AN EXPERIMENTAL STUDY ON RELATIONS BETWEEN THE INTELLECTUAL COGNITION AND THE INTELLECTUAL ACTIVITY IN CHILDREN

AN EXPERIMENTAL STUDY ON RELATIONS BETWEEN THE INTELLECTUAL COGNITION AND THE INTELLECTUAL ACTIVITY IN CHILDREN*

by

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Many studies have been made so far of the intellectual activity of animals and children.**As representative researches about children may be cited, among the rest, Lipmann and Bogen's "*Naive Physik*" and Gottschaldt's "*Der Aufbau des kindlichen Handelns*".

Lipmann tentatively defines that intelligence is the capacities for grasping given contents so as to adjust to the fact and for handling them so as to adjust to the purpose. These two functions are performed as "*Gestaltungsvorgang zum Inhalt*". But the former, namely, intellectual cognition (das intelligente Erkennen), the self-aim of which is cognition, consists chiefly in the grasping of the logical, abstract, sensory characteristics and relations of the objects, while the latter, namely, intellectual activity (das intelligente Handeln) contains activity as an indispensable prerequisite. Accordingly, cognition in this case presents the objects as cues, means or goals of the handling; it is the grasping of the causal relation of things which are to govern the results of activity. Therfore, this cognition is restricted to the "naive Physik".

The validity of this theory of Lipmann's—that intellectual cognition and intellectual activity are totally different functions—was proved by Bogen's detour-experiment in which no great differece was found in the results of intellectual activity between normal children superior in intellectual cognition as measured by common intelligence test and feeble-minded children (morons and imbeciles) inferior in the same function.

The problem given them was to take a ball out of a box with any of five kinds of tools.

A question may natually be raised: "Have these two functions nothing to do with each other in any situation as in this case?" The answer is in the affirmative.

For in Gottschaldt's Experiments XV and XVI, for instance, a remarkable difference in results is seen between normal and feebl-minded children (morons, imbeciles and idiots).

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* A part of the materials of this study is based on my graduation thesis (1952) written under the guidance of Professor Y. Ohwaki.

** For the general introduction and criticism of studies on the intellectuale activity, see Refernces 2, 11, 13, and 14.

The experimental apparatus was a situation in which two boxes were placed 20cm apart on the floor, with the goal-object placed on the box at the farther end. The children standing outside the bars were required to let fall the goal-object on the floor from either the right or left side, seeing to it that it should not fall between the two-boxes, and then to pull it toward themselves. None of the children could solve the problem from the first, but the normal children showed much better results than the feeble-minded in solution by insight after trials and help (einsichtige Lösung nach Probieren und Helfen).

It is certain that in the developmental process of intelligence there is an important boundary between intellectual cognition or logical intelligence (die logische Intelligenz) and intellectual activity or practical intelligence (die praktische Intelligenz) as well as between instinctive reaction and intellectual activity. Further, the difference between Bogen's and Gottschaldt's results suggests that, in some cases, intellectual cognition and intellectual activity may, on account of the problem-situation, have nothing to do with each other while, in others, the former may affect the latter positively and functionally.

One may ask what was the fundamental difference of the problem-situations of the two investigators. As a cue to solve this problem, a highly suggestive explanation is given in Gottschaldt's theoretical inquiry into the reasons why the normal children (3 or 4 years of age) had greater difficulty in his Experiments XV and XVI than in Köhler's detour-board (Umwegbrett) test applied to them.

He says:

"Verwendet man wie Köhler ein sog. Rahmenbrett, so wird dem Prüfling eine grosse Hilfe gegeben, weil durch die Seitenkanten des Brettes die Bewegungsmöglichkeiten des Ziels schon physikalish sehr eingeengt sind. Bei der Kistenanordnug ist das nicht der Fall, sondern physikalisch sind alle vier Kanten der obern Kistenfläche gleichwertig, funktional aber kommen nur die beiden seitlichen Kanten in Frage. Die Leistung des Kindes besteht darin, dass es den Funktionscharakter dieser seitlichen Kanten erfasst, d.h. dass es voraussieht. welche Ortslagen der Zielgegenstand einnehmen wird, wenn er über eine der Kanten geschoben ist. Der Ablauf des Geschehens muss also im ganzen antizipiert werden, schon bevor das Kind zu handeln beginnt, weil jedes probeweise Verschieben des Ziels Fehler zur Folge haben kann, die in dem gleichen Versuchsverlauf nicht verbessert werden können. (Das Ziel kann z.B. in den Raum zwischen beiden Kisten fallen.) "(3, 208)—" Der Aufbau der Anordnung ist sehr viel eindeutiger, weil die Seitenwände nicht nur physikalische Begrenzungen sind, sondern auch psychologischesteuernd wirken. Das Ziel kann zwar direkt herangezogen werden, aber sehr bald stösst es auf die Seitenwände des Kastens, die weiter „fehlerhafte" Bewegungen ausschliessen. Fast alle gesunden Kinder vom 3. Lebensjahr an erweisen sich daher auch fähig, beim Umwegbrettversuch das Ziel zu erreichen." (3,215).

