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INTERACTION OF SOCIAL AND BIOLOGICAL DETERMINANTS IN THE DEVELOPMENT AND FORMING OF THE PERSONALITY

SOME CONCEPTUALIZATIONS AND NEW RESULTS

The first scientific investigation of the biological basis of behaviour and experience was undertaken by Galton in his pioneering twin study in 1875; it was not until this time that the sciences of biology and psychology had developed sufficiently to support systematic studies in this area. Mendel's famous discoveries of the principles of heredity (1865) were notices by none of the biologists of that time. It is interesting for psychologists to know that Mendel aimed to discover material factors of development — according to him Elemente (now called genes). But sixteen years had to pass before the development of biological sciences anabled the rediscovery of his work. On the occasion of the international celebration of the centenary of the publication of Mendel's classic paper Experiments in Plant-Hybridisation an internationally attended Colloquium on Human Behaviour Genetics was held in Brno, too. A number of interesting and valuable papers was collected at this colloquium, especially in the framework of the critical review of methodology. The main contributions appeared 1971 in the volume one of Child Psychology and Patopsychology (Bratislava) which contains the papers of W. Arnold, J. Brožek, J. B. Gibson, A. Elithorn, J. Kotásková, S. Langer, G. A. Lienert, A. R. Luria, J. Linhart, J. Švancara et al. It should be remembered that the organizer (J. Švancara) was criticized for the sake of this topic because it was not emphasized by Marxist psychology. There is no better answer to such a short-sighted criticism that the appearance of two important volumes by prominent Soviet authors (Lomov, Šorochova, Brušlinskij, 1977; Lomov, Ravič-Ščerbo, 1978). It could be also mentioned that the 4th Prague Conference on psychological development, learning and forming of the personality which is to be held in 1981, shall include one thematic session dealing with genetic factors of psychological development.

In contemporary theories of personality development the important

role of social learning is emphasized (for instance J. Kotásková, 1975, O. Mikšík, 1979, J. Křivohlavý, 1980, J. Reykowski, 1980). However, it would be appropriate for the theory and practice of social learning and of prosocial motivation to bear in mind the activity of the learner. The question Who does the learning? involves two major issues: the developmental one and the differential one. In order to contribute to both problems under attack we shall try to evaluate a number of psychological results focussing on the biological and social determinants of personality development. In a dialectical conception of mutual influences of biological and social determinants of psychological development the nature-versus nurture controversy is beaten. To express this in simpler terms, the properties of personality are developed in the interaction between the organism and social environment, which illustrates Figure 1. Much controversy still occurs concerning the relative importance of genotype and environment in their mutual influences. One of the best examples of critical

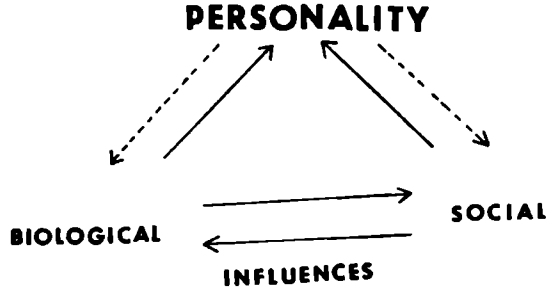

Figure 1. Functional interrelationships of the personality.

comparison of rivalling hypotheses was made by Lienert (1971); Lienert reformulated Rohracher's (1946) hypothesis, according to which environmental influence is being modulated by the hereditary equipment of the individual as a dependency model:

$$\mathrm{Var(B)} = \mathrm{Var(H)} + \mathrm{Var(E)} + \mathrm{Kov(H, E)},$$

where

$$\mathrm{Kov(H, E)} = r_{H,E} \sqrt{\mathrm{Var(E)Var(H)}},$$

where $r_{H,E}$ is the correlation between the measured values of both basic factors. Lienert further suggested a possibility of verifying both models in animal experiments.

