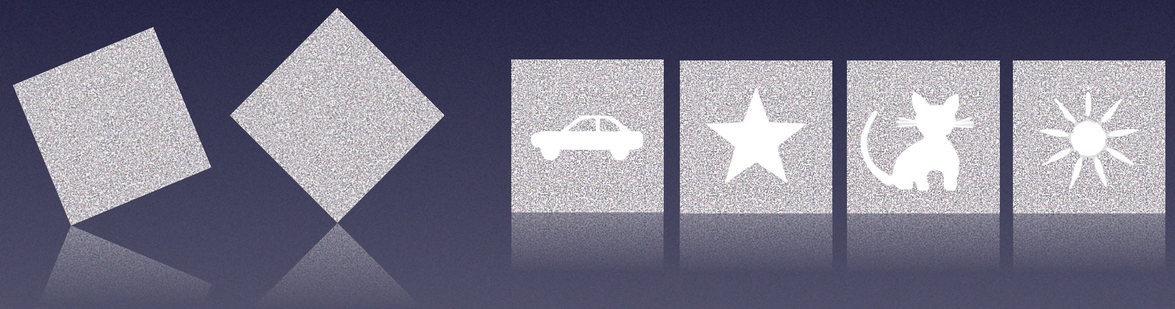
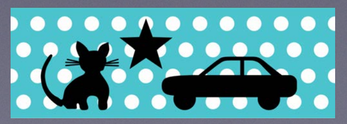
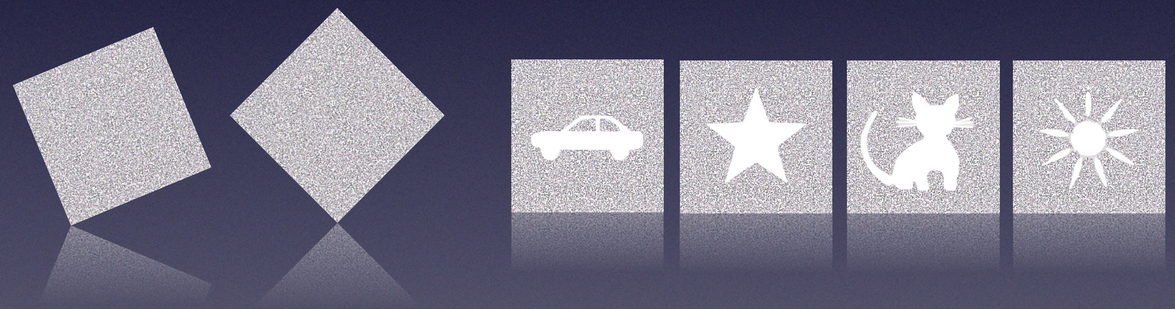
LANG-STEREOPAD®



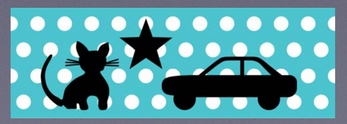
LANG-STEREOTEST®



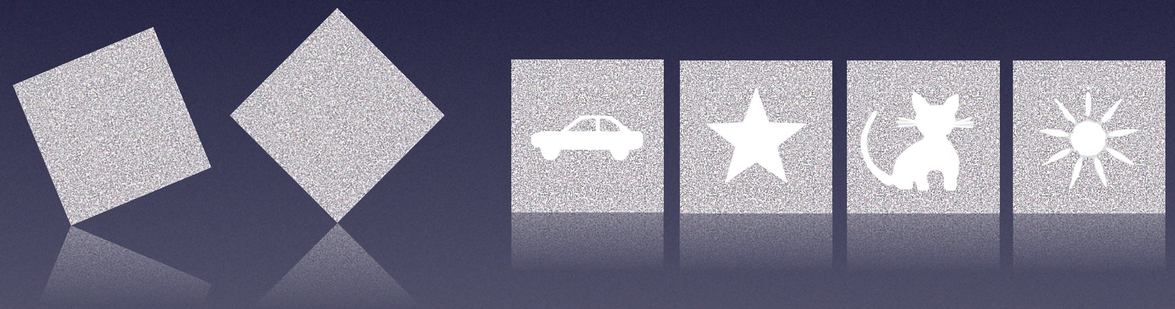
A NEW STEREOTEST



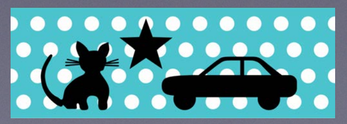
LANG-STEREOTEST®



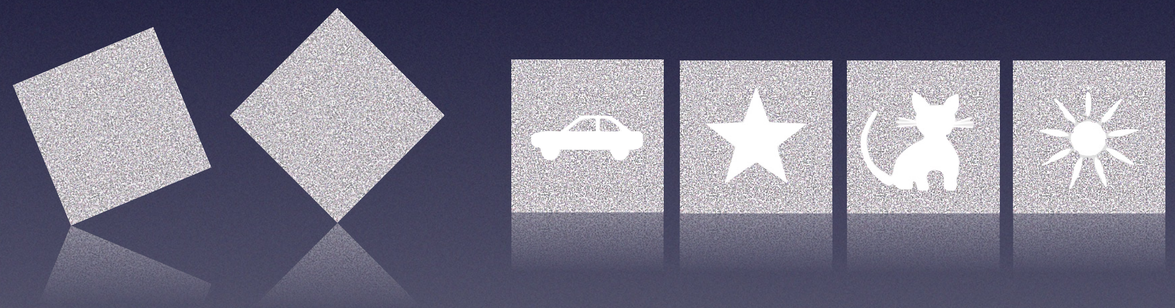
LANG-STEREOPAD®



LANG-STEREOTEST®

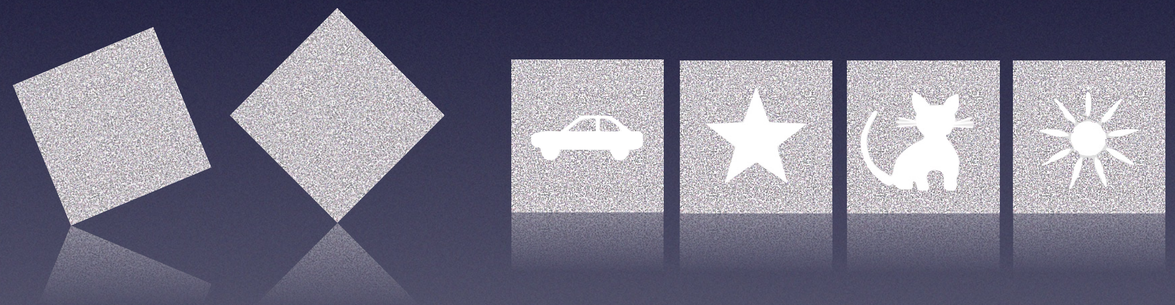


INTRODUCTION - TUTORIAL - STUDIES – DAILY USE



LANG-STEREOPAD®

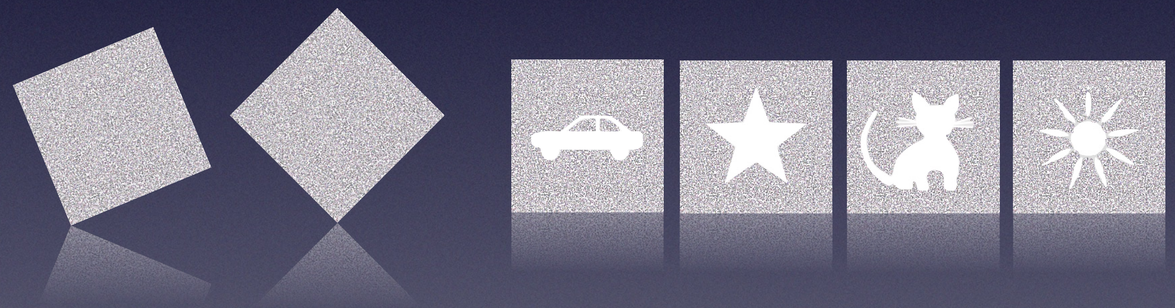
The LANG-STEREOPAD® is a new type of stereo test for binocular assessment and diagnosis of disorders of global stereopsis. Similar to the LANG-STEREOTESTS ® I and II, it combines random dots with a lenticular surface, but offers different possibilities for the assessment of stereopsis. In contrast to the common stereopsis tests, no test glasses are required.



LANG-STEREOPAD®

MAIN FEATURES:

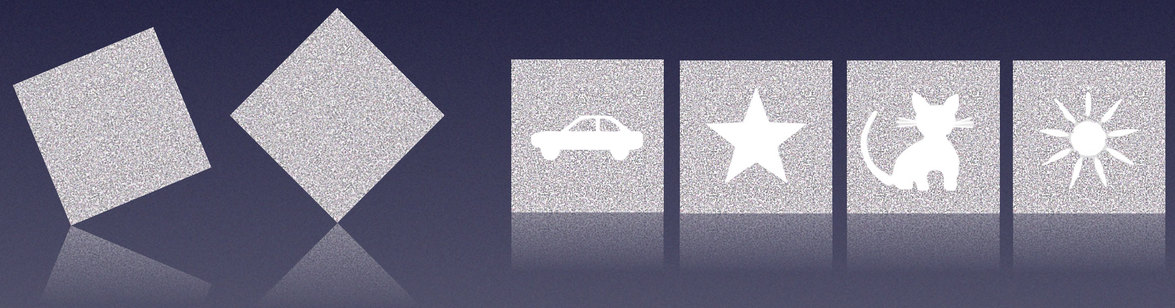
- Lenticular - no special glasses needed
- 100% sensitivity, 93.8-100% specificity for stereopsis (screening)
- ideal for the Preferential Looking examination method
- Disparities from 1000'' to 50'' in 6 gradations
- Random Dots - no monocular detectability



LANG-STEREOPAD®

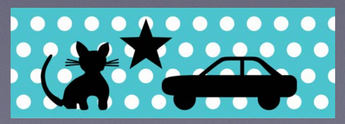
MAIN FEATURES (continued)

- 6 square magnetic test cards with child-friendly test figures
- double-sided test board with soft surface and rounded corners
- Magnetic single-leg support (sold separately)

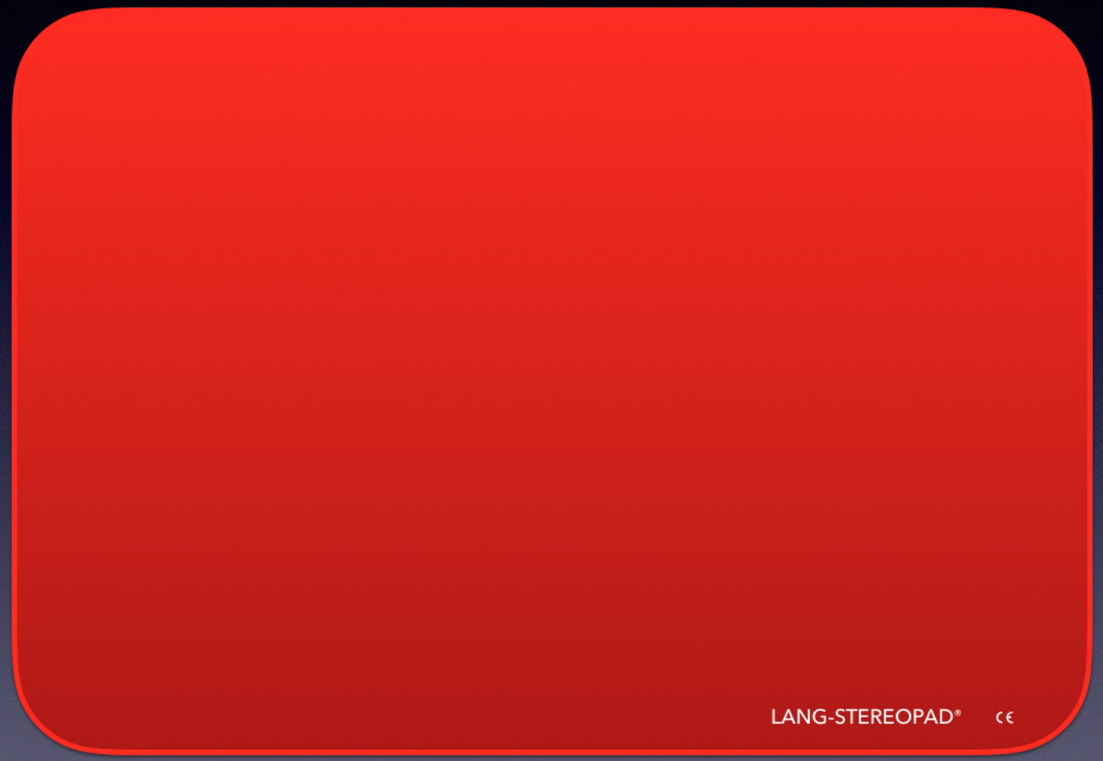


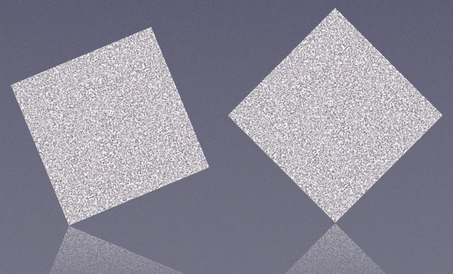
LANG-STEREOPAD®

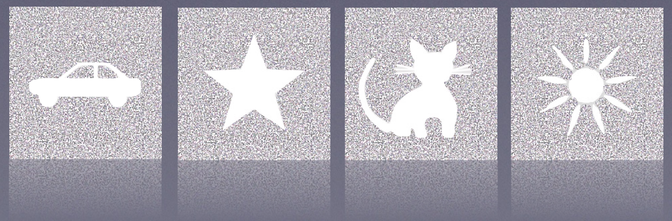
LANG-STEREOTEST®



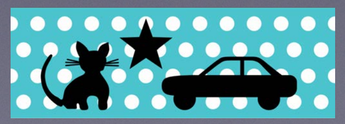
DOUBLE-SIDED TEST PANEL



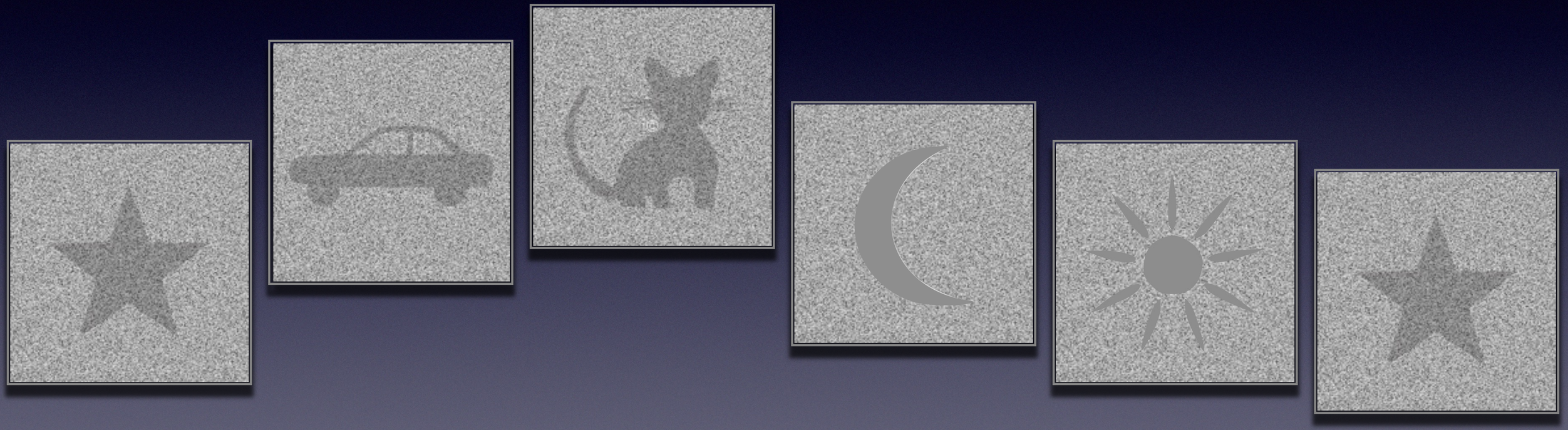


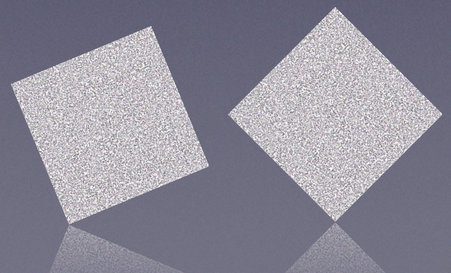


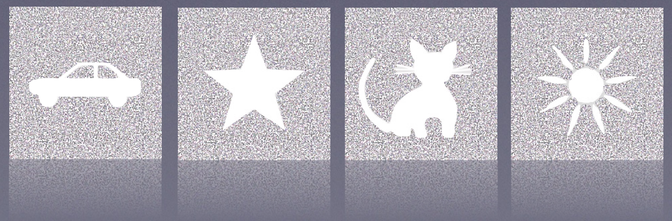
LANG-STEREOTEST®



6 MAGNETIC TEST CARDS
WITH 5 DIFFERENT TEST FIGURES







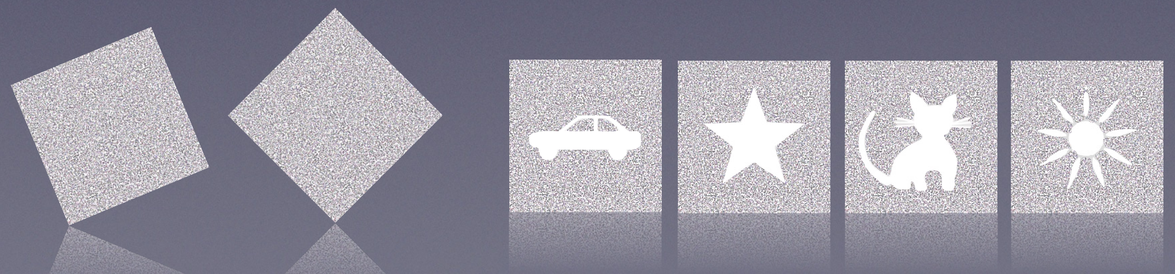
LANG-STEREOTEST®

TEST CARDS

2 test cards with a coarser random dot pattern

STAR 1000

CAR 600



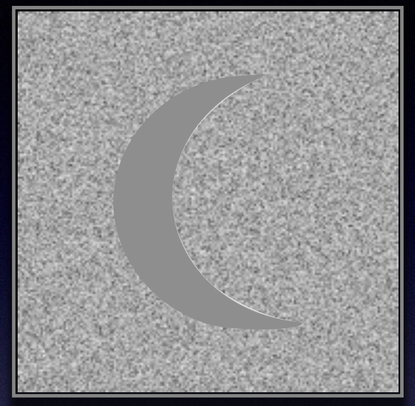
LANG-STEREOTEST®

TEST CARDS

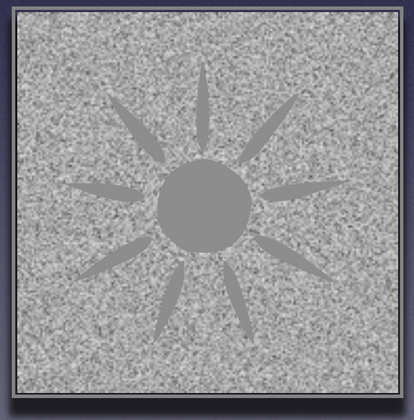
4 test cards with finer random dot pattern

CAT 400

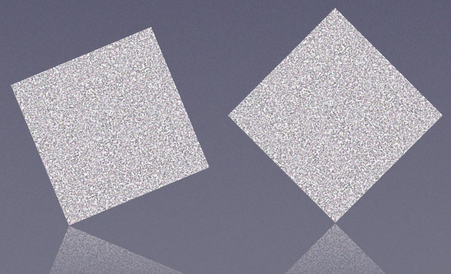
MOON 200

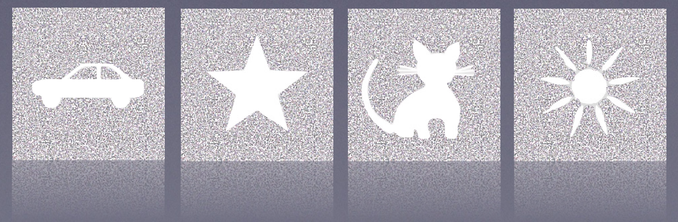


SUN 100

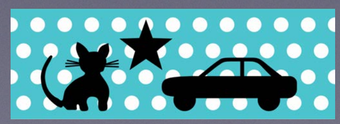


STAR 50





LANG-STEREOTEST®

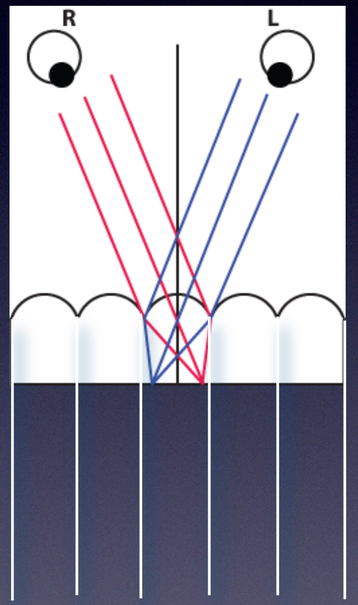


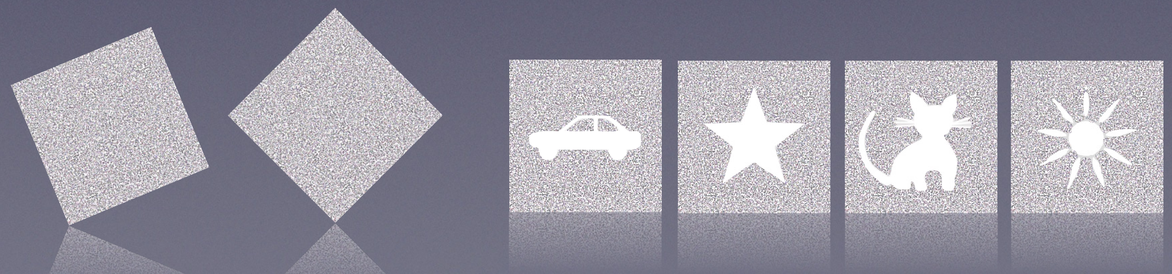
TEST CARDS

Object perception only possible with vertical lenticulars

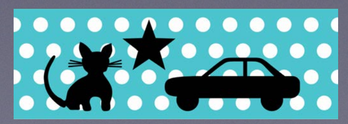
Raster VERTIKAL

Raster VERTIKAL





LANG-STEREOTEST®

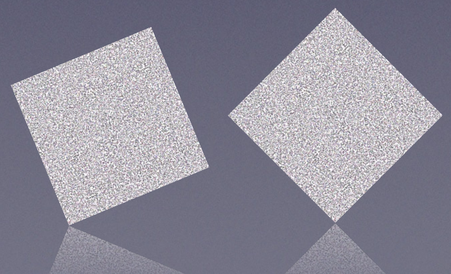


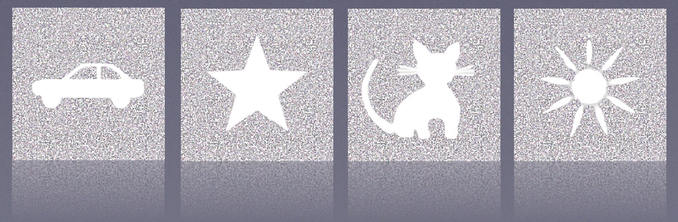
TEST CARDS

NO Object perception with oblique or horizontal grid

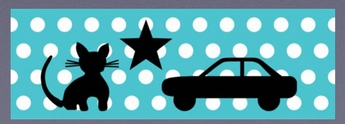
RASTER SCHRÄG

RASTER HORIZONTAL



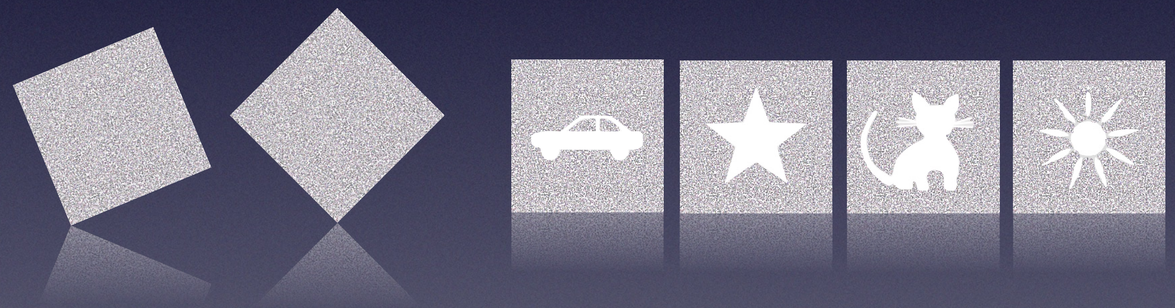


LANG-STEREOTEST®



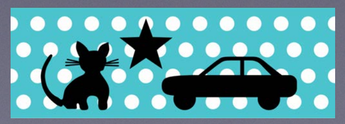
The following tutorial shows 3 TYPES OF EXAMINATION

SIMPLE SCREENING with two confirmation steps
PREFERENTIAL LOOKING METHOD with 2 test cards
STEREO ACUITY THRESHOLD with up to 6 test cards

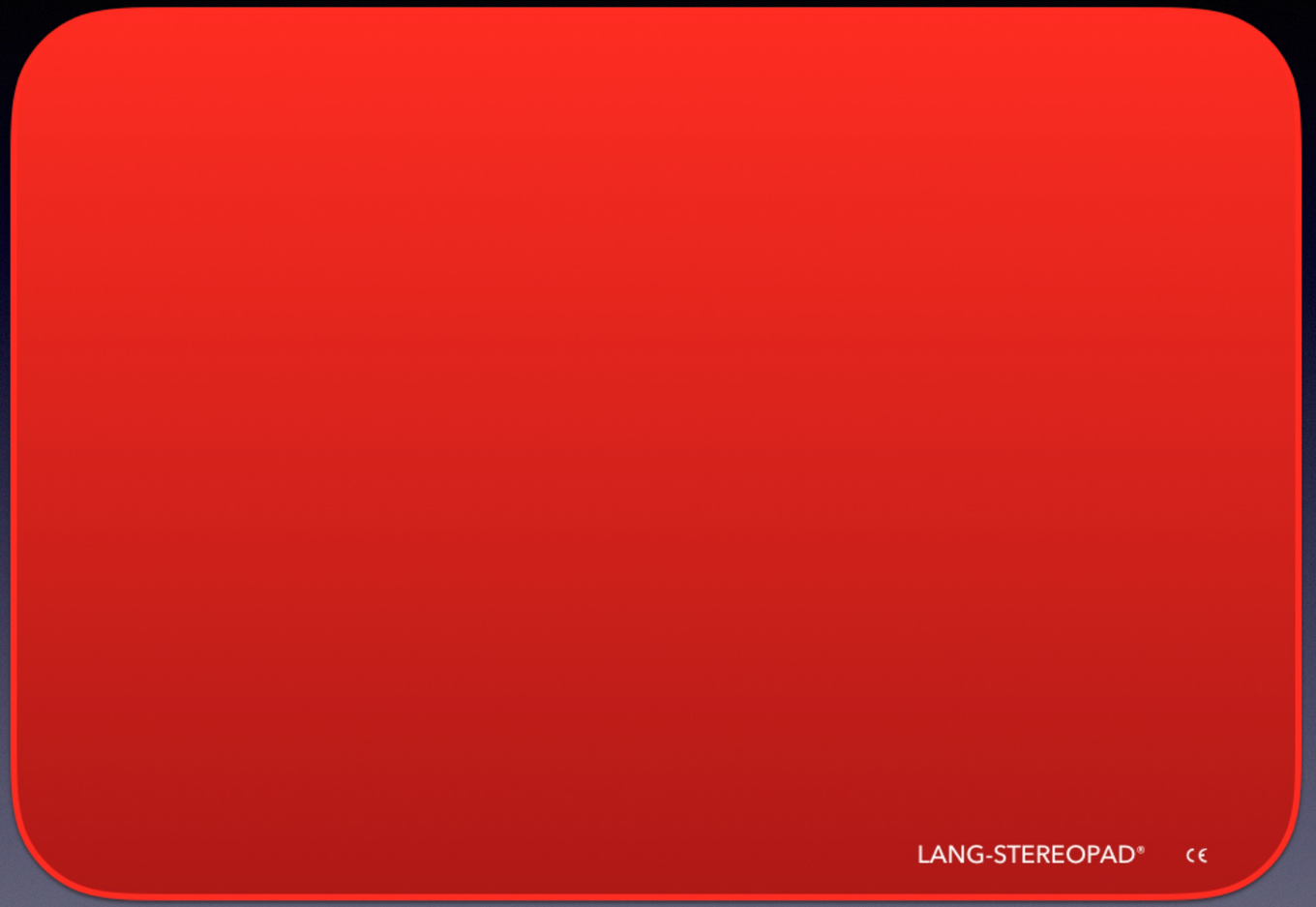


LANG-STEREOPAD®

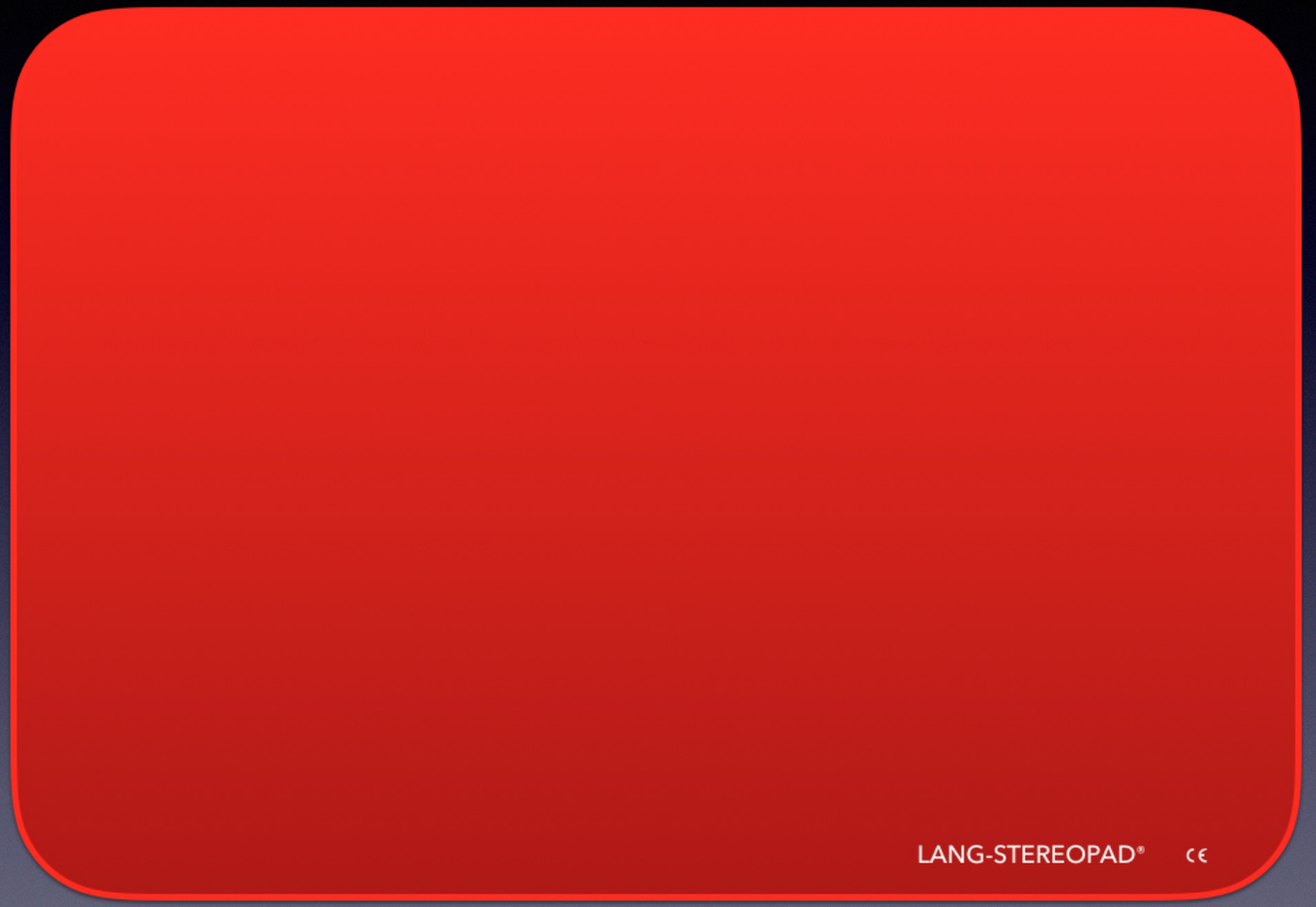
LANG-STEREOTEST®

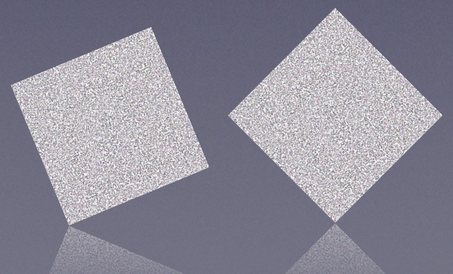


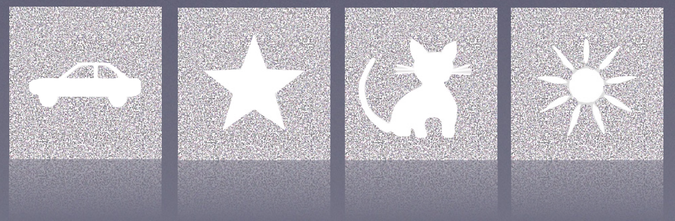
STEREOPSIS SCREENING



Put on a test card with high disparity!

