- One failing went way up, but a few got up to about 50-60%.
  - These students may need extra help, but now you know what they can and can't do so they will need less help.
  - Also, now they are motivated and more likely to seek extra help and attend to extra help.
- One instance of a student giving another student answer during table condition.

Math and Other Example: A Personal Favorite

- Popkin, J., & Skinner, C. H. (2003). Enhancing academic performance in a classroom serving students with serious emotional disturbance: Interdependent group contingencies with randomly selected components. *School Psychology Review, 32*, 271-284.

Academic Targets:
Everything Randomized
Academic Behavior Game

Study: Academic Performance Game (Popkin dissertation)

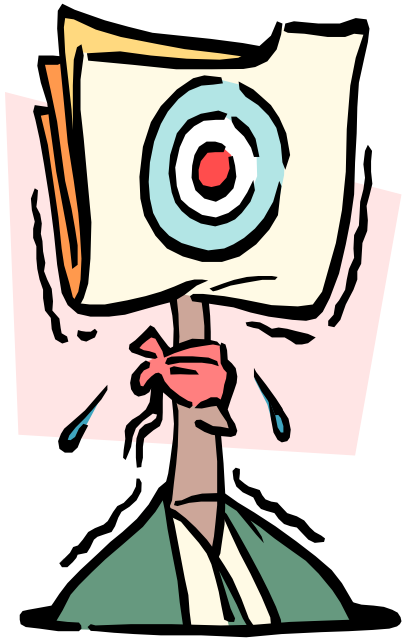
How about randomizing all components!

Class: Self-contained SED middle school classroom, ages 11-14.
All males.
Problem: while some are doing school work, often they are not.

They are failing and failing to learn.

Not sure if *can't do* or *won't do* problem (is the work too hard).

Academic Targets: Everything Randomized Academic Behavior Game



Target Students:

- All

Target Behaviors:

- Spelling, Mathematics, and English

Daily performance:

- (% correct) regardless of what they are doing (ISW, quizzes, exams).
- All five students in different curricula (different activities each day).

Target behavior eventually becomes randomly selected

Academic Targets: Everything Randomized Academic Behavior Game

Criterion: Randomly selected

Start with 30 slips, each says **spelling** and **1- 25%, 3-50%, 3-70%, 4-80%, 4-85%, 5-90%, 5-95%, 5-100%** (Scott used same)

- Mean criteria, class average must be met to earn reward.
- After a few weeks, make identical slips but have 30 say **Math**.
- Few more weeks make identical slips but have 30 say **English**.
- Got 90 slips by end of study.

Academic Targets:
Everything Randomized
Academic Behavior Game

<u>Rewards</u>: Randomly selected, group generated– told activities, something everyone likes, inexpensive. Use a suggestion box.

- Carmen Santiago
- Flight simulator game
- Silent ball
- Computer time
- Bonus bucks (token economy)
- Movie

Academic Targets:
Everything Randomized
Academic Behavior Game

Procedures: Explain game for spelling only.

Have them suggest group rewards.

Show them 30 spelling criteria slips of paper.

Two containers:

- one for rewards (slips of paper)
- one for target behavior/criteria slips

End of each day draw one out – did they earn the reward?

Academic Targets:
Everything Randomized
Academic Behavior Game

Procedures:

