

Individual Psychological Diagnosis



Jan Sterenborg

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The photograph on the cover "Black Box",
is an artwork of the Dutch artist Frans Coppelmans.

This book is dedicated to all the people who have supported me through the years. This is a project of many. It all started with my parents who gave me direction and means to do the work with two great men I met during this long journey Frans Coppelmans and Gé Calis. To have met these men was a great joy to me because they contributed to the success of this project and to my personal development. A project of which I hope will increase the wellbeing of many.

Introduction

In this book, I want to summarize the work of Dr. Gé Calis and the elaboration of his work. In doing so I hope that his approach will be more accessible. The work of Gé Calis shows the path from descriptive to explanatory scientific psychological research. The elaboration of his work shows us how the cognitive field of investigation can be enlarged by the field of emotion, in which traumas and fears play a role.

The findings in the field of cognition are mere facts, facts that another person can verify.

In the field of emotion, we have to deal with the interpretation of findings, this interpretation lies on the shoulders of the psychologist himself or herself. This interpretation comes above the scientifically established outcome. It's not a digital decision anymore as in the cognitive field.

This is also the difference between psychology as a science and the practice of psychology in daily life. In practice, we have to stand for our own interpretation and the consequences these interpretations can have for people involved. As in science, we have to enclose the procedure by which the results were produced so that another person can repeat the investigation.

To get used to this approach a new set of concepts is introduced in appendix two. The actual cognitive research and analysis are described in appendix one.

Individual psychological diagnosis

In this booklet, a summary of the new research tool that has been created based on the scientific work of Dr. Gé Calis and its elaboration is presented.

An instrument for daily psychological practice.

Two areas of research are uncovered: the field of cognition and the field of emotion.

In the field of cognition, we can determine with the instrument described whether concepts are present or absent in the person to be examined.

In the field of emotion, we can get data that are unconsciously linked to fears and traumas within the person to be examined.

The interpretation of the research data is decisive in the field of emotion because the interpretation is linked to the person who made the interpretation. In the field of cognition, the results are clear and can be repeated and confirmed by others. The research in the field of emotion can be repeated too, but the interpretation of the results will yield *differences* between other experts. Which interpretation becomes the most credible depends on how the data relates to other data regarding the person to be investigated and will depend on the expertise level of the expert.

In this sense, we see that psychological professional practice relies on clear scientific results and at the same time on ambiguous scientific results. Ambiguous because these results need extra interpretation.

The psychologist himself is responsible for the interpretation of the ambiguous results in the field of emotion. The latter is precisely the difference between psychological practice in daily life and psychology as a science. In practice, you have to stand for your own interpretation and the consequences that it has for people involved. In science, you have to account for the method used so that others can replicate the research. In doing so science will be able to come up with reliable data. One cannot stress this often enough.

As psychologists, we are interested in human behavior. What is coming out of the black box? Using the Gé Calis approach, we can now look *inside* the Black Box and are interested in:

1. what precedes behavior or how behavior is steered?
2. what unconscious fears and traumas do we find in the Black Box?

The necessary condition for entering this Black Box is *a repeatable answer*

For example, if I show a person a picture of a bear and the question is: what do you see, the answer must always be bear and not suddenly ape. It does not necessarily have to be a spoken word, it can also be a certain eye blinking or pointing out a different bear plate, etc. The reaction has to be repeatable. Even the answer does not have to be "bear", but for example the cuddly name of the bear "Okkie" as long as Okkie as identification always follows after the presentation of the bear.

Cognition data are especially important within the didactic field. Does the child have sufficient concepts to be able to follow a lesson? For example, the teacher uses the concepts left and right to make the children understand something and says: "On the left of the blackboard are the characteristics of birds and on the right are the characteristics of cattle". By doing so, the teacher assumes that all children know what is left and right. But is that the case for all children?

If a child does not know the difference between left and right, then the child misses a lot of information and because of this lack, the child lags behind his peers. If we determine with the new instrument that the child is missing the left-right concept, then with simple training, the child will miss less information. It seems to be a good practice to screen all children on several basic concepts.

Data from the field of emotion are important in many areas of man. Unprocessed traumas and anxieties/fears can get in the way. The difficulty is that the person involved usually has no idea about it. With the new instrument, we can detect unconscious fears and traumas.

Bullying behavior

Nowadays much is talked about bullying behavior in schools and the serious consequences that it can have.

We need an instrument to find out for a school class which children pose a threat to a pupil. If we know which other pupils are being perceived by the pupil unconsciously as threatening, then we can do something about it. It can be an imagined threat or it can be a real threat. A training program can do wonders by bringing pupils closer together, which increases mutual trust and the threat disappears.

If the threat is more substantial, more needs to be done to make both parties aware of what is going on. As a result of the awareness-making, the threat will diminish without suddenly having to become close friends. The discussion of the data with the teacher can also have positive consequences in the sense that the teacher becomes more sensitive to threat or tension signals.

