CHAPTER 4

EVIDENCE-BASED BIODANZA PROGRAMMES FOR CHILDREN (TANZPROBIODANZA) IN SCHOOLS AND KINDERGARTENS

Some Effects on Psychology, Physiology, Hormones, and the Immune System

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Introduction

In order to increase wellbeing in children, it requires being with them in a systemic attentive, mindful, and loving way, which means to be fully present and to include parents, teachers, families, and the field, helping them to express their own identity, autonomously, initially in a non-verbal and later in a verbal way. Those working towards the wellbeing of children often need to understand that the body (e.g. senses and feelings) is the greatest thinking organ for children who feel the world through their bodies (Stueck 2010). Such physical experiences are often associated with play that can make a contribution to the child's sense of wellbeing, as argued by Krenz (2009), and with dance, that may enable a child to express instincts, needs, and feelings in connection with others (Stueck et al. 2010). Moreover, a sense of wellbeing in children can be enhanced through:

• The presence and the love of adults; for example, wellbeing can increase the development of self-awareness in children (Maturana and Verden-Zöller 2010; Stueck 2010).

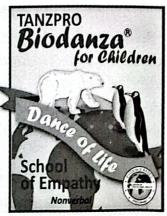
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 - A relaxed, healthy environment; such an environment can increase empathic connections and self-efficacy (Stueck 2010).
 - Empathic links to others and nature; for example, acquiring implicit and explicit knowledge can take place through such links (Stueck 2010; Stueck, Schoppe et al. 2013).

Within the Masterplan of Healthy Education developed by Stueck (2013a), the first three important steps that are recommended (Steps 1-3) are relational and affective. Step 1 involves raising awareness regarding the importance of being with children without any theoretical background, method, or aim, to focus intention. The next step, Step 2 (relaxation), is done by evidence-based programmes with elements of yoga for children (Stueck 1997, 2000, 2008). Further, verbal and non-verbal aspects of the work are integrated in Step 3 of the MasterPlan of Healthy Education, showing a systematic integrated approach as its overarching method. They are defined as essential steps towards establishing relationships, and are used among other methods (e.g. yoga, mindfulness) and dance practices (e.g. Biodanza for children, teachers, and parents) as a way of developing presence, relaxation, and empathy. Empathy is based on love, presence, and relaxation, and is the basis of wellbeing as a biological, affective, cognitive, and behavioural connection with oneself, between a child and their teacher or parents (Stueck 2015), and also towards nature. For empathy to take place there is a need for trust, autonomy, an interest in others, and the giving up of the desire to control or to compensate one's own discomfort states.

Steps 4–7 of the MasterPlan of Healthy Education involve more reflexive abilities concerning the content of educational performance of teachers, parents, and their institutions. They are rational–analytical steps, such as supervision, development of educational abilities, educational concepts, and addressing practical issues (e.g. number of teachers and children in the classroom, payment of teachers, teaching material).

Within this context, several evidence-based Biodanza programmes (Figure 4.1) have been developed and evaluated at the University of Leipzig (1998–2012), the University of Applied Sciences Saxony (DPFA), and the Institute of Biodanza Research Leipzig (IBR/BIOnet research network¹ since 2012), and used since 1998 in the practice (Stueck and





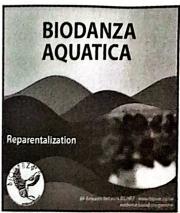


FIGURE 4.1. Examples of evidence-based Biodanza programmes (Logos). (Credit: M Stueck.)

Villegas 2008). They are called TANZPRO-Biodanza (TANZ, German for Dance; PRO, evidence-based programmes with Biodanza), mostly with ten sessions informed by evidence deriving from scientific studies. For each programme there is a logo, a handbook for 'train the trainer approach', and scientific publications (see http://www.bionet.name). TANZRPRO Biodanza is the synonym for a structured Biodanza programme, mostly with ten sessions informed by evidence deriving from scientific studies (OUT).

Until now there have been a number of different evidence-based Biodanza versions:² for adults (e.g. teachers, parents), for elderly people (evidence-based Biodanza program for seniors), in water (Biodanza programme for reparentalization: BIODANZA-Aquatica), and for children (TANZPRO-Biodanza for children) to increase empathy and wellbeing with themselves, with others, and with nature. Biodanza, as an integrative approach, was tested in German schools and kindergartens (Stueck 2003, 2004, 2011; Stueck, Villegas, et. al. 2007, 2008, 2009). In this chapter we will introduce the scientific basis of studies on Biodanza—a method of dance developed by Toro (2010). We will see dance as relating to the movement of life, and focus especially on work relating to children and adults.

Biodanza: Theory and Empirical Research

Dance is a deep movement arising from the most unfathomable depths of human beings; as the founder of the discipline Ronaldo Toro (2010) called it, this form of dance has to do with the movement of life. The name Biodanza makes these references: bios means 'life' and danza (Spanish) means 'dance', and his aim was for people to learn how to live well and happily together and how everyone can express its identity by dancing. Thus, Biodanza encourages movement that is full of meaning, because it expresses true feelings or emotions, its own identity, and is based on the development of nurturing relationships in the dances, while supporting personal integration. It works with four powerful factors: music, movement, emotion, and group. It is a technique that takes place in the here and now (Spanish: *Vivencia*) engaging with auto-regulation, self-organization, and affective integration. It means that everything that you dance or do should be connected with the feeling to yourself, with others, and with nature.

