The *Journal of Precision Teaching* is dedicated to the direct and continuous measurement of behavior, the recording of frequency and the representation of celeration on the Standard Behavior Chart and Chart-based decision-making. The purpose of the *Journal of Precision Teaching* is to accelerate the sharing of scientific and practical information among its readers. To this end, both formal manuscripts and informal data-sharing are encouraged.

Material submitted for publication should meet the following criteria: (1) be written in plain English, (2) be limited to eight typed, double-spaced pages or narrative, (3) use the *Journal of Precision Teaching Standard Glossary and Charting Conventions*, (4) contain data displayed on the Standard Behavior Chart, and (5) be submitted in triplicate to the editor. Each manuscript will be reviewed by the editor and one consulting editor, both of whom must approve it prior to publication.

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As part of its goal to disseminate research, the University Affiliated Facility for Developmental Disabilities (UAF) at the University of Missouri in Kansas City, under the direction of Carl Calkins, assisted with the production of this Journal.
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<td>Consultant</td>
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Dear Readers,

With this issue I would like to welcome nine new consulting editors to the *Journal of Precision Teaching*. We are grateful for your support and your anticipated assistance.

There has been an increasing number of submissions in the last few months. Each submission is sent to at least two consulting editors for their review and recommendations. If your submission is returned for improvement, don’t be discouraged. As I indicated in my last letter, we want your submissions and we will try to be fair and positive in our review.

We anticipate publishing an entire issue of data-shares in January of next year. Don’t be sny; submit your efforts!

Please remind your colleagues who have not renewed their subscription to do so. Also, I would appreciate your assistance in encouraging new subscribers, especially libraries, students and newcomers to Precision Teaching. Consider giving the *Journal* to a friend or colleague. If the *Journal* is to "stay above water", it needs your assistance and support.

I hope you are having an enjoyable summer (or winter for those of you in Australia),

Patrick McGeevy
Editor
FACTS, FUNS, AND FREES DURING EDUCATIONAL FILMS

Abigail B. Calkin
Topeka Public Schools

Americans talk about freedom a lot. We say we are more free than citizens in the Soviet Union. We say our system of education is free. We say this is the home of the free. For hundreds of years people have moved here to obtain religious, political, and economic freedom. Even so, no one has ever measured freedom before.

To learn more about freedom in the classroom, first and second graders, junior high students, and graduate students counted facts, funs, and frees while watching fact films (films with high factual content) and fun films (films designed to be fun).

What are the frequencies of facts, funs, and frees? What is the difference between facts and funs on the fact films and the fun films? Do we feel free when learning? Do we feel free when having fun? Are the frequencies of facts, funs, and frees different at different ages? Are there free films?

Background

Inner Behaviors Psychology began as the study of a person's inner mental mechanisms, grew into a study of outer behavioral observation, and is just recently returning to the study of the inner individual (Jacobs and Sachs, 1971). Jacobs and Sachs reported the measuring of fear, depression, well-being, positive and negative emotions, imagery, and other inner events. Duncan (1971 and 1972), Hively and Duncan (1972), Dean (1973), Sokolove (1973), and Stromberg (1977) have all reported inner data on the Standard Behavior Chart.

Methods

Forty-seven first and second graders and 28 seventh, eighth, and ninth graders from an urban Kansas school district, plus 23 people from a University of Kansas Educational Administration graduate class, counted facts, funs, and freedoms while watching fact films and fun films. The teachers volunteered to have their classes participate.

The first and second graders saw 10 fact films and 10 fun films. The junior high students saw one fact film and one fun film. The graduate students saw three fact films and two fun films.

To verify that first and second grade children could count accurately, I showed them 10 wild animal pictures from Homes and Habits of Wild Animals (Schmidt, 1954), turned around four to five times, and said "Good!" seven to 11 times in response to their naming the animals correctly. Each child tallied the number of pictures I showed, turns I made, and times I said "Good!". To ensure that the elementary and junior high students knew what facts, fun, and free were, I had them give their own examples of each.