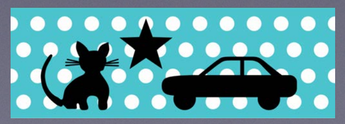




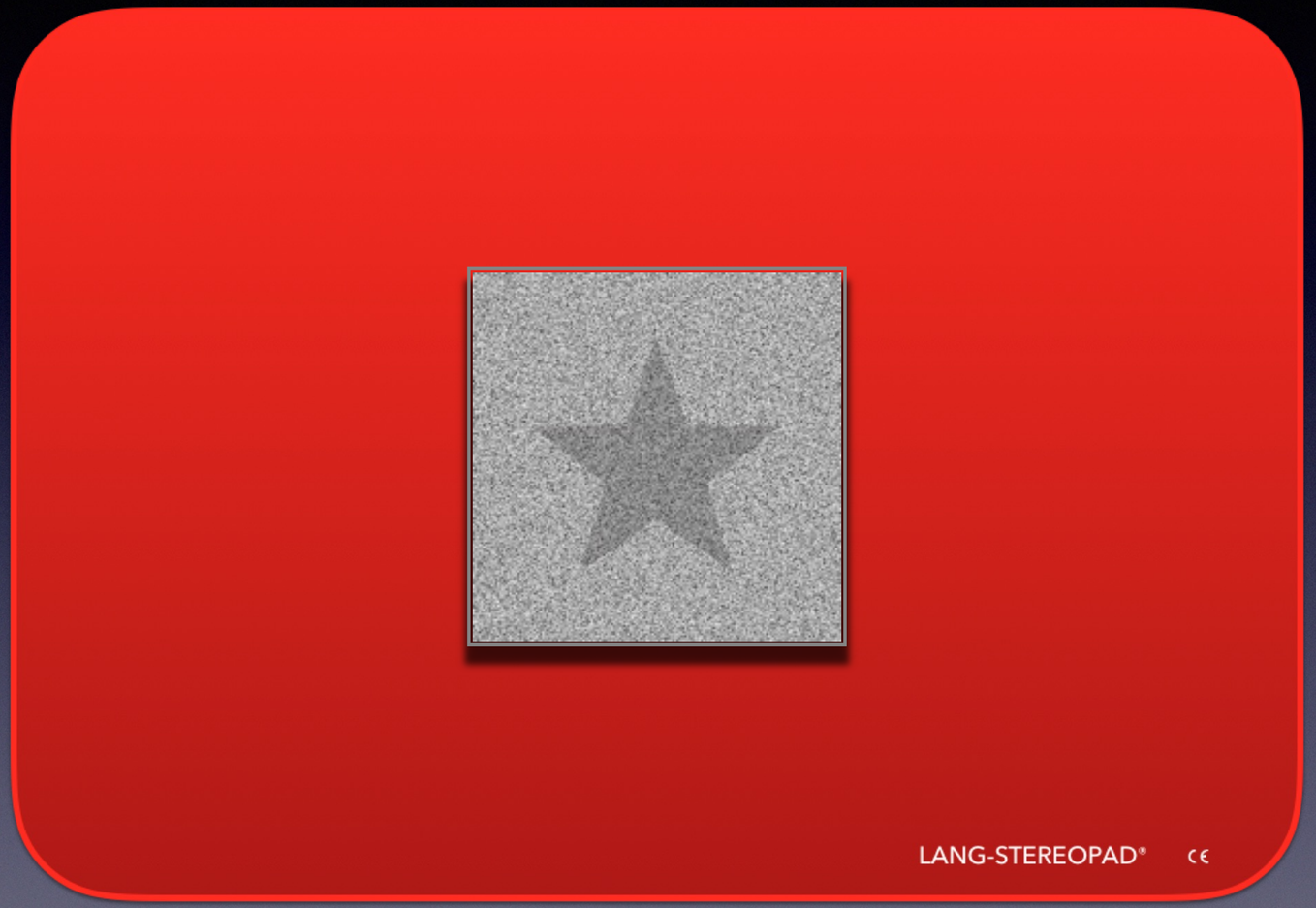


SCREENING

LANG-STEREOTEST®



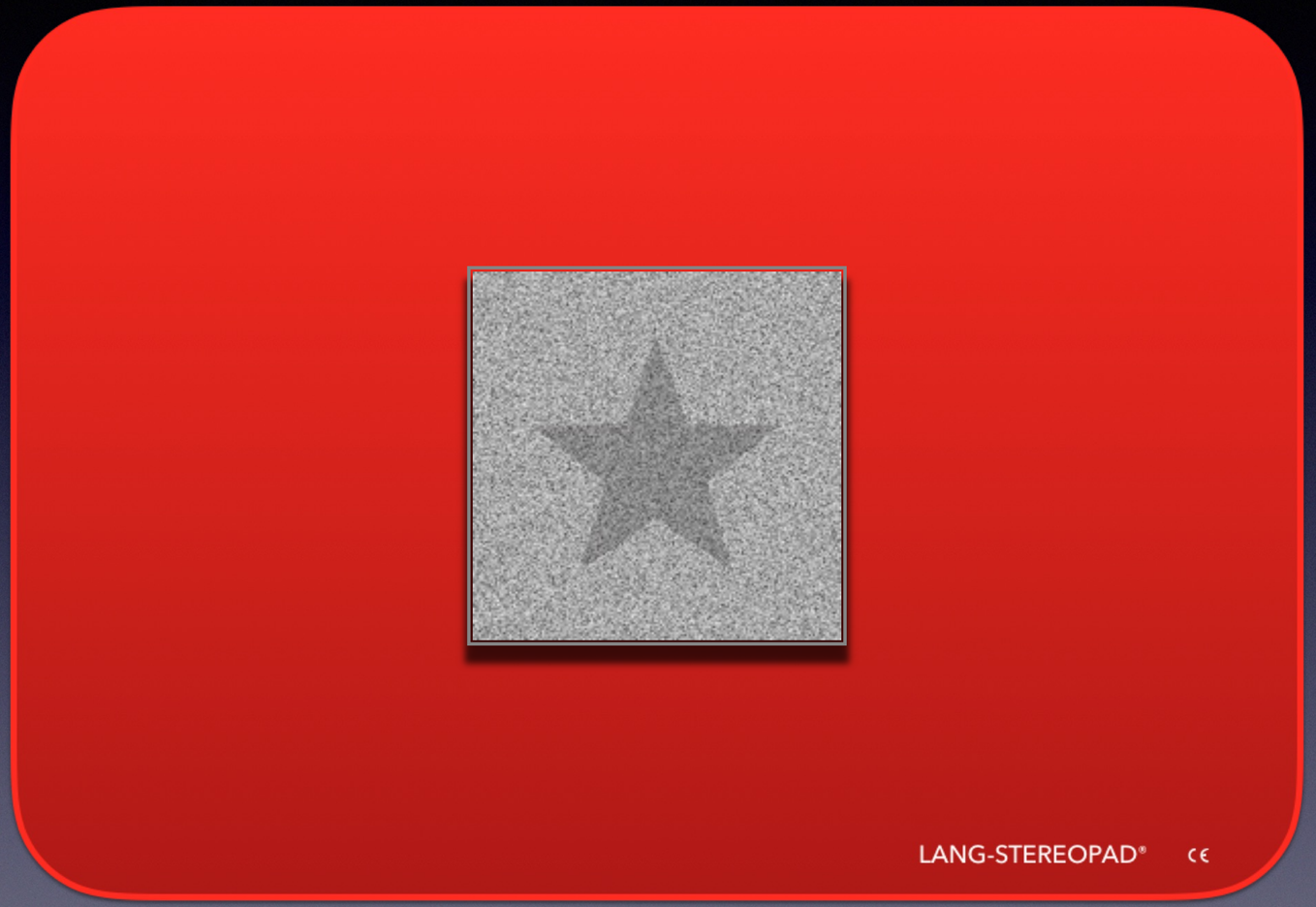
Put on a test card with high disparity!



SCREENING

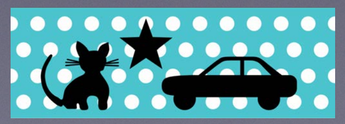
LANG-STEREOTEST®

Ask the patient: What do you see here?

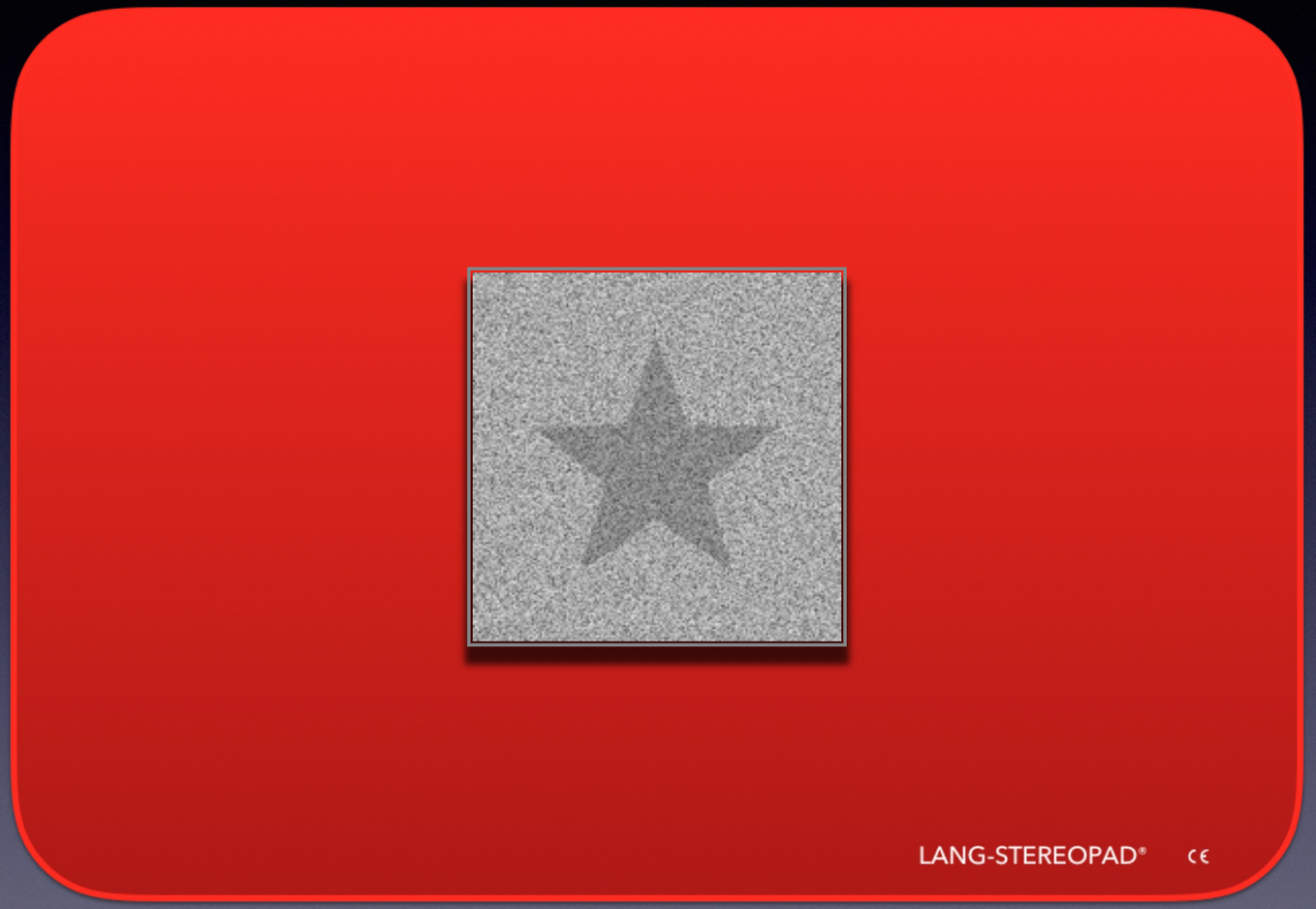


SCREENING

LANG-STEREOTEST®

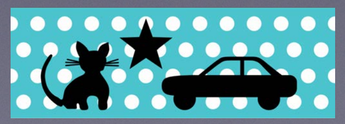


Correct answer : a STAR

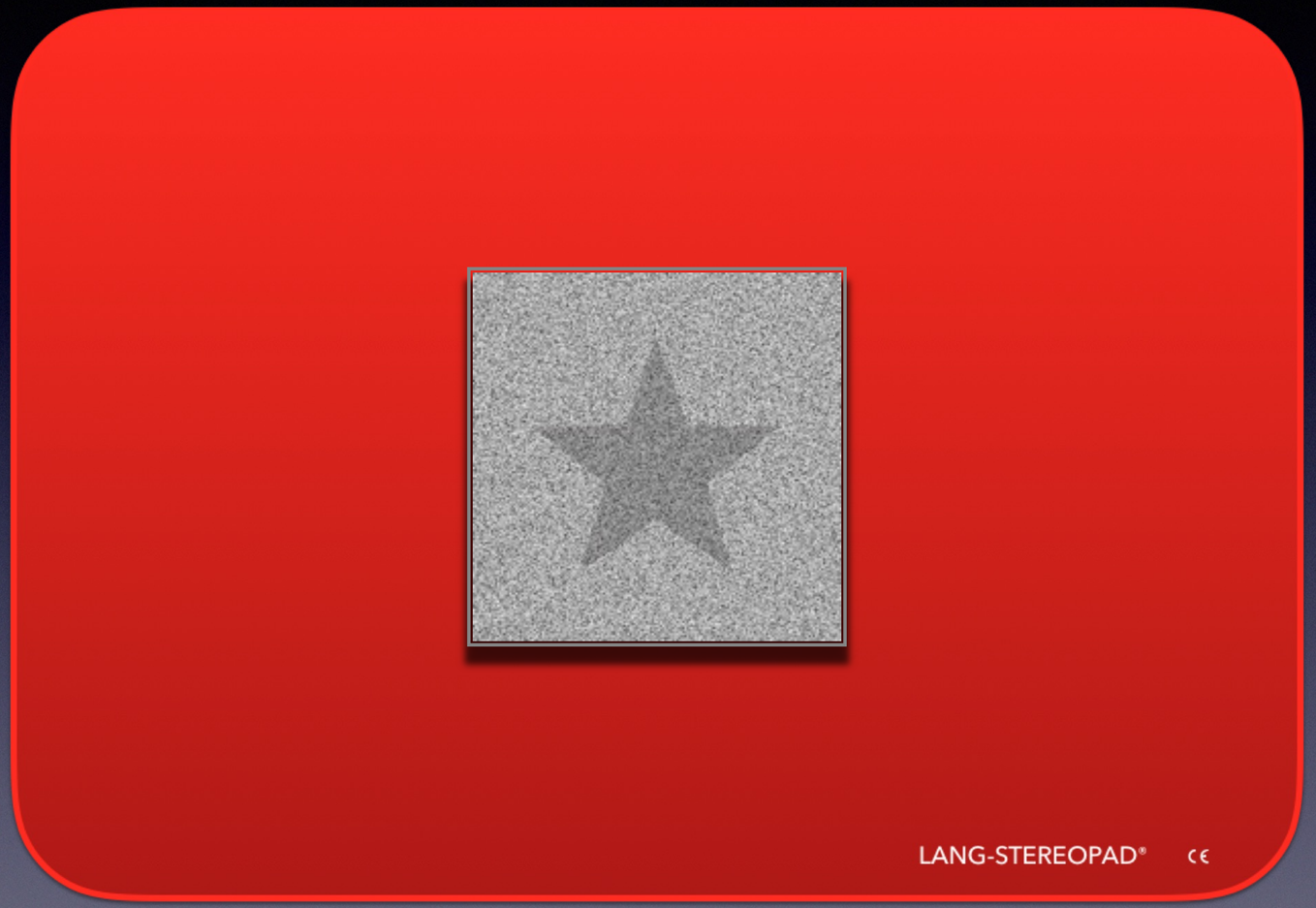


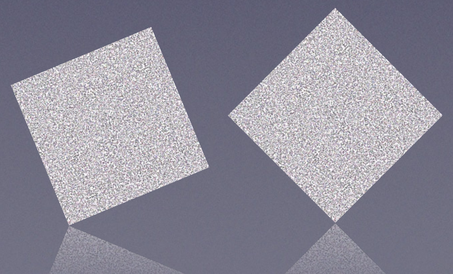
SCREENING

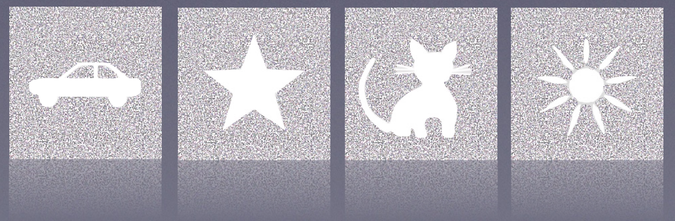
LANG-STEREOTEST®



Confirmation step 1: Turn the test plate 90° clockwise





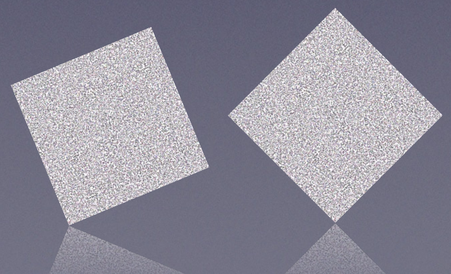


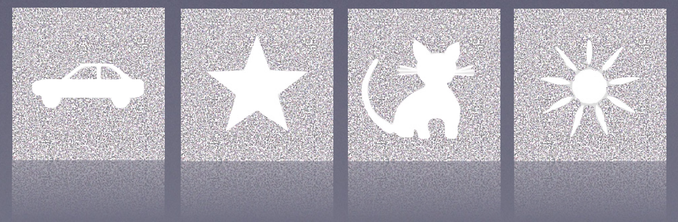
SCREENING

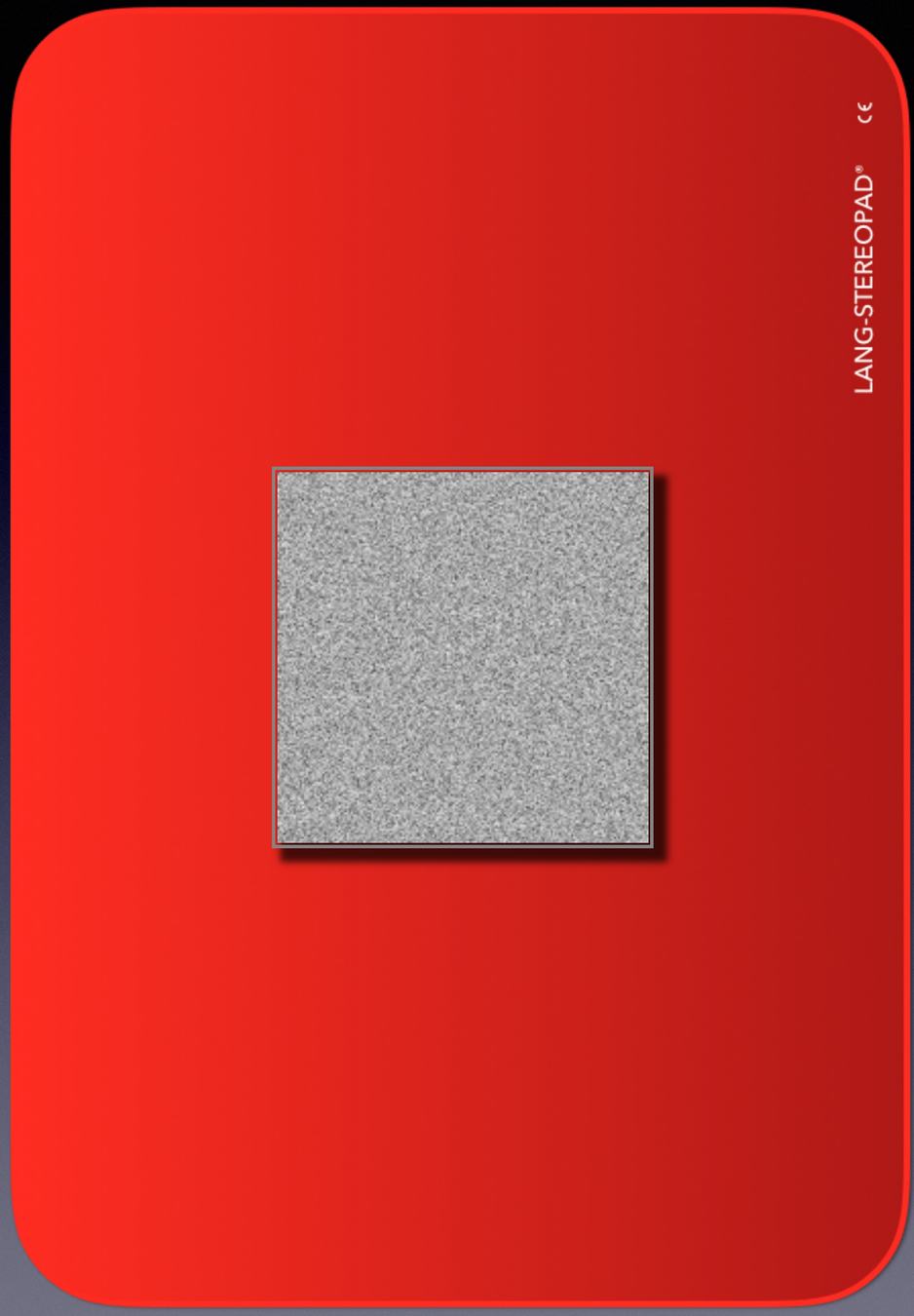
LANG-STEREOTEST®

SCREENING

Test plate upright
(lenticular horizontal)



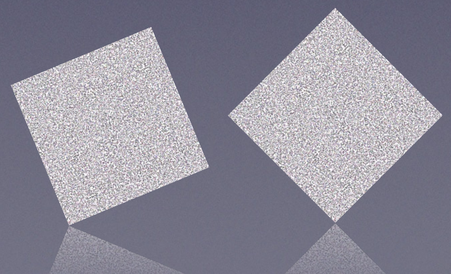


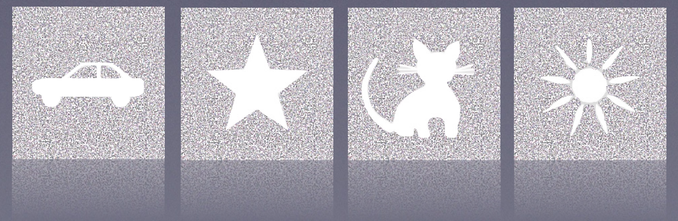


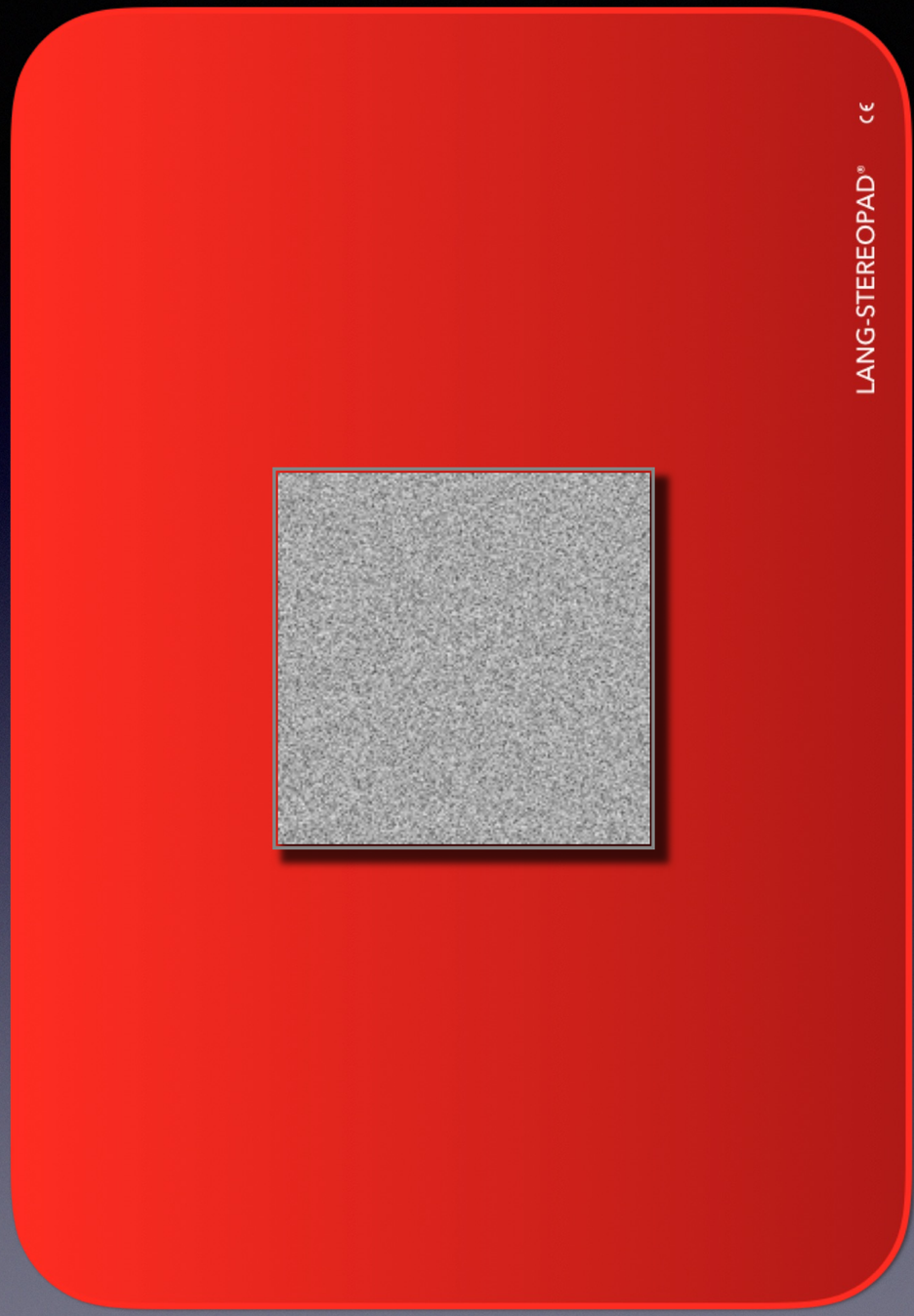
LANG-STEREOTEST®

SCREENING

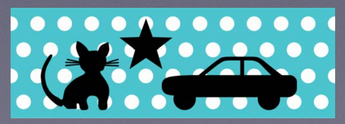
Ask:
What is there here?





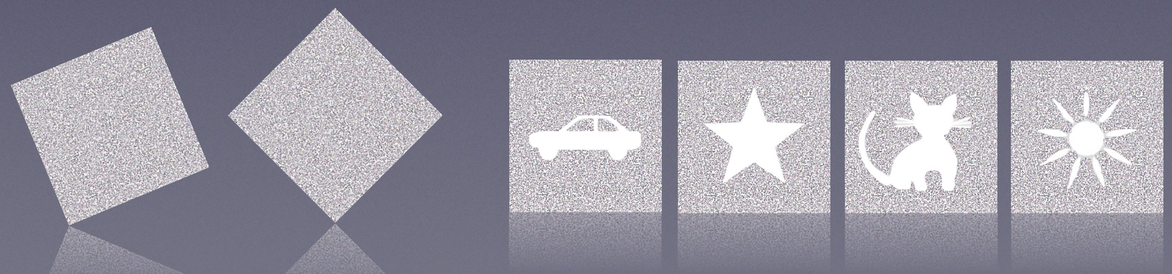


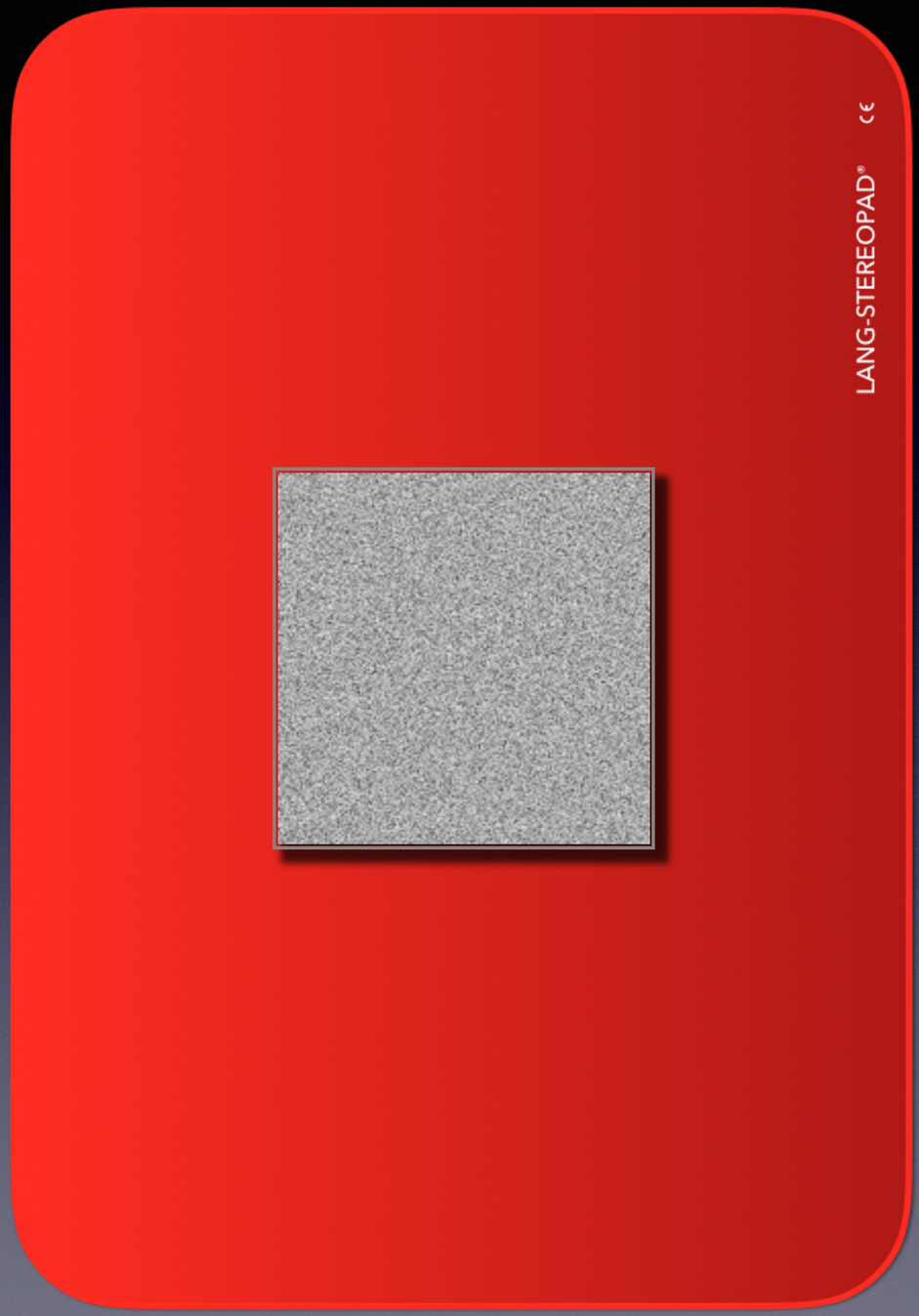
LANG-STEREOTEST®



SCREENING

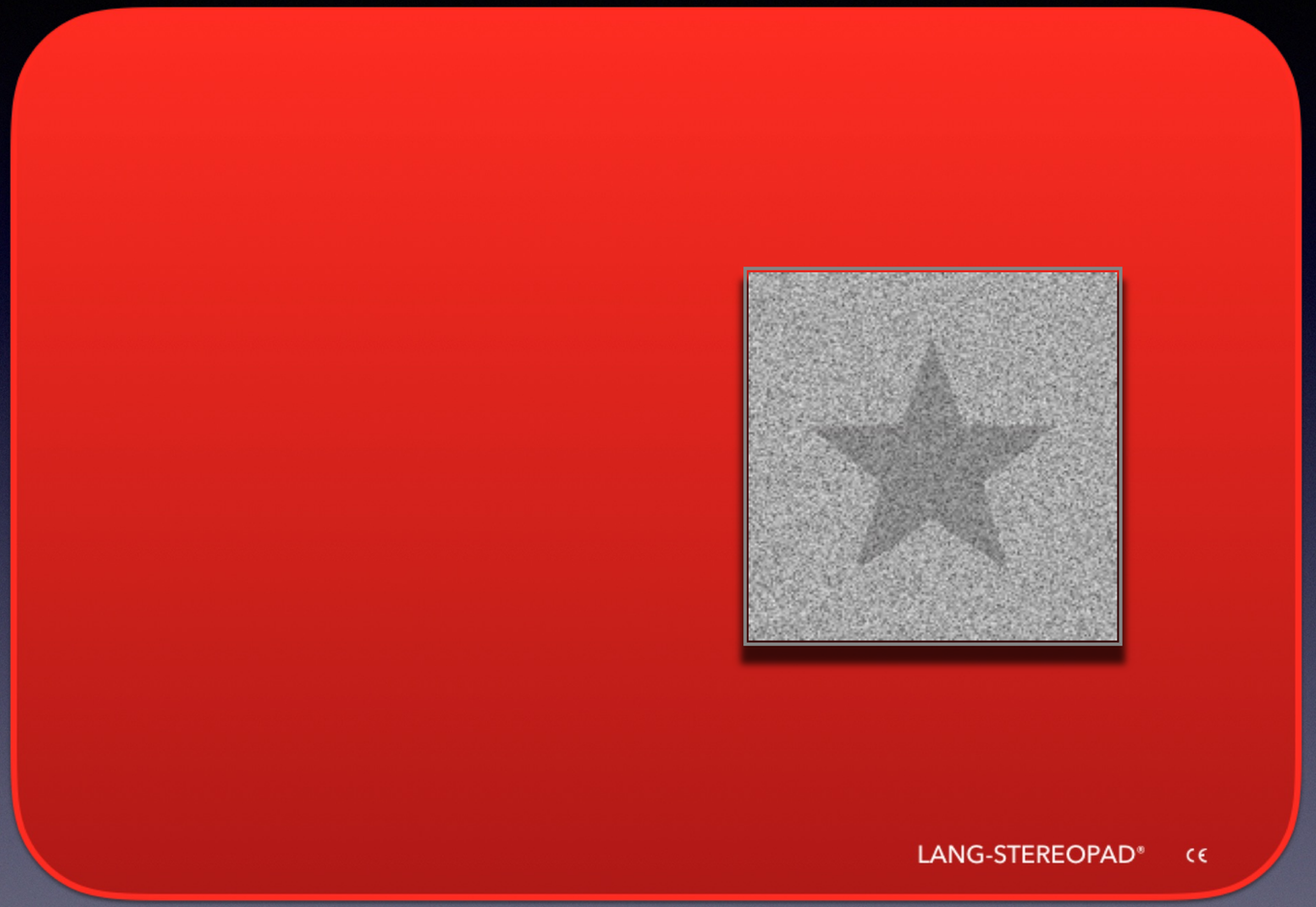
Correct answer:
NOTHING!