The effect of the barrier on the difficulty of detour-behavior was also tested by the author's preliminary experiment. The procedure of that

experiment was as follows:

Ten imbeciles (C. A. 10;1–16;0, M. A. 3;4–6;8) served as subjects in Problem A and B. The situation of Problem A is shown in Fig. 1. The experimenter can open or shut as occation arises the doors of exits A, B, C and

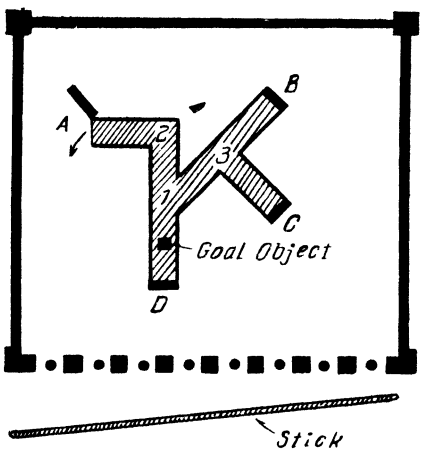

Fig. 1

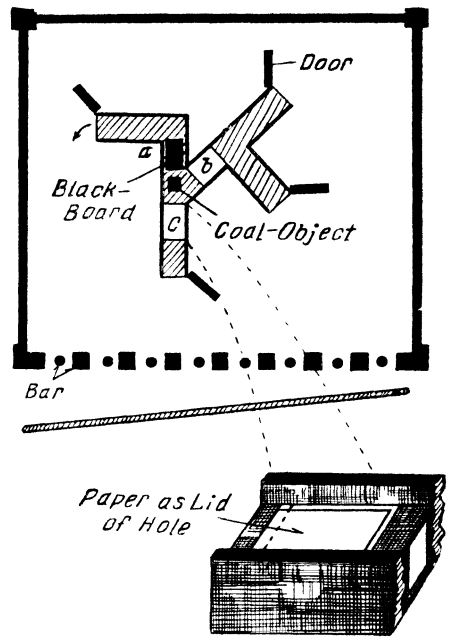

Fig. 2

D in the K-shaped detour-board. The figures 1, 2 and 3 indicate the turning points. Six path units from one turning point to another turning point or an exit were 10.5cm long and 3cm wide. The height of the side-walls and four doors (barriers) was 2cm. Subjects were told to push away the goal-object (jelly) in the direction of 180 degrees and take it out from exit A by a stick. Problem B is shown in Fig. 2. There were three holes (a, b, c) surrourding turning point 1 and white paper was placed on them as the lid in the training situation. Subjects were required to solve the detour (180° or 135°)-problem in the test situation in which hole a or b was stopped by a black board after experiencing that they could not take out the goal-object from any exit on account of the holes during three training trials. We made our subjects repeat the test three times for both Problem A and B.

The principal results were as follows:

All subjects solved purposively Problem A from the first, while in Problem B six of our children failed even in the third attempt. From these results, as Gottschaldt says, it may be admitted that, other conditions being equal, detour-activity becomes very difficult in a situation which contains no barrier with physical and psychological interception -effect.

As a theoretical consequence of Gottschaldt it is probable that Bogen's experimental situation of detour-box, in which children were

told to make detour simply by rolling, scooping up or giving a jumping motion to the ball, has essentially much the same character as Köhler's detour-board; hence no great difference in the results between normal and feeble-minded children. Accordingly, suppose there is a problem-situation which includes both "Section A" having the same character as Bogen's situation, and "Section B" having the same character as Gottschaldt's situation in which the cognition before handling the physical structure inevitably determines the success or failure of the activity.