Most authors would emphasize the decisive role of education in the process of personality development. There is a question how can be personality traits the subject of the same forces of inheritance as those that influence the body characteristics? This question may be rather baffling for a psychologist on first consideration, since he has gravitated quite naturally toward the observation of behaviour and may not have an explicit understanding of the exact nature of biological influences. Another important question is, whether the role of environmental factors increases

during the life-cycle. The problems arising in this connection can be solved by the means of special methods and through the integration of many types of results. It should be recalled at this point that (according to Brožek, 1971) the very first laboratory of behaviour genetics was built by I. P. Pavlov at Koltushi (now Pavlovo) fifty years ago. There, the genetic studies aimed primarily at the clarification of the nature of the inheritance of typological characteristics (strength of inhibition, mobility of nervous processes). We can see that the recent studies of Soviet psychologists continue in this experimental tradition (see Lomov et al., 1977, 1978).

THE ROLE OF METHOD

Surveying the findings from past and recent investigations in this area, we can see that the speed of improvement was greatly accelerated by introducing (1) suitable methodological framework, (2) efficient system for evaluation of the results obtained. One of the most widely used methods in studies of biological and environmental influences is the twin study, which was introduced by Galton. This method is based on the fact that monozygotic (MZ) twins develop from a single fertilized egg and thus are alike in the hereditary endowment; dizygotic twins develop from separate eggs and are no more alike in heredity than are ordinary siblings, of course, they share about the same basic environment and both MZ and DZ tend to be treated alike by parents, teachers, and other children.[1] The comparison of monozygous and dizygous twins has a great importance, especially when the twins have grown up in different life conditions. Almost universally, the similarity between MZ twins is greater than between DZ twins. The two kinds of twins provide a naturally occuring simple experiment: one influence (genetic similarity) varies, while the effects of others (environmental influences) are held fairly constant. The dyadic situation, may not be simple like this. Zazzo (1960) pointed out that some MZ twins may be treated more alike than DZ twins.[2] If so, then it becomes difficult to evaluate such pairs in the framework of the homogeneus sample of MZ twins. But generally, the differences between MZ partners are caused by environment and education, the differences between DZ partners are caused by both genetic and exogeneus factors:

$$D_{dz} = E + H$$
$$D_{mz} = E$$
$$D_{dz} - D_{mz} = H.$$

[1] It is an elementary fact that environmental experiences of twin pairs are usually more similar than the experiences of two unrelated persons and may give rise to specific personality traits in twins.
Discordant monozygotic twin pairs are interesting in themselves and offer a unique opportunity for research of personality development. Discordant MZ represent two individuals of identical genetic endowment who have reached differently even in rather similar environment. Oportunity is thus offered for intensive study of environmental differences in personality development of twins.

The traditional strategy of twin studies focused on the calculation of the relative importance of genotypic and environmental factors of personality. Since both factors are involved, in a certain way this question is senseless and just as silly as the problem whether the engine or the gasoline is of most importance for the movement of the car. As we mentioned, a further progress in this area seems to be at ancher in the interactional conception of biological and social factors. The third step may be seen in the system work which only can save the psychological investigation of twins before getting in a blind alley.

One of the widest reviews of twin studies was carried out by Nichols (1979) and his co-worker. They extracted 756 pairs of intraclass correlations and sorted the correlations according to the trait measured into the broad domains of personality. The results are shown in Table 1. There are unwighted averages of the studies involved; because most studies

Table 1. Mean Intraclass Correlations from Twin Studies of Various Traits (Nichols, 1979; with permission)

