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BEHAVIORAL DISORDERS: A Nutritional Checklist

Ronald F. Bobner Louisa M. Marchionda Carolyn R. Benz Isadore Newman Mary J. Beaubien

Millions of dollars are spent annually on special educational programs for children whose severe behavior disorders prevent them from participating in the regular school setting despite average or above average intellectual capacity. A growing body of research indicates that some of these behavior disorders are related to nutritional problems. (Pfeiffer and Iliev 1972; Kittler 1973; Mayron 1979; and Buckley 1977), and many clinicians support the view that no matter what the etiology of behavioral disorders, nutritional programs can improve the baseline data on medical, social and intellectual achievement, and on personality measures (Palmer 1978). Our purpose here is to present a checklist of physical symptoms associated with dietary problems related to nonadaptive behavior in order to help teachers determine if a medical-nutritional referral is appropriate.

State of the Research

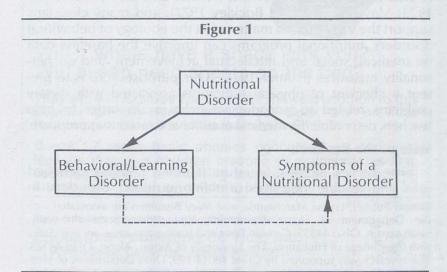
The dietary-medical literature (Grant 1979) has identified valid and reliable indicators of many nutritional disorders. In Ronald Bobner, Louisa Marchionda, and Mary Beaubien are associated with the Department of Home Economics, Youngstown State University, Youngstown, Ohio 44555. Carolyn Benz and Isadore Newman are associated with the College of Education, The University of Akron, Akron, Ohio 44325. This research was supported by Grant #8014-199, Ohio Department of Mental Health.

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general, the literature can be classified into three groups: studies of excesses and toxicities, of allergies and sensitivities, and of deficiencies. By contrast, much of the work on behavior disorders/learning disabilities and nutrition is anecdotal. Only a small portion is experimental, and virtually none directly addresses the question of the proportion of variance in these conditions or the percentage of the population accounted for by certain attribute variables. The relative effects of allergies and toxicities on learning disabilities, for example, has not been shown. The diagnostic value of attribute variables such as age, race, sex, and I.Q. are often related to a particular measure of learning but nutritional characteristics and their symptoms have not been usually related to the symptoms of learning or behavioral disorders.

Certain topics such as food allergies/sensitivities have received a disproportionate emphasis, while others such as malnutrition have been relatively neglected in the literature. In addition, it appears that much of the published experimental work is aimed at supporting or negating a particular treatment regimen or diagnostic tool rather than elucidating the underlying mechanisms.

The current research in behavior/learning disorders is just beginning to relate these problems to nutritional abnormalities. Figure 1 illustrates the link between these two conditions.



An example illustrated by this model is provided by lead in the tissues of the body. A toxic reaction to lead (nutritional disorder) produces deposits in the hair (symptom of nutritional disorder). This nutritional intake also is correlated with auditory problems (the behavioral/learning disorder). The presence of the behavioral disorder might lead one to check the hair in order to plan optimal remediation (the dotted line, a potential link).

Recognizing the potential value of such links between physical symptoms and behavioral disorders that stem from nutritional etiology suggested development of the checklist.

Criteria for Inclusion of a Substance

We set two prerequisities for the inclusion of a particular substance in the checklist. At a very minimum a strong tie between a substance and behavioral/learning disorders had to be supported by a variety of anecdotal records of a number of physicians and researchers. In addition, the nutritional disorder caused by the offending substance had to present physical symptoms that are well established in the dietary clinical and/or medical literature. The reference list presented in Table 1 includes those studies which we selected as being representative of the research on a particular substance. (See Table 1.)

Organization of the Checklist

Since, as we mentioned, our review of the nutritional literature relating to severe behavior handicaps and learning disabilities indicated that most studies could be classified as dealing with excesses/toxicities, deficiencies, or allergies/sensitivities, we organized our checklist using this framework. After reviewing the literature we constructed a matrix indicating the physical and behavioral symptoms included in the final checklist. (See Table 2.)

Limitations

Because of the second criterion for inclusion, the existence of well-established clinical symptoms for the associated nutritional disorder, nutritional disorders related to behavioral/ learning disorders which do not present physical clinical symptoms are not represented in the checklist. Furthermore, the instrument does not take into account subclinical excesses/ toxicities, deficiencies, or allergies/sensitivities which at more exaggerated levels might evidence clinical symptoms.