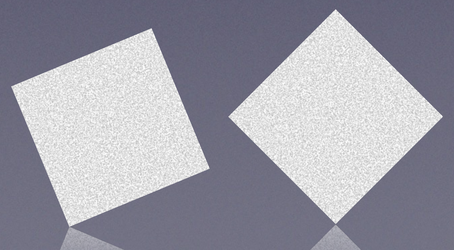


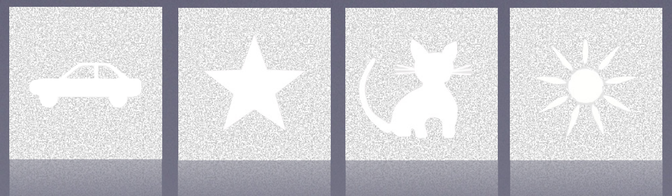


LANG-STEREOTEST®

Confirmation step 2: Place a second one next to the test card!

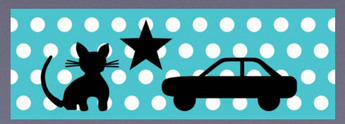




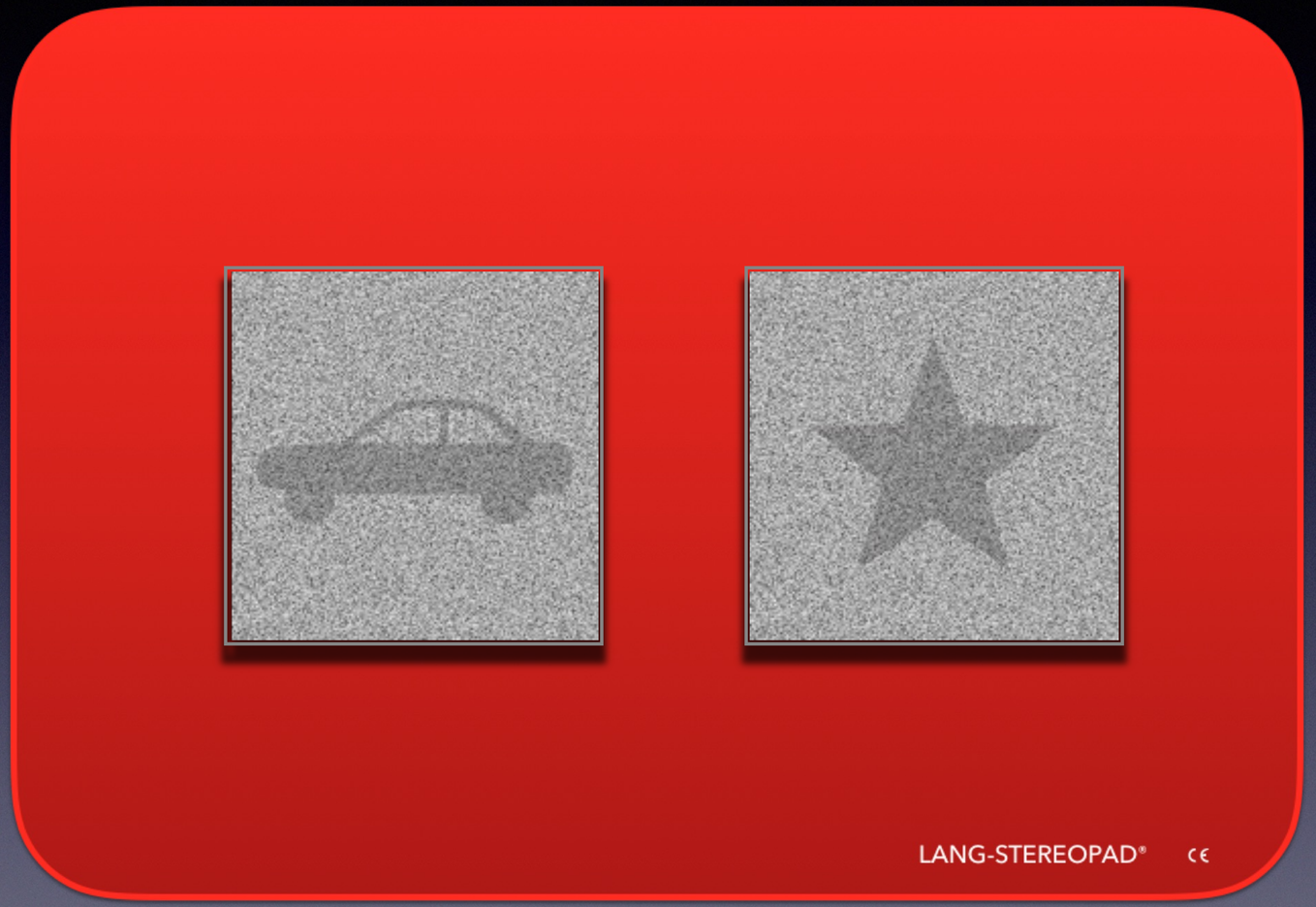


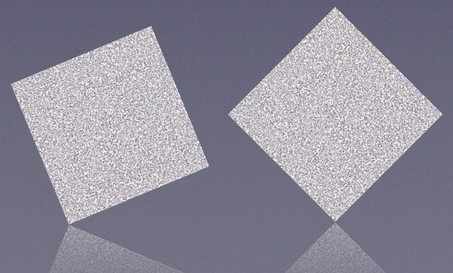
SCREENING

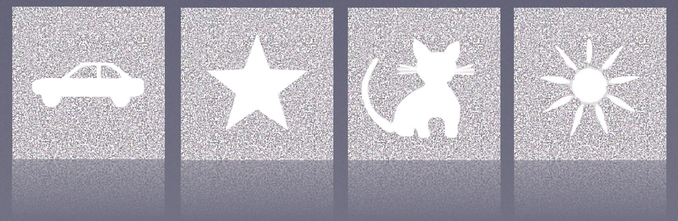
LANG-STEREOTEST®



Confirmation step 2: Place a second one next to the test card!



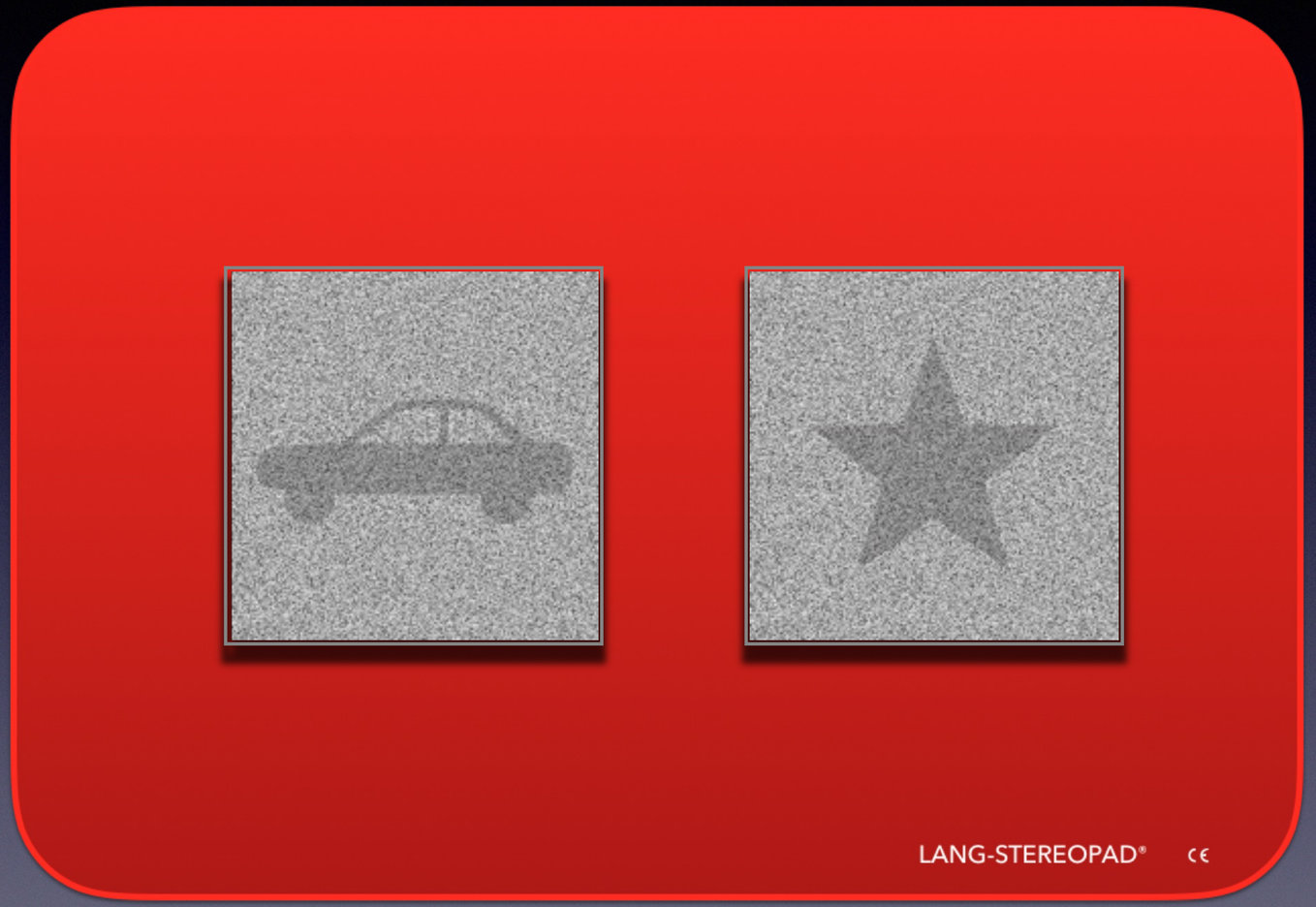


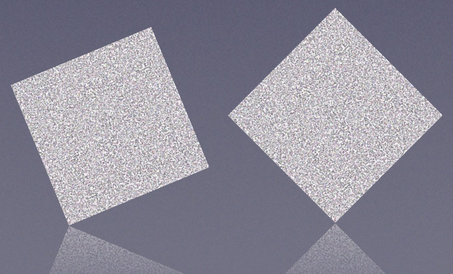


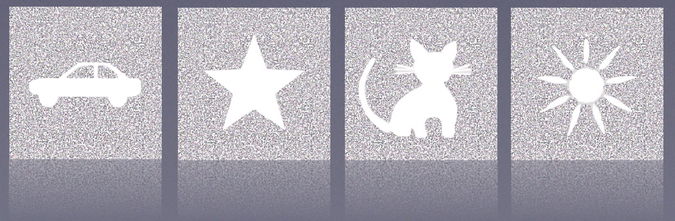
SCREENING

LANG-STEREOTEST®

Ask the patient: What do you see now?

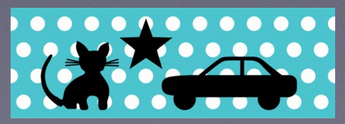




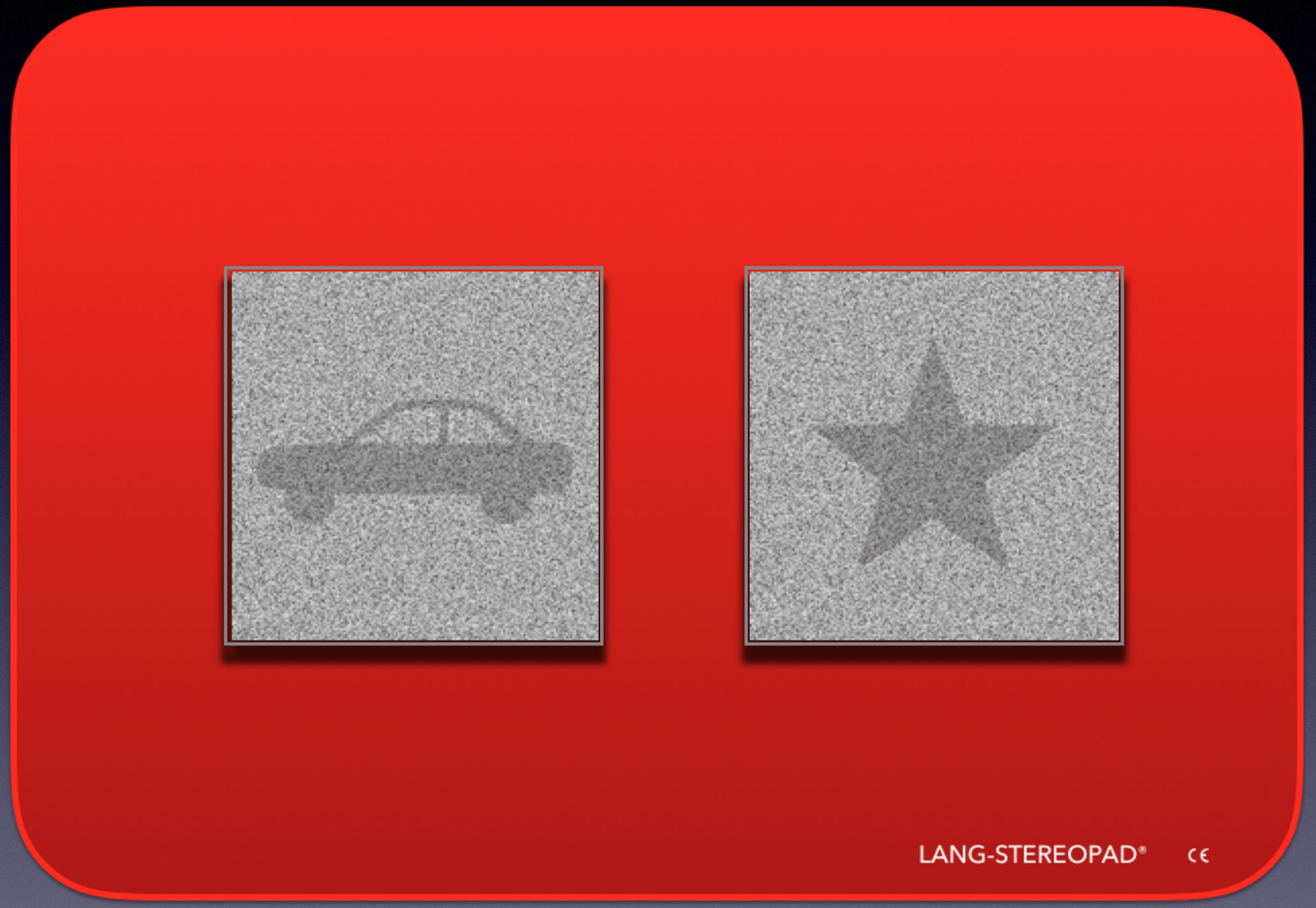


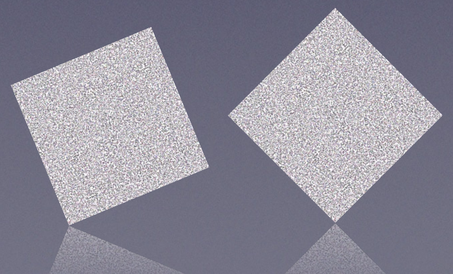
SCREENING

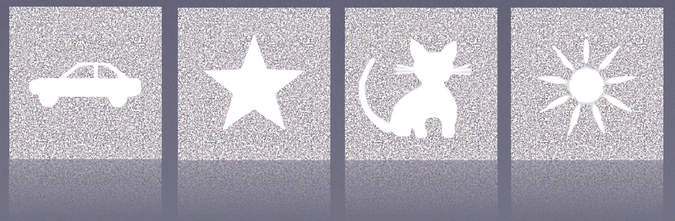
LANG-STEREOTEST®



Correct answer: a STAR and a CAR

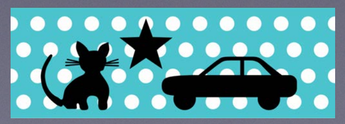




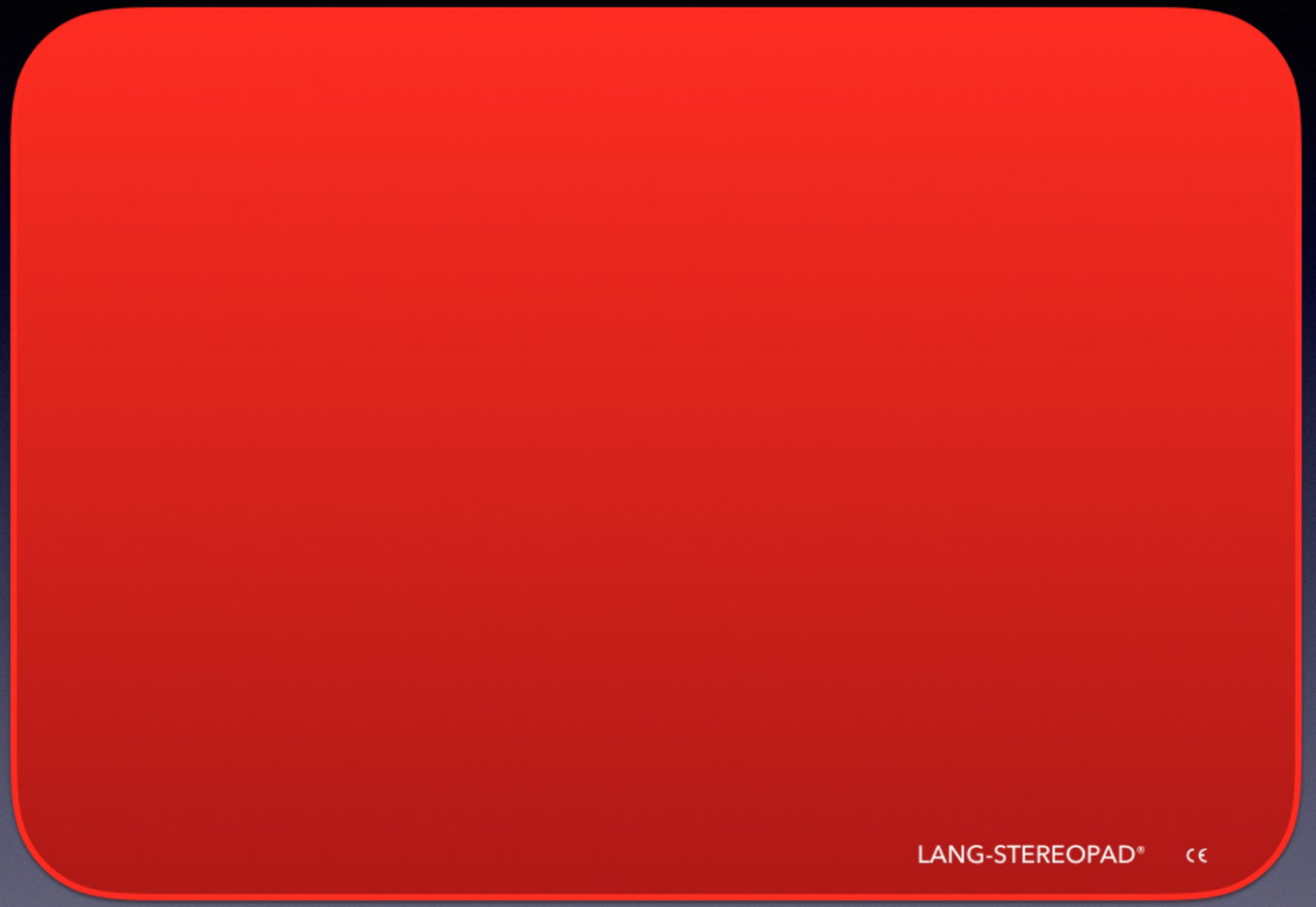


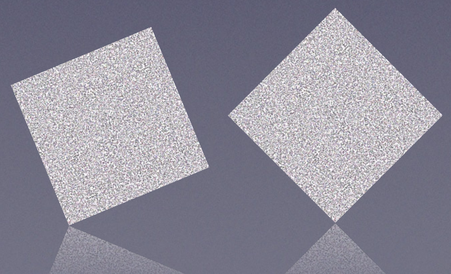
SCREENING

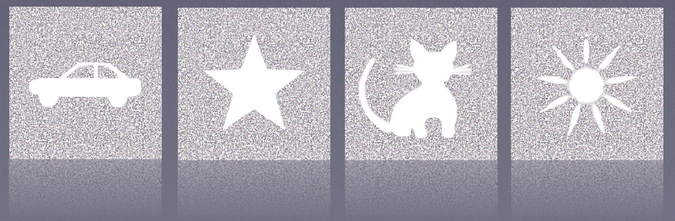
LANG-STEREOTEST®



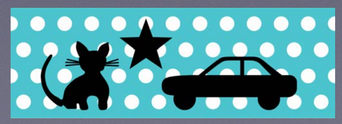
PREFERENTIAL LOOKING METHOD







LANG-STEREOTEST®

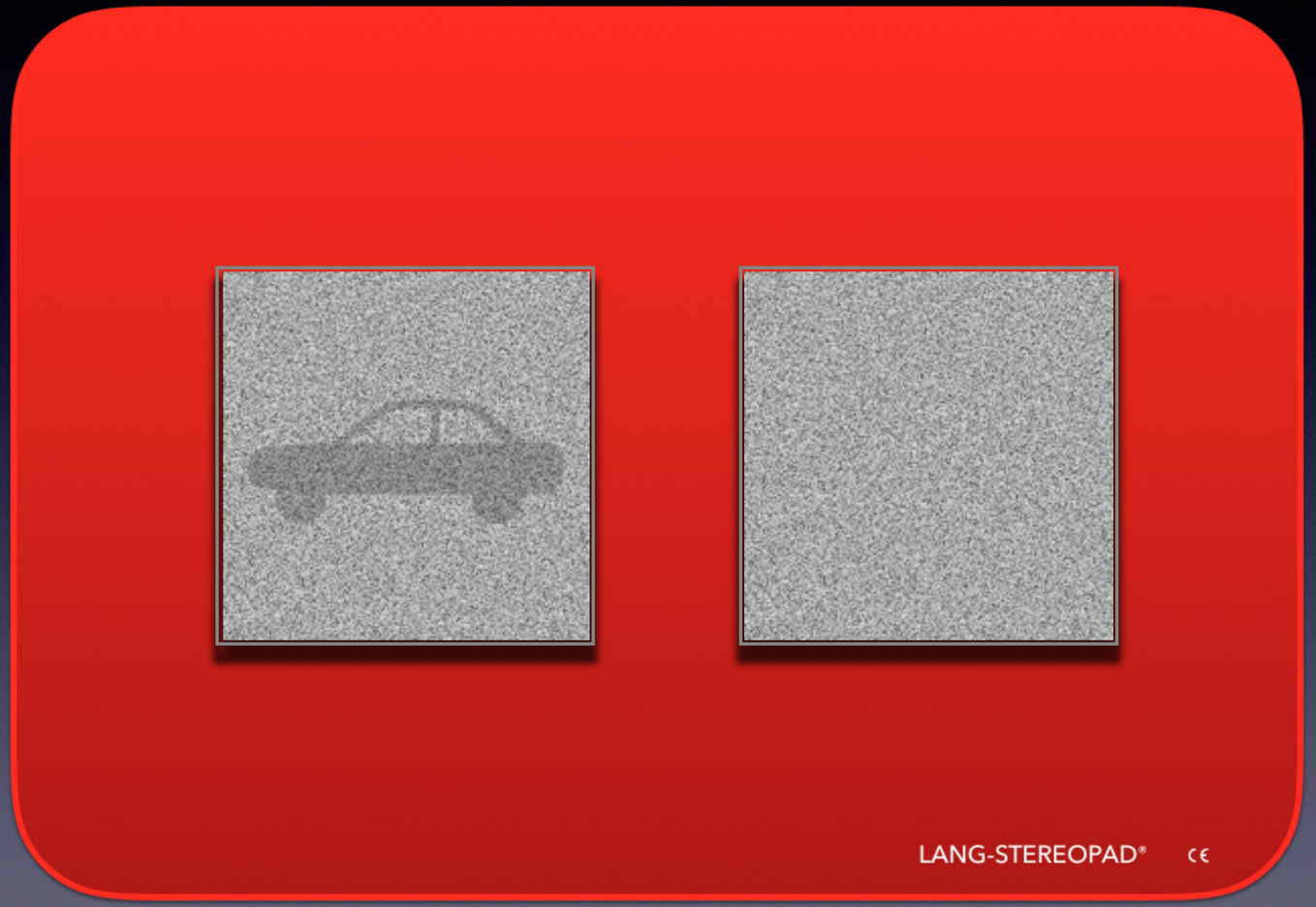


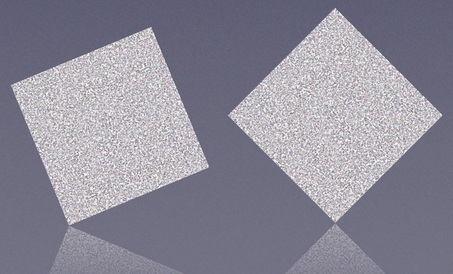
Place a "blind" test card on one side!

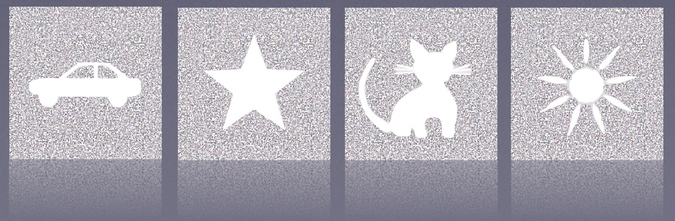
PL-METHOD

LANG-STEREOTEST®

Add a recognisable test card next to it!

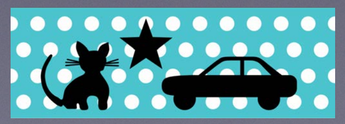




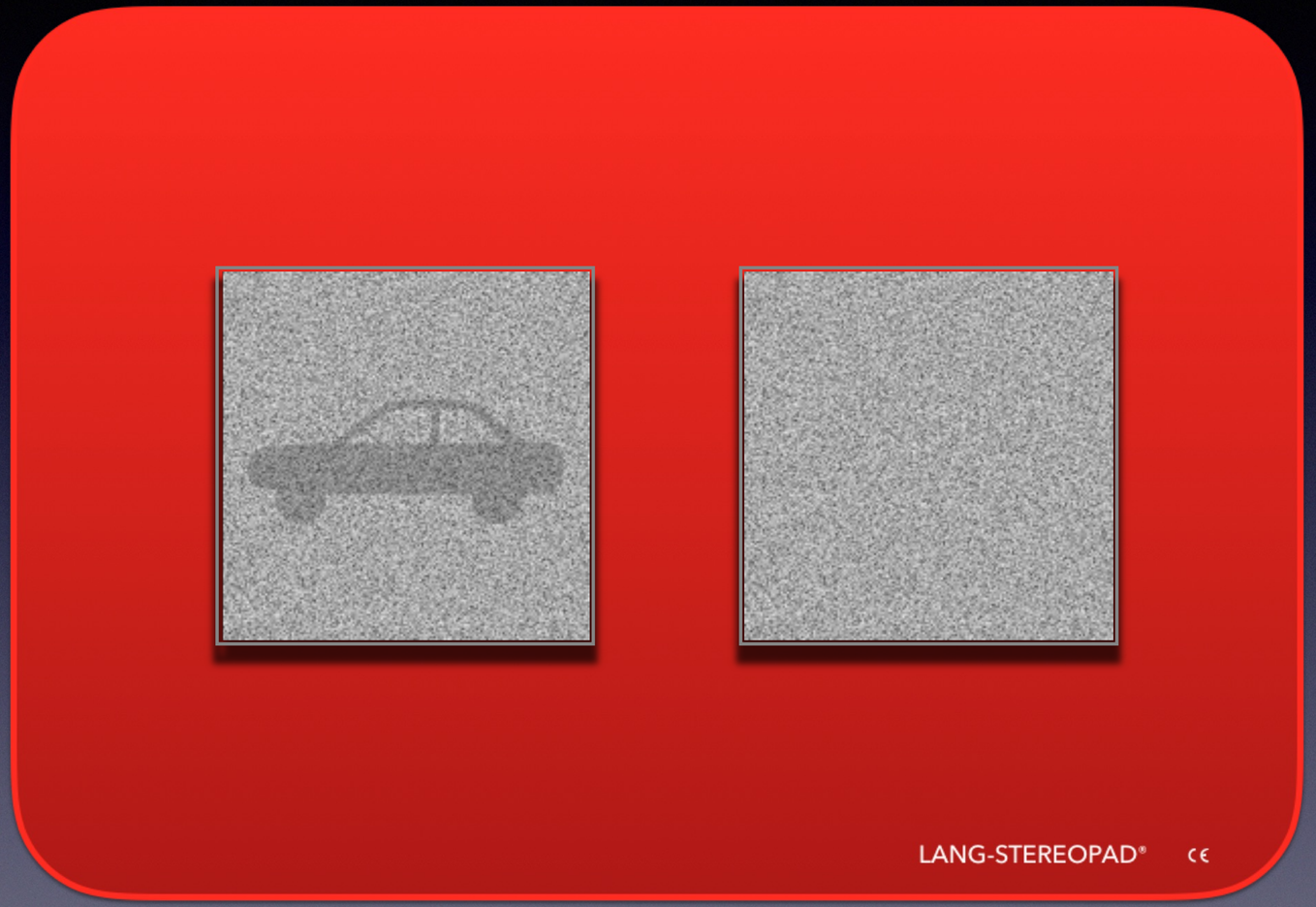


PL-METHOD

LANG-STEREOTEST®

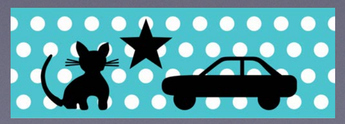


Ask the patient? What is there here?