Trait	Number of Studies	r_{MZ}	r_{DZ}	Difference	
				r_{MZ}— r_{DZ}	Stand. dev.
Ability					
General Intelligence	30	.82	.59	.22	.10
Verbal Comprehension	27	.78	.59	.19	.14
Number and Mathematics	27	.78	.59	.19	.12
Spatial Visualization	31	.65	.41	.23	.16
Memory	16	.52	.36	.16	.16
Reasoning	16	.74	.50	.24	.17
Clerical Speed and Acc.	15	.70	.47	.22	.15
Verbal Fluency	12	.67	.52	.15	.14
Divergent Thinking	10	.61	.50	.11	.15
Language Achievement	28	.81	.58	.23	.11
Social Studies Achievement	7	.85	.61	.24	.10
Natural Science Achievement	14	.79	.64	.15	.13
All abilities	211	.74	.54	.21	.14
Interests					
Practical Interest	20	.50	.37	.13	.15
Science Interest	15	.54	.29	.25	.11
Busines Interest	22	.45	.30	.15	.14
Clerical Interest	10	.44	.26	.18	.09
Helping Interest	18	.48	.30	.18	.14
Artistic Interest	16	.50	.32	.18	.13
All interests	116	.48	.30	.18	.13
Personality					
Extraversion-Introversion	30	.52	.25	.27	.14
Neuroticism	23	.51	.22	.29	.21
Socialization	6	.49	.23	.27	.17
Dominance	13	.53	.31	.23	.18
Masculinity—Femininity	7	.43	.17	.27	.21
Hypochondriasis	9	.37	.19	.18	.28
Conformity	5	.41	.20	.22	.15
Flexibility	7	.46	.27	.19	.27
Impulsiveness	6	.48	.29	.19	.12
All personality	106	.48	.29	.19	.12

employ multiple measures, the same twin sample may be represented in several traits. Nichols states that individual differences in all traits of behaviour, from general intelligence to fingernail biting, are due in roughly equal part to genetic differences and to environmental differences. According to him, the environmental factors that influence abilities tend to affect members of the same family in the same way, while the environmental factors that influence personality and interests tend to affect members of the same family differently (op. cit. 11—13). We can see that there are really very high values which could have dangerous practical issues: they would indicate that the improvement of mental characteristics by modern methods of learning can only occur within rather narrow limits. Further, these results provide only very static information about the parcial properties of personality. As far as our opinion, the real value of the present and future twin results should be seen in their contribution to the solution of urgent needs of general, developmental and social psychology and how their conclusions can be applied in clinical practice, as well as in education and counselling.

On the basis of critical review of results and of the methodology in this area we reached the conculsion that there are at least three wide-ranging problems under attack which can be solved still advantageously on the material of twins:

1. the age variability of personality structure in the extent of the life cycle;
2. the dyadic relations as a model of a least natural social group;
3. the biological determinants of selfregulatory mechanisms at work regulating the interaction between the organism of the learner and the specific features of learning procedures.

The last point seems to be a very promising one as we deduce from the recent Soviet investigations and from the research strategies of Piaget school.

TWIN METHOD IN DEVELOPMENTAL PSYCHOLOGY

Let us present briefly some conceptualizations and results concerning the point one: the a g e v a r i a b i l i t y of psychological results in twins. We can see that in the most twin studies the ratio of genetic and environmental factors has been considered to be constant. For a developmental psychologist, however, the assumption readily occurs that the role of educational influences increases in the course of development of the child. Let us illustrate such hypothesis in Figure 2. The next Figure 3 illustrates the prevailing opinion of genetists that the interrelation of hereditary and environmental factors remains unchanged in the successive stages of psychological development. Luria (1971) in his investigation of memorization found support for the conclusion that the role of environmental influences increases in the process of development. Luria's results would support the second model of development illustrated in Figure 2.

Our own results relying on a longitudinal following up of some MZ

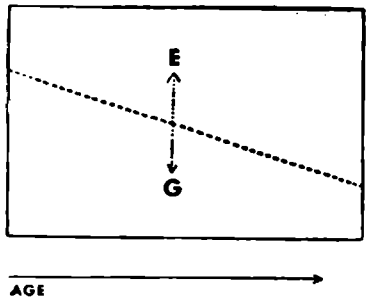

Figure 2. A schematic model of increasing role of environmental factors in the course of development.

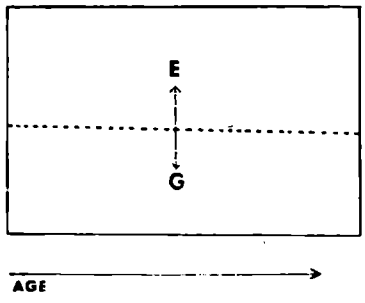

Figure 3. Genotype/environment ratio in the course of development.

and DZ pairs till adolescence and some single pairs till senescence corroborated another model represented by the Figure 4.