Validity

As currently constituted, the checklist has face and content validity. Face validity is assumed when an instrument looks to a respondent as though it is an accurate reflection of the data being collected. "On the face of it" it is acceptable. Content validity has been established by the literature research base. The correlations between the nutritional disorders and their clinical signs have been well established. However, the strength of the association between the specific substances included and their behavioral sequalae vary. It is important to note that one needs to approach different parts of the instrument with varying degrees of confidence. This is evident due to varying amounts of documented evidence for each nutritional symptom. Some disorders, e.g., lead toxicity, may have much more supportive evidence than others at this point in time.

The checklist might be used in known group validity studies to suggest areas of potential research concerning underlying etiologies of behavior/learning disorders. It might also be used in random selection studies to describe the occurrence of these disorders in various populations. Ultimately, such studies would allow an estimate of the percent of variance accounted for in behavior/learning disorders by nutritional phenomena. Correlating experimental results from a pilot study with retrospective case histories will provide a way to test out

interpretations of the results.

Table 1 (Substance, Author, Question Matrix), Table 2 (Substance, Physical Symptom, Question Matrix) and Checklist of Clinical Symptoms Related to Severe Behavior Handicaps and/or Learning Disorders are on following pages.

TABLE 1 Substance, Author, Question Matrix I. EXCESSES/TOXICITIES

	J	I.	H.	G.	F	T)	D.	C.	B.	P	
Checklist Question No.	Pica	Magnesium	Calcium	Copper	Zinc	Cadmium	Iron	Mercury	Sucrose	Lead	
1											Arnold, Christopher, Huestes & Smeltzer MEGAVITAMINS FOR MINIMAL BRAIN DYSFUNCTION
2							-				Brenner TRACER MINERAL LEVELS IN HYPERACTIVE CHILD- REN RESPONDING TO THE FEIN- GOLD DIET
w					1000	THE PERSON NAMED IN					ORTHOMOLECULAR APPROACH TO THE TREATMENT OF LEARN- ING DISABILITIES
4	-										Kraus FEINGOLD DIET
UI					The second						Rapp ALLERGIES AND THE HYPERACTIVE CHILD
6									X		Rimland AN ORTHOMOLECULAR STUDY OF PSYCHOTIC CHILD- REN
7		×	×	×	×	×				×	Sodeman TRACE ELEMENTS
80									×		Service HYPOGLYCEMIA
9					1		X	×	×	×	Sieben CONTROVERSIAL MEDI- CAL TREATMENTS OF LEARNING DISABILITIES
10						77			×	- 0	Thompson BRAIN FUNCTION & VIOLENCE
=	The state of the s									100	Prasad METABOLISM OF ZINC & ITS DEFICIENCY IN HUMAN SUBJECTS
12		X					200		7		Stevens & Ekvall MAGNESIUM DEFICIENCY & TOXICITY
H	×						1			×	Kalisz, Ekvall & Palmer PICA
14									THE PERSON	No.	Myron ALLERGY, LEARNING & BEHAVIOR PROBLEMS
15											Salzman ALLERGY, TESTING, PSYCHOLOGICAL ASSESSMENT AND DIETARY TREATMENT OF THE HYPERACTIVE CHILD SYNDROME

	J.	I.	H.	G.		173	D.	C.	B.	A	
Question #	Pica	Magnesium	Calcium	Copper	Zinc	Cadmium	Iron	Mercury	Sucrose	Lead	
16									X		Huges, Dettinger, Leon, Fordyce and Gotkchalk CASE REPORT: A CHEMICALLY DE- FINED DIET IN DIAGNOSIS AND MANAGEMENT OF FOOD SENSITI- VITY IN MINIMAL BRAIN DYS- FUNCTION
17											Levy & Forbes HYPERKINESIS & DIET: A REPLICATION STUDY
18				×							Mayron ECOLOGICAL FACTORS IN LEARNING DISABILITIES
19										×	Silver, Kempe & Bruyn HAND- BOOK OF PEDIATRICS
20							State of				Webb IRON DEFICIENCY ANEMIA AND SCHOLASTIC ACHIEVEMENT IN YOUNG ADOLESCENTS
21										X	Needleman LEAD POISONING IN CHILDREN: NEUROLOGICAL IMPLICATIONS OF WIDESPREAD SUBCLINICAL INTOXICATION
22						×	The second	The same		×	Pihl & Parkes HAIR ELEMENT CONTENT IN LEARNING DISABLED CHILDREN
23						×				×	Maugh HAIR: A DIAGNOSTIC TOOL TO COMPLEMENT BLOOD SERUM AND URINE
24					200				No. of Parties		Kalisz & Ekvall FOOD ALLERGY IN CHILDREN
25					THE PERSON NAMED IN				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		Thiesen & Mills THE USE OF MEGAVITAMIN TREATMENT IN CHILDREN WITH LEARNING DIS- ABILITIES
26					0						Hamilton & Whitney NUTRITION CONCEPTS AND CONTROVERSIES