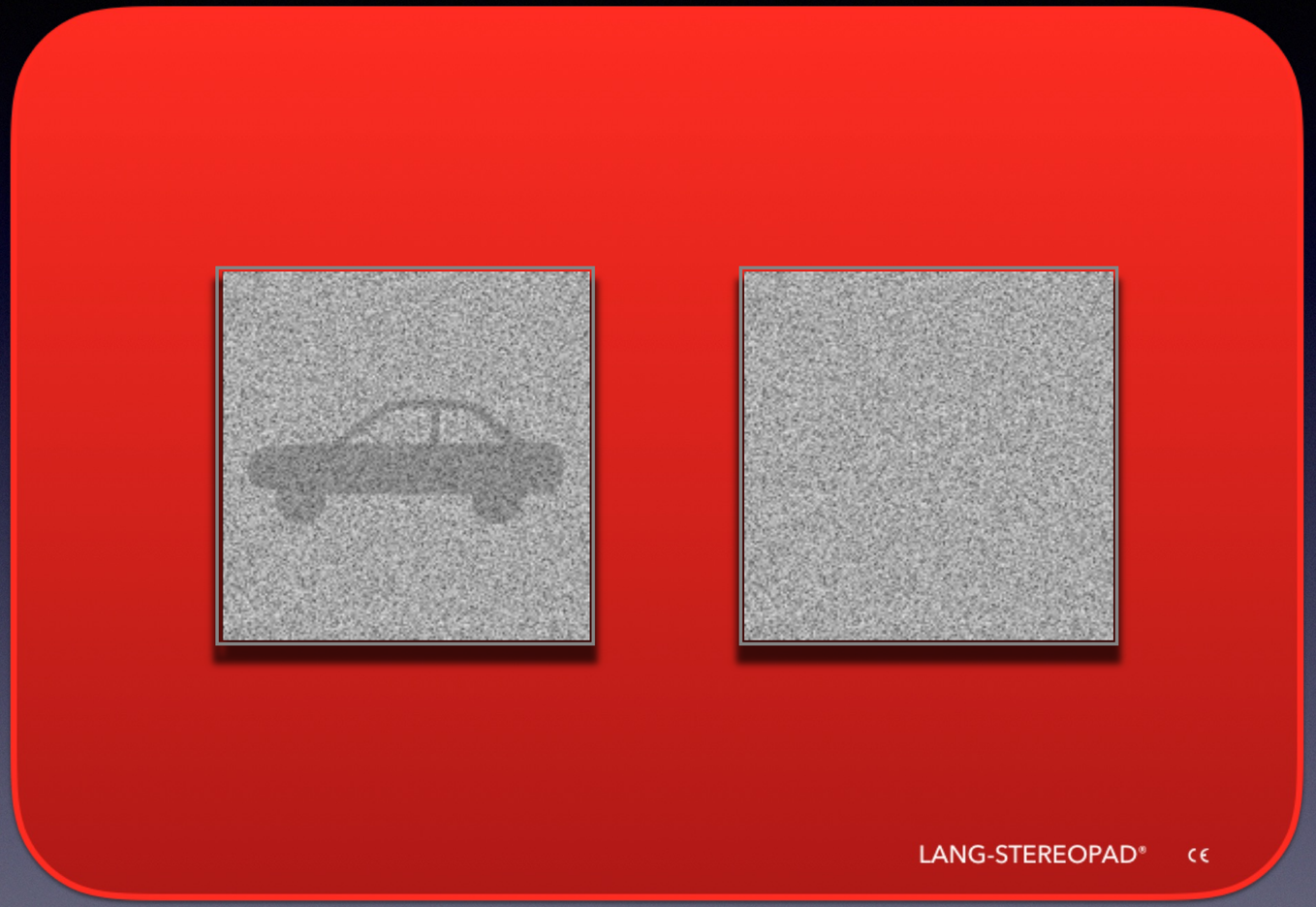


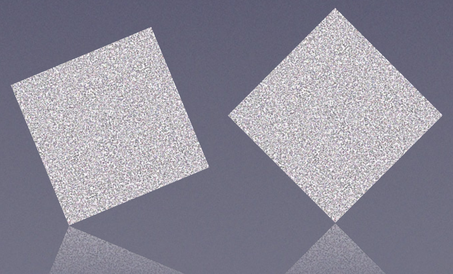
PL-METHOD

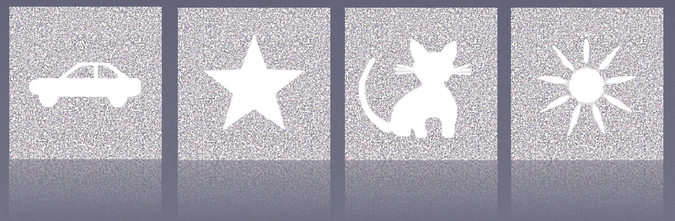
LANG-STEREOTEST®



Subject with stereopsis says: a CAR
Baby with stereopsis tries to reach for CAR

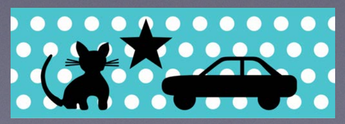




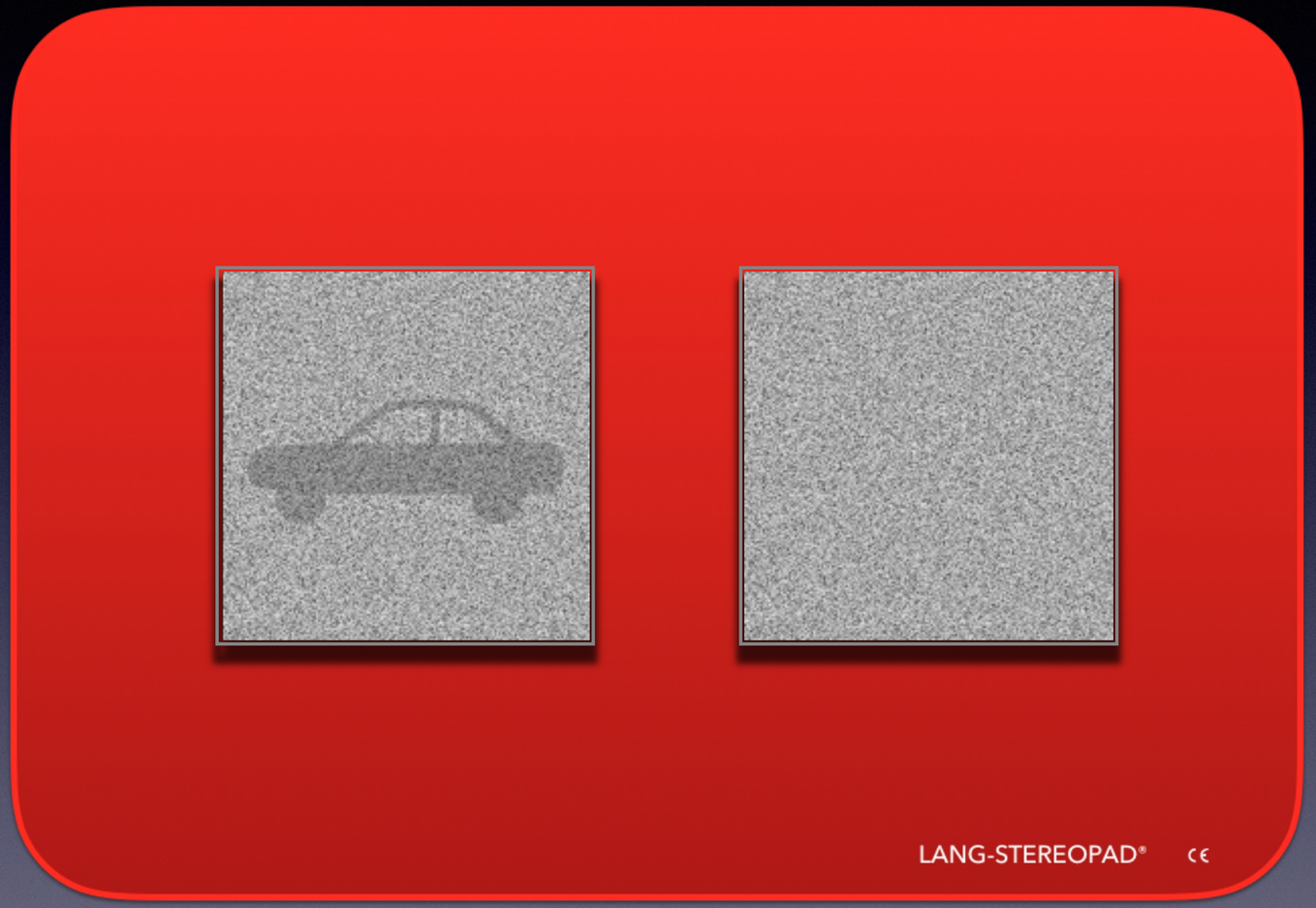


PL-METHOD

LANG-STEREOTEST®



Confirmation step 1: Turn the test plate 90° counter-clockwise!

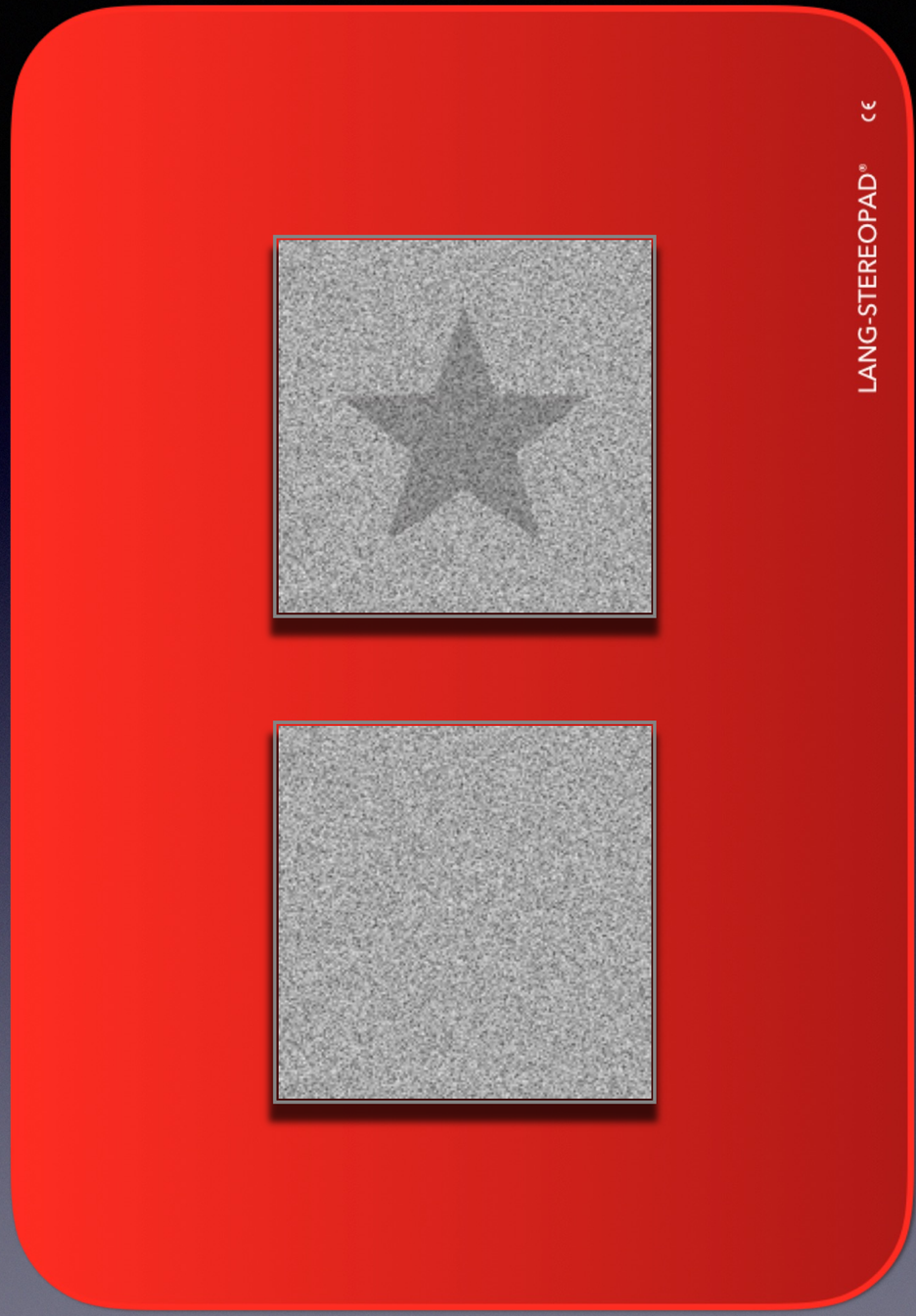


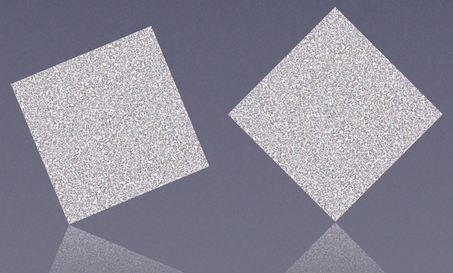
PL-METHODE

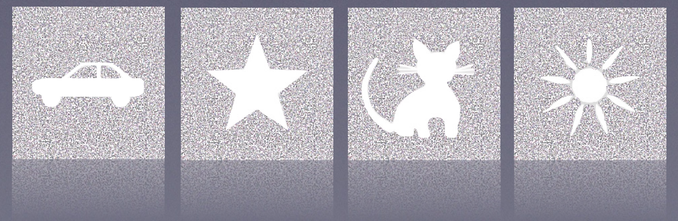
LANG-STEREOTEST®

PREFERENTIAL LOOKING-METHODE

Testplatte vertikal nach Drehung



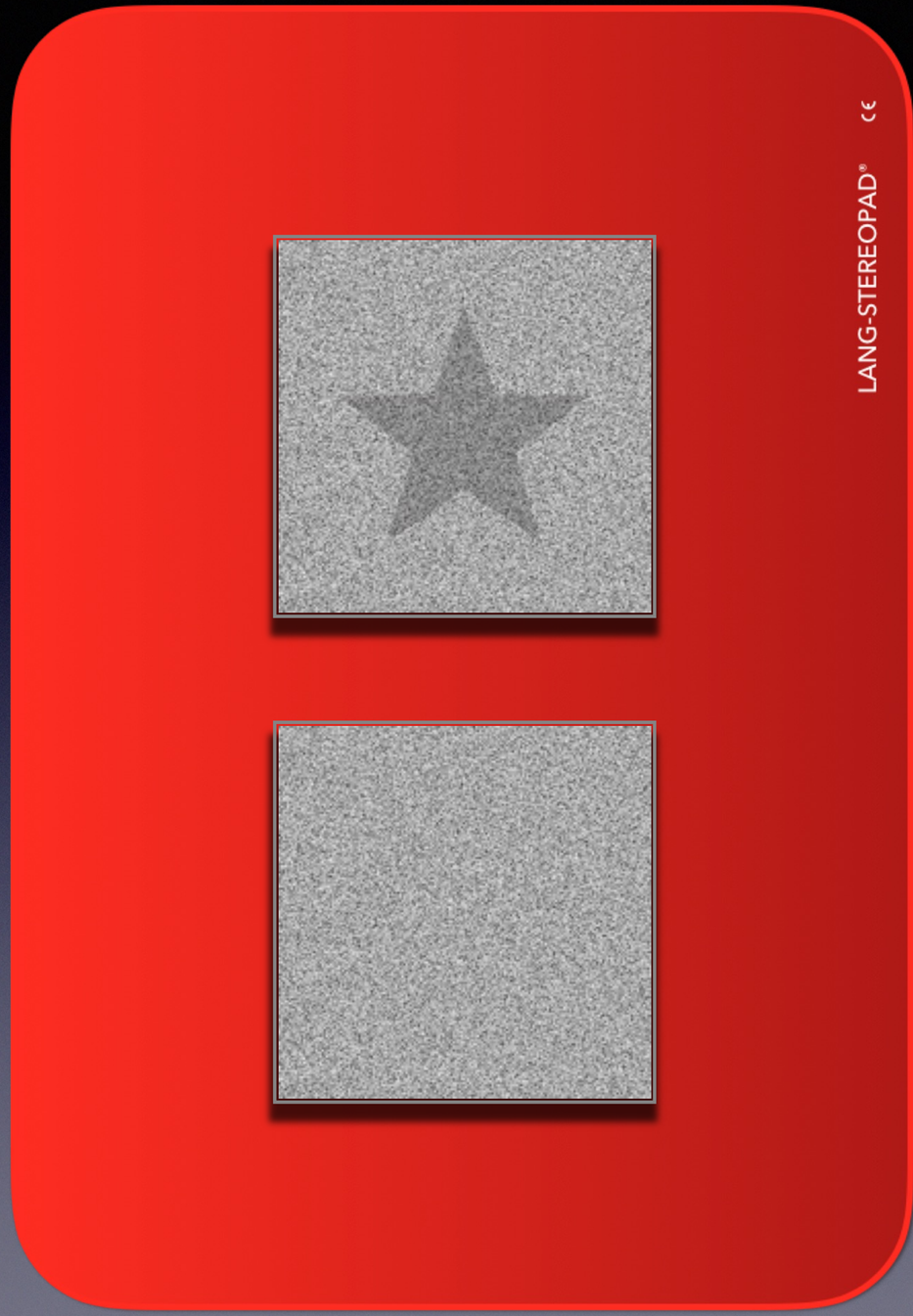


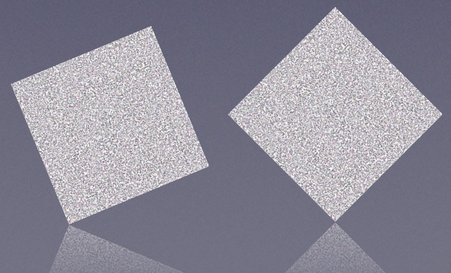


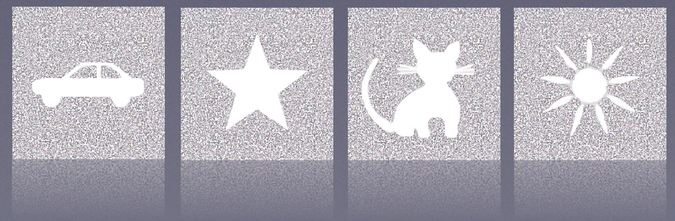
LANG-STEREOTEST®

PREFERENTIAL LOOKING-METHODE

Fragen Sie den Patienten:
Was gibt es hier zu sehen?





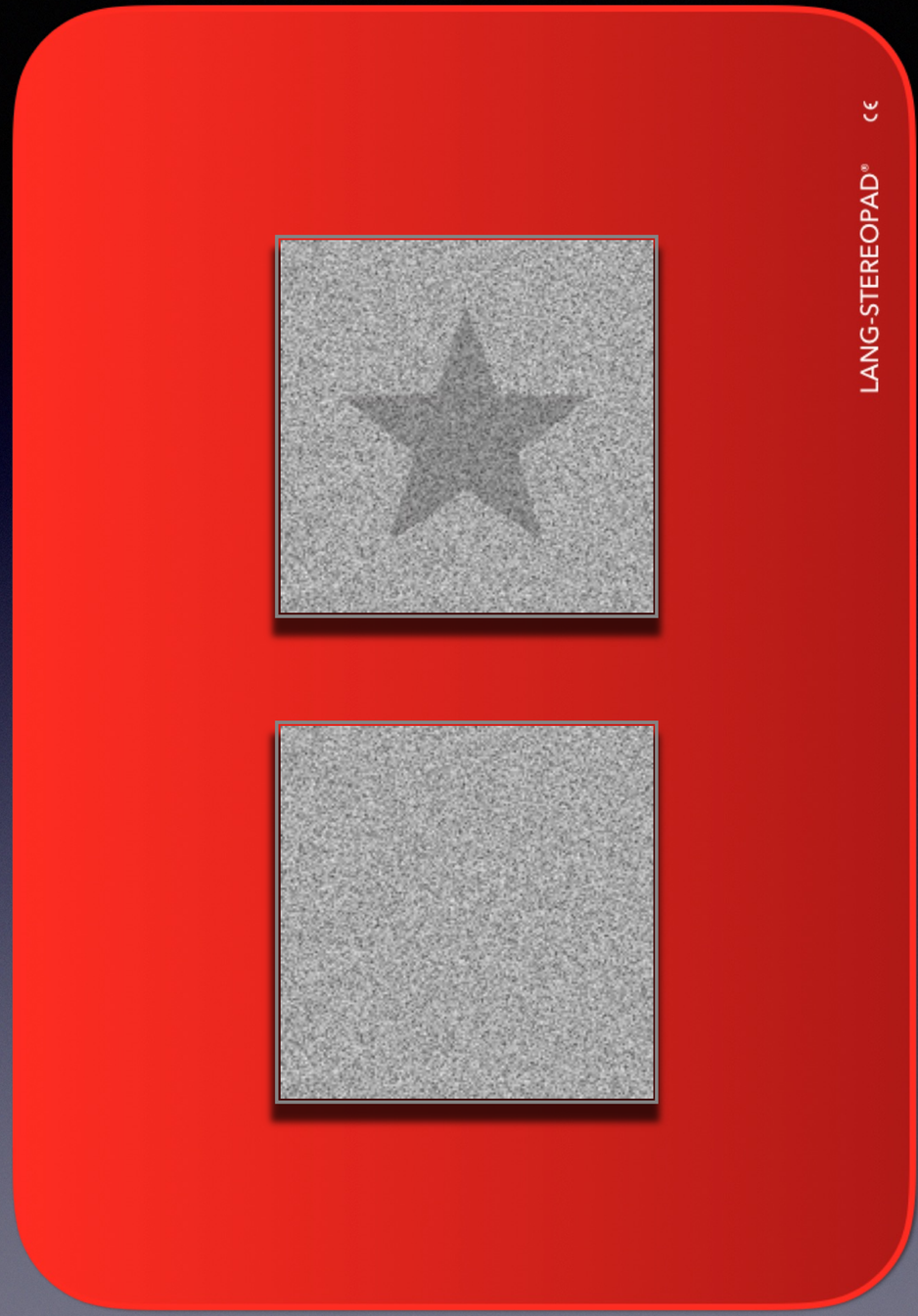


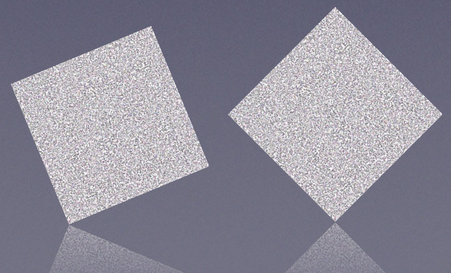
LANG-STEREOTEST®

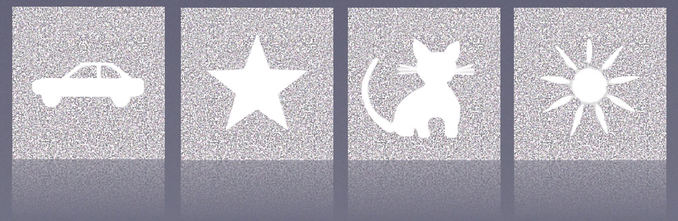
PREFERENTIAL LOOKING-METHODE

Richtige Antwort: STERN

Baby mit Stereopsis will STERN ergreifen

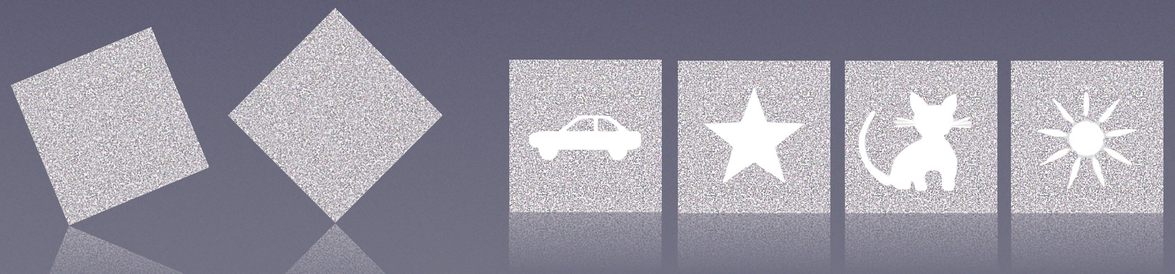






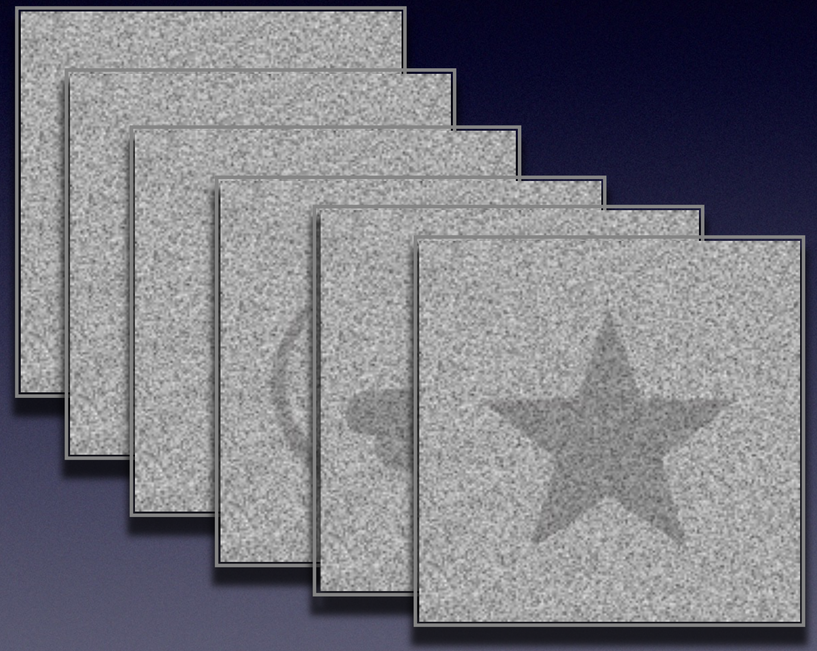
LANG-STEREOTEST®

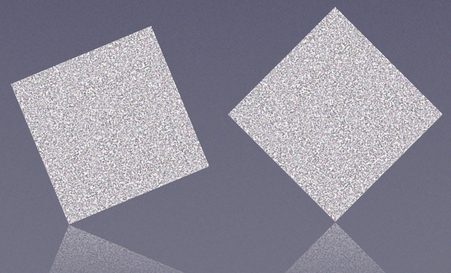
STEREO-THRESHOLD

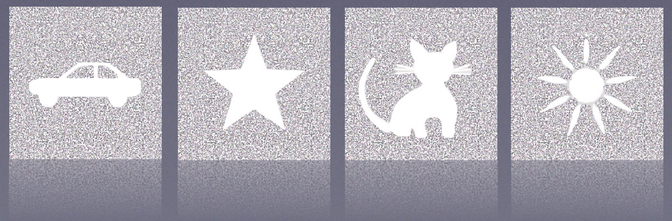


LANG-STEREOTEST®

STEREO-THRESHOLD



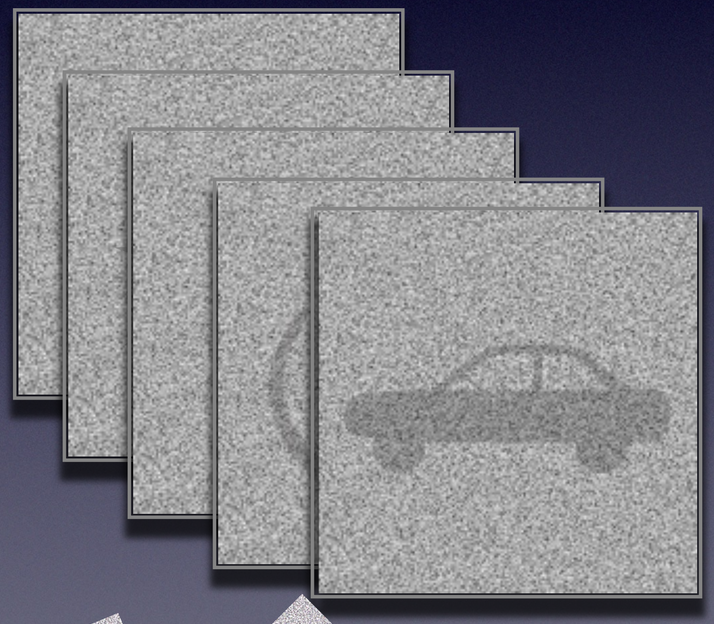


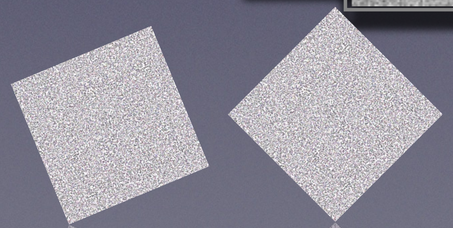


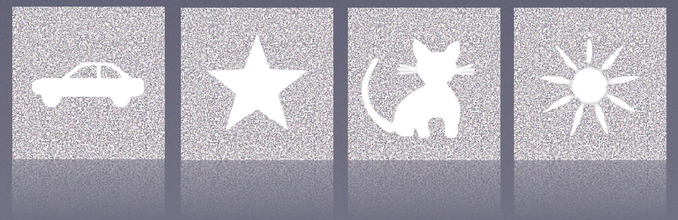
LANG-STEREOTEST®

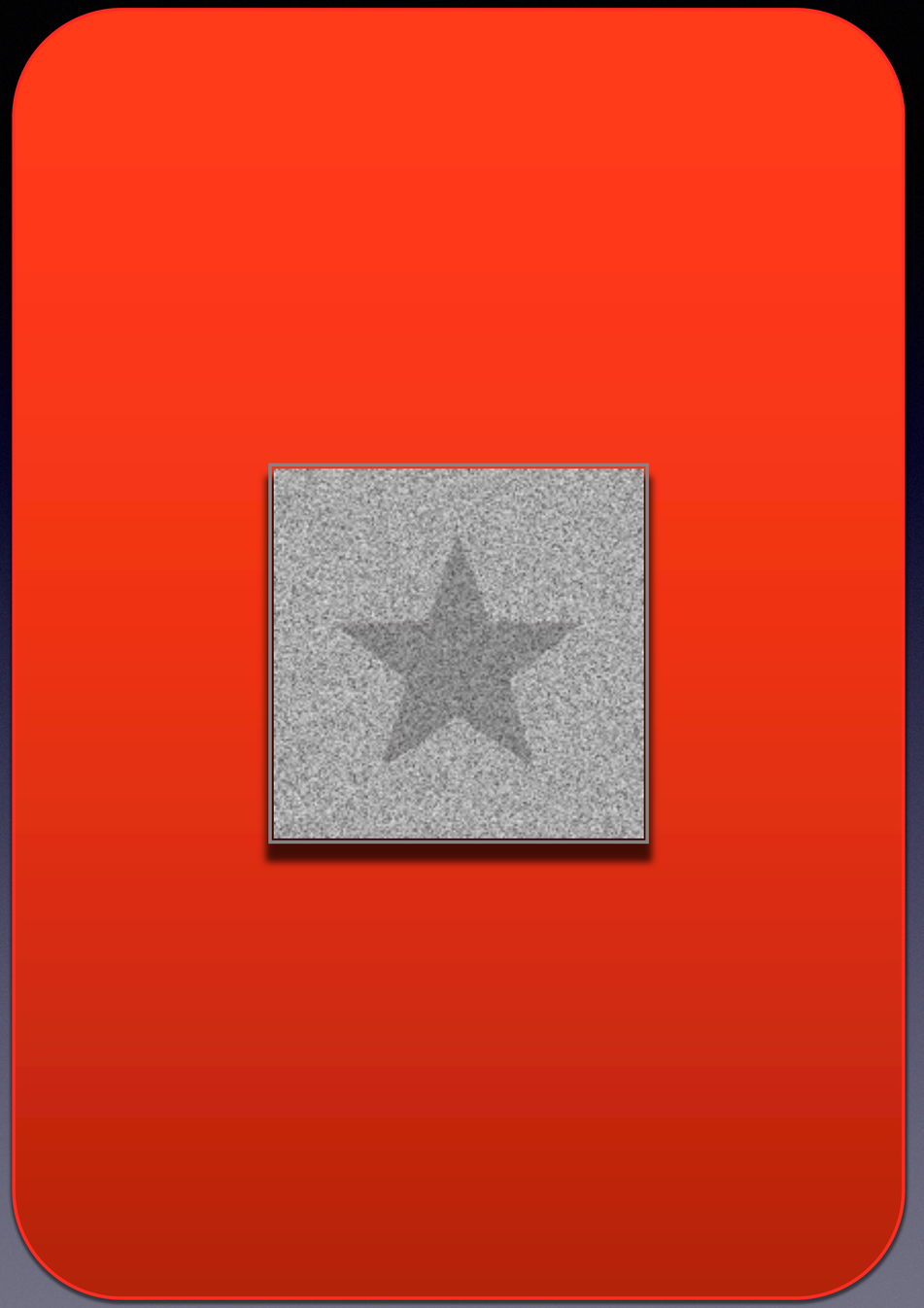
STEREO-THRESHOLD

Put on the test card with the largest disparity (1000'')!