In "Section A" there will be seen no difference in results between children with superior and those with inferior intellectual cognition faculty. In "Section B", on the contrary, it may be expected that the former will adjust better, consequently show better result in solving the whole problem situation.

The present experiment is intended to examine such relations between intellectual cognition and intellectual activity, and also to inquire into the dynamic process of solution by insight.

METHODS

Subjects:

The subjects used in the principal experiment were 10 superior children (C.A. 11;9–12;6, I.Q. 119–136) and 10 inferior children (C.A. 11;7–12;5, I.Q. 72–98) belonging to the 6th grade of the primary school. Both groups consisted of 5 boys and 5 girls. In a supplementary experiment were used 10 feeble-minded children (morons and imbeciles, C.A. 10; 2–14; 3, I. Q. 41–66).*

Apparatus:

The present experimental apparatus consists of a detour-box (Fig. 3) and five kinds of tools (Fig. 4) with which to take out the ball from the box.

The detour-box (33.5×29.5×17.5cm) has in its front nine perpendicular bars standing in a row at a distance of 2.5cm. The interior is divided by three rails into Section I and Section II, both of which are so constructed that the floor slants downward toward the front by raising the back-bottom 1.5cm. The ball (3.8cm in diameter) is placed at (a) in Section I. Section II is connected with Section III through an obstacle (d) 4cm high. Section III (a square scantling 4×4×41cm) makes an upward slope leftwardly from (e) to (f) which is 7.5cm high. The wall at the end (g) is coverd with cloth so as to prevent the ball from bouncing as much as possible. The part (h) with (a) downward slant toward the front, faces the hole (i) in Section IV. The bottom of this hole (5×5×6cm) forms a downward slope to the right, so that the ball, when it falls into the hole, may return to its original place (a).

* The I.Q. of normal children was taken from α Scale Intelligence Test (Kokumin Chinô Kensa A). Further reference was made to the results of β Scale Intelligence Test (Tanaka B). The I.Q. of feeble-minded children was taken from Binet-Simon Intelligence Test (Revised by Suzuki).

Four kinds of tools S, T, R and C are all 33cm long. S with a square board and a check-board at its end is shaped like a spoon. T has a 3cm long bar at its end. R is an ordinary stick, while C is a chop-stick with

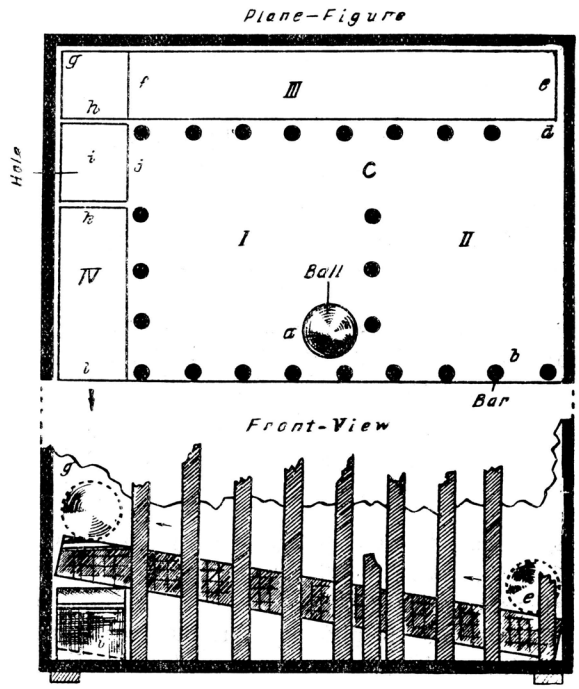

Fig. 3 Detour-Box

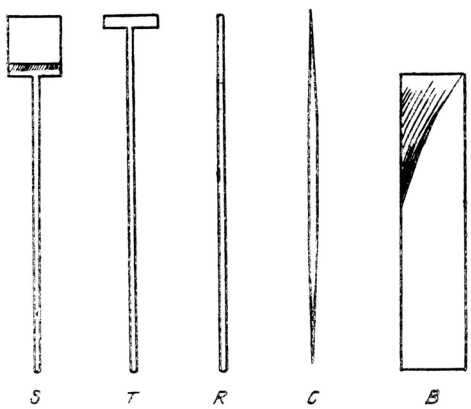

Fig. 4. Tools

both ends pointed. The tool B is a board to be used for covering the hole (i) in Section IV so as to pass the ball. This, of course, can be done by tool S also.