I chose 20 films, 10 of which presented many facts and 10 of which were fun. The fact films were above the grade level of first and second graders, with topics ranging from multiplication to astronomy. The film catalog rated the fact films from an intermediate elementary through an adult level.
The fun films used included those with the highest median fun counts in a pilot study, those previewed on the basis of the catalog description, and films the school district's media specialist recommended. They included fairy tales, Dr. Seuss stories, films made from award-winning children's books, and award-winning films. Each film was approximately 10 minutes long.

**Data Collection** During the fact film and the fun film, each person tallied facts, funs, and frees. These frequencies were charted on the Daily Standard Behavior Chart. The elementary students had 4 x 6 inch white sheets of paper with a line for the child's name, with "facts", "fun", and "free" printed in columns across the top. They tallied facts, funs, or frees on the sheets during each film. At the end of each film, a child collected the sheets and put them in a large manila envelope labeled either "fact film" or "fun film". They watched a fun film and a fact film each day for 10 days. The junior high and graduate students labeled their own sheets and shared their frequencies after the films.

**Data Analysis** The frequencies were charted on the Standard Behavior Chart. The analyses used included frequency distributions, the frequency range, the mid-median test with Fisher's exact probability, and celeration lines.

**Results**

**Counting Accuracy** Chart 1 shows the frequency range, the median, and the range of counting error for two classes of first and second graders when they counted pictures, turns, and "Good!"s. The probability that the differences between the counts occurred by chance is also shown. Probability levels were computed with the mid-median test and Fisher's exact probability.

The first grade class counted pictures and "Good!"s more accurately the second day. The range of all the counts decreased from the first to the second day. Using the counts from the second day for the first grade class and the counts for the first-second grade class, the range of counts for pictures was $x_{13}$ for the first graders and $x_{2.3}$ for the first-second graders; for turns, $x_{2}$ and $x_{2.5}$; and for "Good!"s, $x_{3.8}$ and $x_{2.4}$. Both classes accurately counted pictures and undercounted "Good!"s. The first grade class slightly overcounted turns.

What is the Difference Between Fact, Fun, and Free Frequencies on the Fact Films and the Fun Films? Charts 2, 3, 4, and 5 show the median frequencies for facts, funs, and frees during the fact films and the fun films in each class. Each chart is sectioned into facts, funs, and frees. The first frequency in each section is the median for the first film; the second frequency is the median for the second film; etc. The celeration line shows the trend of the median frequencies. The probability equation states the probability that the differences between facts and frees, facts and funs, and funs and frees occurred by chance.

Charts 2 and 3 show that median frequencies for facts were significantly higher in fact films. Charts 4 and 5 show that median frequencies for fun were significantly higher in fun films. Comparing all four charts, it is clear that median fact frequencies on fact films were higher than median fun frequencies on fun films. Also, median fact and fun frequencies were lower in the first grade class. Finally, median free frequencies were low in both
Chart 1. Counting Accuracy

A. Calkin

FIRST AND SECOND GRADERS COUNT “PICTURES” “TURENS” “GOOD”

* number presented per minute < median count

p = .08
p = .2
p = .08
p = .005
p = .005
p = .005
p = .005
p = 8 x 10^-10
p = .005
p = 8 x 10^-8

FIRST GRADE CLASS

1st. day 2nd. day 1st. day 2nd. day 1st. day 2nd. day

p = .16
p = .00098
p = .16

PICTURES

TURNs

"GOOD"

FIRST-SECOND GRADE CLASS

PICTURES

TURNS

"GOOD"
Chart 2. First graders' median frequencies for facts, funs and freeses on fact films.

A. Calkin

<table>
<thead>
<tr>
<th>FIRST GRADERS</th>
<th>COUNT</th>
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<td></td>
<td>FACTS, FUNS AND FREES ON FACT FILMS</td>
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</table>
Chart 3. First-second graders' median frequencies for facts, funs and frees on fact films.
Chart 4. First graders' median frequencies for facts, funs and frees on fun films.
Chart 5. First-second graders' median frequencies for facts, funs and frees on fun films.
classes and both types of films.