The threat can also come from the teacher himself. Then one has to look at where the threat is based on: is the threat fictional because the teacher looks like the angry neighbor or is the threat real?

Perpetrator recognition

The instrument can also be used in criminal cases. We often see on TV a lineup of people from which the perpetrator must then be chosen by the victim. In my opinion, this is a rather unfortunate method because once the person who is attacked recognizes the perpetrator a huge fear, depending on the severity of the offense, will be induced. This fear experience can ensure that the person who causes the anxiety is not designated.

If we approach this with the developed method then there will also be fear generated when a photo of the perpetrator is presented, but this generating of fear is kept to a minimum by keeping the presentation period of the offender portrait as short as possible and by focusing on something innocent: recognizing, for example, familiar persons.

If there is fear, it will result in a drop in positive identifications of the familiar persons.

At present, however, only data are available from the field of cognition but not yet from the field of emotion. I hope that the data from the field of emotion will come soon. In this book, I will give an example of how a fear test will look like.

A simple example of the method in the field of cognition will follow.

Example of research in the cognition field

The question to be answered is:

Does a person use a Gender concept in recognizing people?

A Gender-concept means that a person can distinguish between a man and a woman.

What do we need?

1. Two tachistoscopes for research in the field of cognition
2. Images for the recognition task
3. Registration of the answers
4. Someone willing to cooperate in the investigation

Visual material consists of:

1. Visual material to be presented as the first photo;
2. Visual material to be presented as the second photo. This material is familiar or made familiar to the person under investigation.

Visual material that is presented as the first photo is *not* the same as visual material that is presented as the second photo.

Both sets consist of men and women.

Task description:

After pressing the start button, the person to be examined is presented with two photographs or pictures in rapid succession.

In this study we used two pairs of presentation time:

- a. First photo 50 milliseconds followed by second photo 30 milliseconds;
- b. First photo 70 milliseconds followed by second photo 10 milliseconds.

In the analysis, this is the PTO variable (the Presentation Time Order variable).

The task is to identify the familiar second photo.

The person's choice is registered.

We examined two persons: person R and person E.

Results:

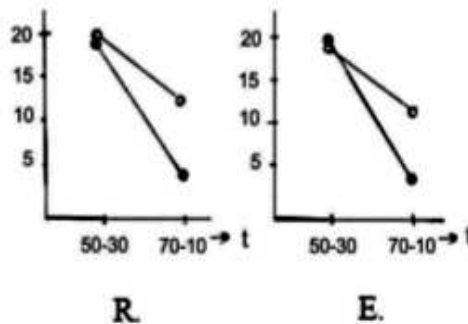


Figure 1. Results of person R and person E.

X-axis: Presentation Time Order PTO with PTO1: 50-30 and PTO2: 70-10

Y-axis: Number of correct identifications (max = 20)

Drawn lines with the Gender Order GO:

the upper lines GO1: a man *followed by* another man and a woman *followed by* another woman.

the bottom lines GO2: a man *followed by* a woman and a woman *followed by* a man.

Analysis of the research data

The analysis of the data in Appendix 1 shows that both persons that were investigated, use the Gender concept in identifying the presented persons.

The main effect (PTO) is significant in both persons examined, which confirms the logical assumption that the less time an observer receives to identify the second photo, the less good answers will emerge.

Also, the interactions between presentation time order (PTO) and Gender Order (GO) are significant for both persons R and E, which means that there is an increasing differentiation between the GO1 and the GO2 condition, where the GO1 condition lies above the GO2 condition and thus confirms exactly the theory.

The theory says that if an observer uses a concept he or she will *benefit* if the concept that is confirmed on the first picture matches to the gender of the person on the second picture (the acting system already has the right mindset, and so on, the acquired expectation is confirmed).

And the person will be *disadvantaged* if the confirmed concept on the first picture finds no confirmation with the gender of the person on the second picture.

As the time to identify the second image decreases, the differentiation will be greater. In other words, the benefit becomes more visible, although the overall result decreases.

Two concepts and their relationship

If we examine the presence of two concepts and their mutual relationship, we look for a second-order significant interaction if we assume a hierarchical relationship between the two concepts.

For example, the Position of the head of the person to be identified has to be established first before e.g. Gender or other characteristics of the person on the photo can be established.

To speak of a hierarchical relation between Position and Gender, PresentationTimeOrder x Position x Gender has to provide a significant second-order interaction.

It is easier from a research point of view to first examine whether the concept of Position is present and whether the concept of Gender is present. Then their mutual relationship.

Summary of research in cognition field

We can say that Gé Calis has done a tremendous job with this research approach. He has succeeded in getting real data or facts on the table in the cognitive scope of scientific psychological research.

With his approach, he has laid the foundation for scientific *explanatory* psychological research.

Not finding a concept does not mean that the research has failed. Certainly in children, we will discover more than once that a concept is not present or not yet present. And then we have to ask ourselves whether the child should already have this concept or whether there is development time in comparison with older children.

So both results, the finding of a concept or the absence of a concept are valuable.