Even if the ball has been skilfully moved up to Section III, the problem cannot be solved at all unless the hole is coverd, because the ball will fall into the hole. It can be said, therefore, that Section IV, unlike Section I–III, has such a nature that the correction of errors is not permissible in one and the same trial and the preliminary cognition before handling of the physical strucuture of the problem-situation inevitably determines the success or failure of the activity. Thus, without the hole, our apparatus would not differ essentially from Bogen's.

Procedure:

All children were required to try three times in succession, each success or failure counted as one trial. Hence, three successive failures were cosidered as non-solution. When a subject took more than a quarter of an hour before the manipulation, some help was given to enable him to find thd detour-path; further, if a subject could not pass the ball through Section III whithin a quarter of an hour after help or manipulation without help, it was considered as failure.

The instruction given was as follows:

"You see a ball (pointing to it) in there, and some tools down there (arranged as shown in Fig. 4 on the right side of the box). Take out the ball as you please with those tools". And to the child who could not find the detour-path within the fixed time was given a help in words; for instance: "You see a slope rising from there (pointing to(e)) up to there (f). what is that path for?" If any child rolled the ball from (a)in Section I ditectly to the hole (i), trying to scoop it up from there, he was told not to do so.

The types of solution by insight were observed from the points of view generally accepted by many past investigations, such as "survey of total situation", "appearance of critical point", "fluent process of solution", etc.

RESULTS AND DISCUSSION

J. Discovery of detour-path

It was not so difficult for both superior and inferior children to grasp the visual structure of the detour-situation; all the children discovered sooner or later, as it may be self-evident, the route connecting Sections I, II, III, and IV, that is, the detour-path. It follows, therefore, that for both groups of children the difficulty of problem-situation consists in that of grasping the physical structure of the detour-path.

Now, for the feeble-minded children the discovery of the detour-path was relatively difficult; 4 of them spent some time in trying to pull the ball directly to his side and rolling it between Section I and Section II to no purpose. That such manipulation of tools towards themselves in the feeble-minded is, in the process of thinking, a"Ground" against detour-behavior on one hand, but that it has, on the other hand, a character of "Figure" against an uneffectual reaction of lower dimension, is proved by the activity of an idiot (C.A. 17;4, M.A. 2;6, I.Q. 14) used for comparison.

The series of activities of this child in his first trial may be shown with signs as follows;

I(LH↓-R↓-C↑)—II (C↓-R↓-B↓-C↓-B↓-C↓-S • C↓-C↓LH↓-B↑) — I (LH↓-C↓-RH↓-C↓-R↓-RH↓C↓-C↑) — II (B↓-R↓ — Fifteen minutes being passed, a help was given—S↑-R↑-S•R↑) — III (S←) — 30 minutes passed — II (S↑) — III (S←) — IV (As the hole was not stopped, the ball returned to its original place), (Two more trials also

failed).*

As is evident from the above, this child tried first to pick out the ball with his left hand through the bars many times: when he saw that it was in vain he then tried to pull it to himself with any tool his hand happened to touch upon. Even after he got accustomed to the use of the tools, a minute coordinate action was seen of trying to put his hand into the box, and further, even after he began to make a detour. such actions momentarily appeared as throwing away his tool and thrusting his hand into the box in a great hurry when the ball fell down from the tool to the bars in front, and picking up the tool again. This is a phenomenon which is called by Köhler "turning-round" (Umschlag) (5, 168–169, 184–185), it may mean that the detour as a "Figure" and the structure of habitual reaction as a "Ground" were yet unstable and that the relief of the "Figure" and "Ground" made a sudden change at the moment of the "increase in strength of the valence (Aufforderungscharakter) of the goal object owing to its approach". Further, in case of this child, it so happened that. when he succeeded in putting the ball on (e) after some difficulty, he rejoiced so much as if he had finished the whole problem that he at once took out the stick, letting the ball roll back again to (b).