There is no doubt that a complex longitudinal project would provide an ideal design for the verification of developmental hypotheses of this type. This is the work for our next project. At present mostly a semilongitudinal evaluation is available according to the following design (see Figure 5).

The subjects of the Brno twin study were 250 pairs, aged 6 to 16 years, investigated in collaboration with the Institute of Pediatric Research, where the zygosity determination was decided with respect to blood groups and secretor factors. About 30% of pairs were monozygotic.

Our psychological twin study included a battery of laboratory techniques and tests: tachistoscopic perception, the measurement of simple reaction time, Elithorn's perceptual maze test, dynamometric measurement, Raven's coloured progressive matrices, a group intelligence test of Grzywak-Kaczyńska, human figure drawings, emotional apperception of colours, picture frustation test, aspiration responses, questionnaires, the microvibration recording in a trifactorial experiment including emotional stressor. Adapted analysis of variance technique, in which the effect of sex is removed when the combined sample is used, was calculated accordingly to Vandenberg (1965). In order to enable the comparison with other

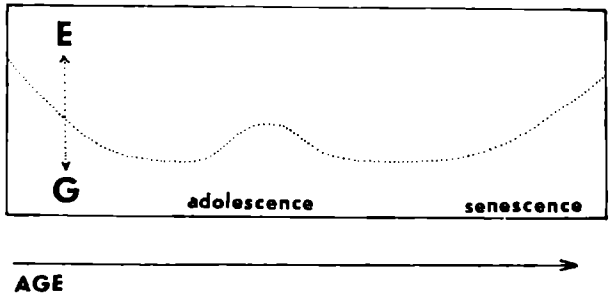

Figure 4 Another schematic illustration of the G/E ratio during the whole life cycle.

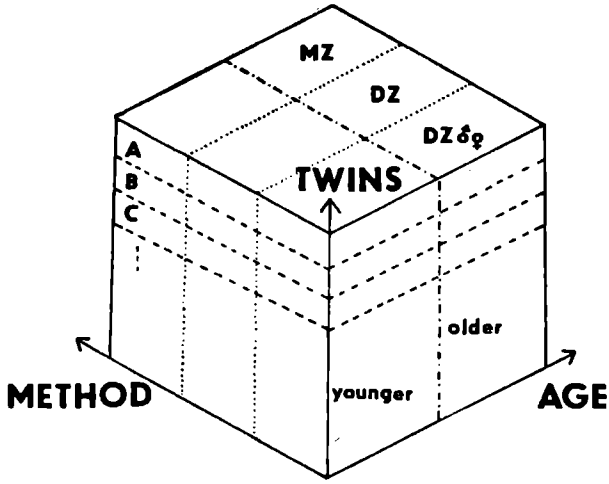

Figure 5. Three-dimensional model showing the basic variables of the Brno psychological twin study.

investigations the intraclass correlation coefficient was calculated, too; the formula is as follows:

$$r_i = s^2_b - s^2_w \,/\, s^2_b + s^2_w$$

where *b* is variance between pairs, *w* is the variance within pairs. The heritability index was also calculated; the formula used is

$$H' = s^2_{dz} - s^2_{mz} \,/\, s^2_{dz}$$

Comparison of the most frequent formulae aiming to estimate the extent to which a characteristic is genetically determined in the general population:

r_{mz}	r_{dz}	Holzinger's H	Nichols's HR	Jensen's h^2
1,00	0,50	1,00	1,00	1,00
0,40	0,20	0,25	1,00	0,40
0,90	0,80	0,50	0,22	0,20
1,00	0,99	1,00	0,02	0,02

We have also inductively reached further hypothesis: The relative simple and phylogenetically older abilities are genetically stronger determined than the more complex personality characteristics. These assumptions are represented in Figure 6.