Research in the field of emotions

Although no real data are available yet, I want to give an impetus to show how we can come up with meaningful data. Let us develop a simple fear test:

For example, someone has a fear of dogs.

How can we demonstrate this with the new instrument?

We collect two sets of images:

- First set with several different animals including dogs, supplemented with some neutral photos of people or landscapes;
- A second set with several people familiar or made familiar by training to the person to be investigated.

Now we offer these two sets of images as follows:

A picture from the first set followed by a picture from the second set.

We vary both the presentation time of the first picture and that of the second picture.

The expectation is: if the person to be examined is afraid of dogs, there will be less good identifications of familiar photos from the second set than in comparison with other animals, people and landscapes from the first set.

If we have no clue at all where the person is afraid of then we can use this research tool as an explorative tool by starting with a large number of themes as first photo and then reduce this set until the cause of the fear or trauma becomes clear.

This research can be realized with two tachistoscopes.

If we want to increase the fear effect, because a picture is just a picture, then we add a *movement*:

First we present a small dog followed by the same dog but then somewhat larger, followed by the familiar person.

The transition from a small dog to a larger dog evokes an *approaching* movement and if there is already fear of a dog, the fear is greater for an approaching dog.

And the number of good identifications of familiar person will fall even further after this approaching dog.

Three tachistoscopes are needed to realize these three steps.

A psychologist who is well-introduced with colors or symbols and their deeper meaning, can also add several colors or symbols in the first set of photographs to be offered, and see which colors or symbols indicate a dropout.

This can help the diagnostics along with other data about the person to be diagnosed a whole lot further and will deepen the level of interpretation.

References

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Calis, G. J., Sterenborg, J., & Maarse, F. (1984). Initial microgenetic steps in single-glance face recognition. *Acta Psychologica*, 55(3), 215-230.

Sterenborg, J. (2018). *New Resources for Individual Psychological Diagnosis Version 3.0*. Amsterdam: Brave New Books.

Internet

Research data: R and E:

<https://frans-coppelmans.jouwweb.nl/data>

Tachistoscope:

<http://ipd-community.jouwweb.nl/>

Contact address author:

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Appendix 1

The research described below is based on the approach of Dr. Gé Calis. Calis showed that when we recognize another person, the perceptual process is organized hierarchically. To prove this Calis showed that at least two concepts must be shown to have had a *hierarchical* relationship. The first concept is always more general than the second concept, which is a more specific one.

In this paper, I will demonstrate the use of *one* concept, in order to make the approach more accessible.

The research implementation is as follows:

The person to be examined is offered two photos very quickly in succession.

The question to be answered for the person to be examined is:

whom did you see?

In Calis' research, both the first photo to be offered and the second photo to be offered were members from the *same* set.

In the research described in this booklet, *different* sets are used for the first and the second photo. The second set consisting of men and women who are familiar to the person to be examined or who have become known through a short training.

The question for the person to be examined is:

whom did you see? Referring to a person from the second set of known people.

The first set consists of men and women unknown to the person to be examined.

The investigation is aimed at one person, so no grouping of data from different research subjects, $N = 1$.

Two research subjects R and E participated in the study.

Their data will be analyzed individually.

Research question

Does the person under investigation use a Gender concept when recognizing or identifying another person?

A Gender concept means being able to distinguish men from women.

Number of items in the first photoset

The first set of photos consisted of 8 men and 8 women. This set can be much more extensive with the current means. Through the internet, one can collect countless faces of men and women in a short time and put them in a dataset from which you can choose at random. At the time of this research (1983), I worked with two Kodak Carrousel slide projectors that could be controlled by a computer. This made it possible to select an individual slide for projection. Each carousel could hold 80 slides. Both slide projectors were equipped with an electronic shutter. Shutter-times could be set very accurately using computer control.

Number of items in the second photoset

The number of known people to be recognized consisted of 2 men and 2 women. This number can be expanded, which means that the investigation time will increase. In this study, an attempt was made to keep the duration of the investigation as limited as possible, partly because of the applicability of the approach in practice. To achieve this goal two men and two women were put in the second set of photos. Two photos of each gender is a minimum condition because there must be a choice within each option.

Presentation times

Two ways of presentation were chosen based on old research data as reported in appendix three.

The first way of presentation: 50 milliseconds for the first photo and 30 milliseconds for the second photo.

The second way of presentation: 70 milliseconds for the first photo and 10 milliseconds for the second photo.

For the statistical analysis, the ways of presentation are named as follows:

PresentationTimeOrder abbreviated PTO where:

- PTO1 = 50 milliseconds for the first photo followed by the second photo 30 milliseconds.
- PTO2 = 70 milliseconds for the first photo followed by 10 milliseconds for the second photo.

Creating a stimulus set

Starting with two presentation times and the first set consisting of eight men and women and the second set consisting of two men and women, five blocks of sixteen photo pairs to be offered were put together. A total of eighty photo pairs were used in this research. This leads to an investigation time of between 30 and 40 minutes per person to be examined. Choosing five blocks is an arbitrary thing.