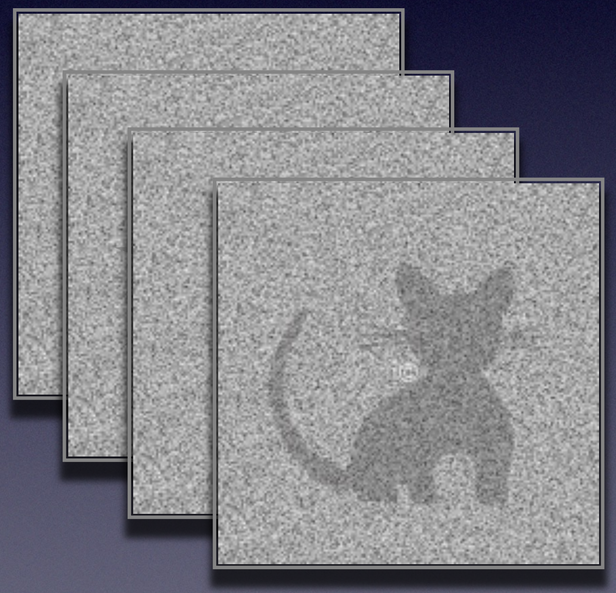


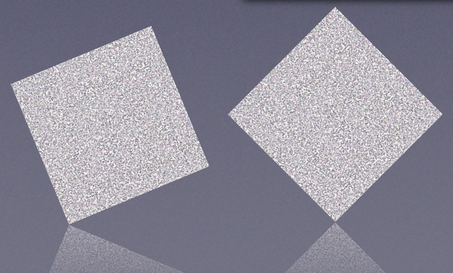


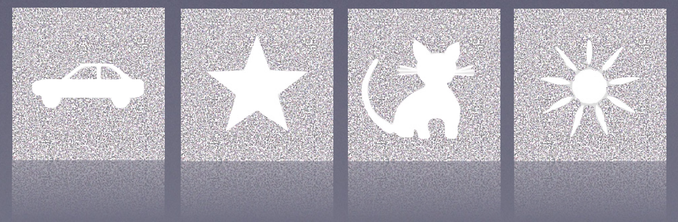
LANG-STEREOTEST®

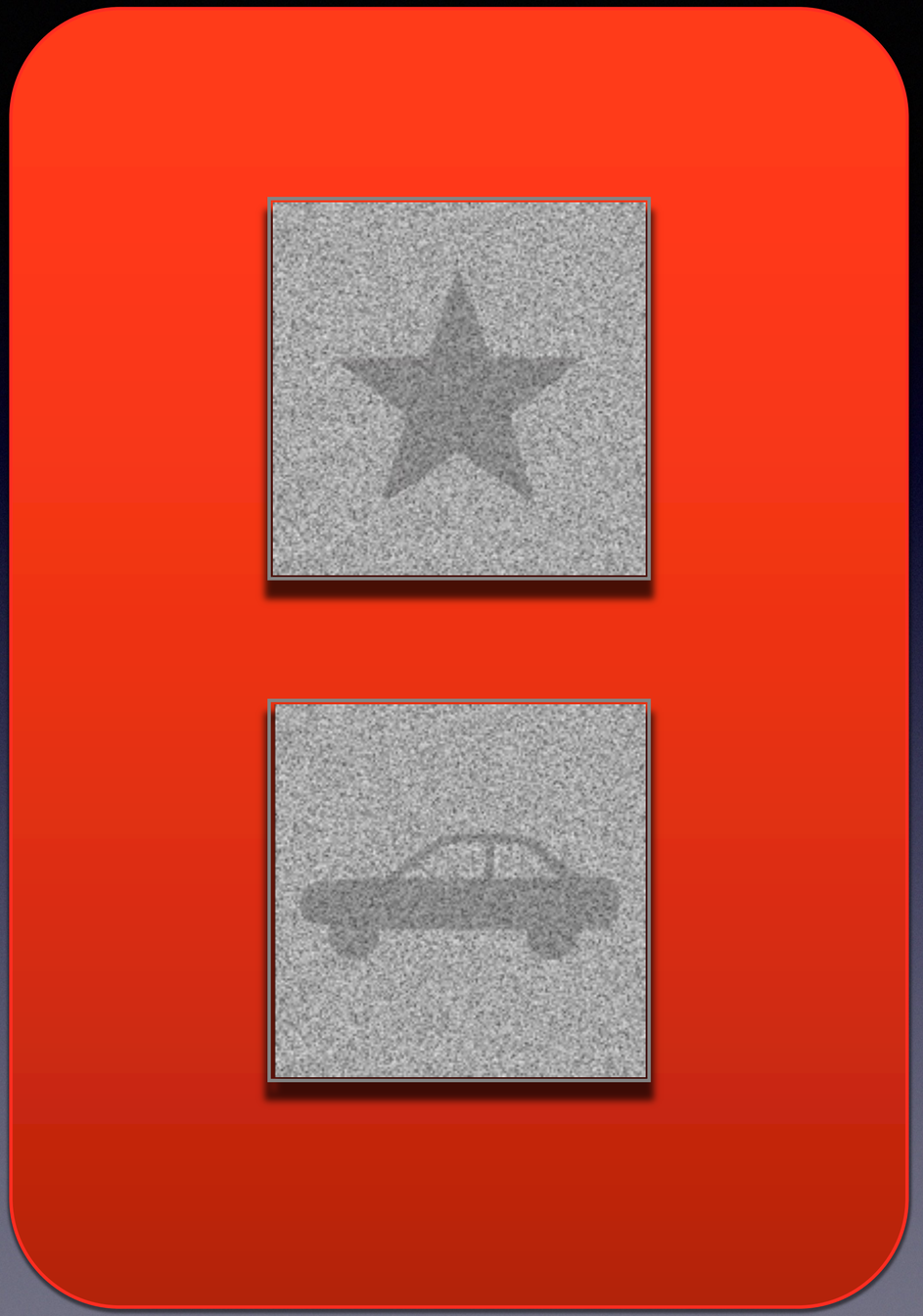
STEREO-THRESHOLD

Slide the test card upwards and place the test card with the next smallest disparity!





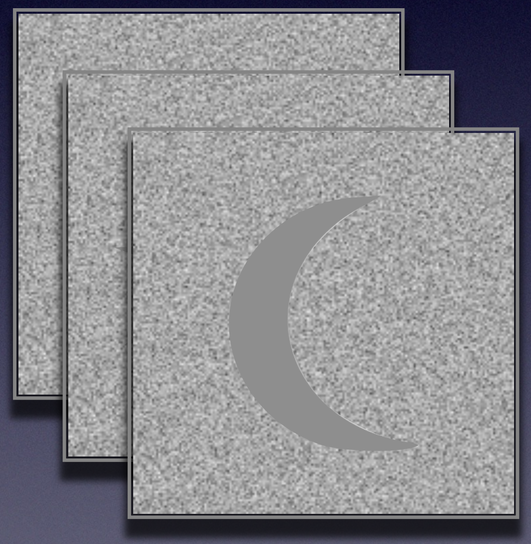


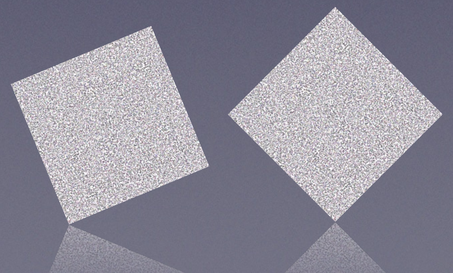


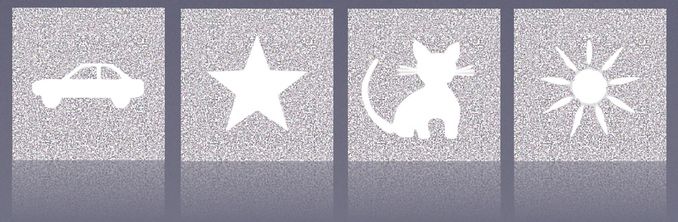
LANG-STEREOTEST®

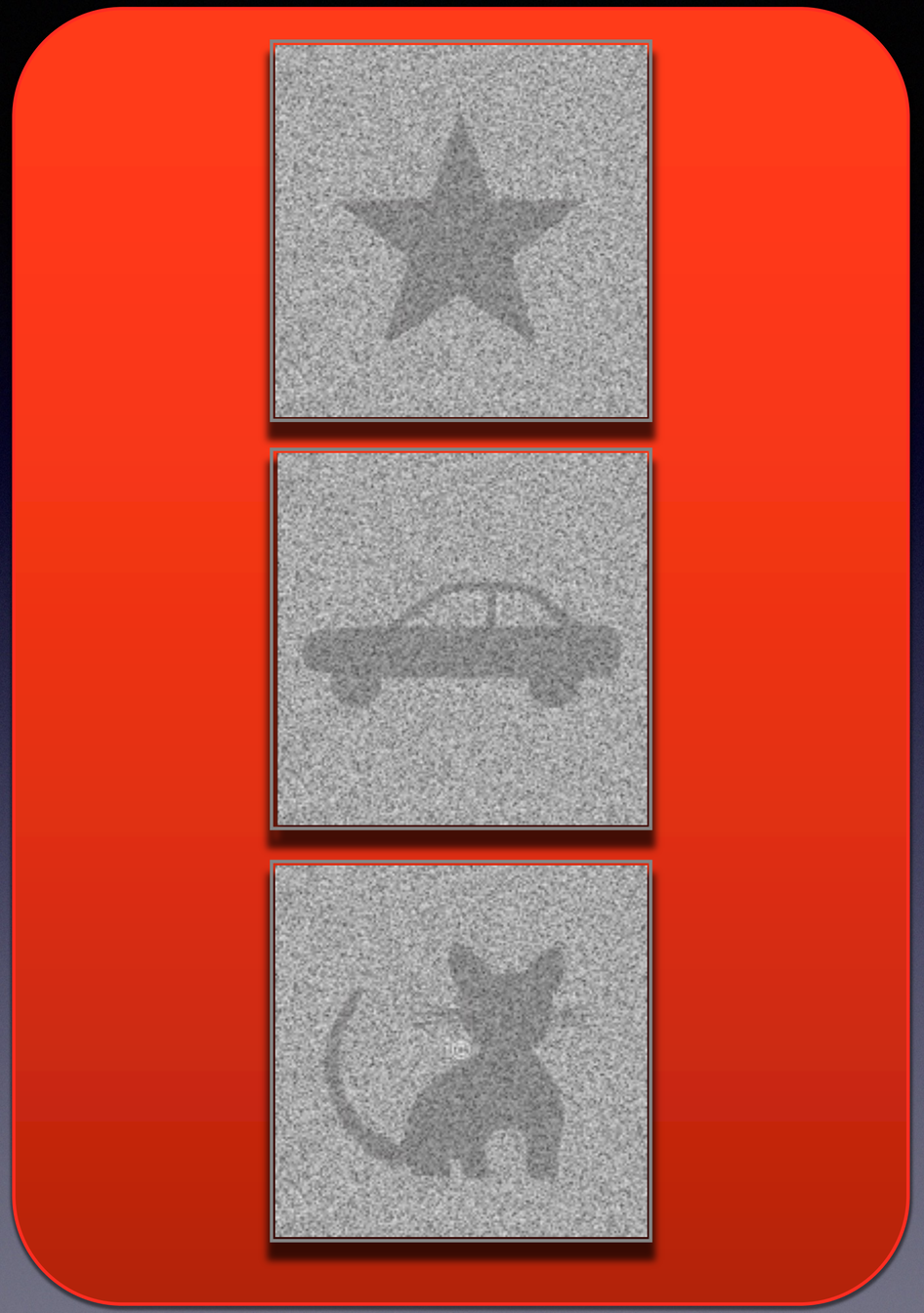
STEREO-THRESHOLD

Slide the test card upwards and place the test card with the next smallest disparity!





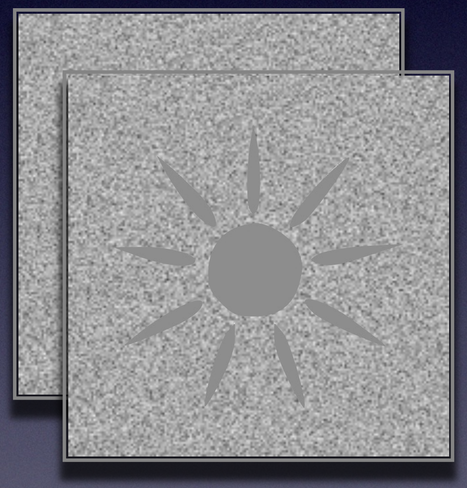


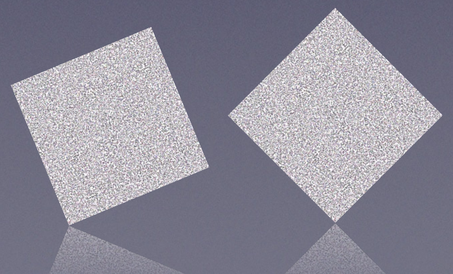


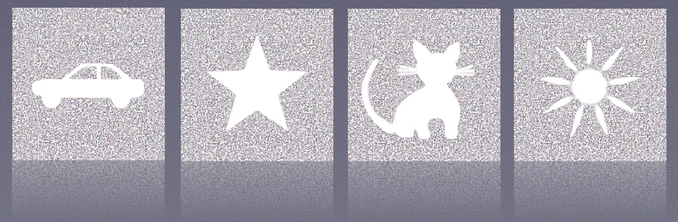
LANG-STEREOTEST®

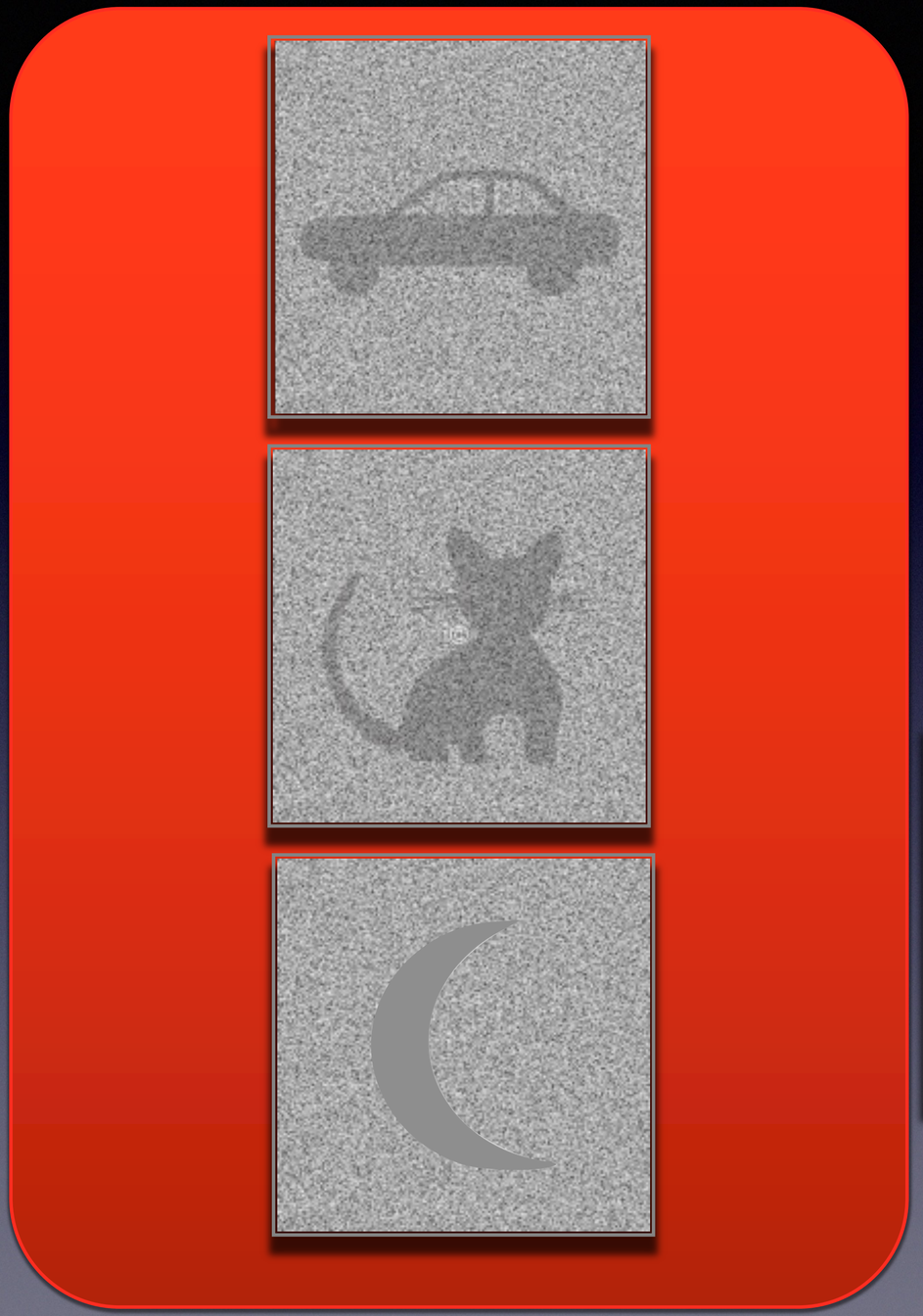
STEREO-THRESHOLD

Repeat the last step until the subject no longer recognises the figure!





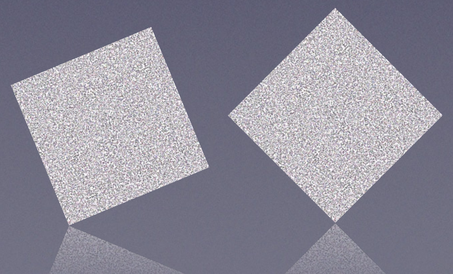


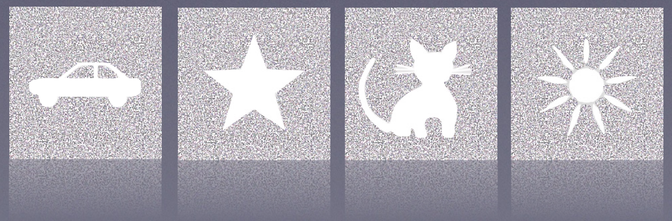


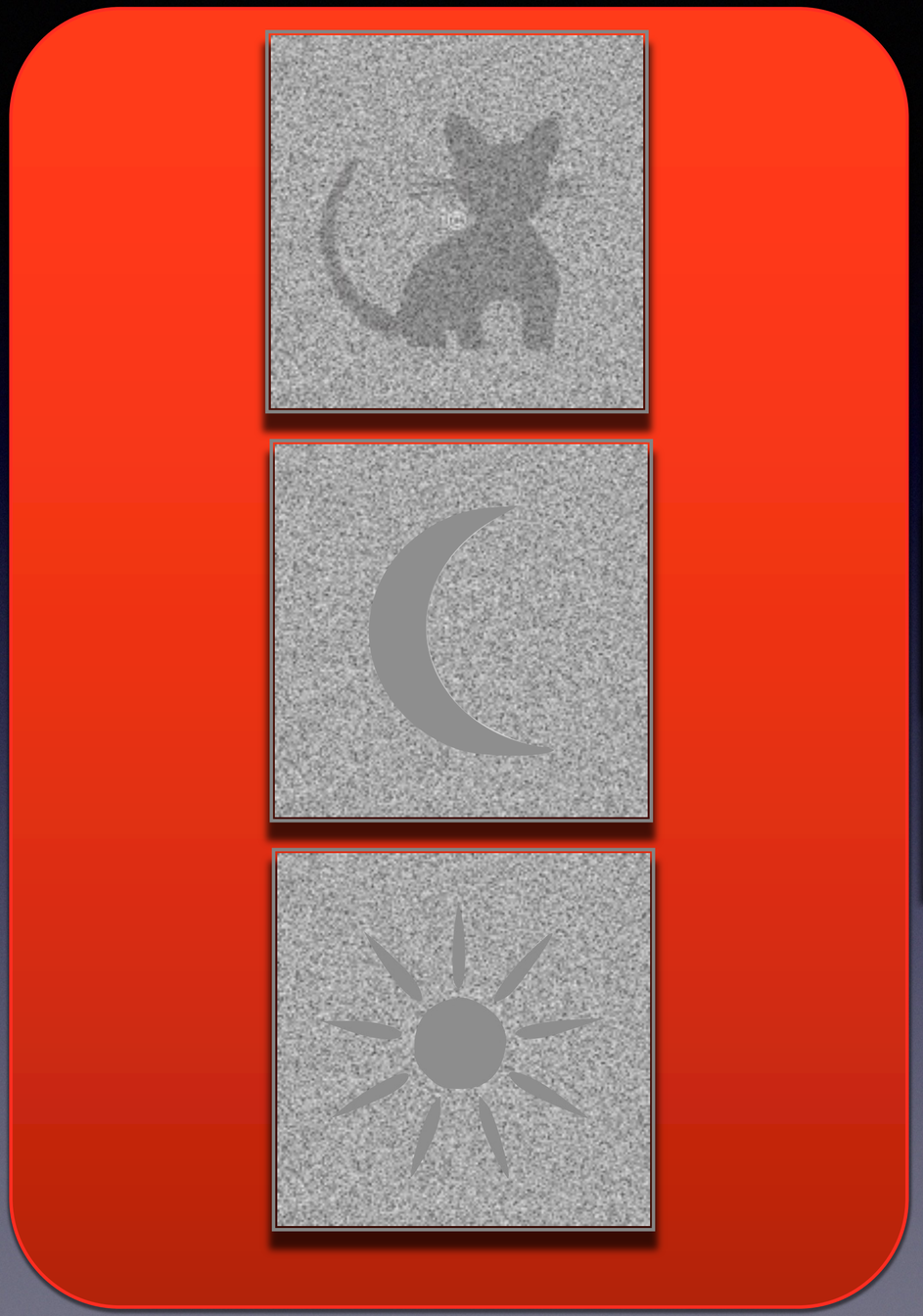
LANG-STEREOTEST®

STEREO-THRESHOLD

Repeat the last step until the subject no longer recognises the figure!





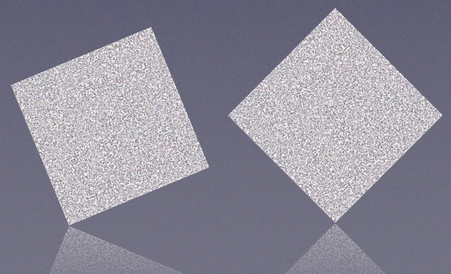


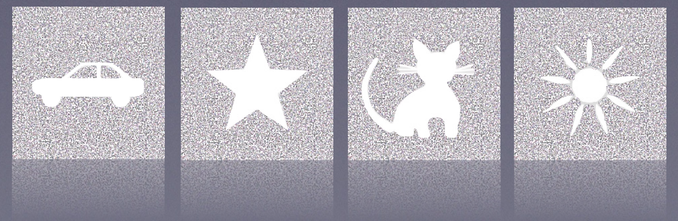
LANG-STEREOTEST®

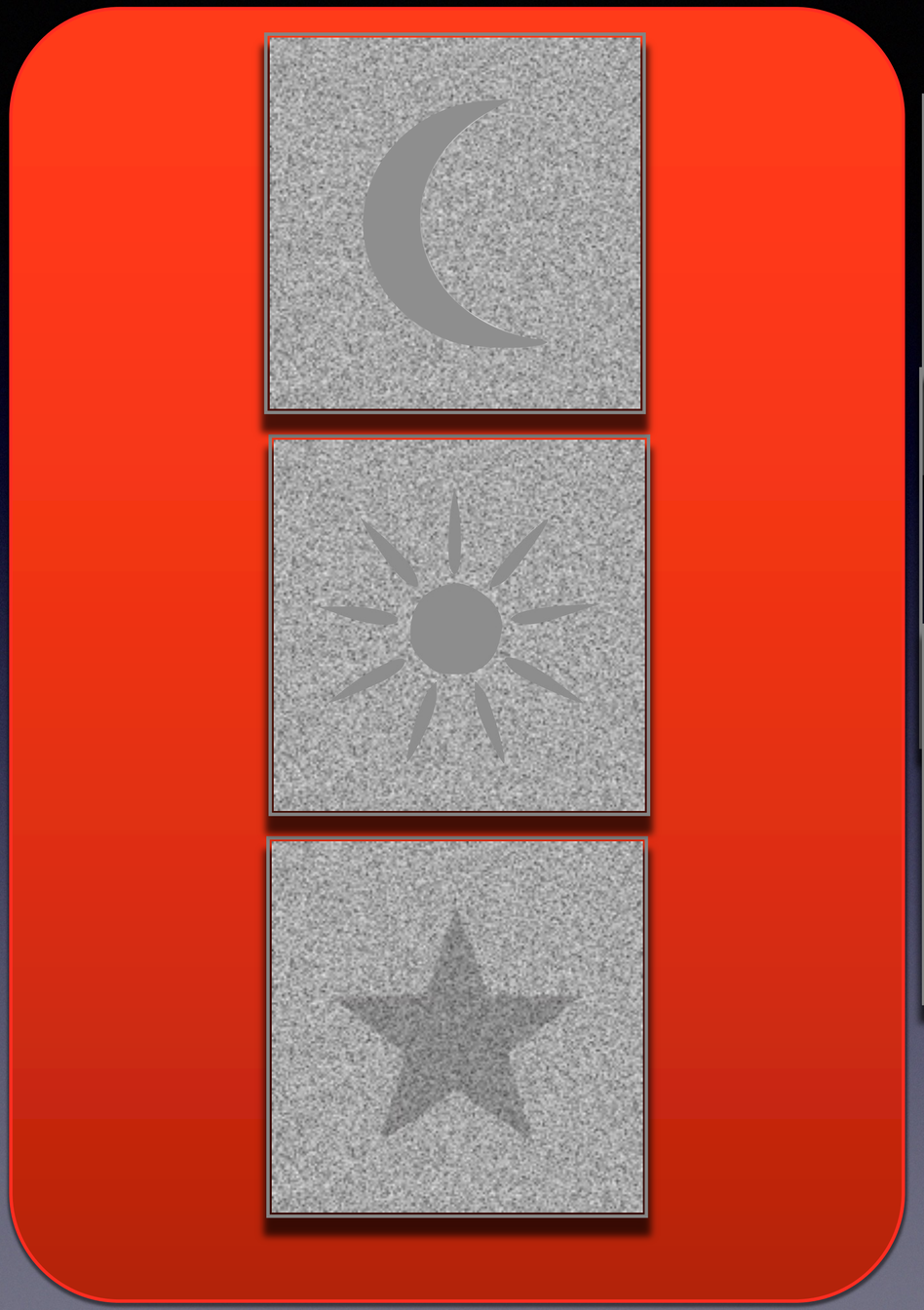
STEREO-THRESHOLD

Note the deepest disparity detected by the patient!

Example:100'' (SUN 100'')
or 50'' (STAR 50'')

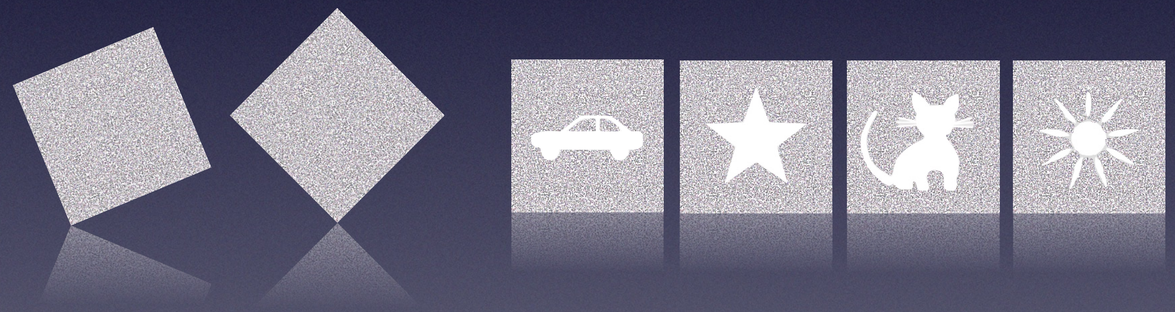




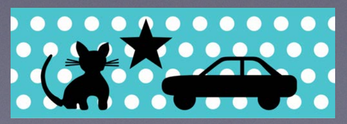


LANG-STEREOTEST®

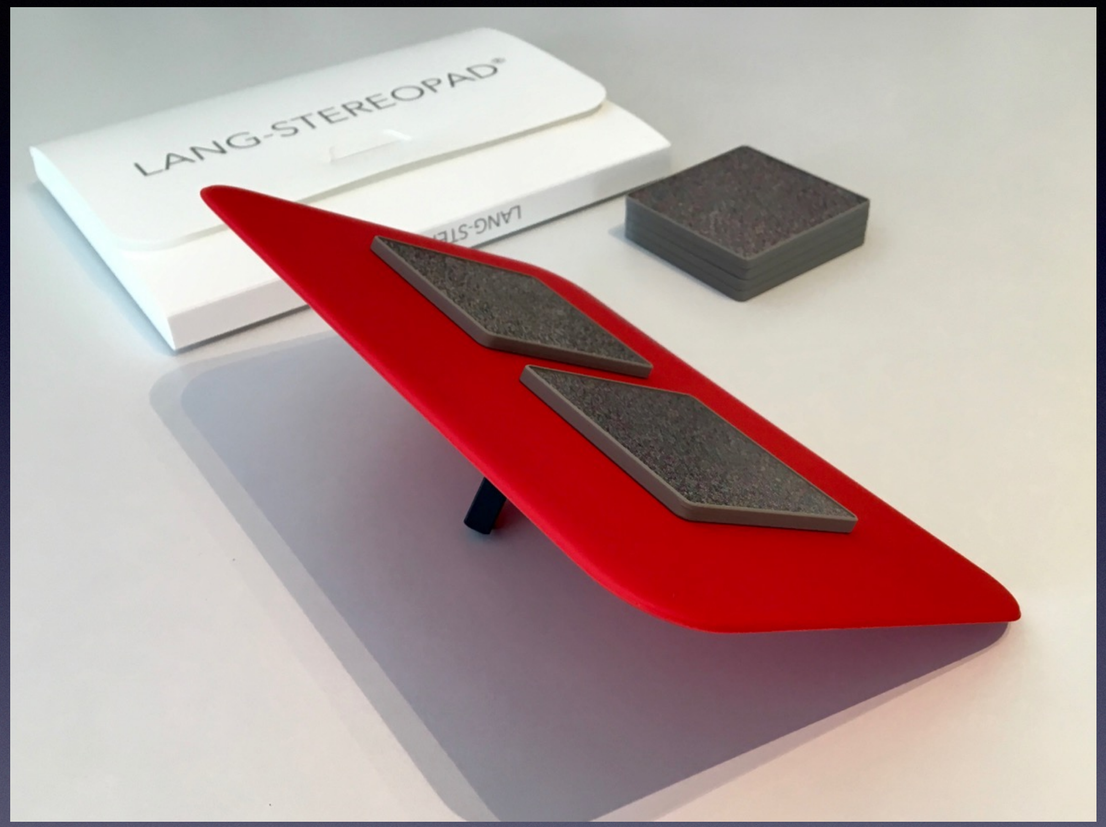
LANG-STEREOPAD®



LANG-STEREOTEST®



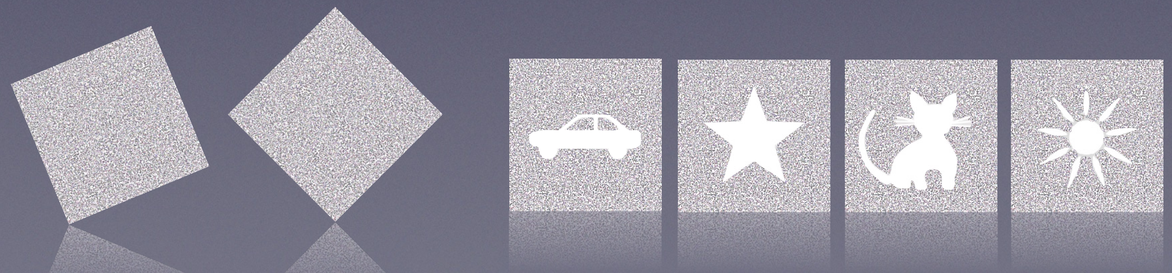
LANG-STEREOPAD® TESTBOX



Test plate red, PVC, 21x15cm
6 test cards magnetic, grey
Storage box
20-page test instructions

Weight: 350g

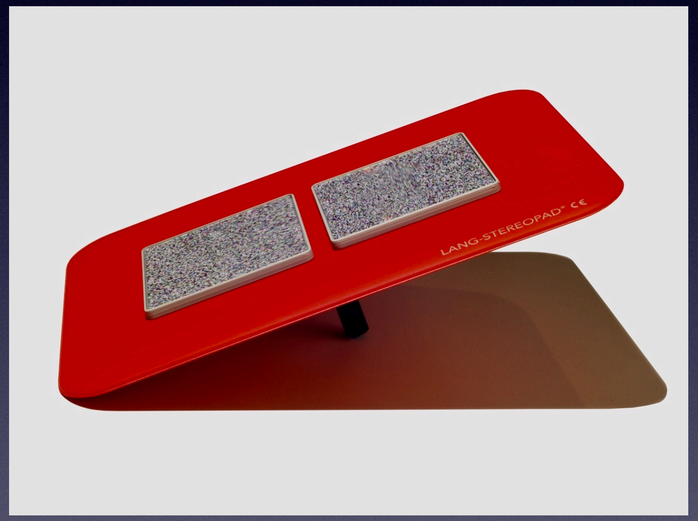
Selling price (without VAT): CHF 585
(magnetic monopod support: CHF 15)