	R.	0	. 0				7		I.		H	G.	79		F		0		2		B	7									
Question #		Magnesium	Calcium	Vitamin E	Manganese	Copper	Zinc	Vitamin D	Folic Acid	(Vitamin B12)	Cyanocobalamin	Biotin	Pantothenic Acid	(Vitamin B6)	0	(Vitamin B3)		(Vitamin B2)	Riboflavin	(Vitamin B1)	iamin	(Vitamin C)									
1							NEW TOWN					S. P. L.											Arnold, S Smelt MINIMAL	tzer	MEC	AV.	ITA	MIN	SF		
2														100			The second						Brenne: IN HYPI SPONDIN	ERACT		CH	ILD	REN	RE	-	5
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5											1		1								1		Rapp A			5 &	TH	E H	YPE	R-	
6						-	1		THE REAL PROPERTY.				100										Rimland STUDY (ORT						
7												1		N					1		T		Sodeman	n TR	ACE	EL	EME	NTS			
00																				I			Service	e HY	POGI	YC	EMI	A			
9	1000						The Party of the P				000												Sieben TREATMI ABILITI	ENTS	TROV OF I						
10																							Thompso		RAIN	FT	JNC	TIO	N &		
11																							Prasad ITS DEF JECTS								THE PERSON NAMED IN
12								ALC: UNIT			-												Stevens					GNE ITY	SIU	И	
13														-							T		Kalisz,	Ekv	all	& 1	Pal	mer	P:	CA	
14						1000	100					No. of London			The same								yron BEHAVIO	ALLE OR PR	RGY,	LI	EAR	NIN	G &	1	
15							2000				The second second						7						alzmar PSYCHOI DIETARY TYPERAC	TRE	ATME	NT	OF	MEN	T Al	ND	

Question #		Q. Magnesium		O. Iron	N. Vitamin E		L. Copper	K. Zinc	J. Vitamin D	I. Folic Acid		H. Cyanocobalamin	Biotin	F. Pantothenic Acid	(Vitamin B6)	(vicamin b)	D. Niacin	(Vitamin B2)	C. Riboflavin	(Vitamin B1)	A. Ascorbic Acid (Vitamin C)	
1 16	The second second														17 17 17 17			10000000000000000000000000000000000000				Huges, Dettinger, Leon, Fordyce & Gotkchalk CASE REPORT: A CHEMICALLY DE- FINED DIET IN DIAGNOSIS & MANAGEMENT OF FOOD SENSI- TIVITY IN MINIMAL BRAIN DYSFUNCTION
17					100								A. A. S.									Levy & Forbes HYPERKINE- SIS & DIET: A REPLICATION STUDY
18		×	×			T.		×	100		1.1							×		1	×	Mayron ECOLOGICAL FACTORS IN LEARNING DISABILITIES
19																						Silver, Kempe & Bruyn HANDBOOK OF PEDIATRICS
20				×					The second													Webb IRON DEFICIENCY ANE- MIA AND SCHOLASTIC ACHIEVE- MENT IN YOUNG ADOLESCENTS
21																						Needleman LEAD POISONING IN CHILDREN: NEUROLOGICAL IMPLICATIONS OF WIDE- SPREAD SUBCLINICAL INTOXI- CATION
22									The state of									18 8 19				Pihl & Parkes HAIR ELEMENT CONTENT IN LEARNING DIS- ABLED CHILDREN
23	×	X	×					×											DIA TO			Maugh HAIR: A DIAGNOSTIC TOOL TO COMPLEMENT BLOOD SERUM AND URINE
24									F													Kalisz & Ekvall FOOD ALLERGY IN CHILDREN
25														×	×	>	4				×	Thiesen & Mills THE USE OF MEGAVITAMIN TREATMENT IN CHILDREN WITH LEARNING DISABILITIES
26									No.					No.								Hamilton & Whitney NUTRI- TION CONCEPTS AND CONTRO- VERSIES