It is of considerable interest that tens intraclass correlation coefficients we have gained, have a high variability, not always meeting our expectations. The measurement of simple reaction time yielded some of the highest r_i values (.80—.90) both in monozygous and in dizygous. On calcu-

lating H'we reached the value .35 with younger and .41 with older pairs. Of course, this small difference could be incidental. But accordingly, in Raven's PM we also gained a lower H'index with younger and higher with the older group (.25, .53). Thus, there is reason to assume that the genotype/environment ratios change[3] as illustrated in Figure 4. The analysis of the microvibration records leads to the following conclusion:

1. identical twins have not necessarily an identical MV record;

2. developmental changes are expressed by MV amplitude, not by MV frequency. Certainly, these methods are not feasible for every problem of personality development. Surveying, however, the results from the standpoint of more generally delimited psychological varaibles we can put the gained r_i into three groups:

1. motor behaviour, perception, verbal reasoning: high r_i with MZ but not necessarily low correlations with DZ;

2. perceptual maze, performance subtests of intelligence scales, human figure drawings: a modest positive r_i with MZ and DZ groups;

3. picture frustration, aspiration responses, social attitudes: inconsistent results.

Our data suggest that specific social attitudes are less dependent on the genes than are other psychological varibles. Thus, in view of these findings it seems reasonable to keep in mind the stratification of G/E ratios illustrated in Figure 6.

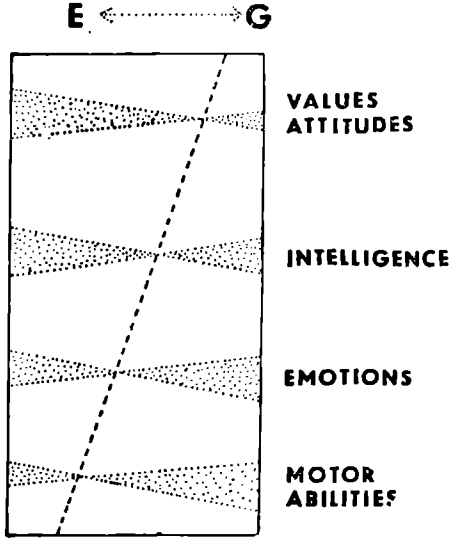

Figure 6. A model of G/E ratio in single psychological characteristics.

[3] For a long time psychologists have been playing with the possibility that certain skills or behaviours can be learned only at certain periods of development and also that certain skills cannot be learned until a certain stage of development has been reached. The investigotion of sensitive periods in human development, however, is still in its initial stage. The searching for personality development of twins will probably helps us to new starting-points in this area.

Let us give some remarks just to illustrate the complexity of the twinship. There is no doubt that we often neglect the intrapair variability of each single pair. Thus, it may be appropriate to introduce complex twin profiles enabling to fix and compare the cotwins in a number of variables as illustrated in Figure 7 showing a complex profile of a pair of monozygous boys, 10 years old. Blue: physical, hatched: psychological scores. Lienert's new configural frequency analysis could be an appropriate statistical tool for the further evaluation of the proposed twin profiles.

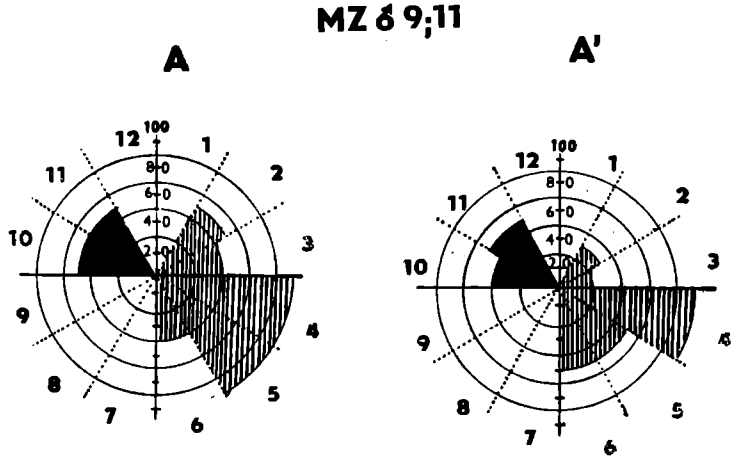

Figure 7. A complex profile of a pair of MZ twins, boys, 10 years old. Blue: physical, hatched: psychological variables.