The fact that such actions as "reaching out a hand", "using the tools in the direction of oneself", "discovery of a detour-path and detour-behavior", etc. may appear and disappear at any moment clearly shows the process of dynamic change of the "relief of accent" (Betontheitsrelief) of the total field. The relationship between the degree of development of the logical intlligence and the difficulty of detour-behavior may mean the same thing as what Köhler calls "Umwegkurven in verschiedenen Grade" (5, 174) and what Maier (9) calls the effect of the habitual direction on a new direction.** Now I turn to the question what process of activity was taken by the superior and inferior children in Section I–II–III.

2. The use of tools in Section I, II, and III.

The superior and inferior children's use of tools in Sections I—III is shown in Table I.

On the whole, the tendency to use two kinds of tools in combination was greater in the superior children than in the inferior children. This was especially so in Section II where the children were required to grasp fairly complicated relations between the slope, the rolling of the ball, the shape of the tool, and the existace of an obstacle. Thus it is known that superior children made better selection of tools (the average number of tools used in combination in Section II is as follows: Superior children, 1.30 and inferior children 0.20; the difference is significant at the 5% level of confidence by t-test).

* Sections are shown by I, II, III, IV: Tools by S, R, C, etc.; Direction of the hand or tool used is shown by an arrow ↓ (for nistance, means the direction towards the subject); LH means the left hand, RH means the right hand.

** Hull, C. L. (1938) and Lewin, K. (1946) tried to explain this "effect of the starting angle" from their respective standpoint.

But to turn to each tool, tool S, which seems most effective through the three sections, was made use of most frequently either separately or in combination by the majority of children of both groups (superior child-

TABLE 1

The figures in this table show the number of times; e. g., Subject No. 1 used both tool T and R at the same time once, and R alone twice in Section I.

Section		I									II								III								
Method of use		Combination				Single					Combination				Single				Combination				Single				
Group	Tool / Ss No.	S • R	S • C	T • R	R • C	S	T	R	C	B	S • R	S • C	T • R	R • C	S	T	R	C	S • R	S • C	T • R	R • C	S	T	R	C	B
Superior Children	1			1				2			2		1						2	1							
	2		3									3										2	1				
	3				2	1							1	1		1						2	1				
	4					3									3								3				
	5					3									3								3				
	6	1				2									3								3				
	7					2				1					3								3				
	8					3									3								3				
	9	3									3													3			
	10				1	1	1							2	1							1	1			1	
	Total	4	3	1	3	15	1	2		1	5	3	2	3	16	1			2	1	1	5	17	3		1	
	Mean	1.10				1.90					1.30				1.70				0.90				2.10				
Inferior Children	11					3									3				2				1				
	12					2		1							2		1						2		1		
	13					2	1								2	1							2	1			
	14							2	1								2	1				1				1	1
	15	2				1					2				1				1						2		
	16						3									3								3			
	17					2		1							2		1						2		1		
	18					3									3								3				
	19					3									3								3				
	20					2	1								2	1							2		1		
	Total	2				18	5	4	1		2				18	5	4	1	3			1	15	4	5	1	1
	Mean	0.20				2.80					0.20				2.80				0.40				2.60				

ren: 90%, 90%, 80%,; inferior children: 80%, 80%, 70% in Section I, II and III respectively; the differences between the two groups are insignifi cant).

It was further noticed that even when the inferior children chose comparatively unfit tools such as R and C, they could pass the ball successfully through each section all three times with those tools, and make a detour, by rolling, scooping up and giving a jumping motion to the ball, as skilfully as the superior children with their single or combined use of tools.

In the case of the feeble-minded children, three of them failed to pass the ball through Section III. but the other seven handled the ball skilfully after their discovery of the detour-path, there being no difference in technique

between these children and the other groups. But the more or less conspicuous tendency observed among them was that after putting in the stick S or T perpendicularly through the bars, they did not make it horizontal but tried to push the ball holding the stick perpendicularly, and when taking out the stick, they tried to take it out by force without paying no attention to the bars, and in Section III they put in the stick at a wrong place and tried to bounce up the ball. But in general, we find that the superior, inferior and feeble-minded children made no great difference in their records as far as the results of Section I-II-III are concerned.