There were three structurally free films -- Wind, Powers of Ten, and Movement of Plants. Wind was the only film which had free as the highest count. This occurred in the first-second grade. The median free frequency was 7, the median fact frequency was 4, and the median fun frequency was 5.

Are the Frequencies of Freedom Feelings Different at Different Ages? Chart 6 shows the frequency distributions of first and second graders and adults on facts, fun, and free while watching a fact film, Multiplication, and a fun film, Yax from Seuss on the Loose. This Chart shows that the adults learned more facts than the children and that the children had more fun than the adults. The results on the frees do not show that one group consistently felt more free than the other.

Charts 7, 8, and 9 show the frequency distributions of first and second graders, junior high students, and adults on Powers of Ten, a fact film, and Blaze Glory, a fun film.

Chart 7 shows that facts were consistently and significantly higher on the fact film than on the fun film for all three groups. It is obvious from Chart 7 that the probability levels within each group far exceed the probability levels calculated for the differences between the groups.

Chart 8 shows that the fun frequencies on the fun film were significantly higher than on the fact film for all three groups. Again, the probability differences within each group for the fact and fun counts on the fun film for each group were much greater than the probability levels between the groups.

Chart 9 shows that both films had low frees in all three age groups. The adults had the highest free; the junior high students had the lowest free.

Are There Free Films? The junior high students expressed an interest in making free films. Three students each made a free film. The teacher made a fun film. The films were made in the Spring and shown the following Fall. Over half the class were new students, and the teacher was different also.

Chart 10 shows that Marti and Rosalie each made a film in which frees had the highest frequencies. Bruce's film had low fact, fun, and free frequencies. Virginia's fun film had the highest frequencies on the funs.

Discussion

Free Feelings This study found that free counts on fact and fun films were low in all three age groups. The one exception to this was the first-second grade class's counts on the film, Wind. While the adult free frequencies were higher than either the first and second graders or the junior high students, they were still low.

One explanation is that the films chosen had little freedom in them. Another possibility is that the viewing of the films was a controlled operant situation, i.e., the viewers did not have a choice in what they saw or in when they viewed the films. Given that all the films were shown in classroom settings, the viewer did not truly have the option to leave the room.
Chart 6. Frequency distributions of first and second graders and of adults on a fact and a fun film.

A. Calkin

<table>
<thead>
<tr>
<th>FIRST AND SECOND GRADERS</th>
<th>COUNT</th>
</tr>
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<tbody>
<tr>
<td>FACTS</td>
<td>FUNS</td>
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Behavior Research Co.
Box 3351 Kansas City,
Kansas 66103

Chart 7. Fact frequency distributions for three age groups watching a fact film and a fun film.
Chart 8. Fun frequency distributions for three age groups watching a fact film and a fun film.

A. Calkin
Chart 10. Frequency distributions for free films made by junior high school students and for a fun film made by the teacher.

A. Calkin
Free Films Two junior high students each made a free film. The high free counts indicate that it is possible to make a free film, but that the fact and fun educational films in this study were not free. While the junior high students felt the least free in the fact and fun films, they at least knew their own operational definition of freedom sufficiently well to make films which had high free counts.

First and Second Graders The first-second grade class had higher frequencies than the first grade class. It is possible that the first graders became bored watching two films daily. The first-second grade was an open classroom, and the first grade was traditional. It is possible that an open classroom atmosphere induces more learning and fun than a traditional classroom.

Frequencies Across Ages The results from the elementary, junior high, and graduate students show that there are greater differences between fact and fun frequencies than there are between the three age groups. This shows that the fact films are high in factual content and the fun films are high in fun. Thus, the important difference is not the age of the viewer but the content of the film.

Conclusions

1. Children, teenagers, and adults count feelings with approximately the same frequency ranges when presented with the same material.

2. Feelings can be counted and studied using objective behavioral science. The frequency distributions of the three feelings have the same spread.

3. Primary children, teenagers, and adults can operationally differentiate between fact and fun films as measured by fact and fun frequencies counted on fact and fun films.