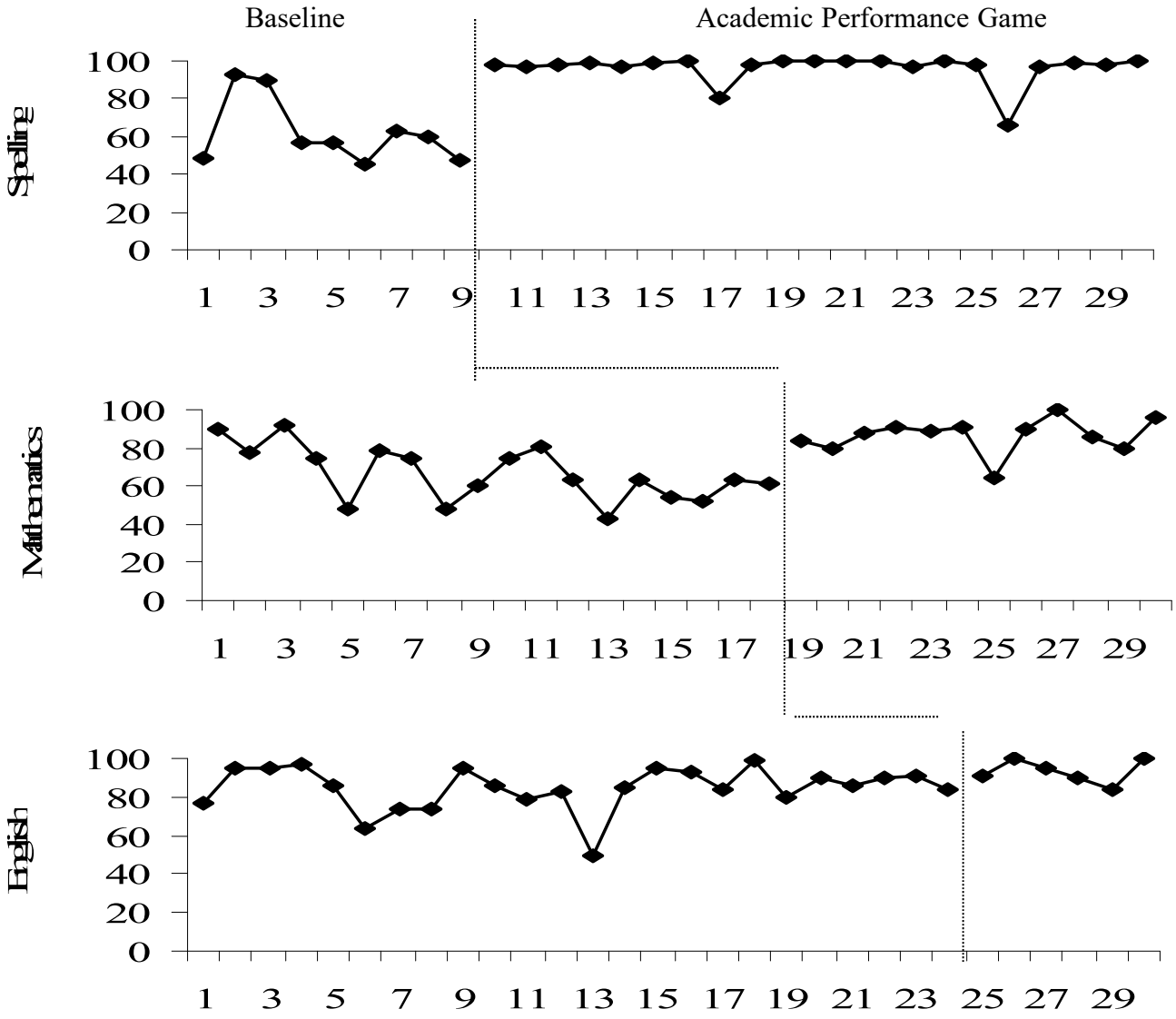
After a few weeks add the 30 slips for math.

- Now 60 criteria-target behavior slips:
  - do not know how well you have to do
  - do not know what subject

Solution: do your best and encourage your peers to do the same

After a few more weeks add 30 slips with English on them.