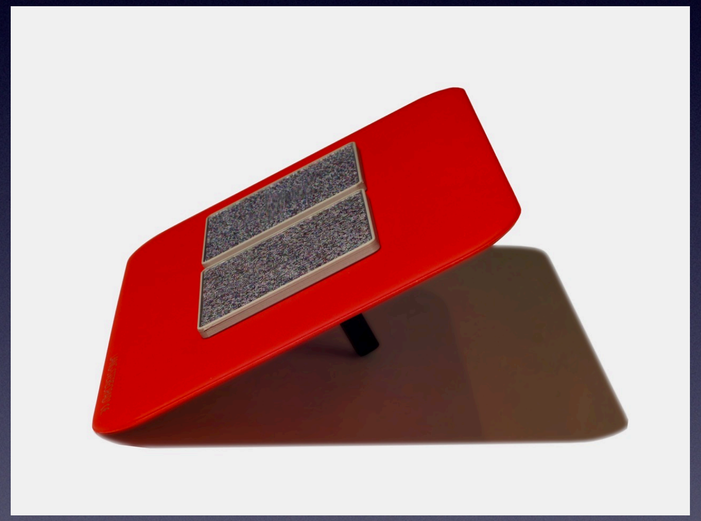


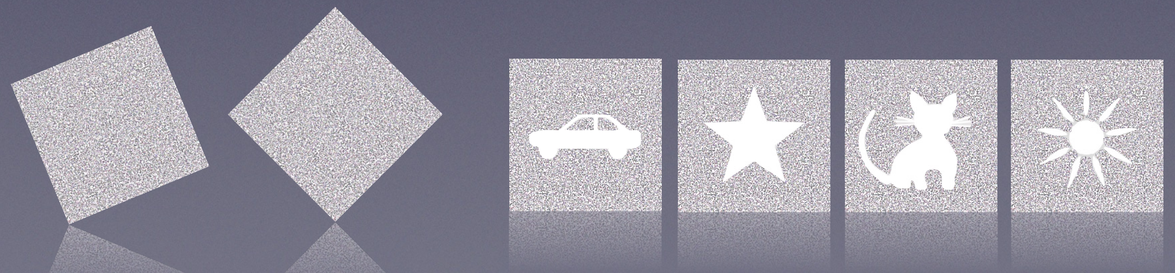
LANG-STEREOTEST®

MAGNETIC SUPPORT

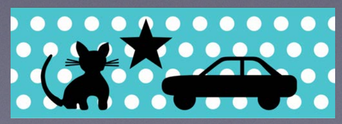
Use as support on table, or as handle



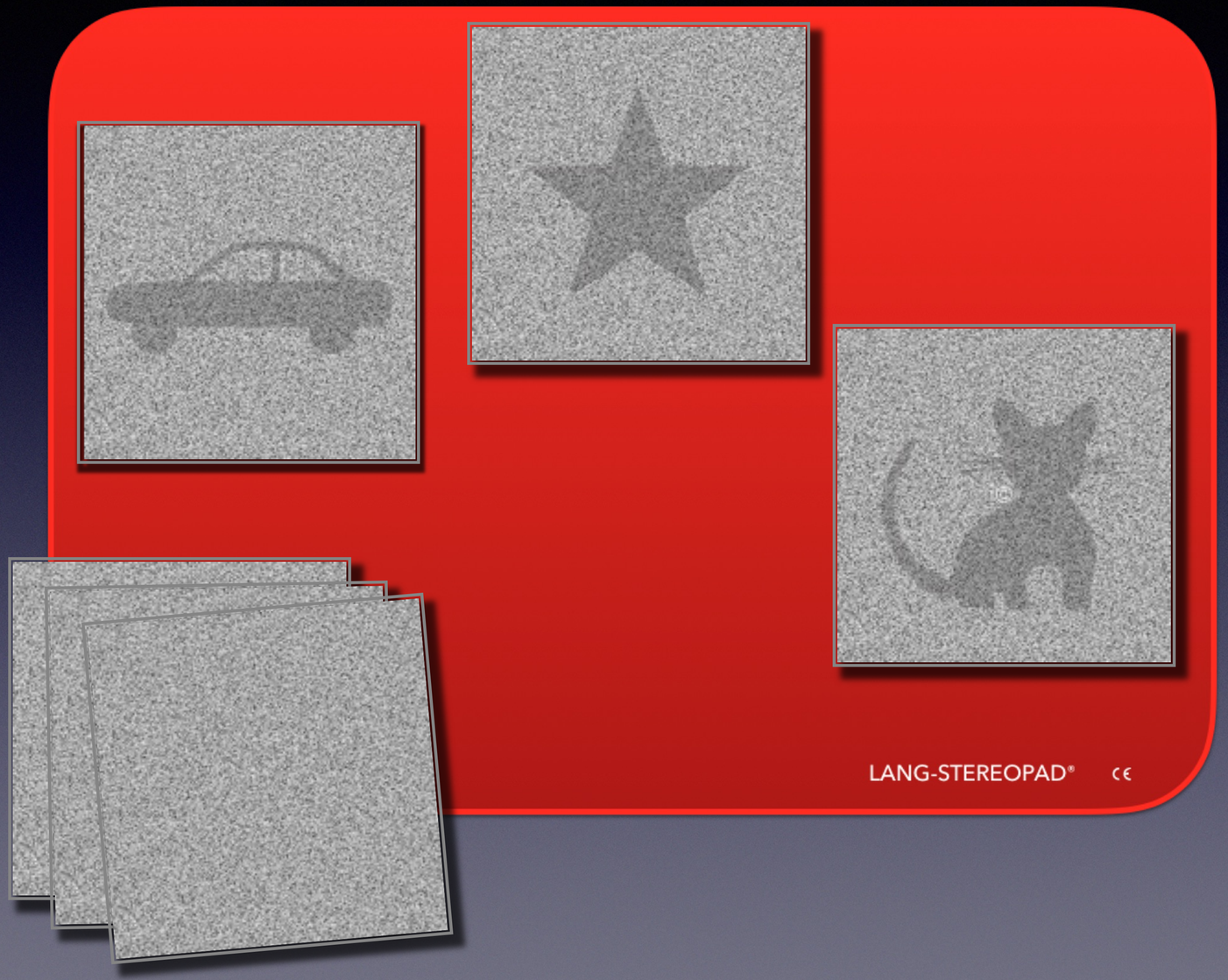




LANG-STEREOTEST®



Study Results



LANG-STEREOTEST®

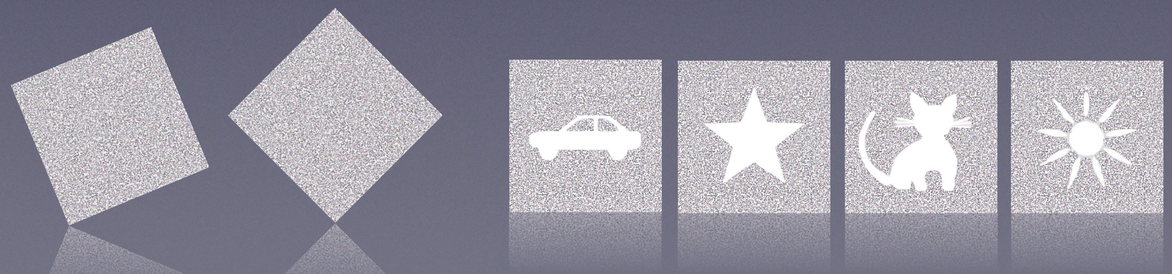
Studies

Study 1: Normally sighted children compared to Lang I and TNO. Piantanida, 2017

Study 2: Normally sighted adults: comparison to TNO, Frisby, Lang II. Rowe et al. 2019

Study 3: Children suspected with microstrabismus after Lang I. Piantanida et al. 2019

Study 4: Development of sterepsis between 4 and 7 months. Röthlisberger, Frick, 2020



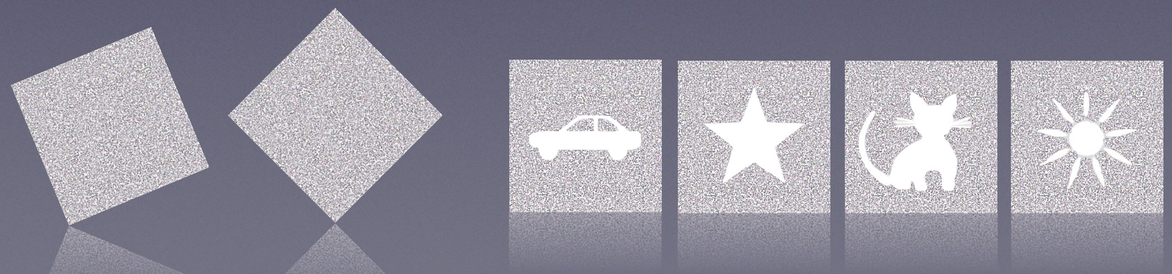
Study 1:
Normally sighted children

SAMPLE:
240 orthotropic* children aged <1 to10 years.

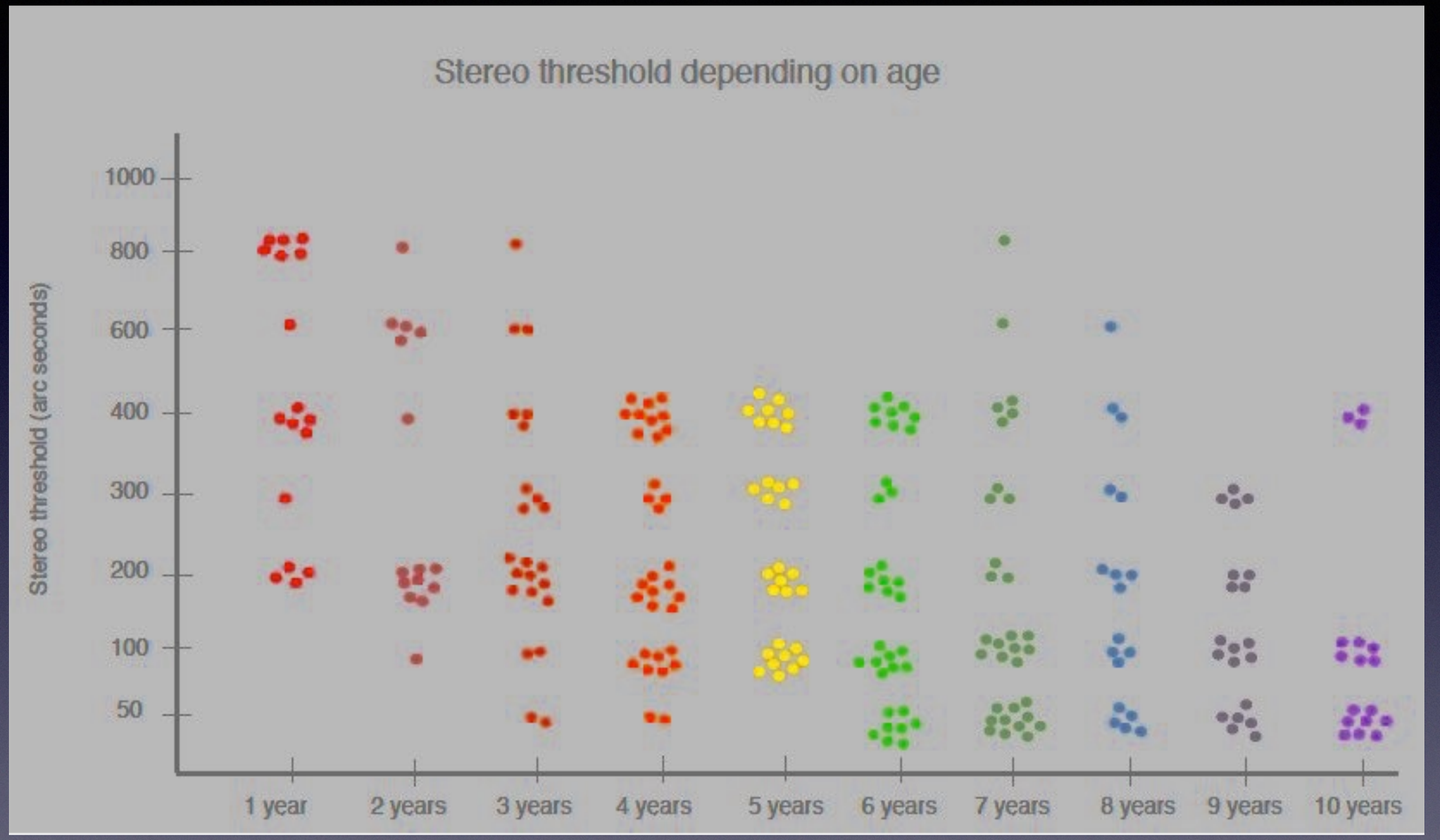
METHOD:
Direct screening or with preferential looking method, with LANG-STEREOPAD prototype.

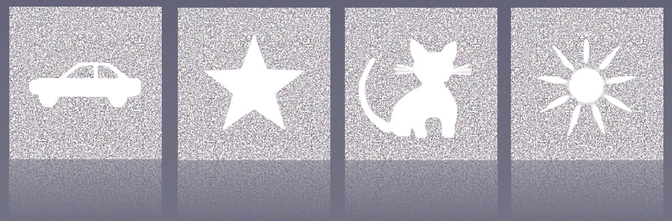
Sensitivity for Stereopsis: 100% in all age groups.
Specificity for Stereopsis:
- for younger than one-year-olds and five to ten-year-olds: 100%
- for two- to four-year-olds: 93.8%-97%

* 8-DIOPTERS BASE-IN TEST OF PAGLIAGA A.Piantanida, Cernobbio-Como, Italy, 2017



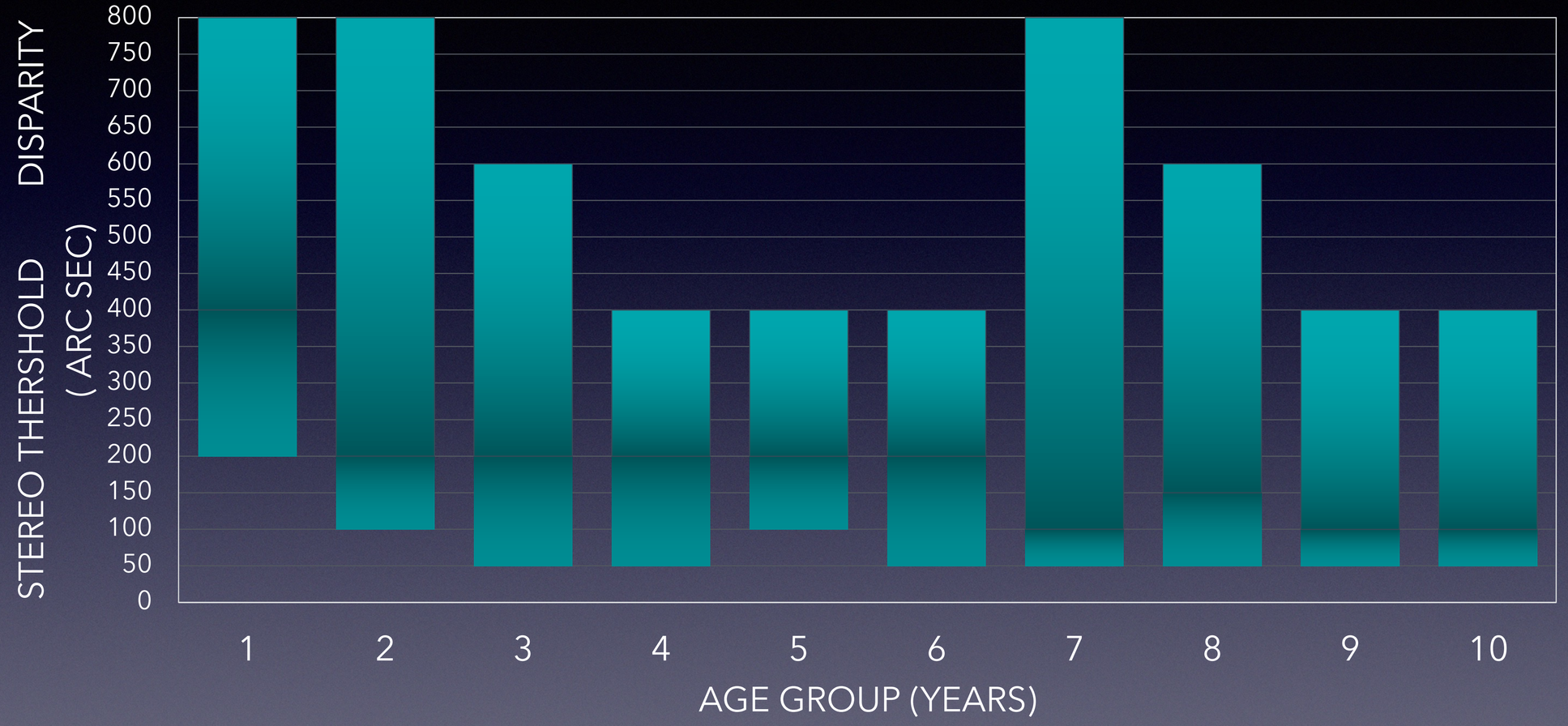
Stereo threshold (arc sec) in n=240 orthotropic children

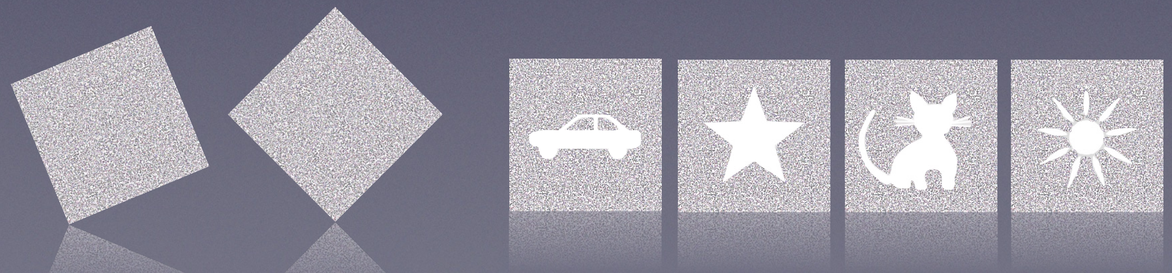




LANG-STEREOTEST®

RANGE AND MEDIAN OF STEREO THRESHOLD IN 240 ORTHOTROPIC CHILDREN OF AGE GROUPS 1-10 YEARS



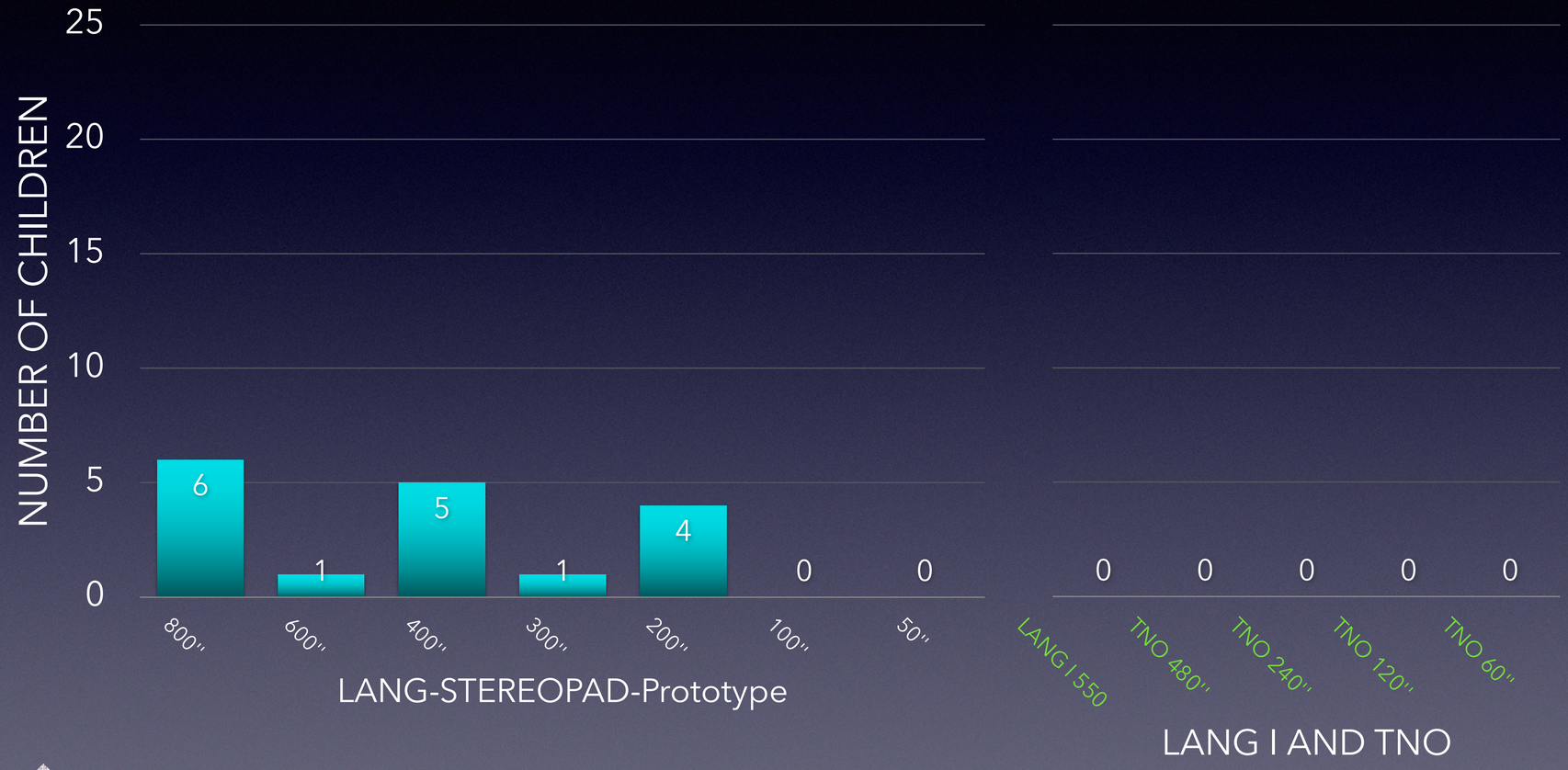


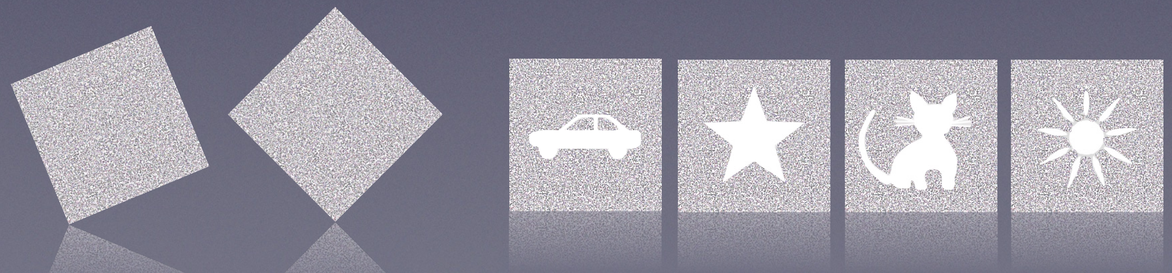
A.Piantanida, Cernobbio-Como, Italy, 2017

LANG-STEREOTEST®

STEREO THRESHOLDS ON LANG-STEREOPAD (PROTOTYPE), LANG-STEREOTEST I AND TNO

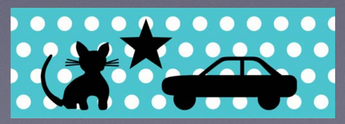
AGE GROUP: UP TO 1 YEAR N=17





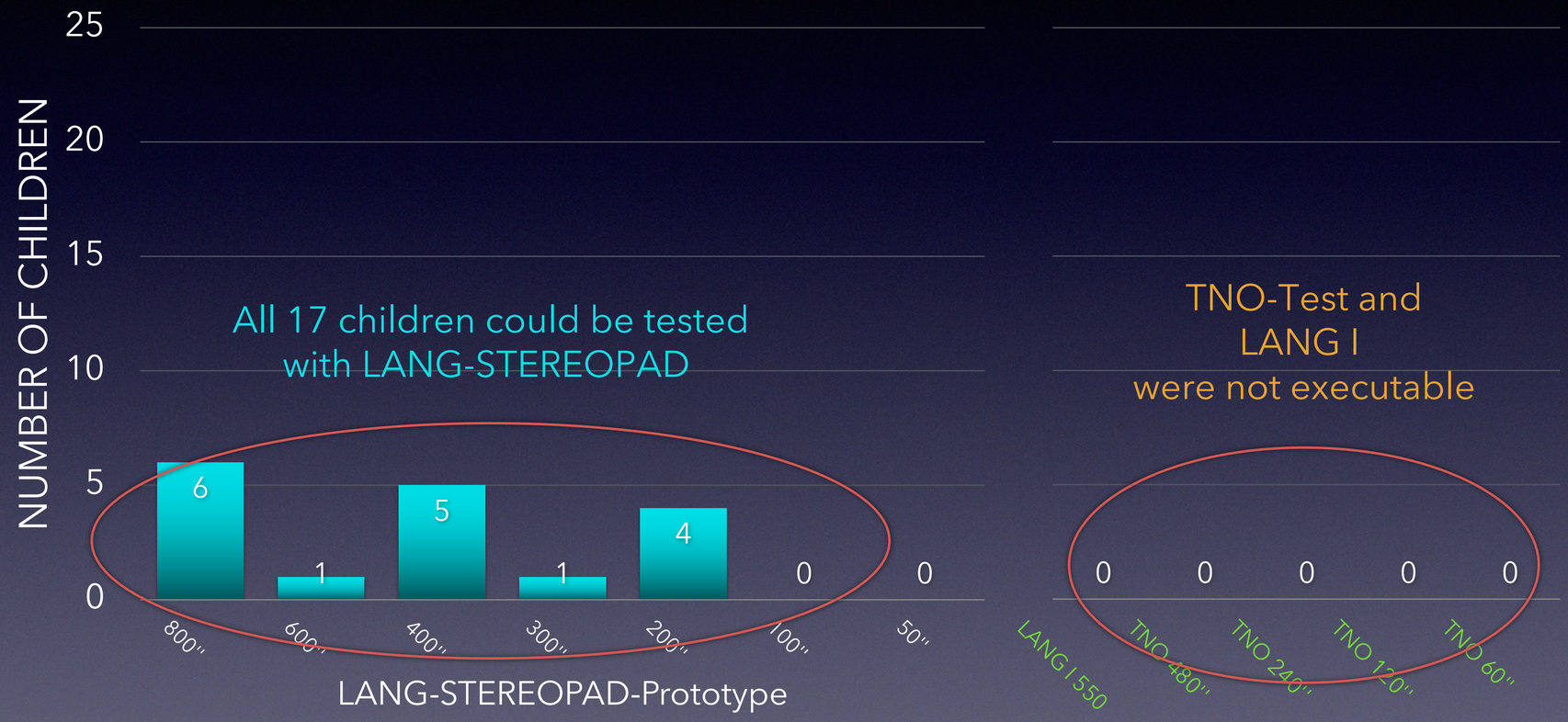
A.Piantanida, Cernobbio-Como, Italy, 2017

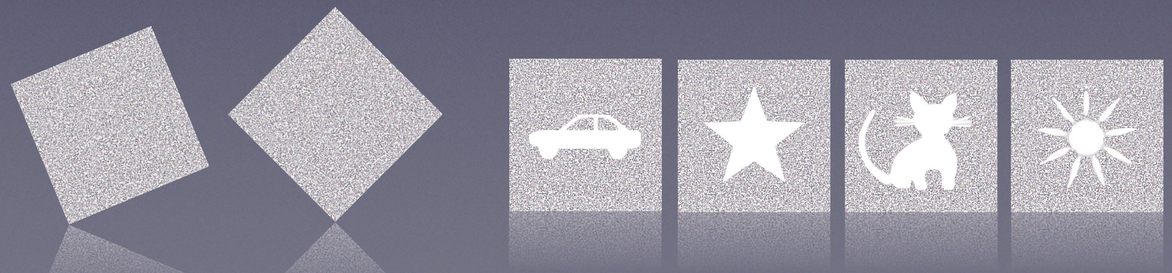
LANG-STEREOTEST®



STEREO THRESHOLDS ON LANG-STEREOPAD (PROTOTYPE), LANG-STEREOTEST I AND TNO

AGE GROUP: UP TO 1 YEAR N=17



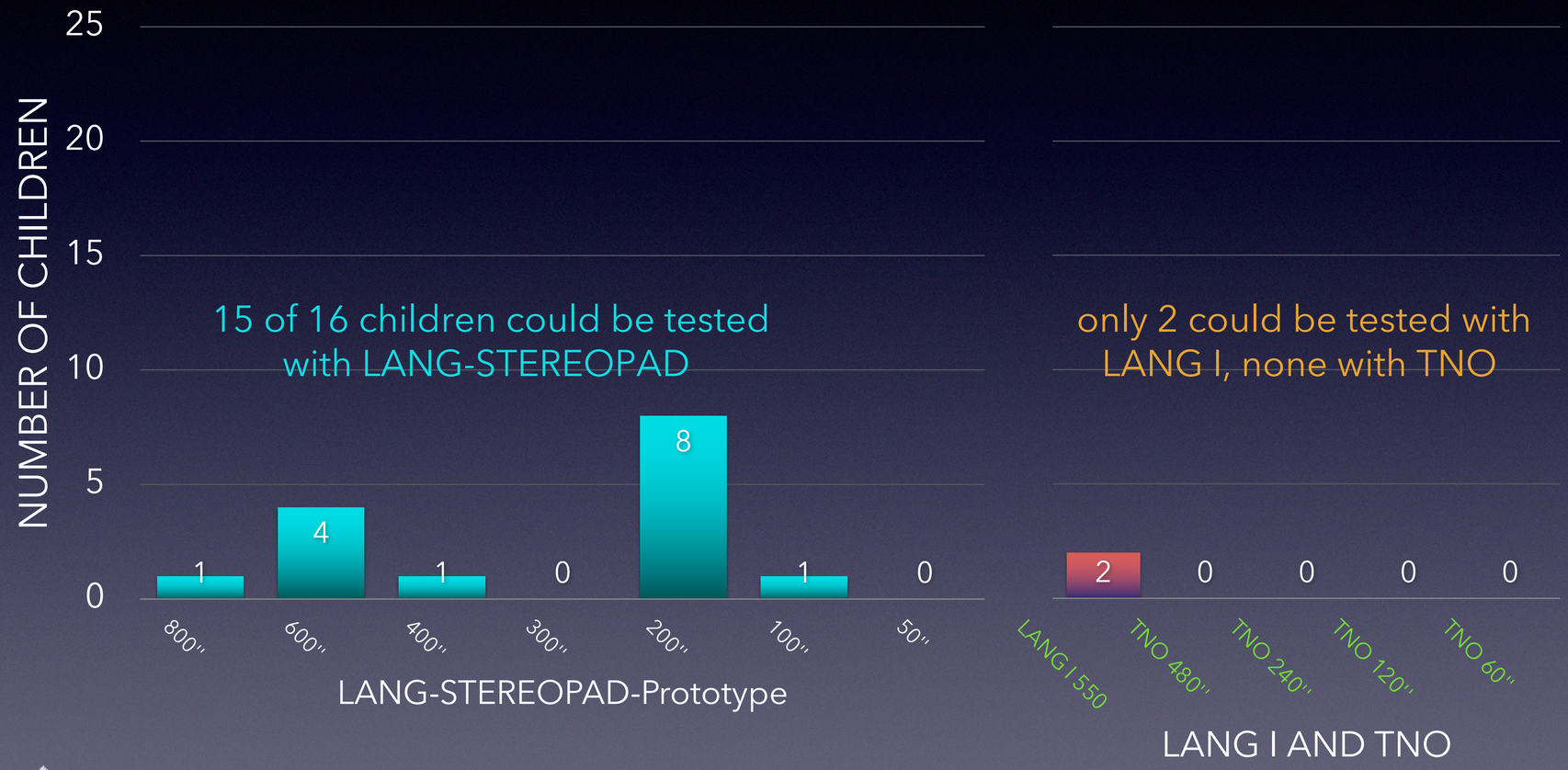


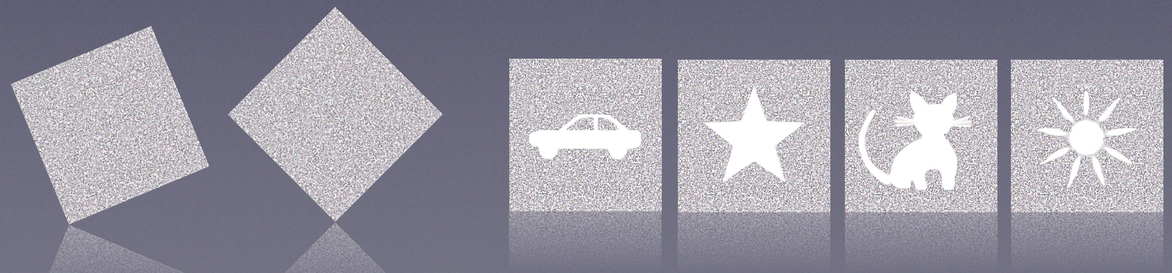
A.Piantanida, Cernobbio-Como, Italy, 2017