4. The differences between the fact film and the fun film were greater than the differences between the primary children, the teenagers, and the adults.

5. Primary children, teenagers, and adults do not feel free while watching films in a classroom setting.

6. It is possible to make a free film.

Implications for Future Research

Films producing high free frequencies need to be found or made. This could be done by a high school or college film class. It may be possible to make a film with high facts, high funs, and high frees.

A good topic for research would be to have the film viewers count facts they felt they learned, as well as share after the film facts they actually learned. This would give a teacher information on which films produce learning as well as make the viewers feel they learned and had fun.
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Lindsay, O.R. Supervision of Instruction lectures. University of Kansas, Spring 1977.


Abigail Calkin is the Assistant Principal of Capital City High School, Topeka Public Schools, 2700 West Sixth Street, Topeka, Kansas 66606.
AN EFFECTIVE GROUP-BASED DURATION CONTINGENCY FOR CLASSROOM MANAGEMENT

Marcea L. Pennypacker
South Metro Psychoeducational Center

H. S. Pennypacker
University of Florida

There is increasing emphasis within the Precision Teaching movement on the use of the Standard Behavior Chart to display children's academic progress in the form of learning pictures. However, there is also a set of important functional relations between many requisite social response classes (such as orderly transition from activity to activity) and the opportunity to record and enjoy growth during highly structured timings. The Chart is equally useful as a tool in managing the classroom environment in ways that enhance and support development of such socially functional responses. For example, in this study the convention for charting measures of duration was used to monitor a group contingency applied to a class of six students who initially had difficulty making the transition from a period of individual activity to a group activity.

Method

Students and Setting The six students involved in this demonstration ranged in age from 7 to 8 years old, were from low to middle socioeconomic homes, and had been classified as severely emotionally disturbed as a result of either psychological or psychiatric evaluation. They were assigned to a self-contained Behavior Disorders class managed entirely by the first author (MP) and one support therapist.

The daily classroom routine consisted of 15 activities, each of 15 to 20 minutes duration. One activity, known as Center Time, was devoted to individual participation by the students in various learning centers located around the room. Following this activity was Group Time, which required the students to assemble and participate as a group in a designated area of the room. The daily transition from the first of these activities to the second had become lengthy and usually disruptive, often requiring both therapists to intervene verbally and/or physically to achieve behavioral redirection. Such intervention, of course, carries the risk of reinforcing the undesired behavior, especially if physical contact is involved.

Procedure Baseline data were collected for one week prior to imposition of any contingencies. The lead therapist (MP) announced each day when it was time to clean up for Group Time. With the announcement a timer was started; it was stopped when all the children were seated at their desks in the Group Time area. Thus, a transition duration was obtained daily.

On the fifth day the class was informed of the timing procedure and its results. A discussion was held and agreement was reached that a reduction of this time to 1 1/2 minutes would merit a special activity or treat. Various suggestions were offered by the students. These suggestions were listed on the chalkboard, and a vote was taken. The class selected a special snack (other than the routine juice and cookies) for Snack Time as the consequence most worth working for. Thus was the following arrangement cemented: On each day that the entire class cleaned up and moved from Center Time to Group Time in 1 1/2 minutes or less, they would receive something special during Snack Time.
Each day of the second phase the lead therapist would announce the beginning of the transition time and mention the special snack available for that day (potato chips, brownies, oranges, etc.). She then said, "Go" and started timing. At the end of 1 minute she said, "Thirty seconds to go." In addition, as each student completed the transition, she announced it to the class. For example: "Sam is ready. He has cleaned up his center and is sitting at his desk." Upon completion of the transition, the elapsed time was announced.

The procedure during the third phase was identical to that of the second, except the allowable duration was reduced to 1 minute, and the 30-second warning came after the first 30 seconds of timing. This phase was conducted in an effort to establish a limiting value for the time involved in the contingency. We suspect that there is some optimal frequency for the composite behavior involved in transition. Attempts to drive the frequency higher may not only destroy the quality (centers left in a mess, etc.), but may lead to physical injury due to running, colliding, etc.