It is inferred, therefore, that if they had not been required to make adjustment to the physical structure of Section IV, the problem would have been solved without much difficulty by the children of all the three groups. And it follows that in a situation like Sections I-III where they make a detour by rolling, scooping and giving a jumping motion to the ball, the intellectual cognition and the intellectual activity have no relation at all with each other. Now let us see what was their abjustment to Section IV.

3. The use of tools iu Section IV (making of the detoure-path) and the patterns of solution of the total situation.

The use of tools by the superior children and inferior children in Section IV is shown in Table 2 and Fig.5, and the comparison of solution-

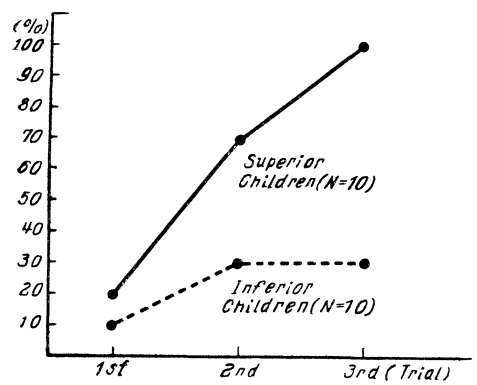

Fig. 5

TABLE 2

IV								
Superior Children					Inferior Children			
Ss	Success		Failure		Ss	Success		Failure
	Tool					Tool		
	B	S				B	S	
1	1	2			11		2	1
2	1	1	1		12			3
3	1	1	1		13			3
4	2		1		14			3
5	2		1		15		2	1
6	1		2		16			3
7	1		2		17			3
8	1		2		18			3
9		3			19	3		
10		2	1		20			3
Total	10	9	11		Total	3	4	23
Mean	1.90		1.10		Mean	0.70		2.30

pattern between the two groups in Table 3.

These tables and figure show, in the first place that very few of even the superior children succeded by using tool S or B, and that "direct solution by insight" of the problem in such a situation is extremly difficult for children of this age. In the second or third trial, however, superior children made rapid progress in "solution by insight after error" with any one of the tools, while inferior children, on the contrary, made little progress.

In other words, between the average numbers of both groups: $t=2.79$, $p=0.025$; between the percentages of solution by insight of total problem: $X^2=7.14$, $p=0.01$; namely the difference is found to be significant at each level. As for the feeble-minded, all 10 ended in non-solution, including those who failed before Section IV. Here are the typical cases of solution-patterns:

TABLE 3

Patterns of Learning \ Group		Superior children	Inferior Children
Solution	Insightful: Direct Solution by Insight	N=10: 2	N=10: 1
	Insightful: Solution by Insight after Errors	8	2
	Non-Solution	0	7

a) Direct solution by insight.

Subject No. 9;

Looking into the box here and there for some time, he murmured, "It 'll fall, I'm sure". Suddenly he said "I'll get it by covering there (i) with this stick (S)", with a smile—1m. 20 s. passed—and using both S and R he made a detour round c, further rolled the ball from (b) toward (d), and after scooping up to e he pressed it with R and, taking out S at the same time, put it into Section IV; next he took up T and pressed the ball with it and took out R, and holding perpendicularly, succeeded in buncing up the ball to (g). The whole process took 1m. 40 s. In his second trial likewise, he showed a smooth and appropriate behavior process with his handlings in each section directed toward the total purpose, and in the third it took him only 20 seconds to solve the problem.

b) Solution by insight after error.

Subject No. 7:

First trial: He first gave a few pushes to the ball in Section I with B and made a detour round (c). After that he perhaps found it difficult to use B in that way, and passed the ball through Section II and III with S. But he failed, because he did not cover the hole. In the second trial too he let fall the ball in Section IV (see Fig. 6), though he had made some progress in handling S. Soon after that, however, this subject, who had been watching the ball returning to its original place (a) cried "Oh, I see". He gave a hasty glance at the tools one after another, and the next time he tried, he stopped the hole with B and solved the problem by moving the ball with S (see Fig. 7).

Most of the inferior and feeble-minded children were apt to ascribe their failure to their handling in Section I-III. A moron child, for instance, in his third trial went on bouncing the ball with R and S alternatively in Section III and murmured many times "Wait, it (ball) will fall over there (i)" on his way, but knew not how to handle against the hole, and, perhaps

wanting to prevent the ball from falling down, he pushed B through the bars at (a) as far as (f) to block the path in Section III, and there he was seen bouncing the ball many times. Finding that this served only to make the ball return to (e), he took out B again, bounced the ball, and left it fall as in his first and second trials.