The five blocks of 16 photo pairs were created as follows:

The photos from the second set were repeated 4 times in the same order, then the order was randomized per block without replacing. The first two blocks of four fell under presentation time order 50/30 (PTO1) and the second two blocks fell under presentation time order 70/10 (PTO2).

Within 1 block of 16 pairs, all answer alternatives occurred 4 times.

Subsequently, a block of 4 men (the men were pulled from the first set at random without replacing) was linked to the first block of the second set, then a block of 4 women (the women were pulled from the first set at random without replacing) on the second block of the second set then again a block of 4 men (again at random draw without replacement) on the third block of the second set and finally a block of 4 women (also at random drawn without replacement) on the fourth block of the second set (Figure 2).

This resulted in 4 different photo pairs:

1. A man *followed by* another man
2. A woman *followed by* another woman
3. A man *followed by* a woman
4. A woman *followed by* a man

All pairs were equally present within a block of 16.

For the statistical analysis, these four photo pairs are referred to as the Gender Order abbreviated GO where:

GO1 = a male followed by another male and female followed by another female

GO2 = a male followed by a female and a female followed by a male.

Finally, the entire block of 16 was randomized and by repeating this approach, 5 blocks were created per person to be examined:

Subject R.		Subject E.		
1 1 2 11 1	40 1 1 5 3	1 1 2 11 1	40 1 1 5 3	
2 1 2 14 4	41 2 1 10 3	2 1 2 14 4	41 2 1 10 3	
3 2 1 9 4	42 2 1 3 4	3 2 1 9 4	42 2 1 3 4	
4 2 2 2 3	43 2 2 1 2	4 2 2 2 3	43 2 2 1 2	
5 1 1 6 2	44 1 2 15 3	5 1 1 6 2	44 1 2 15 3	
6 1 1 8 4	45 1 2 2 2	6 1 1 8 4	45 1 2 2 2	
7 2 1 5 2	46 2 2 12 1	7 2 1 5 2	46 2 2 12 1	
8 2 1 16 3	47 2 2 14 3	8 2 1 16 3	47 2 2 14 3	
9 1 1 3 1	48 1 2 6 4	9 1 1 3 1	48 1 2 6 4	
10 1 2 10 2		10 1 2 10 2		
11 1 2 15 3	49 2 2 5 4	11 1 2 15 3	49 2 2 5 4	
12 1 1 7 3	50 2 1 12 1	12 1 1 7 3	50 2 1 12 1	
13 2 2 12 1	51 1 1 9 1	13 2 2 12 1	51 1 1 9 1	
14 2 1 4 1	52 1 1 10 2	14 2 1 4 1	52 1 1 10 2	
15 2 2 1 4	53 2 1 1 2	15 2 2 1 4	53 2 1 1 2	
16 2 2 13 2	54 1 1 15 3	16 2 2 13 2	54 1 1 15 3	
	55 1 2 2 4		55 1 2 2 4	
17 1 2 9 3	56 1 2 11 3	17 1 2 9 3	56 1 2 11 3	
18 1 2 8 2	57 2 1 3 4	18 1 2 8 2	57 2 1 3 4	
19 2 1 2 1	58 2 2 13 2	19 2 1 2 1	58 2 2 13 2	
20 1 2 11 1	59 2 2 14 3	20 1 2 11 1	59 2 2 14 3	
21 2 1 3 2	60 1 2 7 1	21 2 1 3 2	60 1 2 7 1	
22 2 2 16 3	61 1 2 8 2	22 2 2 16 3	61 1 2 8 2	
23 2 1 12 3	62 2 1 4 3	23 2 1 12 3	62 2 1 4 3	
24 1 2 6 4	63 2 2 6 1	24 1 2 6 4	63 2 2 6 1	
25 1 1 13 3	64 1 1 16 4	25 1 1 13 3	64 1 1 16 4	
26 1 1 1 1		26 1 1 1 1		
27 2 1 5 4	65 1 2 7 3	27 2 1 5 4	65 1 2 7 3	
28 2 2 15 2	66 1 2 12 2	28 2 2 15 2	66 1 2 12 2	
29 1 1 10 2	67 2 2 11 2	29 1 1 10 2	67 2 2 11 2	
30 2 2 7 4	68 2 2 6 1	30 2 2 7 4	68 2 2 6 1	
31 2 2 14 1	69 2 1 15 4	31 2 2 14 1	69 2 1 15 4	
32 1 1 4 4	70 2 2 3 4	32 1 1 4 4	70 2 2 3 4	
	71 2 1 10 3		71 2 1 10 3	
33 2 2 13 4	72 2 2 16 3	33 2 2 13 4	72 2 2 16 3	
34 2 1 7 2	73 1 1 9 3	34 2 1 7 2	73 1 1 9 3	
35 2 1 16 1	74 1 1 1 1	35 2 1 16 1	74 1 1 1 1	
36 1 1 8 2	75 2 1 14 1	36 1 1 8 2	75 2 1 14 1	
37 1 2 9 1	76 1 1 8 2	37 1 2 9 1	76 1 1 8 2	
38 1 1 11 1	77 1 2 2 4	38 1 1 11 1	77 1 2 2 4	
39 1 1 4 4	78 2 1 5 2	39 1 1 4 4	78 2 1 5 2	
	79 1 1 4 4		79 1 1 4 4	
	80 1 2 13 1		80 1 2 13 1	