Our recent investigation sought to identify some similarities of personality traits in twins. Von Bracken (1969) investigated in his first twin studies the tendency of the partners in a pair to feel attached to each other by employing standardized interviews and calculating an index of attachment. Answers in which the subject attached the significance to his twin brother/sister were counted as „attachment scores", answers indicating similarity, concordance, the desire to be alike, etc., were termed „neutral answers" and replies in which the subject stressed his own superiority, the desire to be different, etc., were considered to exhibit competitiveness. According to von Bracken, as a rule one of the partners is the „ambassador", it is he or she who answers when the pair is addressed, etc. In control investigations Lehtovaara (1938) and Husén (1959) employed analogous technique. Accordingly, Zazzo (1960) found that le même jumeau au cours de son histoire est tantôt dominant tantôt dominé. In our Brno twin study we employed an adapted questionnaire the answers of which were evaluated as „rivarly score" and „solidarity score". The *index of rivarly* was calculated according to the following formula:

$$IR = \frac{\text{Rivarly score}}{\text{Solidarity score} + \text{Rivarly score}} \cdot 100.$$

When 25 pairs of monozygous and 17 pairs of dizygous twins of school age were compared in the scores of this method (see Table 2) no significant differences were found. It may be in accordance with the decisive role of educational determinants in the development of prosocial behaviour in our country.

Table 2. Rivarly indices in twin samples (J. Švancara, I. Zetková, 1977)

Type o pairs	Number of pairs	Mean	SD	t	P
MZ	25	16,20	2,62	0,339	N. S.
DZ	17	17,71	3,59		
Boys	21	17,29	3,03	0,218	N. S.
Girls	21	16,33	2,99		
First-born	21	14,10	2,28	1,267	N. S.
Second-born	21	19,52	3,50		
More competitive	21	27,60	2,60	7,920	< 0.01
Less competitive	21	6,00	0,69		

Our future investigation would have the goal of elucidating the process of socialization in every pair of twins. Until now the most dramatic findings in this area were reported by Koluchová (1976, 1979); she reviewed an unusual case of MZ boys who had been living from the age of 18 months until 7 years in almost complete isolation, hidden from their neighbourhood, cruelly punished and tormented by hunger, hated by their step-mother. The original considerable intellectual deficit has been totally levelled out and also their language abilities have developed quite correctly. The nine-year-long detailed psychological observation of this pair by Koluchová is a valuable contribution to the process of forming of personality in dyadic relations.

Despite omissions, ambiguities and possible inaccuracies of interpretations and even though the twins are highly selected, the biographies of both twin partners contain data of a kind very hard to come by. They put down flesh-and-blood twin living and developing in the material, emotional and educational context of their family, neighbourhood, profession and society.

The comparative analysis of dyadic relations seems to be one of the promising approaches in the study of prosocial behaviour.[4] Maybe, it would make possible new conceptualizations of personality development, both theoretical and practical. One of the practical issues is the utilization

[4] Emphathy has a very important role in the diadic relation of twins. It is the basic mode of relatedness, of communication between twins from which voice, speech, gesture and inflection are all derivatives. Emphathy continues through the life of a twin pair.

of experiences for education and self-education of twins themselves. Simply, the twins are here and their parents and teachers should receive a constructive guide for unusual situations of the twinship based on modern psychological results. On the other hand it appears important to investigate the style of upbringing twins in different ages, too.

CONCLUSION

It is evident that the evaluation of genotype/environment ratios should be assessed at successive ages. It is impossible for psychologists to consider the age variability of intraclass correlations in twins to be an unpleasant outgrowth of traditional statistical analysis; in contrary, it is a promising starting-point for a complex, organismic and dialectical analysis of development. Probably this approach shall corroborate a discontinuity theory of personality development in which the individual would be considered to develop through stages and that may also result in the new elucidation of sensitive phases and of critical periods. Finally, the opinion is emphasized that such a complex investigation of genotype/environment ratio has still relevance both to genetics and to psychology and education.