Question	V. Salicylates	(Pres.)	U. Additives	T. Tomatoes			Q. Bakers yeast		O. Chicken	133	toes	M. White Pota-	L. Beef	K, Cereal	J. Berries	I. Nuts	H. Seafood		173		D. Cola		B. Wheat	A. Milk	
_									The Party of the P																Arnold, Christopher, Huestes & Smeltzer MEGAVITAMINS FOR MINIMAL BRAIN DYSFUNCTION
2				The second second												THE PARKS									Brenner TRACER MINERAL LEVELS IN HYPERACTIVE CHILD- REN RESPONDING TO THE FEIN- GOLD DIET
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4	×	×						×			Γ			100		50							-		Kraus FEINGOLD DIET
5	×	×						X		57					S							100000			Rapp ALLERGIES & THE HYPER- ACTIVE CHILD
6			N. T.		See See			200		50 00								1 2 1							Rimland AN ORTHOMOLECULAR STUDY OF PSYCHOTIC CHILDREN
7	×	×			1			×								2000									Sodeman TRACE ELEMENTS
20							1			0	Г												×		Service HYPOGLYCEMIA
9																			THE PERSON NAMED IN						Sieben CONTROVERIAL MEDICAL TREATMENTS OF LEARNING DIS- ABILITIES
10					T	100						0				N N N		100							Thompson BRAIN FUNCTION & VIOLENCE
11													74												Prasad METABOLISM OF ZINC & ITS DEFICIENCY IN HUMAN SUB- JECTS
12							-		10.00	1		No.	1	N. S.				E ST							Stevens & Ekvall MAGNESIUM DEFICIENCY & TOXICITY
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Question	Salicylates	Additives (Pres.		130	1	18			Pork	White Potatoes		Cereal	Berries	Nuts	Seafood	Eggs	Citrus Fruits	Corn	Cola	Chocolate	Wheat	Milk	
16				×	×	×									×		×					×	Huges, Dettinger, Leon, Fordyce & Gotkchalk CASE REPORT: A CHEMI-CALLY DEFINED DIET IN DIAGNOSIS & MANAGEMENT OF FOOD SENSITUITY IN MINIMAL BRAIN DYSFUNCTION
17		×		100								HEAL PAR			KE STATE								Levy & Forbes HYPERKINE- SIS AND DIET: A REPLICA- TION STUDY
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19																10.0							Silver, Kempe & Bruyn HANDBOOK OF PEDIATRICS
20					No.																		Webb IRON DEFICIENCY ANEMIA AND SCHOLASTIC ACHIEVEMENT IN YOUNG ADOLESCENTS
21						TANK I	The second second					A AGE IN											Needleman LEAD POISONING IN CHILDREN: NEUROLOGI- CAL IMPLICATIONS OF WIDE SPREAD SUBCLINICAL IN- TOXICATION
22								1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					THE REAL PROPERTY.										Pihl & Parkes HAIR ELE- MENT CONTENT IN LEARNING DISABLED CHILDREN
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25				7-87				The second second			STATE OF STATE OF								1				Thiesen & Mills THE USE OF MEGAVITAMIN TREATMENT IN CHILDREN WITH LEARN- ING DISABILITIES
26				THE REAL PROPERTY.		N S N		N. Complete	No. 101 Co.				The state of the s		THE PERSON								Hamilton & Whitney NU- TRITION CONCEPTS AND CONTROVERSIES

	Substance,	
I. EXCESSES/TOXICITIES	Substance, Physical Symptom, Question Matrix	

								.,			
Question #	Pica	Magnesium	Calcium	Copper	Zinc	Cadmium	Iron	Mercury	Sucrose	Lead	
-							×		×	×	waxy pallor
2						283	16.6			×	translucent appearance of skin, particularly around the ears
ω						100	2 the			×	very pale mucous mem- branes
4		- Aug	110							×	lusterless, thin, brittle, flattened and spoon-shaped finger- nails & toenails
5				0.00 0.00 0.00						×	coldness and abnormal sensation as prickling and itching of hands and feet
6				×					×	×	convulsions
7			×			×					headaches
80			×		ida		TOL		40	933	abdominal pain
9	×								×		stupor
10			100	8. 3	-				×		breath odor (acetone)
11					- CE	20	0.00				decreased or diminished sense of taste (hypo- geusia)
12											diminished sense of smell (hyposmia)
13	1								×		sluggishness, tiredness
14											colic
15					×						tendancy to drool
16	×	×	×	10					×	×	short attention span
17									×		sweating (excessive)
156				1					×		limpness
19	N.							310	×	-	listlessness
20				nad Tar	Tark.				×		abnormal rapidity of heart action

	J.	1.	=	G.	.79	, to	D.	C.	В.	A.	
Question #	Pica	Magnesium	Calcium	Copper	Zinc	Cadmium	Iron	Mercury	Sucrose	Lead	
21				12			111111111111111111111111111111111111111				loss of coordination of the muscles, especially of the extremities (ataxia)
22											inflammation of nose or its mucous membranes (allergic rhinitis)
23	Ď,			Ama							inflammation of ear (serous otitis media)
24									55		inflammation of the membrane lining of the windpipe and bronchial tubes (bronchitis)
25											labored breathing, a con- striction in chest with coughing (asthma)
26											inflammation of lip (chel- itis)
27	B	Y.				12					inflammation of mouth (stomatitis)
28				i i		0.7 m					ulcerous sores, especially in the mouth (canker sores)
29									Page 1		inflammation of skin with itching and exudation of serious matter (eczema)
30	15					10 C S		100	17		hives (urticaria)
31			in.								itching (pruritis)
32			1						×		obesity
33	×			= 15						×	underweight
34			F								ring of fine blood vessels around colored paer of eye (circumcorneal injection)
35									70		taste buds look red or pink (hyperaemic papillae of tongue)
36								day			tongue looks granular (hyper- tropic papillae of tongue)