First column:
presentation order
Second column:
1 = GO1; 2 = GO2
Third column:
1 = PTO1 50/30
2 = PTO2 70/10
Fourth column:
1,3,5,7,9,11,13,15,17 a man
from set1
2,4,6,8,10,12,14,16 a woman
from set1
Fifth column:
1,3 a man form set2
2,4 a woman from set2

Figure 2. The photo pairs to be presented (column 4 first set and column 5 second set) with column 2 Gender-Order (GO) and column 3 the Presentation Time Order (PTO).

The randomized order for subject R and subject E is the same. This can easily be made different by randomizing the second series within every block of 16, but because the analysis focuses on each individual, this has no adverse effect.

Conducting the investigation

The persons to be investigated were made aware of the answer alternatives through short training. When the photos were correctly identified several times, the real investigation could begin.

The answer alternatives were synchronized with the photos from the second set. So photo 1 from the second set was linked to a button 1 and photo 2 to button 2 and photo 3 to button 3 and photo 4 to button 4.

By pressing a start button a photo pair was projected on a screen. And after making a choice, the following photo pair could be presented.

In figure 3, the 5 blocks with photo pairs and the given answers with an indication in the last column whether the answer was correct (+) or incorrect (-).

Subject R.					Subject E.								
1	1	2	11	1	1	+	40	1	1	5	3	3	+
2	1	2	14	4	2	-	41	2	1	10	3	3	+
3	2	1	9	4	4	+	42	2	1	3	4	4	+
4	2	2	2	3	3	+	43	2	2	1	2	2	+
5	1	1	6	2	2	+	44	1	2	15	3	3	+
6	1	1	8	4	4	+	45	1	2	2	2	2	+
7	2	1	5	2	2	+	46	2	2	12	1	4	-
8	2	1	16	3	3	+	47	2	2	14	3	2	-
9	1	1	3	1	1	+	48	1	2	6	4	4	+
10	1	2	10	2	2	+							
11	1	2	15	3	3	+	49	2	2	5	4	2	-
12	1	1	7	3	3	+	50	2	1	12	1	1	+
13	2	2	12	1	2	-	51	1	1	9	1	1	+
14	2	1	4	1	1	+	52	1	1	10	2	2	+
15	2	2	1	4	3	-	53	2	1	1	2	2	+
16	2	2	13	2	1	-	54	1	1	15	3	3	+
							55	1	2	2	4	2	-
17	1	2	9	3	3	+	56	1	2	11	3	2	-
18	1	2	8	2	2	+	57	2	1	3	4	4	+
19	2	1	2	1	1	+	58	2	2	13	2	0	-
20	1	2	11	1	1	+	59	2	2	14	3	0	-
21	2	1	3	2	2	+	60	1	2	7	1	1	+
22	2	2	16	3	2	-	61	1	2	8	2	2	+
23	2	1	12	3	3	+	62	2	1	4	3	3	+
24	1	2	6	4	4	+	63	2	2	6	1	4	-
25	1	1	13	3	3	+	64	1	1	16	4	4	+
26	1	1	1	1	1	+							
27	2	1	5	4	4	+	65	1	2	7	3	3	+
28	2	2	15	2	2	+	66	1	2	12	2	2	+
29	1	1	10	2	2	+	67	2	2	11	2	2	+
30	2	2	7	4	3	-	68	2	2	6	1	4	-
31	2	2	14	1	2	-	69	2	1	15	4	4	+
32	1	1	4	4	4	+	70	2	2	3	4	1	-
							71	2	1	10	3	3	+
33	2	2	13	4	3	-	72	2	2	16	3	1	-
34	2	1	7	2	2	+	73	1	1	9	3	3	+
35	2	1	16	1	1	+	74	1	1	1	1	1	+
36	1	1	8	2	2	+	75	2	1	14	1	1	+
37	1	2	9	1	2	-	76	1	1	8	2	2	+
38	1	1	11	1	1	+	77	1	2	2	4	3	-
39	1	1	4	4	4	+	78	2	1	5	2	2	+
							79	1	1	4	4	4	+
							80	1	2	13	1	3	-

Figure 3. The photo pairs to be offered (column 4 first set and column 5 second set) with column 2 Gender Order (GO) and column 3 the Presentation Time Order (PTO). In column 6 the answer given by the person to be investigated (0 = don't know) and in column 7 whether the answer was correct (+) or incorrect (-).