- Now do your best and peers do their best in *spelling, math, and English*


Baseline
Academic Performance Game
Spelling
Mathematics
English
100
80
60
40
20
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29

	Spelling		Mathematics		English	
	BL	Int.	BL	Int.	Baseline	Int.
Student	*X*-Grd	*X*-Grd	*X*-Grd	*X*-Grd	*X*-Grd	*X*-Grade
One	93.3 A	97.7 A	68.4 D	89.8 A	85.6 B	98.0 A
Two	69.0 D	92.3 A	64.7 D	86.6 B	80.2 B	92.0 A
Three	26.2 F	96.3 A	72.4 C	86.1 B	72.9 C	90.0 A
Four	90.7 A	98.5 A	58.0 F	80.4 B	86.8 B	100.0 A
Five	0.0 F	89.5 A	63.7 D	84.0 B	87.7 B	79.0 C
Class	62.2 D	96.2 A	66.6 D	86.6 B	85.7 B	93.3 A

So lets see Alphie Kohn beat this.

Academic Targets: Everything Randomized Academic Behavior Game

Advantage:

- Never blow their chance to meet goal, because goal is random
- By adding target behaviors, get more behavior for same reinforcement (thus fading).
- Fun for teacher and students
- Could randomly select rewards and add to them
- All improved (good and bad students)

Disadvantage: more grading to do for teachers. Phone calls regarding report cards

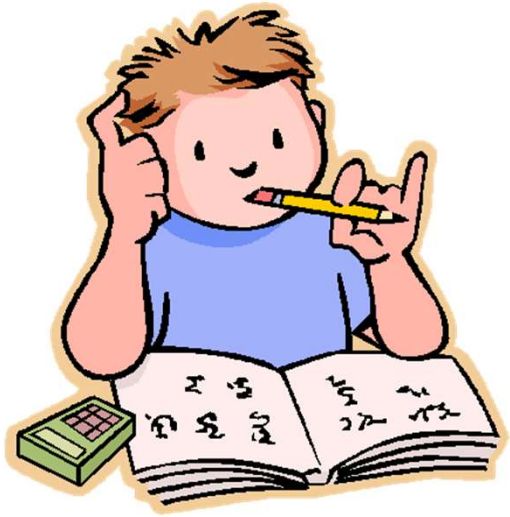
Homework

I have included summaries of 3 homework studies in your handout. Time constraints prevent me from reviewing each.

Bullet points:

- Aloisio and Little studies had smaller effects and they included completion as a target behavior, they were also doing well during TCP, so had less room to improve.
- Aloisio may have confused students with too many different criteria (lows, class average but must also have 70% correct). Popkin gradually added them so they were more easily understood. Little used improvement over the previous day which may have backfired as they got real high and found it hard to meet criteria.

Homework



Homework Bullet points:

- Little used improvement over the previous day which may have backfired as they got real high and found it hard to meet criteria.
- Zibreg Harris – got large effects, 8th grade; total of 17 students, and 10 receiving.
- Like Scott, all students increased (7% to 53%).
- Special Ed students increased mean of 44%, 28-53% range.

On-task

I have summarized three studies, two used variation of the clock-light game. With this procedure, a clock runs while all students are academically engaged or on-task. If any student becomes off task the clock stops and a light or buzzer sounded. The clock starts when all were once again on-task.

Free time = clock time

Someone has continuously monitor and stop/start clock.

What negative side effect is likely to occur?

On-task

Heering & Wilder is a much stronger study.

- Two classes – one third grade and one fourth; 31 and 33 students
- **IGBR**
- Four times during a 50 minute period they observed a row. If all students in the row were on-task for ¾ observation times the group earned a reward.
- Students did not know which row or when observed.
- Randomly selected reward
- On-task increased from below 50% to above 80% in both classes.

What negative side effect is likely to occur?

On-task

Acceptability check – asked if ever blamed for not earning?

- About 9% and 13% said they were, but just once – even when the class did not know row or time of observation.
- Now think about blaming when clock or buzzer signals everyone to look up and see which student is off task.

Maintenance

Use **Discriminable Contingencies:**

- Never know how well you have to do because you do not know how well classmates are doing.
- Should enhance maintenance (Stokes & Baer, 1977).