**Results and Discussion**

Chart 1 displays the daily duration measures obtained during the three phases of this study. The announcement of each phase change brought compliance prior to the first contact with the special snack. This initial step-up from phase to phase may be due to the earlier establishment of consistent behavior management practices in the classroom.

Of particular interest is the change in variability (daily bounce) from phase to phase. Table I shows the geometric mean, total bounce, and kappa values (Johnston & Pennypacker, 1980) of the duration measures for each of the three phases.

**Table I**

<table>
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<tr>
<td>Geometric Mean</td>
<td>Phase I</td>
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<tr>
<td></td>
<td>.39</td>
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<tr>
<td>Total Bounce</td>
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<tr>
<td>Kappa</td>
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</table>

Regardless of the index of variability selected, it is clear that the performance of the class became substantially more variable in Phase III, during which the 1-minute contingency was in effect. In fact, the students attempted to beat the 30-second warning signal and, as the chart shows, were successful on 3 of the 6 days the contingency was in effect. Thus, some value between 30 seconds and 1 minute probably represents a realistic ceiling or limiting value for this performance by this group in this situation.

In this study, a simple, direct contingency produced a x6.7 overall increment in a socially appropriate class of behavior. It also induced an increase in day-to-day variability, leading one to question the generality
**Phase I:** baseline

**Phase II:** special snack - duration ≤ 1'30"

**Phase III:** special snack - duration ≤ 1'
of this effect to other classes of complex social behavior. It may be, for example, that children described as having behavior disorders would benefit from the initial use of any contingencies designed to accelerate cooperative social responding. Thereafter, differential consequtiation of increasingly appropriate elements in the higher frequency repertoire could lead to rapid acquisition of adaptive social behavior and a corresponding decrease in the frequency with which they are described as "disordered".

REFERENCE


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STRATEGIES FOR IDENTIFYING REINFORCERS AND PUNISHERS

Carl Binder
Walter E. Fernald State School
Jim Pollard
Merrimack Education Collaborative
Jim Rast
Sunland Center

A reinforcer is an event that occurs immediately subsequent to a movement cycle and increases the frequency of that movement cycle. Similarly, a punisher is a subsequent event that decreases the frequency of a movement cycle. Strictly speaking, we cannot call an event a "reinforcer" or a "punisher" unless we have demonstrated its effects or functions relative to a measurable response. However, statements such as "we reinforced the response" commonly occur in the absence of the appropriate data. Even worse, we occasionally hear such statements as "reinforcement didn't work," which is a contradiction in terms. If a subsequent event did not increase the response frequency relative to a baseline measurement, it cannot be called a reinforcer.

All too often, psychologists, teachers, and other behavior change agents fail to identify reinforcing consequences, especially when working with the severely handicapped. Instead, they rely on such observations as "he seemed to like it," or "she ate the candy when I gave it to her." Such observations may be clues, but they are not proof that the events or substances in question are reinforcers. Unfortunately, especially in attempts to manage inappropriate behavior, we decide that procedures such as DRI (reinforcement of incompatible behaviors) will not work, and opt for other (often aversive) procedures because of an initial incorrect assumption that we have identified a reinforcing event. The problem is not that DRI didn't work. Rather, it wasn't applied -- we did not actually reinforce the incompatible responses (i.e., increase their frequency through subsequent event manipulations). Over and over again we observe failures in instruction or behavior management because of faulty assumptions concerning the function of subsequent events. We must begin to be more systematic in
Identifying reinforcers and punishers.

The following two cases illustrate strategies for identifying the functions of subsequent events. The basic approach is to identify a movement cycle that the client is capable of performing without assistance. It is best to find a simple motor movement (either an elementary skill or a problem behavior) which occurs frequently enough in a brief period (e.g., 1 or 2 minutes) to be able to present the subsequent event in question at least 3 or 4 times. One of the examples involved a test period of approximately 45 minutes on one day, while the other involved brief sessions each day for several weeks.