	J.		H.	G.	-	[7]	D.	C.	В.	A.	
Question #	Pica	Magnesium	Calcium	Copper	Zinc	Cadmium	Iron	Mercury	Sucrose	Lead	
, 37											widespread thickening of skin at knees, elbows, ankles, and possibly knuckles. Skin may also be wrinkled and cracked.
38							III,				increased secretion of seba- ceous glands around nose (nasolabial seborrhea)
39											eyelid linings, inner sur- faces of cheeks pale (pale conjunctiva)
40					1000			or tunk			corners of eyes become cracked and red (angular palpebritis)
41					no.						bilateral cracks, redness and flaking at corners of mouth (angular stomatitis)
42											vertical cracks on lips (cheilosis)
43					739	10] 1			123		purplish-red tongue (magenta tongue)
44							872	10			atrophied taste buds. Tongue appears smooth, pale and slick (atrophic filiform papillae)
45											tongue is red, painful and taste buds atrophied. Burn- ing and taste changes pre- sent (glossitis)
46											hyperpigmented areas bi- laterally on cheeks, forearms, neck, etc. (pellaground der- matosis)
47											loss of ankle jerks
48									5 10		loss of knee jerks
49											darkened or brown pigmenta- tion over cheeks and under eyes (malar and supraorbital pigmentation)

	J.	I.	Ξ.	G.	. ¹⁷	111	D.	C.	В.	A .	
Question	Pica	Magnesium	Calcium	Copper	Zinc	Cadmium	Iron	Mercury	Sucrose	Lead	
# 50					100		96	199	×		skin diseases
51								×	N A SI		ulceration of gums & mouth
52						200					inflammation of stomach & intestinal tract (gastro-enteritis)
53	T.										extreme thirst
54								1			extreme warmth
55								E			hypersensitivity to light
56			102	100			Ē.,			1	burning sensation of feet
57								-1	13		muscle twitching
58	1										cramps
59					M					Y	lack of muscle tone (hypotonia)
60		100		127		1/3/		021	51		body temperature below normal (hypothermia)
61											loss of pigment in skin & hair
62					E DE						dermatitis
63											vertical ridging on finger- nails
64					100						tremors
65											tetany
66							44	1	a R	1	dark circles under eyes
67					×						vomiting

		0	9								H.	G.	7	tri .	D.	C.	В.	A.	
Question #	Lithium	Magnesium	Calcium	Iron	Vitamin E	Manganese	Copper	Zinc	Vitamin D	Folic Acid	Cyanocobalamin	Biotin	Pantothenic Acid	Pyridoxine	Niacin	Riboflavin	Thiamin	Vitamin C	
1				×	×		×			×	×	×				X		×	waxy pallor
2				X	×	100	×		0 5	X	×	×		Total I		×	1	×	translucent appearance of skin, particularly around the ears
w				×	×		×			×	×	×			100	×		×	very pale mucous membranes
4				×	×		×			×	×	X	THE PERSON			X		×	lusterless, thin, brittle, flat- tened and spoon-shaped fingernails and toenails
л				×	×		×			X	X ·	×	A THE PARTY			X		×	coldness and abnormal sensation as prickling and itching of hands and feet
2		×	×				i A		×		B	100		×				7	convulsions
7													-		×	al visit			headaches
20	0																1		abdominal pain
9													100						stupor
10						1													breath odor (acetone)
11						1 1 1 1 1 1	2 7 1	×											decreased or diminished sense of taste (hypogeusia)
12								×											diminished sense of smell (hyposmia
12				×					×					X		X	X		sluggishness, tiredness
14						100							THE CO.	Show !	300			103	colic
,														1					tendancy to drool
16							-												short attention span
17																			sweating (excessive)
18																			limpness
19				×											-	No.			listlessness
20																			abnormal rapidity of heart action
21								100			The second	100			0				loss of coordination of the muscles especially of the extremities (ataxia)