LANG-STEREOTEST®

STEREO THRESHOLDS ON LANG-STEREOPAD (PROTOTYPE), LANG-STEREOTEST I AND TNO

AGE GROUP: 1 TO 2 YEARS N=16



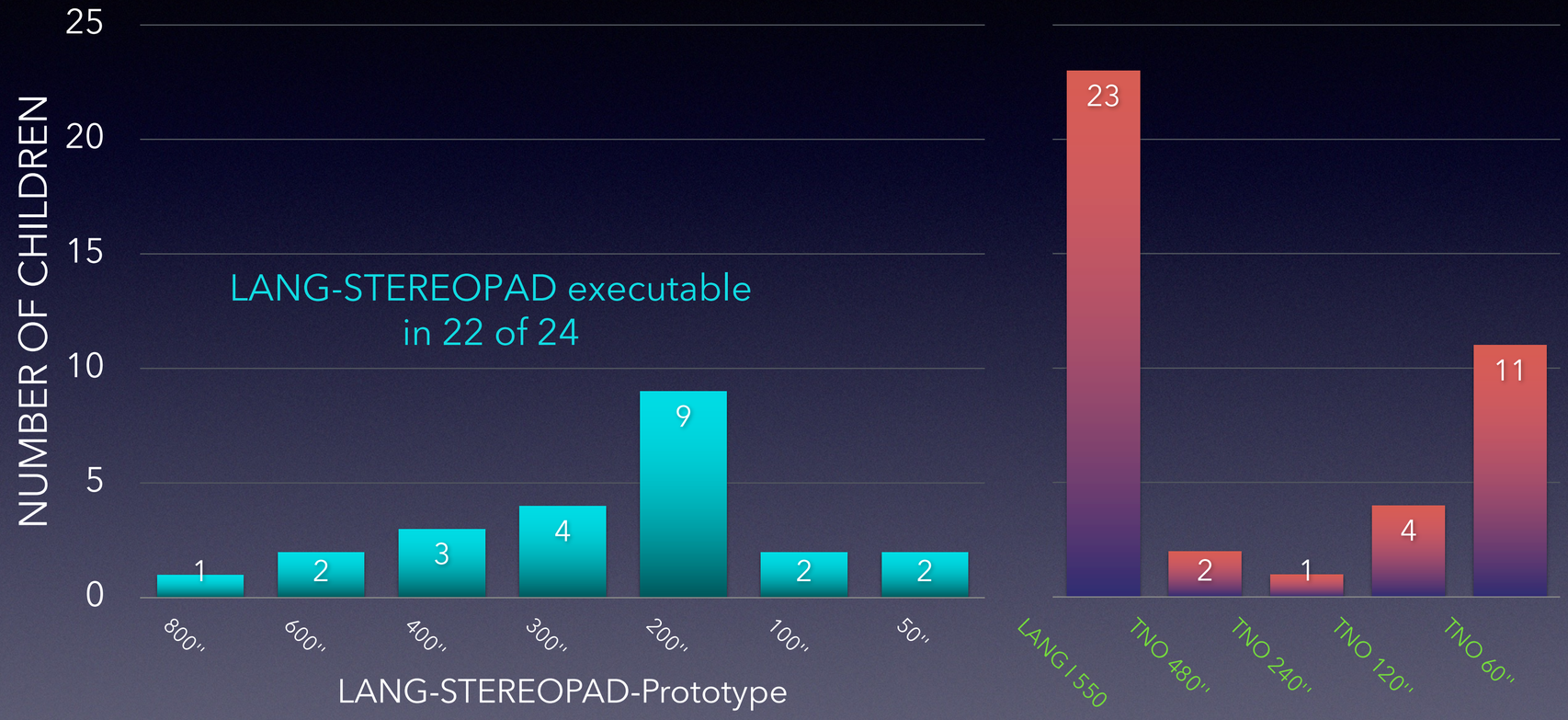


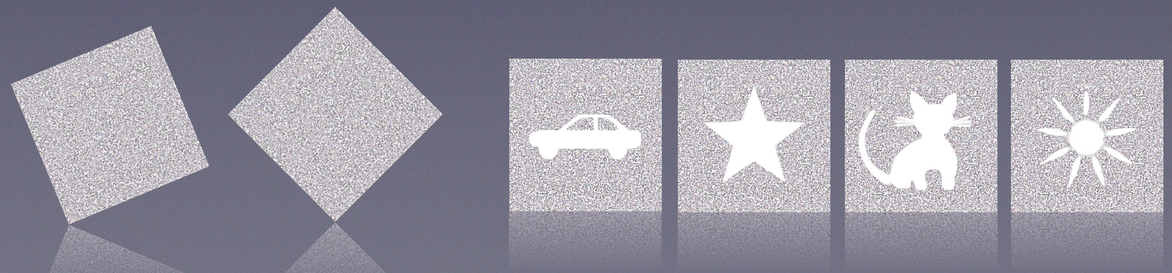
A.Piantanida, Cernobbio-Como, Italy, 2017

LANG-STEREOTEST®

STEREO THRESHOLDS ON LANG-STEREOPAD (PROTOTYPE), LANG-STEREOTEST I AND TNO

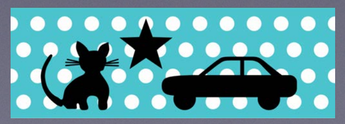
AGE GROUP: 2 TO 3 YEARS N=24





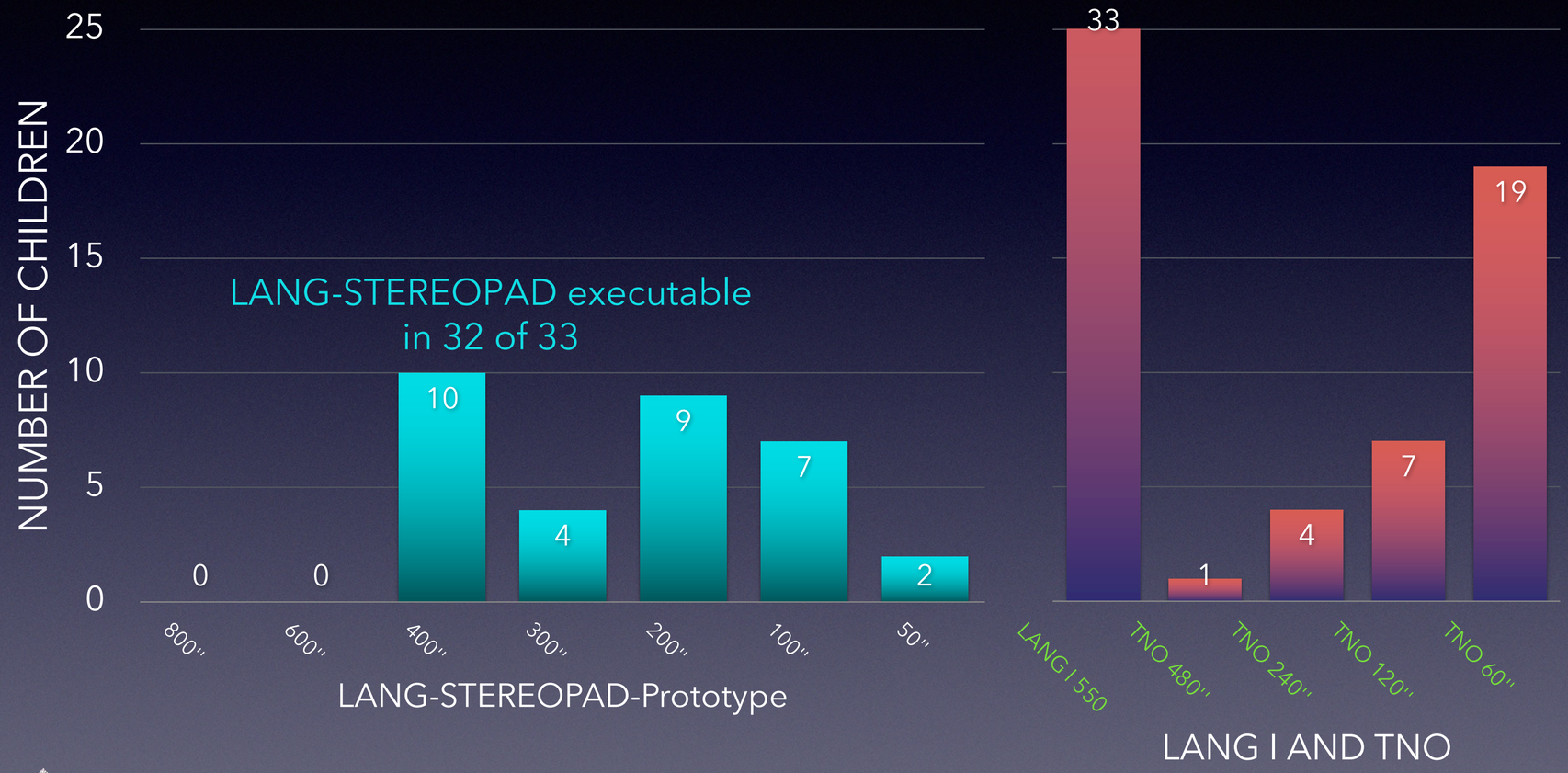
A.Piantanida, Cernobbio-Como, Italy, 2017

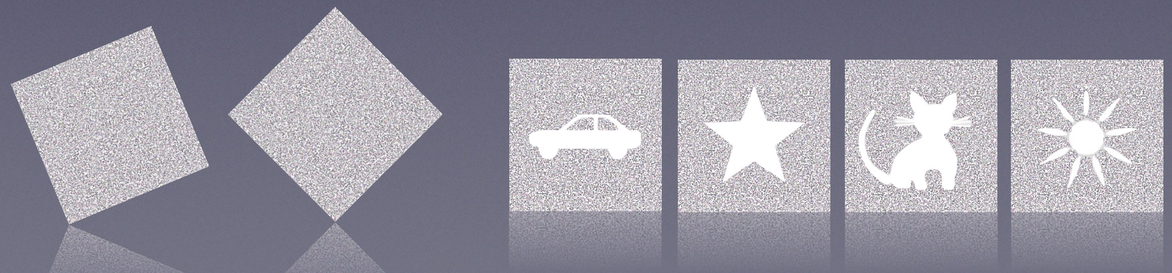
LANG-STEREOTEST®



STEREO THRESHOLDS ON LANG-STEREOPAD (PROTOTYPE), LANG-STEREOTEST I AND TNO

AGE GROUP: 3 TO 4 YEARS N=33



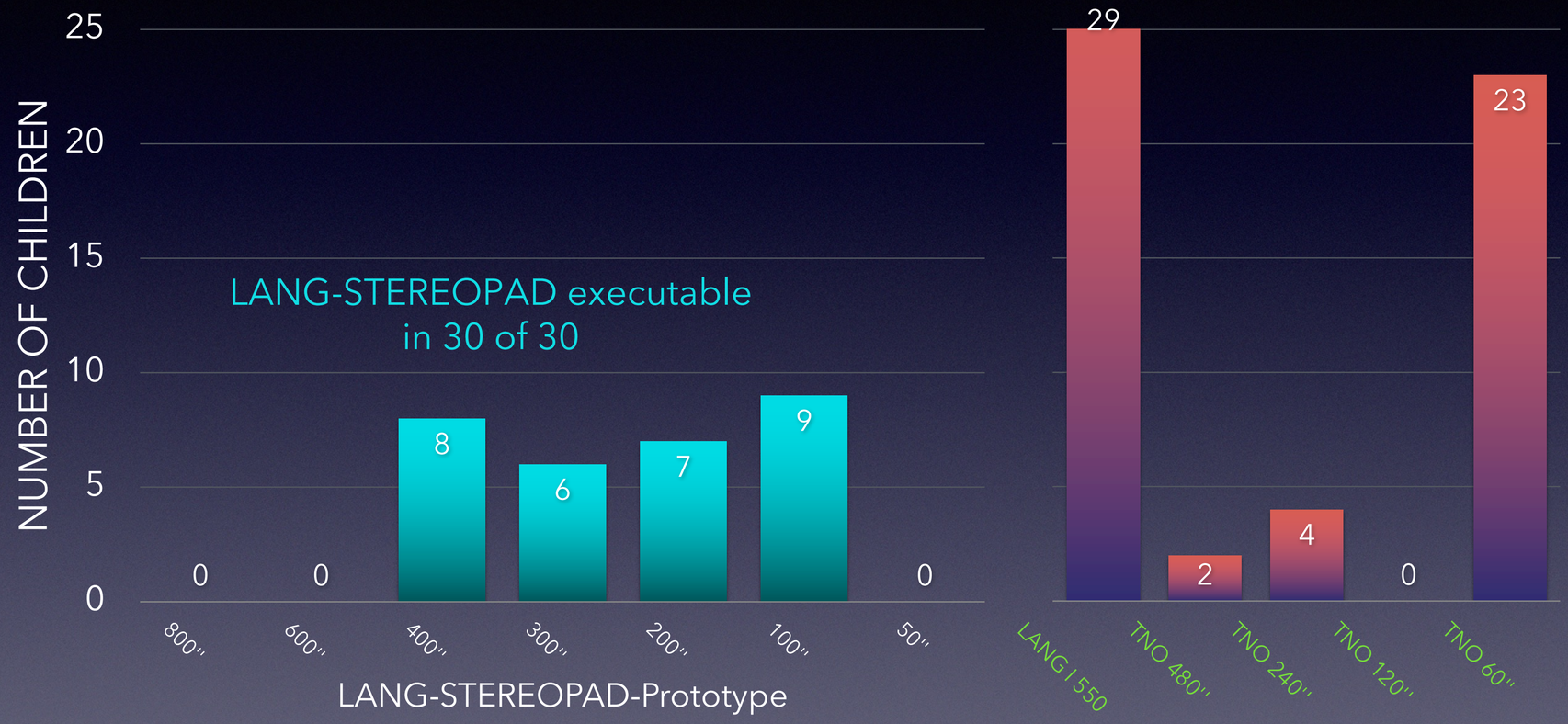


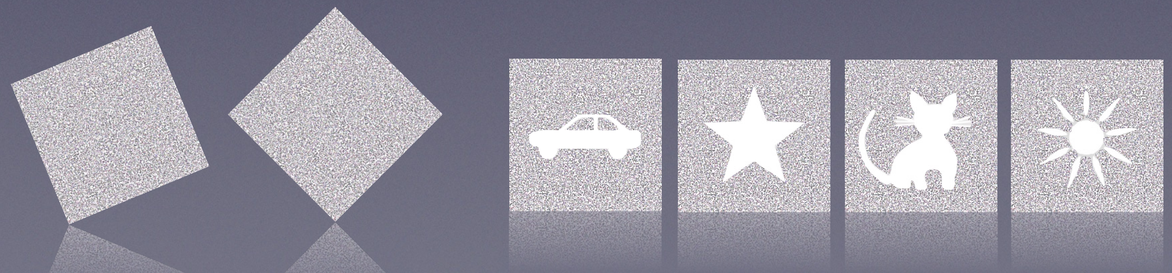
A.Piantanida, Cernobbio-Como, Italy, 2017

LANG-STEREOTEST®

STEREO THRESHOLDS ON LANG-STEREOPAD (PROTOTYPE), LANG-STEREOTEST I AND TNO

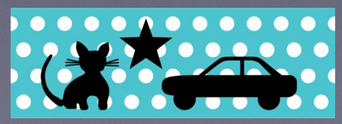
AGE GROUP: 4 TO 5 YEARS N=30





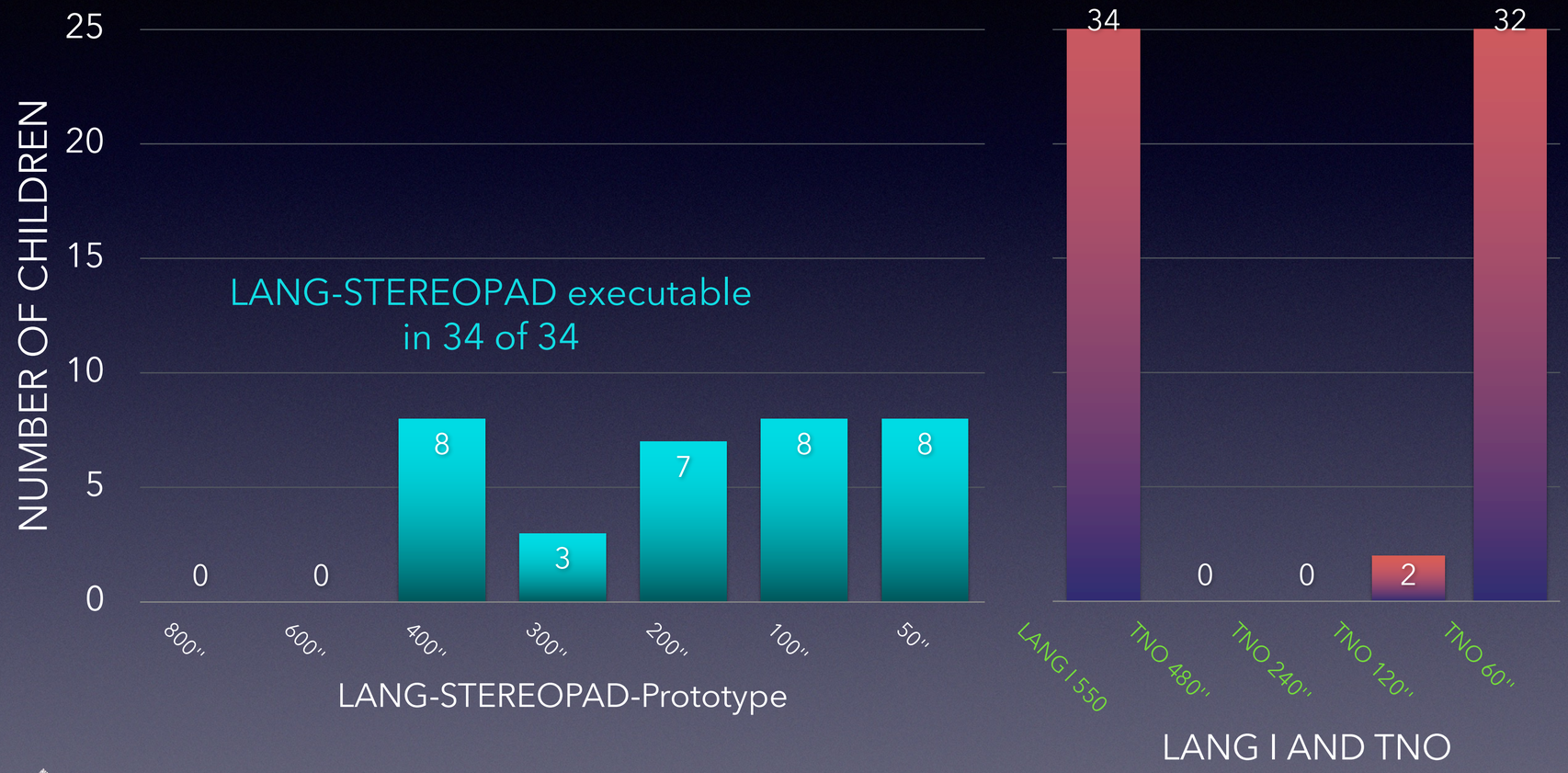
A.Piantanida, Cernobbio-Como, Italy, 2017

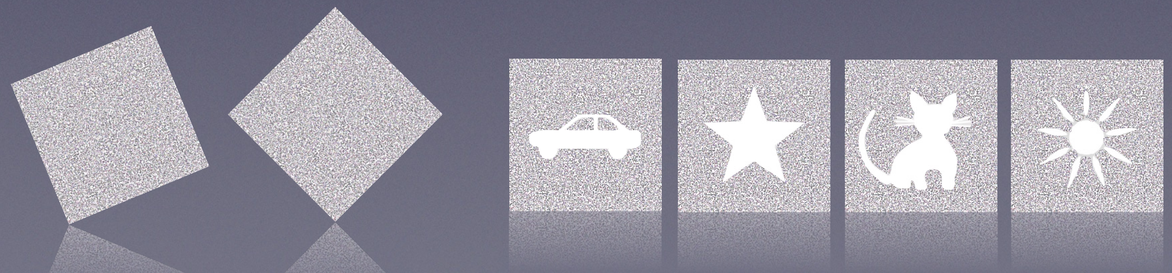
LANG-STEREOTEST®



STEREO THRESHOLDS ON LANG-STEREOPAD (PROTOTYPE), LANG-STEREOTEST I AND TNO

AGE GROUP: 5 TO 6 YEARS N=34



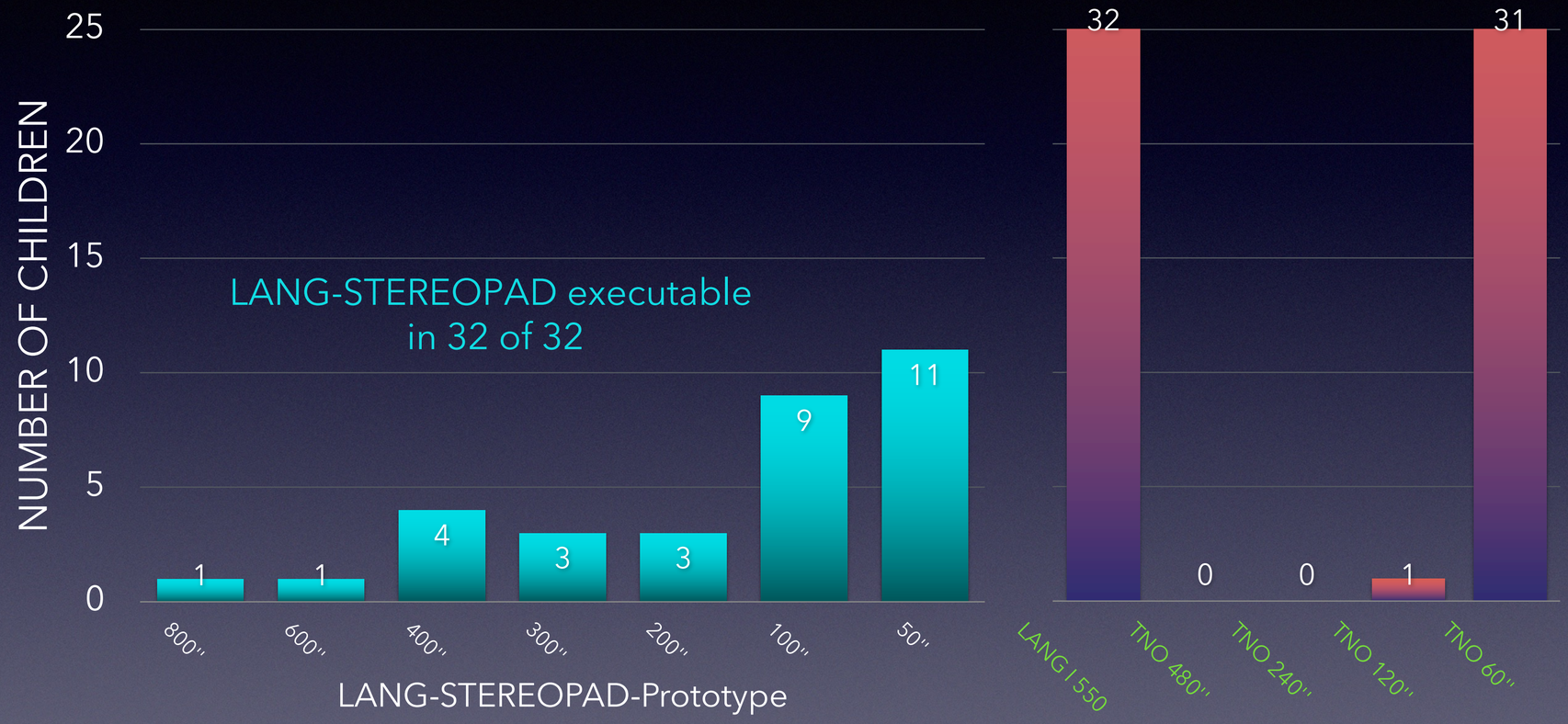


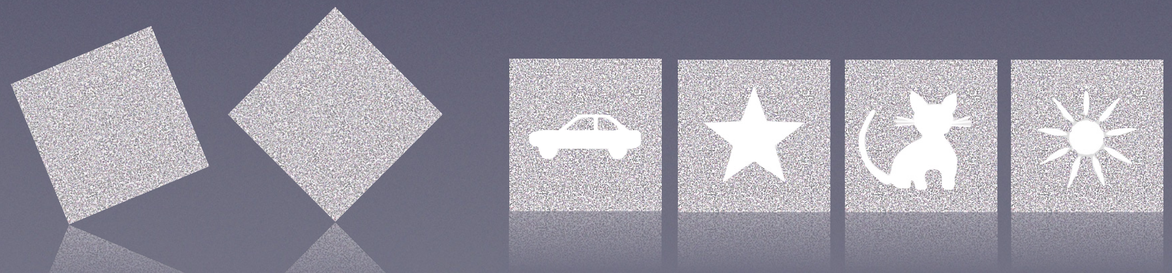
A.Piantanida, Cernobbio-Como, Italy, 2017

LANG-STEREOTEST®

STEREO THRESHOLDS ON LANG-STEREOPAD (PROTOTYPE), LANG-STEREOTEST I AND TNO

AGE GROUP: 6 TO 7 YEARS N=32



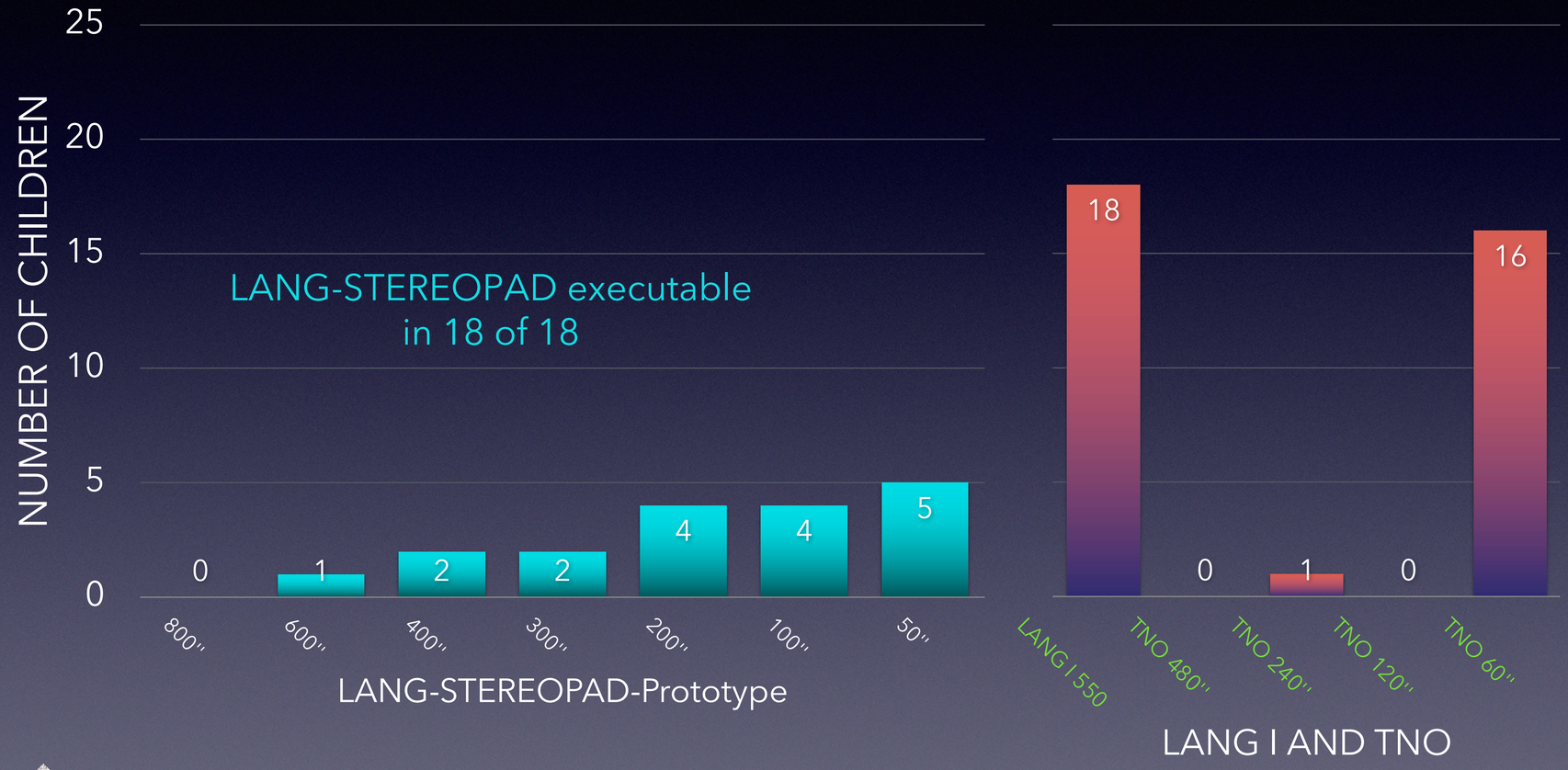


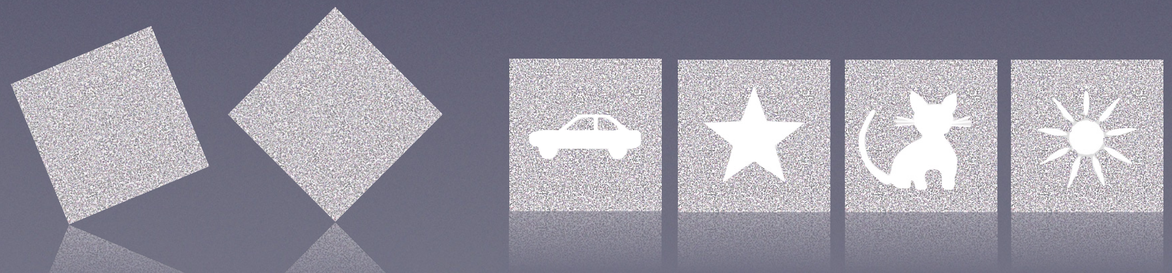
A.Piantanida, Cernobbio-Como, Italy, 2017

LANG-STEREOTEST®

STEREO THRESHOLDS ON LANG-STEREOPAD (PROTOTYPE), LANG-STEREOTEST I AND TNO

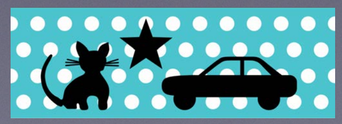
AGE GROUP: 7 TO 8 YEARS N=18





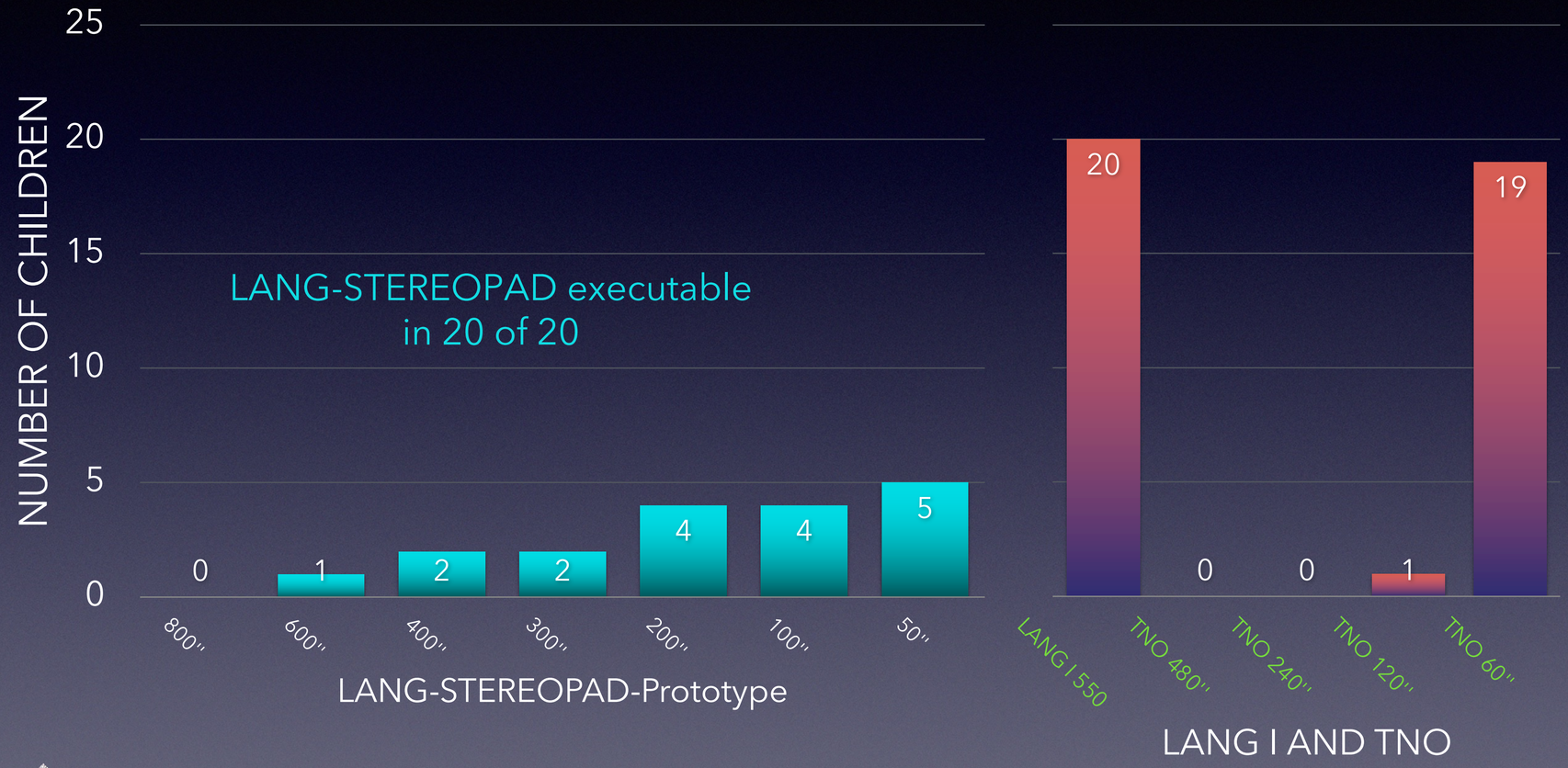
A.Piantanida, Cernobbio-Como, Italy, 2017