Results

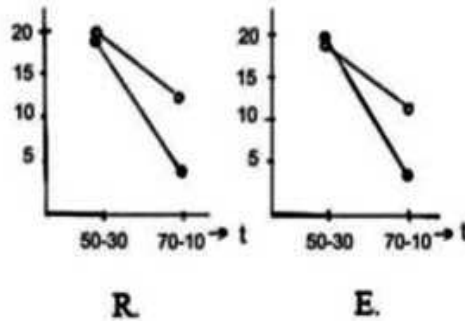


Figure 4. Results of the person R and person E to be investigated

x-axis: Presentation Time Order PTO with PTO1 50-30 and PTO2 70-10

y-axis: Number of correct identifications (max = 20)

Drawn lines with the Gender Order GO where:

the upper lines GO1:

A male from set1 followed in time by a male from set2 and a female from set1 followed in time by a female from set2.

the lower lines GO2:

A male from set1 followed in time by a woman from set2 and a woman from set1 followed in time by a male from set2.

Analysis of the results

What can we expect according to Calis' theory? According to the theory we can expect:

1. That as we have less time to perceive something, the number of good identifications will decrease. This is an obvious logic, but it must be demonstrated.

Transformed into analysis terms: we expect a significant main effect with the Presentation Time Order (PTO in the analysis table).

2. To demonstrate that the intended concept plays a role in perception, we must show that:

a. there is a time condition in which there is a difference between the GO1 and the GO2 condition, where the GO1 condition must be above the GO2 condition for the number of correct answers and

b. there is a second time-condition in which this difference is none or less or more than the difference established in point a.

None and less means a little more time for the second photo and more means less time for the second photo.

Increasing difference with decreasing presentation time and decreasing difference with increasing presentation time for the second photo. This is crucial for demonstrating that a concept is used in identifying the known person.

We are between two extremes:

A. The first extreme is the situation where the second photo is given sufficient time to be identified, whatever precedes it. In our research that is at 30 milliseconds.

B. The second extreme is that the presentation time for the second photo reaches 0 milliseconds. There is then nothing left to identify and we then retain gambling behavior within a limited number of answer alternatives.

Between both extremes (between 30 and 0 milliseconds for the second photo) is an area where the observer increasingly benefits (with decreasing presentation time for the second photo) in a GO1 situation. And is increasingly disadvantageous in the GO2 situation. As a result, the difference in correct identifications between GO1 and GO2 increases as the presentation time for the second photo decreases, while the overall identification level decreases.

The increase in the differentiation in the data is visible as a significant first-order interaction effect between Presentation Time Order and Gender Order (PTO * GO in the table of analysis).

Differences within the Gender Order condition can be determined separately for the different Presentation Time Order conditions (with, for example, the Pearson test), but it can also be established in one go by establishing an interaction between Presentation Time Order (PTO) and Gender Order (GO) (Anova).

Transformed into analysis terms: we expect a significant interaction effect (first-order interaction) between Presentation Time Order and Gender Order (PTO * GO in the table of analysis).

If this interaction is found and is significant, it is also the confirmation of the hypothesis: The intended concept is active within the person being studied in the recognition of persons.

Analysis person E

Cases	Sum of Squares	df	Mean Square	F	p
PTO	6.613	1	6.613	56.151	< .001
GO	0.612	1	0.612	5.201	0.025
PTO * GO	1.012	1	1.012	8.598	0.004
Residual	8.950	76	0.118		

Note. Type III Sum of Squares

Figure 5. Statistical analysis¹ of the person to be examined E.

We see a significant main effect regarding the Presentation Time Order (PTO) and then a significant interaction between Presentation Time Order and Gender Order (PTO * GO).

For person E, we can conclude that person E is using the Gender concept when recognizing people.

Analysis person R

Cases	Sum of Squares	df	Mean Square	F	p
PTO	6.050	1	6.050	52.851	< .001
GO	1.250	1	1.250	10.920	0.001
PTO * GO	0.800	1	0.800	6.989	0.010
Residual	8.700	76	0.114		

Note. Type III Sum of Squares

Figure 6. Statistical analysis of person R.

The same picture as for the person under investigation E, which also justifies the conclusion that the person under investigation R uses the Gender concept when recognizing persons.

The cautious conclusion is that person R uses this concept more heavily than person E. The p-value for GO (Gender Order) as the main effect for person R is 0.001 and person E is 0.025.

Both studies confirm Gé Calis research approach.

¹ Analyses were performed with the JASP program <https://jasp-stats.org/>

Discussion

The analysis shows that the approach of Calis makes sense and can be very useful in practice settings due to the foreseeable duration of the research.

The research possibilities have increased enormously due to technical progress since 1983. It is much easier to collect photo material in large numbers. It is now also possible to present the photos by a tachistoscope² connected to a computer, making the whole thing even more flexible.

In my opinion, nothing stands in the way to detect many concepts and their mutual relationships.

² Appendix 4

Appendix 2

New concept names

Anyone who wants to understand the work of Gé Calis must take new concepts into account. For example, we are familiar with the concept of position with the extremes left and right or the concept of gender with the extremes of man and woman.