- 1					N. V			K. 2	J. V	I. F	H. C	G. B	F. P	E. P	D. N	C. R	B. T	A. V	
Question #	ithium	Magnesium	Calcium	Iron	itamin E	anganese	opper	inc	Vitamin D	olic Acid	Cyanocobalamin	Biotin	Pantothenic Acid	Pyridoxine	Niacin	Riboflavin	Thiamin	Vitamin C	
													181						inflammation of nose or its mucous membranes (allergic rhinitis)
23			0		25					100	Par la		00			181	Section 2		inflammation of ear (serous otitis media)
24																			inflammation of the membrane lin- ing of the windpipe and bronchial tubes (bronchitis)
25									STATE OF		100					18 2			labored breathing, a constriction in chest with coughing (asthma)
26			1000								135		100				81103		inflammation of lip (chelitis)
27			1500				T.		191										inflammation of mouth (stomatitis)
28		L. CALL															The Nation		ulcerous sores, especially in the mouth (canker sores)
29																			inflammation of skin with itching and exudation of serous matter (eczema)
30				day.															hives (urticaria)
31									1201		191		9000						itching (pruritis)
32															18	200	N. A.		obesity
띪							No.		100	1			187			1			underweight
34		£2000									M. C.					The second	×		ring of fine blood vessels around colored part of eye (circumcorneal infection)
35		A TOWN			A 0.00						S. S. S.			100		×	S. C. S.		taste buds look red or pink (hyper- aemic papillae of tongue)
36	-	SERVICE				The state of the s	19		00000					The second		×	100		tongue looks granular (hypertropic papillae of tongue)
37				San San Carlotte											×	THE REAL PROPERTY.			widespread thickening of skin at knees, elbows, ankles, and possibly knuckles. Skin may also be wrinkled and cracked.
38								×						×	×	75.			increased secretion of sebaceous glands around nose (nasolabial seborrhea)

	Olo	P.					×.	J.	I.	H.	G.	F .	E	D.	C.	В.	A.	
Question #	Magnesium	Calcium	Iron	Vitamin E	Manganese	Copper	Zinc	Vitamin D	Folic Acid	Cyanocobalamin	Biotin	Pantothenic Acid	Pyridoxine	Niacin	Riboflavin	Thiamin	Vitamin C	
39		×							×	×								eyelid linings, inner surfaces of cheeks pale (pale conjunctiva)
40														×	×			corners of eyes become cracked and red (angular palpebritis)
41		×		THE PERSON NAMED IN									×	×	×			bilateral cracks, redness and flak- ing at corners of mouth (angular stomatitis)
42															×			vertical cracks on lips (cheilosis)
43														×	×			purplish-red tongue (magenta tongue)
44						1		×		×				×	×			atrophied taste buds. Tongue appears smooth, pale and slick (atrophic filiform papillae)
45		×				77 7		×					×	×	×			tongue is red, painful, and taste buds atrophied. Burning and taste changes present (glossitis)
46														X			1	hyperpigmented areas bilaterally on cheeks, forearms, neck, etc. (pellagrous dermatosis)
47				-						×								loss of ankle jerks
48																		loss of knee jerks
49														X				darkened or brown pigmentation over cheeks and under eyes (malar and supraorbital pigmentation)
50										7		La Maria			×			skin diseases
51																		ulceration of gums & mouth
52												×						inflammation of stomach and intestinal tract (gastroenteritis)
53																		extreme thirst
54																		extreme warmth
55												×		T	×			hypersensitivity to light
56												×						burning sensation of feet
57							×		T		-			T				muscle twitching

1	R	0	P.	0.	Z.	3	L.	х.	J.	I.	H.	G.	T]	E I	D.	C.	В.	A.	
9	hium	Magnesium	Calcium	Iron	Vitamin E	Manganese	Copper	Zinc	Vitamin D	Folic Acid		iot	Pantothenic Acid	Pyridoxine	Niacin	Riboflavin	Thiamin	Vitamin C	
58														0			0.0		cramps
59							100						-			HEAT IN	3	100	lack of muscle tone (hypotonic)
60											7		181			100			body temperature below nor- mal (hypothermia)
61							2 8 8	-											loss of pigment in skin and hair
62																1			dermatitis
63															177				vertical ridging on finger- nails
64																			tremors
65		1	0																tetany
66																			dark circles under eyes
67	-		-		-					4		7			-				vomiting

Question #	V. Salicylates		T. Tomatoes		R. Beans	Q. Baker's Yeast	P. Food dyes	O. Chicken	Pork		Beef	K. Cereal	J. Berries	I. Nuts	H. Seafood	G. Eggs	F. Citrus Fruit		D. Cola	C. Chocolate		A. Milk	
1		-	-																		1		waxy pallor
2	100			THE PERSON			THE PERSON NAMED IN										AL AL SE		1				translucent appearance of skins, particularly around the ears
w										1													very pale mucous membranes
4						A			B		The same of	TO THE	L G					The Party	10 to 10 to				lusterless, thin, brittle, flattened and spoon-shaped fingernails and toenails
5	The sales						-				11 P. S. Co.	10 1 10	100										coldness and abnormal sen- sation as prickling and itching of hands and feet
6										18									1				convulsions
7					N				Y.		200	100		200			100			90			headaches
00												-									-		abdominal pain
9							1000	31				13			1					W.			stupor
10																							breath odor (acetone)
11																							decreased or diminished sense of taste (hypo-geusia)
12												100											diminished sense of smell (hyposmia)
13	×	×	×	×	X	X	×	×	×	×	×	×	×	X	×	×	×	×	×	×	×	×	sluggishness, tiredness
14		×	×		-													1					colic
15		×	×			1						7											tendancy to drool
16												1											short attention span
17			1							19		1						14					sweating (excessive)
18										-		20	1										limpness
19						P		130		1		4									1		listlessness
20					1000					THE STATE OF				S. Contraction	1	101				200			abnormal rapidity of heart action