REFERENCES

Bracken, H. v.: Humangenetische Psychologie. In: P. E. Becker (Hrsg.), Handbuch der Humangenetik. Stuttgart, Thieme, 1969, 409—561.

Brožek, J.: Genetics of Behaviour: Introduction to the Brno Colloquium on Human Behaviour Genetics. Psychol. and patopsychol. dieť., 1971, 6, 5—11. In Czech.

Cattell, R. B.: Research design in psychological genetics with special reference to the multiple variance method. Amer. J. Hum. Genet., 1953, 5, 76—93.

Husén, T.: Psychological twin research I. Stockholm, Almqvist and Wiksell, 1959.

Koluchová, J.: The further development of twins after severe and prolonged deprivation: a second report. J. Child Psychol. Psychiatry 1976, Vol. 17, 181—188.

Koluchová, J.: Lo sviluppo psichico di due gemelli monozigotici a seguito di una grave e prolungata deprivazione. Atti del IV congresso biennale della ISSBD. Milano, Franco Angelli, 1979, 69—75.

Kotásková, J.: Kontinuita a diskontinuita vývoje interakcí v socializačním procesu. Čs. psychol. 1975, 6, 508—526.

Křivohlavý, J.: Sociální zralost. Psychol. a patopsychol dieť., 1980, 15, 3, 195 až 204.

Lienert, G. A.: A contribution to psychological problems of hereditary-environmental influences from a methodological viewpoint. Psychol. a patopsychol. dieť., 1971, 6, 1, 53—59. In Czech.

Lomov, B. F., Šorochova, E. V., Brušlinskij, A. V. (red.): Biologičeskoje i social'noje v razvitii čeloveka. Moskva, Nauka, 1977.

Lomov, B. F., Ravič-Ščerbo, I. V. (red): Problemy genetičeskoj psychofiziologii. Moskva, Nauka, 1978.

Luria, A. R.: On variability of mental functions in the process of child's development. Psychol. a patopsychol. dieť., 1971, 6, 1, 13—20. In Slovak.

Mikšík, O. et al.: Aktuální problémy psychologie osobnosti. Praha, Horizont, 1979.

Mittler, P.: The study of twins. Penguin books, 1971.

Mönks, F. J., Hartrup, W. W., de Wit, J. (edit.): Determinants of Behavioral Development. New York-London, Academic Press, 1972.

Müntzing, A.: Human mentality in the light of Mendelism and genetic research. Folia Mendeliana 1971, 6, 335—339.

Nichols, R. C.: Heredity and environment. IAAEE Monographs No. 6. New York, 1979.
Reykowski, J.: Origin of prosocial motivation: Heterogenity of personality development. In: R. K. Silbereisen (Hg.): Bericht über die 4. Tagung Entwicklungspsychologie, Berlin 1980, 65—98.
Rohracher, H.: Die Mikrovibration. Bern-Stuttgart-Wien, Huber, 1969.
Švancara, J.: Variability of psychological results in twins as a starting point for developmental hypotheses. Psychol. a patopsychol. dět., 1971, 6, 1, 89—104.
Švancara, J., Zetková, I.: Podíl solidarity a rivality v dyadickém vztahu dvojčat. Nepubl. výzkumná zpráva, Brno, 1977.
Švancara, J.: Variabilità con l'età delle caratteristiche psicologiche nei gemelli. Atti del IV congresso biennale della ISSBD, Milano, Franco Angeli, 1979, 61—67.
Švancara, J.: Longitudinal study of preschool and school children from Brno. Studia psychol., 1979, 21, 4, 269—277.
Thompson, R. F.: Introduction to Biopsychology. San Francisco, Albion Publ. Co., 1973.
Vandenberg, S. G. (edit.): Methods and goals in human behavior genetics. New York, Acad. Press, 1965.
Wilson, R. S.: Synchronies in Mental Development: An Epigenetic Perspective. Science 1978, Vol. 202, 939—948.
Zazzo, R.: Les jumeaux, le couple et la personne, 1—2. Paris, PUF, 1960.