Case 1

R., a 16 year old severely handicapped student, was able to open 35 mm film cannisters independently to obtain their contents. The teacher presented a box of the cannisters for 2 minutes each day to the student, initially demonstrating how to obtain their contents by removing the caps. During each of the 5 weeks in which the testing occurred, a specific substance or item was placed inside all of the film cannisters for each of 5 days. The teacher chose this task because the subsequent event (the contents of the cannister) was "built into" the task, and thus there was no question that it would be delivered immediately following the response. It is apparent from the data (Chart 1) that cheese curls, which produced response rates of between 4 and 8 per minute for 2-minute sessions, were reinforcing, as contrasted with the other subsequent events (Fruit Loops, M&M's, Zarex Sweet Drink). Note that a series of tests, with retesting or "reversal" to the cheese curls during the last week, demonstrated that the first test of cheese curls was not a fluke or chance occurrence. From these data the teacher might decide to test other salty items, since saltiness is one obvious distinguishing characteristic of the cheese curls. (We should always attempt to identify as many reinforcing consequences as possible as a safeguard against satiation, daily variations in preference, etc.) We might generalize from this example to other skills for which the subsequent events being tested are an immediate and automatic effect, as would also be the case in an electronically programmed laboratory or "active stimulation" procedure.

Case 2

Penny was a profoundly retarded student who engaged in self-injurious behavior (face-slapping and head-hitting) at approximately 10 to 20 hits per minute. Her teacher attempted to identify a punishing consequence -- a liquid which when squirted into the mouth immediately subsequent to a self-injurious response, would reduce the response occurrence to zero. The testing procedure involved a single session of approximately 45 minutes in duration, during which the teacher counted and charted self-injurious responses for each 1-minute interval. During the first 18 minutes, the teacher delivered a squirt of lemon juice to the mouth for each response. As Chart 2 indicates, face-slaps and head-hits decelerated toward zero, and were entirely absent during 6 of the 18 intervals. (A question mark beneath the floor indicates a count of zero during that interval.) Tests of Gatorade and milk, interspersed with reversals to lemon juice, convincingly demonstrated the punishing function of lemon juice for this student. We can generalize from this case to consider tests for both reinforcing and
Chart 1. Identifying reinforcers.

Chart 2. Identifying punishers.
punishing functions of various subsequent events with a variety of simple movement cycles.

Particularly in cases which seem to require aversive consequences for behavior management, and thus human rights committee review, we should consider the use of preliminary tests (approved by the committee) of a set of subsequent events in the same category (e.g., liquids dispensed to the mouth). Such preliminary assessments would reduce the likelihood of extended periods of applying ineffective procedures on the basis of a single guess prior to full human rights approval.

REFERENCE


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DATA-SHARING

WILL THE REAL "SLOW LEARNER" PLEASE STAND UP?

Robert Bower
Wayne State College

Ken Meier
Howard Elementary School

The following data were collected in Ken Meier's regular fifth-grade classroom. Twenty-one students were provided with a list of 45 energy terms. Each child then prepared a set of flash cards. The student saw the front and said the back. Daily 1-minute timings were taken, followed by a short period of peer-conducted review. This was the first time this procedure was used with the children. Like most public school classrooms, Ken's room also contained those children who had been identified as "resource" of "gifted".

Chart 1 displays the data for all 21 children. Look at Chart 1. Draw freehand acceleration lines for each of the children. Now try to identify the "resource", "regular", and "gifted" children based on those learning lines.
Chart 1. Find the "resource" and "gifted" students.

Howard Elementary School, Fremont, Nebraska

R. Bower
K. Meier

SUPERVISOR
ADVISER
MANAGER

DEPOSITOR
AGENCY
TIMER
COUNTER
CHARTER

CALENDAR DAYS
21 students
10-11
5th. grade
see and
say energy terms
Those children identified as "gifted" or "talented" are: 1, 2, 11, and 13. Those identified as "resource" students are: 12, 19, and 21.

CONCLUSION. The "resource" child has been too frequently branded with the reputation of a "slow learner". Teacher expectations very often follow suit. Fortunately, evidence contrary to that kind of thinking and feeling is being produced by those who "care enough to chart."

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