		U. Additives	T. Tomatoes	S. Pears	Beans	Q. Baker's Yeast	Food dy	O. Chicken	N. Pork	M. White Potatoes	Beef	K. Cereal	J. Berries	I. Nuts	H. Seafood	G. Eggs	F. Citrus Fruit	E. Corn	D. Cola	C. Chocolate	B. Wheat	A. Milk	
21																							loss of coordination of the muscles especially of the extremities (ataxia)
22	×	×	×	×	×	×	X	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	inflammation of nose or its mucous membranes (allergic rhinitis)
1 23	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	X	×	×	inflammation of ear (serous otitis media)
24	×	×	×	×	×	×	×	×	×	×	×	X	X	×	X	×	×	×	×	×	×	×	inflammation of the membrane lining of the windpipe and bronchial tubes (bronchitis)
25	×	×	×	×	×	×	×	×	×	×	×	×	×	×	X	×	×	×	×	×	×	×	labored breathing, a constriction in chest with coughing (asthma)
26	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	inflammation of lip (chelitis)
27	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	inflammation of mouth (stomatitis)
28	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	ulcerous sores, especially in the mouth (canker sores)
29			The state of the s										100			Par III						×	inflammation of skin with itching and exudation of serous matter (eczema)
30											-3											×	hives (urticaria)
31		Ì	-			1															1	×	itching (pruritis)
32																							obesity
33							100	0														×	underweight
34									The state of												The second		ring of fine blood vessels around colored part of eye (circumcorneal infection)
35		-							1							1					181		taste buds look red or pink (hyperaemic papillae of tongue)
36		Second Second																111111111111111111111111111111111111111					tongue looks granular (hyper- tropic papillae of tongue)
37							The second second															No.	widespread thickening of skin at knees, elbows, ankles, and possibly knuckles. Skin may also be wrinkled and cracked.
38																							increased secretion of sebaceous glands around nose (nasolabial seborrhea)

Question #	V. Salicylates	U. Additives	T. Tomatoes	S. Pears	Beans	Q. Baker's Yeast	Food dye	O. Chicken	N. Pork	M. White Potatoes	K. Cereal	J. Berries		H. Seafood	F. Citrus Fruit		D. Cola		B. Wheat		
39																					eyelid linings, inner surfaces of cheeks pale (pale conjunc- tiva)
40																	1				corners of eyes become cracked and red (angular palpebritis)
41						M. M.								138				A P			bilateral cracks, redness and flaking at corners of mouth (angular stomatitis)
42									100									-			vertical cracks on lips (cheilosis)
43			1																		purplish-red tongue (magenta tongue)
44					100								N. S. L.								atrophied taste buds. Tongue appears smooth, pale and slick (atrophic filiform papillae)
45																	1 1 1 1				tongue is red, painful, and taste buds atrophied. Burning and taste changes present (glossitis)
46																					hyperpigmented areas bilaterally on cheeks, forearms, neck, etc. (pellagrous dermatosis)
47																					loss of ankle jerks
48																					loss of knee jerks
49																					darkened or brown pigmentation over cheeks and under eyes (malar and supraorbital pigmen- tation)
50																				2	skin diseases
51																					ulceration of gums & mouth
52																The state of					inflammation of stomach and intestinal tract (gastro-enteritis)
53																					extreme thirst

CU. H. S. R. O. P. O. N. H. H. G. F. B. D. C. B. A.