INTERAKCE SOCIÁLNÍCH A BIOLOGICKÝCH DETERMINANT VE VÝVOJI A FORMOVÁNÍ OSOBNOSTI

Psychologická zkoumání heritability přinášela donedávna více zužitkovatelných závěrů genetice než psychologii. Autor zaměřil brněnské kolokvium Human Behaviour Genetics 1970 na řešení problémů vývojové psychologie. Pro psychology je důležité vědět, že již G. Mendel usiloval ve své klasické práci o objevení materiálních faktorů **vývoje** („elementů"). Otázku o úloze biologického a sociálního ve vývoji člověka řeší v současné době také přední sovětští psychologové a psychofyziologové (Lomov a kol., 1977, 1978). Jestliže se v současných koncepcích vývoje osobnosti klade důraz na sociální učení, nelze zanedbávat otázku, **kdo** se učí; je to problematika determinace osobnosti a jejího vývoje. Dyadická situace dvojčat představuje nadále plodný přístup ke zkoumání vývoje socializace chování, formování osobnosti a rozumových schopností.

Ve svém výzkumu 250 monozygotních a dizygotních párů dvojčat školního věku autor ověřuje hypotézy o variabilitě relativního podílu biologických a sociálních determinant na různých věkových úrovních a u různých psychologických proměnných. Některé pozoruhodné rozdíly indexu H' u mladších a starších žáků naznačují revizi lineárního modelu základních faktorů vývoje. Autor dále konstatuje, že se při statistickém zpracovávání výsledků psychologického zkoumání dvojčat často zanedbává komparativní analýza dyadických vztahů každého dvojčecího páru, kterou tvořivě rozvíjí zejména Zazzo. Autor k tomuto účelu používá grafického znázornění „komplexního profilu dvojčecího páru". Zanedbává se také praktická aplikace závěrů. K důležitým úkolům v této oblasti patří objasnění vývojových zvláštností dvojčat pro rodiče, učitele i pro sebevýchovu dvojčat.

ВЗАИМООТНОШЕНИЕ СОЦИАЛЬНЫХ И БИОЛОГИЧЕСКИХ ДЕТЕРМИНАНТ В РАЗВИТИИ И В ФОРМИРОВАНИИ ЛИЧНОСТИ

Психологические исследования геритабильности приносят до сих пор более использовательных заключений генетике чем психологии. Автор статьи напрамил брновское колоквиум Human Behavior Genetics 1970 на решение проблем психологии развития. Говорит о том, что уже Г. Мендель стремился в своей классической работе к открытии

материальных факторов развития (элементов). Вопрос о роли биологического и социального в развитии человека решат в современности также видные советские психологи и психофизиологи (Ломов и кол. 1977, 1978). Если в современных концепциях развития личности придают особое значение социальному обучению, нельзя забрасывать вопрос, кто учится — это проблематика детерминации личности и ее развития. Диадическое положение близнецов всегда является плодотворным подходом к исследованию развития социализации поведения.

В своем исследовании 250 ОЯ и ДЯ пар близнецов школьного возраста проверяет автор гипотезы о вариабильности релативной доли биологических и социальных детерминант в течении возраста и у различных психологических переменных. Некоторые интересные различия возраста индекса Г' приводят к редакции линеарной модели основных факторов развития. Автор далее констатирует, что во время статистической обработки психологических исследований близнецов все чаще забрасывают компаративный анализ бинарных отношений каждой пары близнецов, разрабатыванный прежде всего Заззо. Автор для этой цели употребляет графическое изображение комплексного профиля пары близнецов. Часто пренебрегают также практической апликацией заключений. К важным задачам дальше принадлежит обработка особенностей развития близнецов для родителей, учителей и также для самовоспитания близнецов.