In our normal use of language, we don't even think about this anymore. Within a research context, another aspect is added, namely the order in time. For example, a picture with a face on it is looking to the left, followed in time by a picture with a face on it looking to the right.

Or in the case of the concept of gender, a picture with the face of a woman, followed in time by a picture with the face of a man. A very short video of two frames.

We have to add order in time to normal concepts. One after the other.

Position then becomes PositionOrder and gender becomes GenderOrder.

Written out in the case of position:

1. Image with face to the left *followed by* an image with a face to the left.
2. Image with face to the right *followed by* an image with a face to the right.
3. Image with face to the left *followed by* an image with a face to the right.
4. Image with face to the right *followed by* an image with a face to the left.

And for gender:

1. Picture with a woman *followed by* a picture with another woman.
2. Picture with a man *followed by* a picture with another man.
3. Picture with a woman *followed by* a picture with a man.
4. Picture with a man *followed by* a picture with a woman.

And so for position the independent variable position order (PO) arises and for gender the independent variable Gender Order (GO).

Position Order (PO) then has two extremes:

PO1: 1 and 2 combined:

left *followed by* left and right *followed by* right.

PV2: 3 and 4 combined:

left *followed by* right and right *followed by* left.

Gender Order (GO) then has two extremes:

SV1: 1 and 2 combined:

A woman *followed by* another woman and a man *followed by* another man.

SV2: 3 and 4 combined:

A woman *followed by* a man and a man *followed by* a woman.

It takes some getting used to, but the more people work with this type of research, the more it becomes clear.

Similarly with the ways of presentation of the two images as an independent variable:

Presentation Time Order abbreviated PTO, in our research:

PTO1: first picture 50 milliseconds *followed by* second picture 30 milliseconds.

PTO2: first picture 70 milliseconds *followed by* second picture 10 milliseconds.

The dependent variable then is the identification given(response) by the person to be investigated. This response can be right or wrong.

Appendix 3

Old research

Calis started his research into the secrets of perception with observations: what do people see when they are offered a photo of a person for a very short time and which details are easier or more difficult to perceive. Countless protocols were drawn up and processed into evaluated.

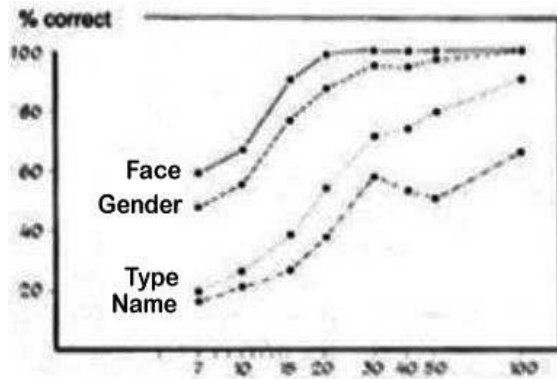


Figure 7. Percentage correct identifications for some open-end categories for unexpected portrait presentations in function of the presentation time.

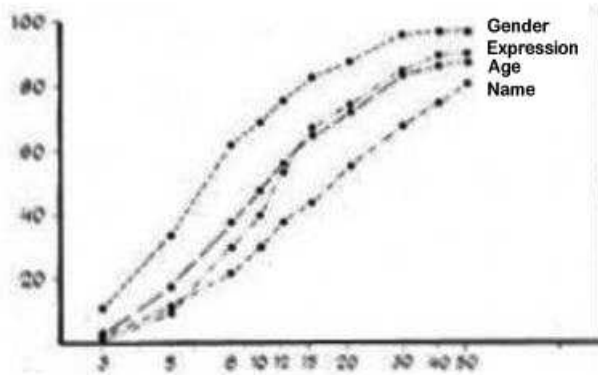


Figure 8. Percentage of correct identifications for a few pre-coded categories for observing portrait presentations and free answer choice Depending on the presentation time.

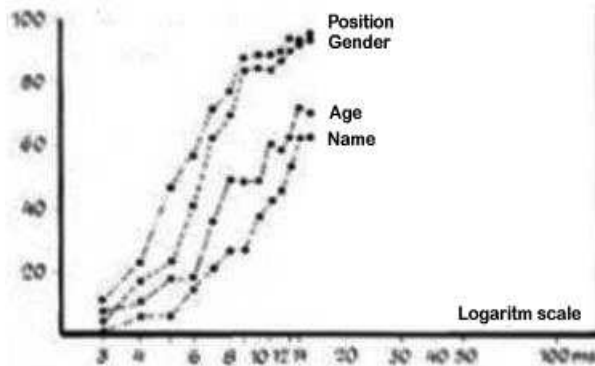


Figure 9. Percentage of correct identifications for a few pre-coded categories with expected portrait presentations and forced-choice answers based on the presentation time.

From Calis' dissertation (1974), page 65.

Monk's work that led to the idea that there could be a hierarchical perception process. However, this fall in results was not enough for Calis to come to the conclusion that the observation process in its current operation is also hierarchically organized.