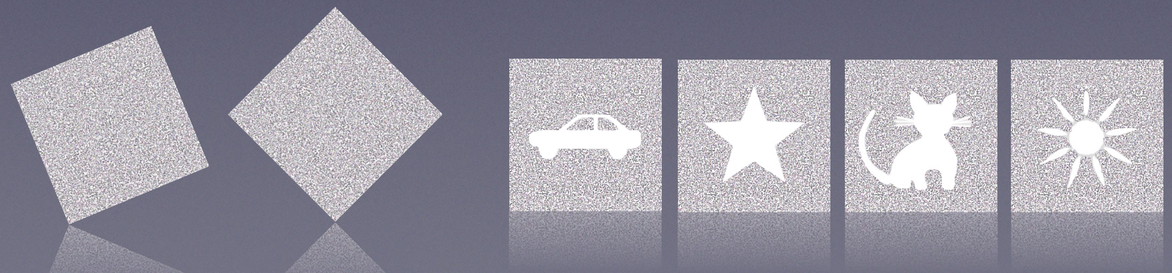
LANG-STEREOTEST®



STEREO THRESHOLDS ON LANG-STEREOPAD (PROTOTYPE), LANG-STEREOTEST I AND TNO

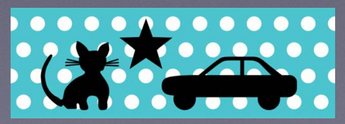
AGE GROUP: 8 TO 9 YEARS N=20





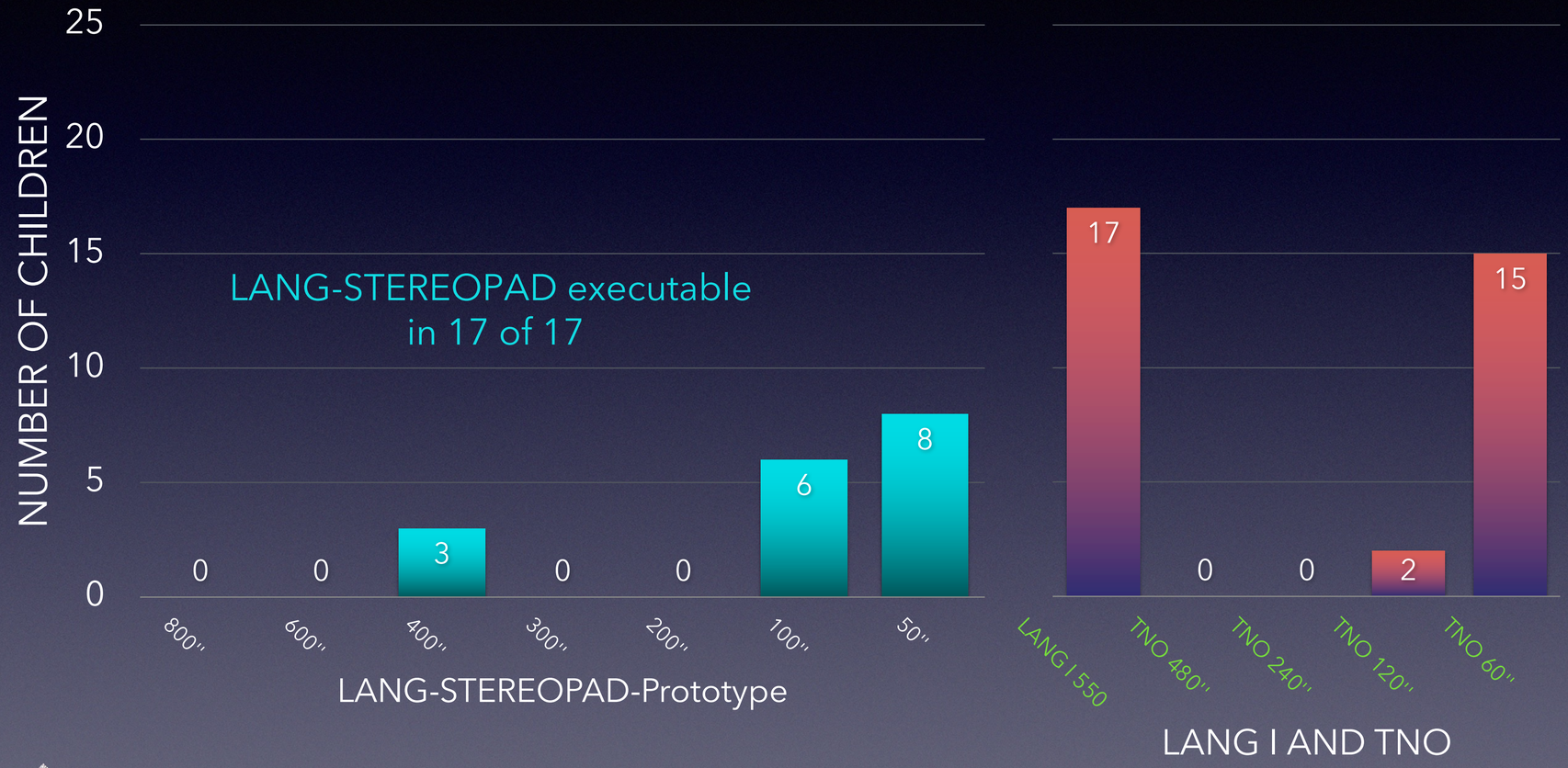
A.Piantanida, Cernobbio-Como, Italy, 2017

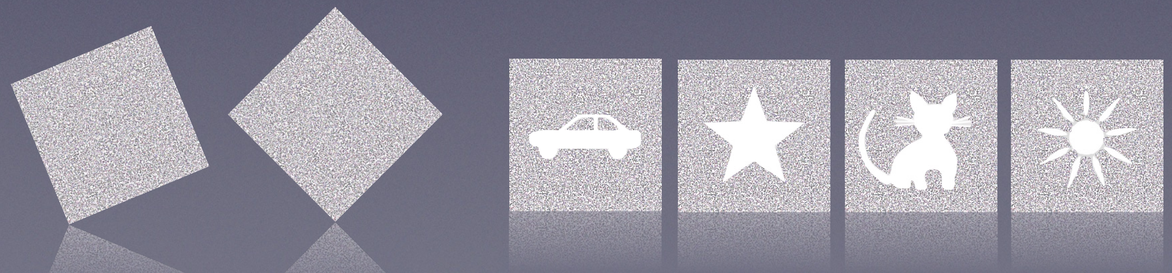
LANG-STEREOTEST®



STEREO THRESHOLDS ON LANG-STEREOPAD (PROTOTYPE), LANG-STEREOTEST I AND TNO

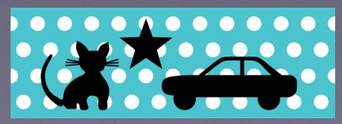
AGE GROUP: 9 TO 10 YEARS N=17





A.Piantanida, Cernobbio-Como, Italy, 2017

LANG-STEREOTEST®



Study 2:
Comparative analysis of the Lang Stereopad in a non-clinic population

Aim: New methods of measurement require testing to evaluate test validity. This study compares stereoacuity results of the Lang Stereopad to other common clinical stereoacuity assessments in a normal vision population.

Methods: A prospective cross-sectional study was conducted comparing the Lang Stereopad stereoacuity results to results from the Lang II, Frisby, and TNO stereo tests. Mean stereoacuity values and their correlation with inter-ocular visual acuity difference were compared for each stereo test.

Results: 98 subjects (mean age of 33.5 years, SD 14.1; 39 males and 59 females) with normal parameters of visual function underwent multiple stereotest assessments. Median stereoacuity values were the lowest (i.e. more detailed stereoacuity) when using the Frisby stereotest (median 40”; 20–170” [minimum-maximum]) and TNO stereotest (median 60”; 15–480”). In comparison, medians were about double at 100” (50–800”) for the Lang Stereopad and greater at 200” (200–200”) for the Lang II stereotest. There was no correlation for each stereotest with interocular visual acuity differences.

Conclusions: The Lang Stereopad test is easy to administer and it has certain advantages such as no requirement for additional test glasses. It is a useful assessment to add to the clinical armamentarium for binocular assessment of stereopsis. The Lang Stereopad does not agree well with other stereo tests such as the TNO and Frisby but provides a greater stereoacuity test range than the Lang II. The Lang Stereopad now requires testing in a clinical population in which stereoacuity is a pre-requisite part of the assessment.

Rowe et al. Comparative analysis of the Lang-Stereopad in a non-clinical population. Strabismus 2019

LANG-STEREOTEST®

Study 3: Microtropia

SAMPLE: 217 children of a paediatric ophthalmology practice, aged 3- 10 years, with suspected microstrabismus.

Cut-off stereo threshold esotropia on Lang Stereopad: only STAR(1000'') detected.

Test results on Lang Stereopad:

"Esotropic" screening Lang Stereotest I:	n= 45 43 positive*	2 false-negative
"Orthotropic" Screening Lang Stereotest I:	n=172 166 negative	6 false-positive

*positive: object not detected - no stereopsis (only in this study)

Piantanida et al. Statistical Evaluation in Pediatric Patients of the New Lang-Stereopad Test: A Preliminary Report

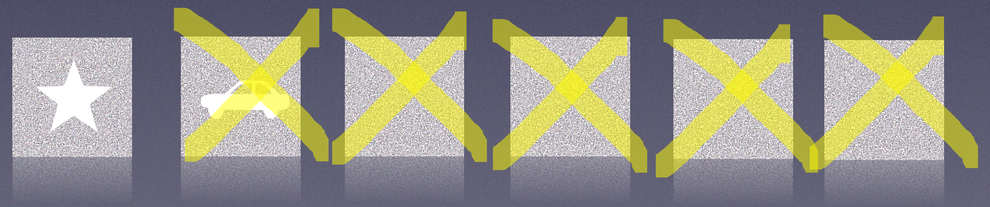
LANG-STEREOTEST®

Study 3: Microtropia

EXAMINATION:
1. Orthoptic examination, corneal reflexes, cover test, motility.
2. Lang-Stereo Test I
3. Determination of stereo threshold on the long stereo pad.

Two subgroups:
"Esotropic": children who did not recognise the car (550''): n= 45
"Orthotropic": children who recognised all 3 test objects: n=172

Cut-off Lang-Stereopad: 1000'' (STAR)



Piantanida et al. Statistical Evaluation in Pediatric Patients of the New Lang-Stereopad Test: A Preliminary Report

Study 3: Microtropia

Sample: 217 children suspected of having microstrabismus.
Age group: entire sample: 3 to 10 years , subsamples: 3 to 5 years, 6 to 10 years

Table 1 Summary of the statistical results according to ages

Statistical Value Of Lang Stereopad Test According Different Ages Groups					
3 years to 10 years (217 pts)		**3 years to 5 years** (76 pts)		**6 years to 10 years** (141 pts)	
Sensitivity	95,5%	Sensitivity	93%	Sensitivity	87%
Specificity	97%	Specificity	93%	Specificity	98%
Positive predictive value	87%	Positive predictive value	77%	Positive predictive value	92%
Negative predictive value	98%	Negative predictive value	98%	Negative predictive value	96%
Likelihood Ratio	27,39	Likelihood Ratio	14,23	Likelihood Ratio	48,1
Pre test probability	5%	Pre test probability	5%	Pre test probability	5%
Post test probability	57,80%	Post test probability	41,58%	Post test probability	70,63%

Piantanida et al. Statistical Evaluation in Pediatric Patients of the New Lang-Stereopad Test: A Preliminary Report

LANG-STEREOTEST®

Study 3: Microtropia

Sample: 217 children suspected of having microstrabismus.
Age group: entire sample: 3 to 10 years , subsamples: 3 to 5 years, 6 to 10 years

Conclusion

"The Lang-Stereopad is a simple test with high specificity and sensitivity. The positive and negative predictive values correspond to a test with good reliability in young children. Likelihood ratios are commonly used in the analysis of a test's usefulness, as an indirect measure of a test's effectiveness in real-world people (9-10-11). The likelihood ratios highlight the importance of the Lang-Stereopad test in diagnosing small-angle isotropy in children. The findings are comparable to the TNO test for children aged 3 to 10 years (3). Further studies need to be conducted to test the efficacy and effectiveness of the Lang-Stereopad in children younger than 3 years."

Translated with DeepL

Paper presented at the 40th Meeting of the European Strabismological Association ESA, 5th-8th June 2019.
Piantanida et al. Statistical Evaluation in Pediatric Patients of the New Lang-Stereopad Test: A Preliminary Report

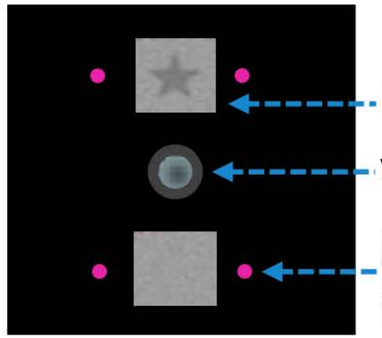
LANG-STEREOTEST®

Study 4: Development of Stereopsis from 4 months to 7 months

n=41 babies at 4 and 7 months
Preferential Looking Method: Star 800'' and blind test card

Apparatus: Infants were seated on their parents' lap in front of a puppet stage at a distance of about 30 cm (stereo test) and 50 cm (object recognition) from the stimuli.

Stereo Test: Stereograms of the Lang Stereotest® (800'' disparity) were presented in two trials according to a preferential looking design:



Stimulus Presentation

6 s (min.) – 60 s (max.);
trial end: 2 s look away

order of target position (top/bottom) counterbalanced

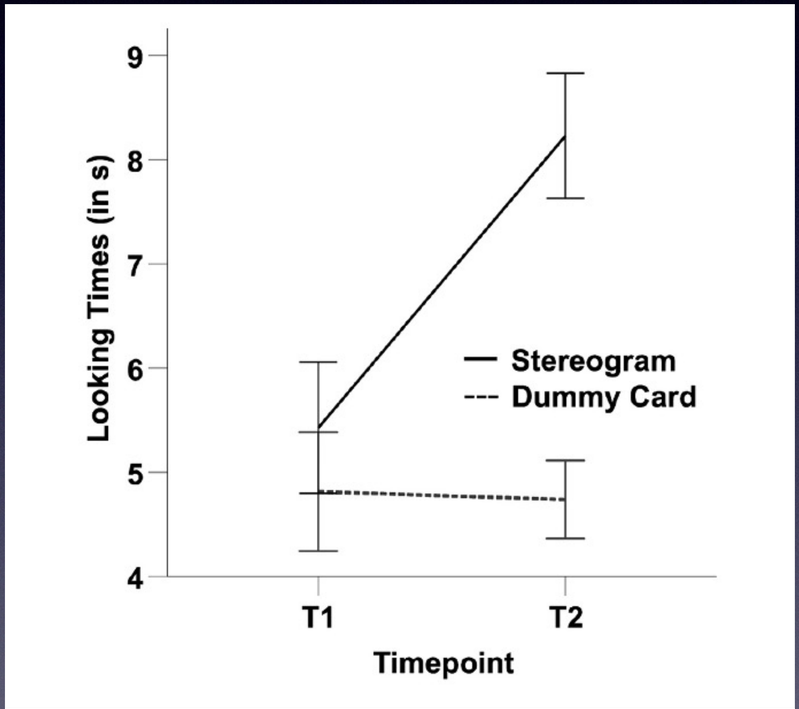
- 80 completely healthy babies tested (38 girls, 42 boys)
- 2 babies excluded because of querulousness
- All babies tested at 7 months
- 41 babies tested longitudinally at 4 and 7 months of age
- No significant differences between gender and mean age at T2

Development of stereo vision in young infants. Röthlisberger, Frick. Infancy 2020

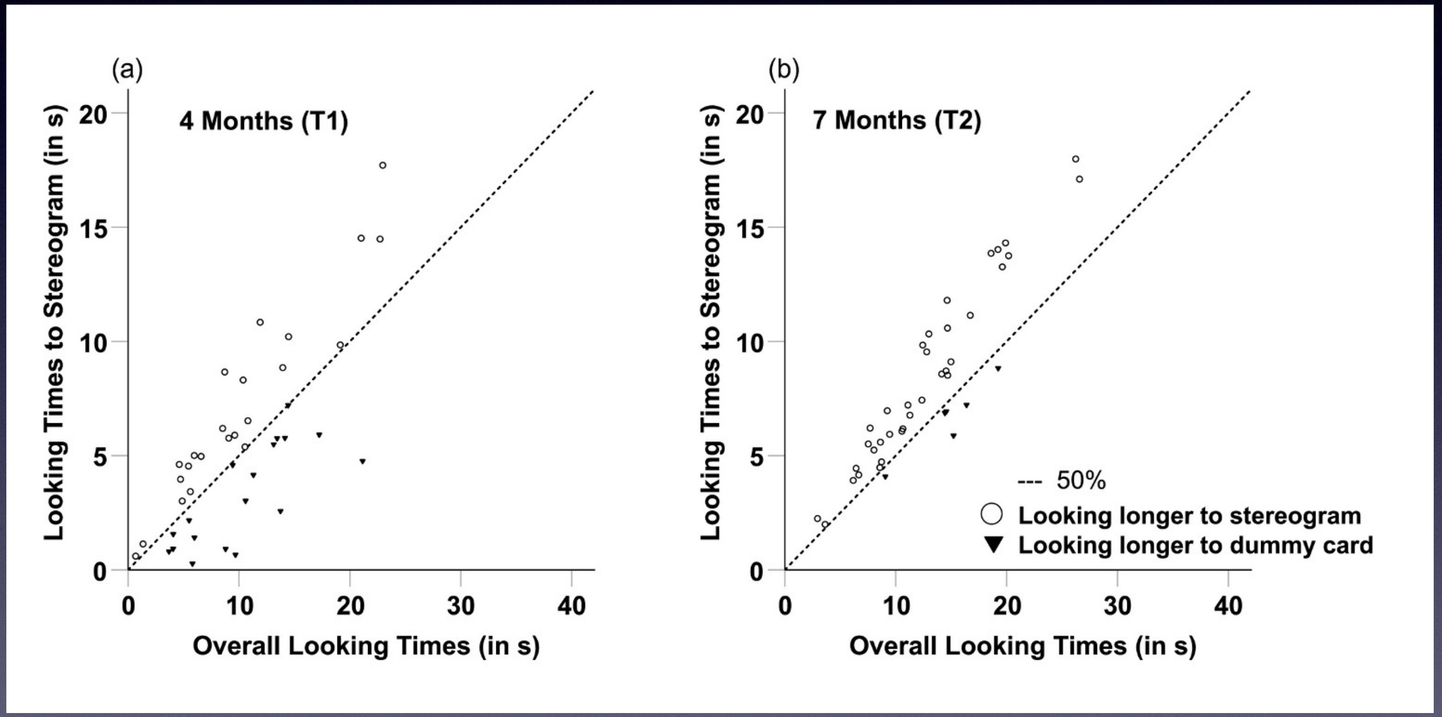
LANG-STEREOTEST®

Study 4: Development of Stereopsis from 4 months to 7 months

Looking Times in s at T1 and T2



Looking Times at Stereogram vs. Overall Looking Time



Development of stereo vision in young infants. Röthlisberger, Frick. Infancy 2020

LANG-STEREOTEST®

Study 4: Development of Stereopsis from 4 months to 7 months

Conclusions:

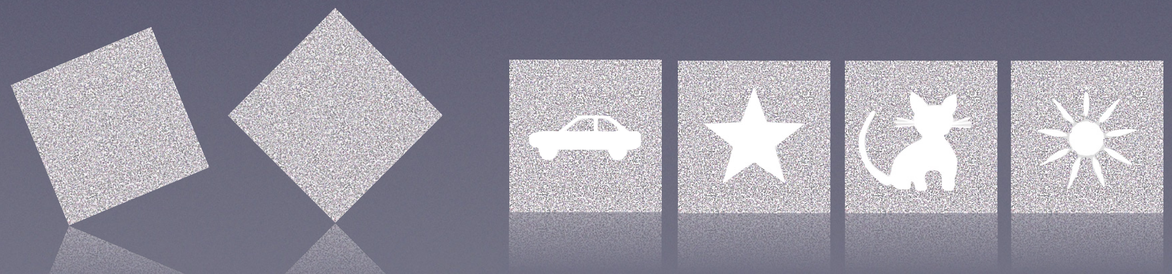
- First investigation of the usability of a commercially available stereotest in a standardised experimental setting and with a large sample of young babies.
- Number of babies with preference for the stereogram increased significantly from 4 to 7 months.
- Increase was also confirmed in group analyses.
- Representative results as no children were excluded and dropout rate very low.
- Excellent consent rate shows reliable and objective measurement.
- Stereocard tests of the Lang-Stereopad® are well suited for use in experimental settings and provide an easily available tool for testing the depth sensitivity of very young babies in future research.

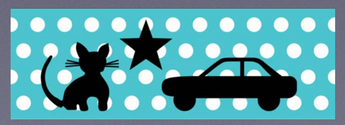
Development of stereo vision in young infants. Röthlisberger, Frick. Infancy 2020

LANG-STEREOPAD® in daily use

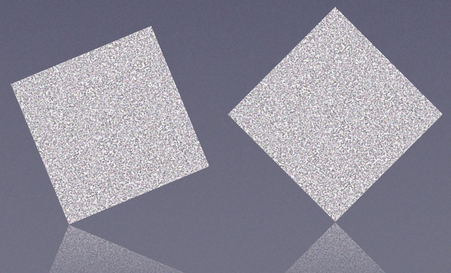
Girl, 3 years
at pediatrician visit

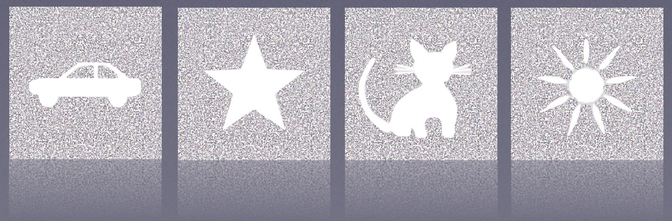
Duration Video 1 min.





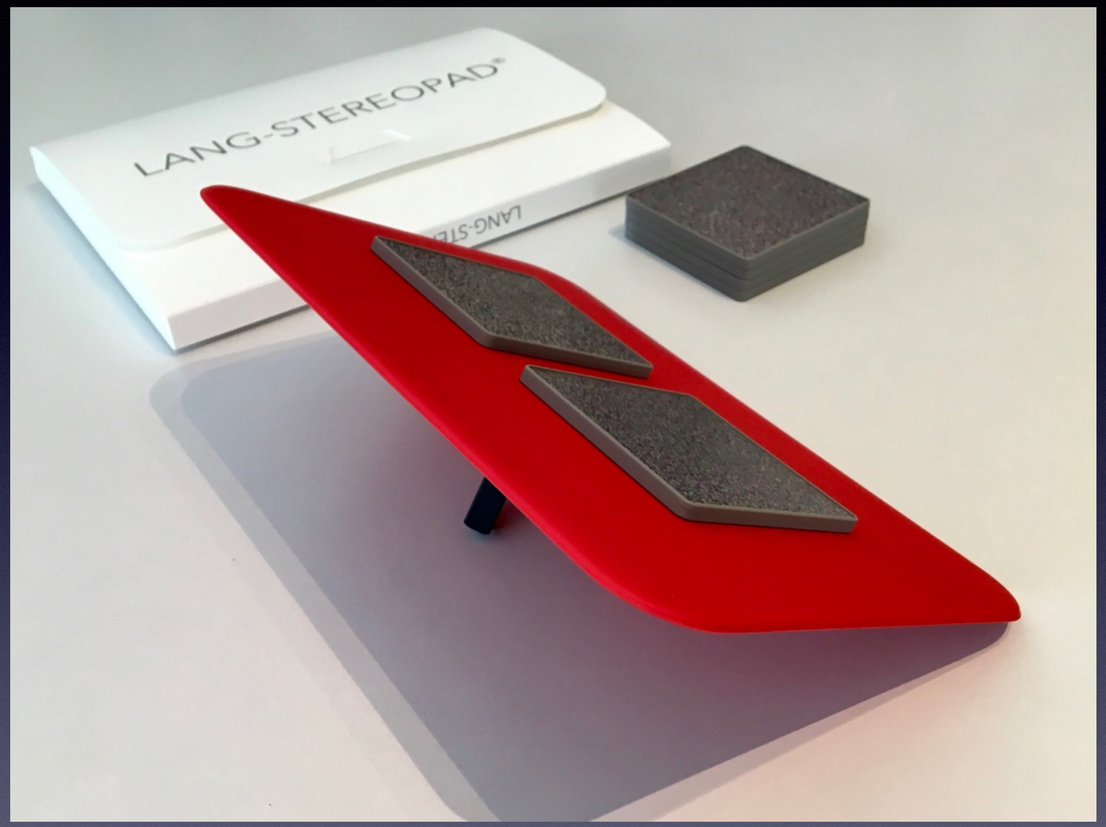
LANG-STEREOPAD® in daily use





LANG-STEREOTEST®

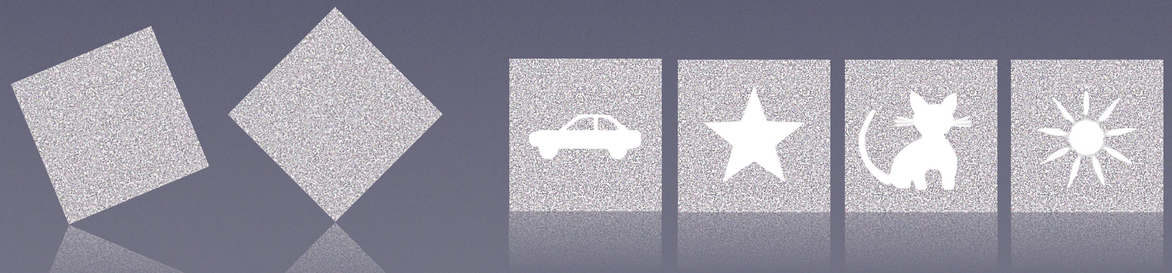
LANG-STEREOPAD® TESTBOX



Test plate red, PVC, 21x15cm
6 test cards magnetic, grey
Storage box
20-page test instructions

Weight: 350g

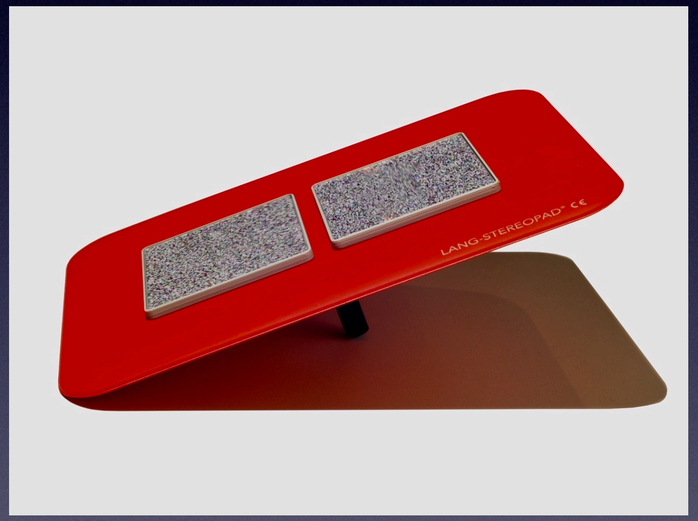
Selling price (without VAT): CHF 585
(magnetic monopod support: CHF 15)

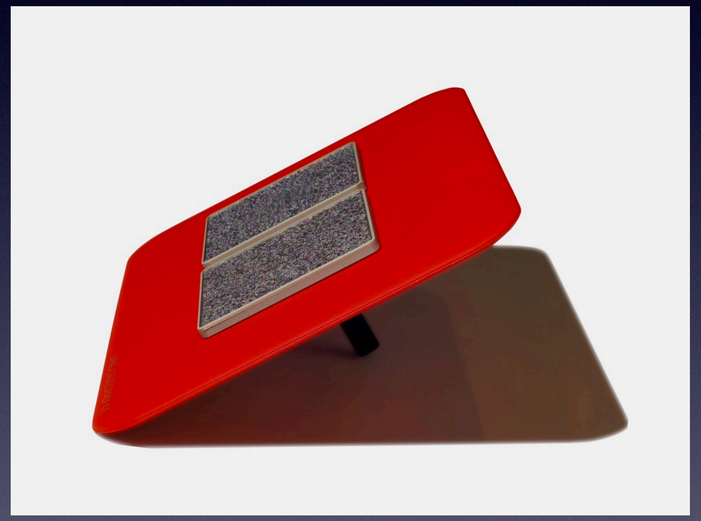


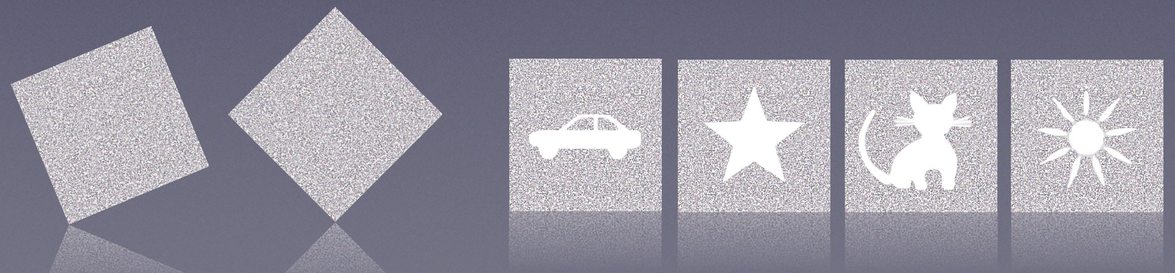
LANG-STEREOTEST®

MAGNETIC SUPPORT

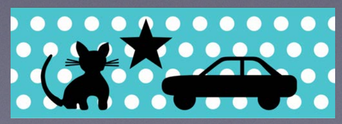
Use as support on table, or as handle



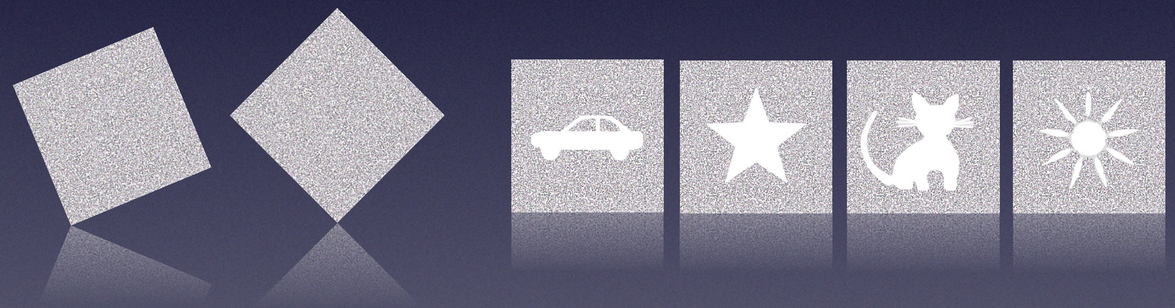




LANG-STEREOTEST®



Thank you for your attention!



LANG-STEREOPAD®