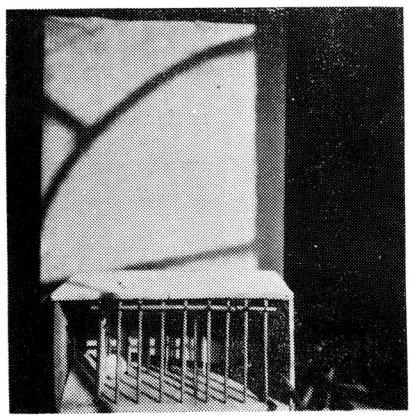

Fig. 6

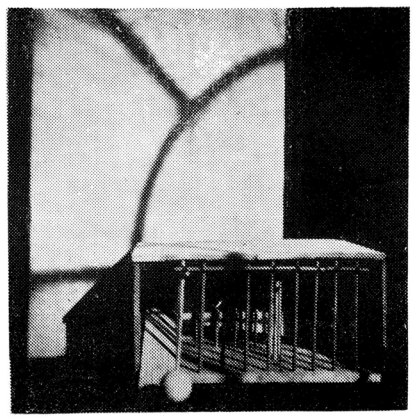

Fig. 7

With superior children, on the contrary, their failure made them survey the physical, causal relations of Section IV and the use of tools against the hole. The hypothesis built up there resulted in changing the cognitive structure of the total situation. In this case, the hole, which had so far been a part of a different whole playing no special role in the detour-path, seemed to be brought by the falling movement into close relation with the detour and united into a new whole.

Such a solution-pattern is different to some degree from what is called "foresight" as in cases where the subject can solve appropriately from the first beginning or "hindsight" after solution by trial and error, but it is a pattern of activity by insight which may be called, so to speak, a sort of "bysight". It may also be said a concrete process of the "structual shifting (Umstrukturierung) of the field of thinking" (1, 4, 6, 7, 20, 12). Consequently, it was found that in Section IV superior children adjusted much better than the other two groups, thus showing much better results in the solution of the whole problem including Section IV.

It may be concluded from this fact that in a situation where preliminary cognition before handling inevitably determines success or failure, the intellectual cognition exercises a positive, functional effect on the intellectual activity.

In future we must inquire into the the developmental limit of the relationships between these two intelligence functions.

SUMMARY

The purpose of this experiment was to inquire the relations between

the intellectual cognition or the logical intelligence and the intelliectual activity or the practical intelligence of the children.

We put to test ten superior children and ten inferior ones in the 6 th grade of the primary school and ten feeble-minded children for a supplementary experiment.

These children were told to lead a ball out of a detour-box with tools.

The principal resulte were as follows:

In the detour-handling of rolling, scooping up, giving a jumping motion to the ball, there could be found no difference in the results of the three groups. In such a case, hence, the intellectual cognition and the intellectual activity have no relation to each other.

However, in a situation in which preliminary cognition before handling inevitably determines the success or failure of the technical activity, such as th case in which one fails to let the ball pass a place unless one has stopped a hole beforehand with some tool, the superior children showed a more excellent adaptation than the other groups. This result led us to conclude that the intellectual cognition positivly and functionally affect the intellectual activity in such a situation.

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RÉSUMÉ

Le but de l'expérimentation est d'éclaircir les rapports existant entre la cognition intellectuelle ou l'intelligence logique et l'activité intellectuelle ou l'intelligence pratique des enfants, et en même temps d'observer l processus dynamique de la solution par la perspective. Nou avons pris, comme sujets, dix enfants supérieurs (âge chronologique 11 ; 9–12 ; 6, quotient d'inteillgence 119–136) et dix enfants inférieurs (âge chonologique 11;7–12;5, quotient d'intelligence 72–98) de la sixième année de l'école primaire et comme expérimentation auxilière, dix enfants à l'esprit faible (*anglais* moron et imbécile, âge chronologique 10 ; 2–14 ; 3, quotient d'intelligence 41–66).

Nous avons demandé à ces enfants de faire sortir une Balle hors de la boête à détours en employant un des cinq instruments.

Voici les résulatats principaux de l'expérimentation.