He considered the results of his observations not yet as proof for the existence of a hierarchical process in current perception. This was followed by countless experiments to demonstrate the hierarchical effect, resulting in the development of the *double stimulation paradigm* in which two images were quickly presented one after the other. This setup led to proof that the observation process is organized hierarchically. The evidence included two hierarchically related concepts. The concepts used were position and identity:

- | | |
|----------|---|
| Position | Pos- Photo A and B are in different positions. Nose point of A is directing to the left and that of B to the right. |
| | Pos+ A and B are pointing in the same direction |
| Identity | Set- A and B are picked from different subclasses. We only use two subclasses: wearing spectacles and not wearing spectacles. |
| | Set+ A and B from the same subclass, both wear spectacles or both wearing no spectacles. |
| | ID A and B are photos of the same model |

Fig. 10 From the dissertation of Gé Calis (1974), page 145.

The evidence was provided with a significant second-order interaction effect. This research was repeated using more advanced equipment with the same result. This study has been published in *Acta Psychologica* (1984).

Those who want to look into Gé Calis' dissertation contact the author:
website.vcr@gmail.com

The dissertation in Dutch includes both the philosophical background of perception and the course of research from descriptive observation to explanatory experiment.

Appendix 4

The tachistoscope

For his research, Calis used different tachistoscopes that became more and more advanced. Below some excerpts from the dissertation:

A two-channel tachistoscope (Bettendorf) for cards of 130 x 180 mm.

A three-channel tachistoscope (Scientific Prototype type GB) for card presentations.

During this period of our research, however, a 6-channel stereo tachistoscope became available for our research department, whereby the stimulus input was automated. This tachistoscope, as well as the aforementioned 3-channel tachistoscope of the brand "Scientific Prototype", does not use cards for this purpose, but slides, which are placed in two magazines with a capacity of 100 pieces each. After each stimulus presentation, which is also started here by the subject using a push-button, the device can automatically change the slides, so that a next presentation can be made very quickly. Depending on the experience and speed of the test person, we were able to make two to four times as many presentations and process answers at the same time.

It can be considered whether it is therefore not possible to switch over to binocular presentation, partly because with the longer presentation times now being used the effect of disturbing peripheral retinal interactions can no longer be so great. In addition to an automatic binocular tachistoscope, for further research one can think of computer-controlled image presentation using fast electronic screens or tachistoscopic projectors.

At the end of his dissertation, Calis already refers to the possibility of fast screens and computer control. Three years later, this possibility arose with the arrival of a fast video disc with computer control, which was used to repeat the dissertation research. Because a video screen was used, the fastest presentation time was 20 milliseconds, half of an entire video image that was built up in 40 milliseconds by odd and even lines.

With the Kodak carousel slide projector equipped with electronic shutters, a faster presentation time than the video presentation was possible.

Currently, a tachistoscope can be built which can control a speed of 1 milliseconds by controlling the LED lamp through a Solid State Relay (SSR). In the design below, an LCD LED beamer has been adapted by connecting the LED lamp to the Solid State Relay (SSR). The Solid State Relay (SSR) is controlled by an Arduino microcontroller which can communicate with a laptop or PC by means of the USB port that serves as a COM port.

This design eliminates all number restrictions and the presentation times are varied very easily and the answers are easily registered.

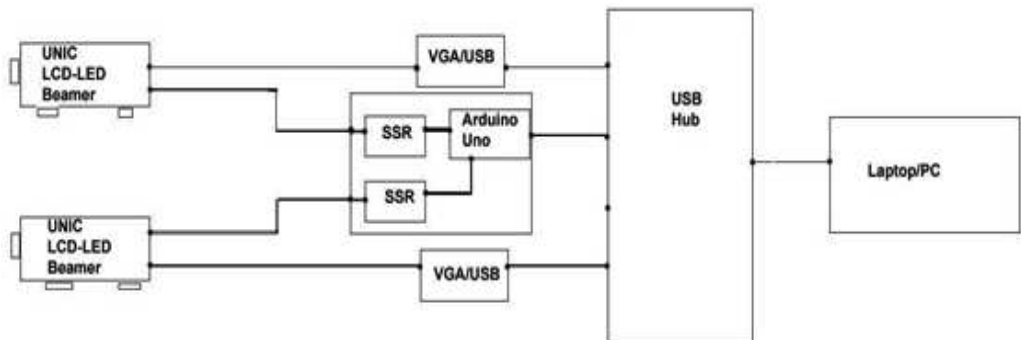


Figure 11. Schematic arrangement of two tachistoscopes.

For more detailed information: <http://ipd-community.jouwweb.nl/>

Table of contents

Individual psychological diagnosis	11
An instrument for daily psychological practice	11
Bullying Behavior	13
Perpetrator recognition	13
Example of research in the field of cognition	14
Results	15
Research in the field of emotion	17
References	19
Appendix 1 Research design	21
Results	26
Statistical Analysis	28
Appendix 2 New concept names	31
Appendix 3 Old research	33
Appendix 4 The tachistoscope	37

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