Question #	Salicylates	Additives	Tomatoes	Pears	Beans	Baker's Yeast	Food dyes	Chicken	Pork	White Potatoes	Beef	Cereal	Berries	Nuts	Seafood	Eggs	Citrus Fruit	Corn	Cola	Chocolate	Wheat	Milk	
54		4																					extreme warmth
55				9																			hypersensitivity to light
56																							burning sensation of feet
57				100																			muscle twitching
58																							cramps
59						E M	N. T.								100	10 PM	N. S.	PACIFIC .	S. Sec. St.				lack of muscle tone (hypotonia)
60				100							The same			1	The same			100	20.5				body temperature below normal (hypothermia)
61						1	The second								Section 1	1							loss of pigment in skin and hair
62					1				10														dermatitis
63					-	11								· ·		The same							vertical ridging on finger- nails
64									-														tremors
65				8		100																	tetany
66		-		×	×	×			O						×		×					×	dark circles under eyes
67	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	vomiting

CHECKLIST OF CLINICAL SYMPTOMS OF NUTRITIONAL DISORDERS® RELATED TO SEVERE BEHAVIOR HANDICAPS AND/OR LEARNING DISORDERS

	SYMPTOM	SYMPTOM ABSENT	POSSIBLY PRESENT	DEFINITLY PRESENT
1.	Waxy pallor			
2.	Translucent appearance of skin, particularly around the ears.	ok [a] să		
3.	Very pale mucous membranes			
4.	Lusterless, thin, brittle, flattened and spoon-shaped fingernails and toenails			
5.	Coldness and abnormal sensation, such as prickling and itching on hands and feet.			
6.	Convulsions			
7.	Headaches			
8.	Abdominal pain			
9.	Stupor			
10.	Breath odor (acetone)			
11.	Decreased or diminished sense of taste (hypogeusia)			
12.	Diminished sense of smell (hyposmia)			
13.	Sluggishness, tiredness			
14.	Colic			
15.	Tendency to drool			

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	SYMPTOM	SYMPTOM ABSENT	SYMPTOM POSSIBLY PRESENT	
16.	Short attention span	1000		
17.	Sweating (excessive)			
18.	Limpness			
20.	Abnormally rapid heart action		27 1806	
21.	Loss of muscle coordination, especially in the extremities (ataxia)	ue sum		
22.	Inflammation of nose or its mucous membranes (allergic		anga bi	
23.	rhinitis) Inflammation of ear (serous otitis media)			
24.	Inflammation of the membrane lining of the windpipe and bronchial tubes (bronchitis)			
25.	Labored breathing, constriction in chest with coughing (asthma)			
26.	Inflammation of the lip (chelitis)			
27.	Inflammation of the mouth (stomatitis)		00 (0)	
28.	Ulcerous sores, especially in the mouth (canker sores)	nale to t		
29.	Inflammation of skin with itching and exudation of serous matter (eczema)			
30.	Hives (urticaria)			
31.	Itching (pruritis)			
32.	Obesity	103 1	(a) Sin	91 -
33.	Underweight			

			SYMPTOM	SYMPTOM
	SYMPTOM	SYMPTOM	PRESENT	DEFINITLY
		ABSENT	PRESENT	PRESENT
34.	Ring of fine blood vessels around colored part of eye (circum-corneal injection)	Istigana	trans pr	
35.	Taste buds look red or pink (hyperaemic papillae of tongue)			
36.	Tongue looks granular (hypertropic papillae of tongue)			
37.	Widespread thickening of skin on knees, elbows, ankles and possibly knuckles. Skin may also be wrinkled and cracked.			
38.	Increased secretion of sebaceous glands around nose (nasolabial seborrhea)			
40.	Redness and cracking in corners of eyes (angular palpebritis)			
41.	Bilateral cracks, redness and flaking at corners of mouth (angular stomatitis)			
42.	Vertical cracks on lips (cheilosis)			1.00
43.	Purplish-red tongue (magenta tongue)	To local		
44.	Atrophied taste buds. Tongue appears smooth, pale and slick (atrophic filiform papillae).			
45.	Tongue is red and painful with atrophied taste buds. Taste changes (glossitis)			
46.	Hyperpigmented areas bilaterally on cheeks, forearms, neck, etc. (pellagrous dermatosis)			
47.	Loss of ankle jerk			
48.	Loss of knee jerk.			

	SYMPTOM	SYMPTOM ABSENT	POSSIBLY PRESENT	PRESENT
49.	Darkened or brown pigmentation over cheeks and under eyes (malar and supraorbital pigmentation)		n, ci i, loven i	9 34.
50.	Skin diseases	NOON O		7
51.	Ulceration of gums and mouth			
52.	Inflammation of stomach and intestinal tract (gastroenteritis)			W
53.	Extreme thirst	Wd Cile	CONT.	10
54.	Extreme warmth			
55.	Hypersensitivity to light			
56.	Burning sensation of feet			
57.	Muscle twitching			
58.	Cramps			
59.	Lack of muscle tone (hypotonia)			
60.	Body temperature below normal (hypothermia)		ri Diya	A D
61.	Loss of pigment in skin and hair		n la line	A
62.	Dermatitis			
63.	Vertical ridging on fingernails			
64.	Tremors			
65.	Tetany			
66.	Dark circles under eyes			
67.	Vomiting			52 D

SYMPTOM SYMPTOM

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