La compréhension de la structure visuelle de la situation de détour (découverte des passages détournés) a été facile pour les enfants supérieurs et les enfants inférieurs, mais elle a étéassez difficile pour les enfants à l'esprit faible. Nous avons compris le processus ici observé de la réaction habituelle à la découverte du passage détourné comme "un changement dynamique du relief de la figure et du fond" dans le champs intellectuel.

Quand les enfants détournent la balle en la roulant, ou en la ramassant, en la faisant sauter (cas analogue à celui de H. Bogen), il n'y a pas eu beaucoup de différence de résultats entre les trois groupes d'enfants. Nous avons appris en conséquence, qu'il n'y avait dans cette sorte de cas aucune liaison entre la cognition intellectuelle et l'activité intellectuelle.

Pourtant, dans le cas (cas au caractère anaglogue à celui de K. Gottschaldt) où la cognition avant manipulation détermine inévitablement le succès ou l'insuccès de l'activité, par exemple, dans le cas où l'on fait passer la balle au-dessus d'un trou qu'il s'agit de fermer avec un instrument, les enfants supérieurs se sont beaucoup mieux adaptés que ceux des autres groupes.

Nous avons conclu que dans un pareil cas la cognition intellectuelle agit positivement et fonctionnellement sur l'activité intellectuelle.

"La solution directe par la perspective" de tout le problème s'est vue très peu remarqueable même chez les enfants supérienrs mais dans "la solution par la perspective après erreur" ils ont donnè un résultat bien meilleur que les deux autres groupes,

Nous nous sommes expliqué ce faits comme un processus concret de "la réorganisation de la situation totale."

ZUSAMMENFASSUNG

In dieser Untersuchung haben wir versucht die Beziehung zwischen dem intelligenten Erkennen oder der logischen Intelligenz und dem intelligenten Handeln oder der praktischen Intelligenz in den Kindern klarzustellen und daneben den dynamischen Vorgang der einsichtigen Lösung zu betrachten.

In dem Hauptexperiment dienten als Vpn. 10 vortreffliche Kinder (L. A. :11; 9–12;6, IQ : 119–136) 10 minderwertigere Kinder (L. A. : 11:7–12:5, IQ : 72–98), alle Schüler des 6 Schuljahres in einer Volksschule,und in dem Ergänzungsexperiment 10 schwachsinnige Kinder (Debile und Imbezille, L. A. : 10:2–14 : 3, IQ : 41–66).

Die Aufgabe war eine Kugel mittels irgend eines der fünf Werkzeuge aus der Umweg-Kiste hinauszuführen,

Die hauptsächlichen Ergebnisse sind :

1) Die Auffassung der visuellen Struktur der Umweg-Situation, d. h. Entdeckung des Umwegs ist leicht für die vortrefflichen wie die minderwertigeren, aber es ist ziemlich schwer für die schwachsinnigen. Wir betrachten den Vorgang dieser Entdeckung als die dynamische Veränderung des Dankfeldes, d. h. die neu hervortauchende Struktur der Figur und des Grundes.

2) Es gibt keinen merkwürdigen Unterschied zwischen den drei Gruppen, wenn sie die Kugel durch stossendes Walzen, Aufschhöpfen und Aufschnellen den Umweg machen lassen (Ähnliche Situation wie die des H. Bogens). Wir finden also keine Beziehung zwischen dem intelligenten Erkennen und dem intelligenten Handeln.

3) Die vortrefflichen Kinder passen besser an als die anderen Kinder dem Fall, wo das vorausgehende Erkennen notwendig Erfolg order Misserfolg des folgenden Handelns bestimmt, wenn die Vp. zuvor die Höhle auf dem Wege mit dem Brett decken muss, so dass die Kugel hemmungslos hinüberrolle (ähnlicher Charakter bei der K. Gottschaldt's Situation). In solchem Fall bietet das intelligente Erkennen einen Vorteil für das intelligente Handeln.

4) Die direkte einsichtige Lösung der ganzen Aufgaben kommt selten auch in den vortrefflichen Kindern vor. In der einsichtigen Lösung nach dem Fehlen beweisen sie aber ganz bessere Leistung als die andere zwei Gruppen. Wir erklären also solchen Tatbestand als einen konkreten Vorgang der Umstrukturierung der ganzen Situation.