Fading:

- Can reduce reinforcement or get more effort for same reinforcers.
- Rather than lose reinforcers, recommend adding target behavior (Popkin study) or change criteria pool to make to make it more stringent (replace low criteria slips with high once (shaping)

Negative Side Effects

Fairness Students:

- Bonus reward
- Offer to stop
- Remind of other rewards and reasons for doing assignments.

Fairness Teachers:

- Do not want to reward students who do poorly or behave atrociously.
- Remind them that they must deliver to all or none or they will lose students' trust.

Fairness

- Not there when really cool reward was drawn? Must attend to receive rewards.

Negative Side Effects

- More grading for teachers.
- More responding to questions and requests for help from students
- Plan for this:
  - Use assistant teachers, peers, etc.
  - But remember to train all so they do not give answers.

Cheating

- Students giving students answers
  - only one instance, but watch for this.

Negative Side Effects

Blaming

- Keep students performance private
- Randomly select tables but do not announce which one unless they win.

Parents called to see if student fudged report cards

- Popkin study, EBD students – report card grades rocked

Negative Side Effects

Over-justification or reducing intrinsic motivation to do math.

- No evidence in Scott study.
- Used to say it was caused by tangibles
- Now say it's caused by laddered rewards i.e. the better you do the better the rewards (just like grades)

Our systems are indiscriminable and not laddered – may avoid those effects.

Big Finish

School would be much better environments for everyone if we focused on providing more satisfying schedules of reinforcement for desired behavior

– BF, the other Skinner

Every day some student goes to school trying to avoid something bad happening to them.

With these, something wonderful can happen each day!

What happened in school today?– *"it was really awesome we did real good on our exam and the teacher had to sing us a song!"*

My Classroom Story

I had this student (Sam) who was overweight, dressed funny, and had bad personal hygiene.

He probably had childhood schizo. Sad case.

Most of my other 10th grade EBD students were conduct disordered.

I had all these canning jars with slips of paper in them.

One day I broke a rule and pulled out a random reward first (it was a very strong one like 1 hour of free time). Then, I pulled out a target behavior (it said last history test, randomly selected students), then I pulled out criteria and it said 90%.

My Classroom Story

What this meant was that the class would get 60 min of extra free time outside (they could smoke, this was back in the day) if a randomly selected student got 90% or higher on our last history test.

Students groaned and one said, “No one ever gets an A on a history test.”

I said, “Do you remember what are last test was on?”

Students said, “one of those wars.” (It was WWII)

I then asked if he knew any student who really new WWII?

My Classroom Story

He made a face and said, “Sam.”

You see Sam was fascinated, even obsessed, with WWII.

I said, “who?”

He said, “Sam.”

I said, “who?”

“Sam!”

The whole class was chanting Sam’s name as I reached into the hat and drew a name that was on a slip of paper.

It said Sam!

Looked like something out of Lord of the Flies as they hoisted Sam on their shoulders and carried him out to outdoor recess chanting his name. Principal…..

My Classroom Story

That was great, then the truly best thing happened.

The toughest, though not the biggest, kid in my room saddled up to me and said, “I saw what you did and I know why you did it.”

You see, I palmed all my random draws to try to give Sam a day in the sun.

Then the toughest kid looked at the next toughest kid and said, “We’re playing football. I pick first and I picked Sam.”

For the rest of the year, not too long, he took care of Sam.

The End – See you this afternoon for reading!

- Think about how you would apply interdependent group-oriented contingencies to reading.
  - I have had less success than I would like.

Oh Yeah

- **Book it** – I like it, but rewards are too delayed.
- **Grundyism** – avoid slavish adherence to conventions
  - Advice – get permission to break school rules (gum music, old playground)
  - But break them cause bonus rewards are easy to identify when you can – *Scarcity breeds demand!*
- **B'Ball Coaches** – Summit and Pearl Rock