The theory of Biodanza is based on the concept of human integration on a personal, interpersonal, and transcendental or transpersonal level. The impact of Biodanza-Vivencias penetrates deeply on the central nervous system, immune system, and hormonal system. Toro (2010) has stated that 'Biodanza is not about peace of mind . . . it is about intensity of living', and he assumed that there was an association between people being optimistic, happy, and healthy, as various research approaches have shown (see, for example, the Positive Psychology approach of Seligman 2004). In order to achieve this he created Biodanza—a system of dances which consist of five Lines of Experience, as he called them. These were Vitality, Affectivity, Sexuality, Transcendence, and Creativity. In the 1990s, Marcus Stueck, Alejandra Villegas (coordinators and pioneers of the Biodanza research worldwide; see Institute of Biodanza Research Leipzig,

IBR integrated in the BIOnet research network of IBF/International Biosemble Foundation, http://www.biodanza.org) and colleagues started to investigate Biodanza scientifically, together with Rolando Toro in Argentine (Univeridad Abierta Interamericana, Buenos Aires4) and at the University of Leipzig Sa 2001, projects with the Institute of Clinical Immunology, University of Leipting, where to investigate blood and saliva samples after Biodanza classes, to discover more about the effects on the immune and hormonal system (Stueck, Villegas, et al. 2002). Since 2012 the project continues at the University of Applied Sciences Saxony (DPFA) and the Institute of Biodanza Research Leipzig (IBR/BIOnet research network) in cooperations tion with the University of Leipzig (the latter since 1998). Stueck and Villegas published many results in journals, PhD work (Villegas 2006), and a professorial disservation (Stueck 2007) on the effects of Biodanza on the wellbeing of students, teachers, electronic people, and patients (increasing feeling of relaxation, mood, and vitality), connected with hormonal, immunological, physiological, and psychological changes (Villeges et al. 2000; Stueck and Villegas 2008). In 2006 the investigation into Biodanza children began. Historical and future accounts of research studies in Biodanza are also available and are integrated in an eight-point research plan for Biodanza⁵ (Stueck and Villegas 2008). In the first journal of the research network BIOnet (Art/Biodanza Mees Science⁶), almost all doctoral theses on the subject are reported, these having been completed in different parts of the world: the first qualitative and quantitative empirical PhD studies of Pereira (2005) with elderly people, Villegas (2006) at the University of Leipzig with 'normal neurotics', and participants with psychopathology, showed a clear effect of Biodanza classes on wellbeing and life satisfaction increasing optimism. Stueck's (2007) first professorial dissertation (for a second PhD at German universities. one criterion to gain full professorship, called 'Habilitation') highlighted the effects of Biodanza on teachers coping with negative frame conditions in schools. If the frame condition in institutions is poor, then teachers have a tendency to display the behaviour pattern of 'withdrawing from work' (Schaarschmidt 2006) increasingly, which means withdrawing from interaction with children. This emphasizes the importance of looking further to dance intervention focusing on skills, supervision, concept, and improvement of conditions. The study of Stueck (2007) could demonstrate the benefits of Biodanza for teachers' non-verbal communication skills and stress reduction. Some research studies conclude that Biodanza appears to have an effect on the physiological (Stueck et al. 2007), psychological (Stueck 2007; Villegas 2008), and immunological systems (Stueck et al. 2009). In light of these possibilities, Biodanza can have an impact on more than emotional expression. It has also been argued that it enhances integration between thinking, feeling, and acting, thus inducing harmony, unity, fluidity, pleasure, and plenitude. These can be shown by the changes in different psychological variables (higher optimism, relaxation, self-efficacy, the abilities to love, and feelings of empathy) (Villegas 2006; Stueck 2007; Villegas 2008; Stueck 2008; Stueck 2012). In these studies, it was found that Biodanza increased potential counterbalances to the excessive negative impact on the system of stress, anxiety, depression, and the sublimation of instinct, and of turning self-expression into 'more culturally acceptable' behaviour. Studies have

been carried out in Germany and Argentina with adults (teachers, psychiatric patients, employees, and elderlies; Fidora, Mader, and Stueck 2008) and children (Stueck, et al. 2008; Stueck and Villegas 2012). Also, a study about the efficacy of Biodanza for treating women with fibromyalgia (FM) shows improvements in pain, body composition, and FM impact in female patients (Carbonell-Baeza et al. 2010). The results of many studies (Stueck and Villegas 2008) argued for the cross-cultural effects of Biodanza on the reduction of psychosomatic symptoms, a more optimistic view of life and future, and a reduction of stress and hypersensitivity (Balzer and Stueck 2008). (For a list of all Biodanza research, see Stueck and Villegas 2016; http://www.biodanza.org).)

EVIDENCE-BASED BIODANZA PROGRAMMES AS LIFE-FOCUSED APPROACHES FOR CHILDREN

Evidence-based Biodanza programmes for children were developed within the theoretical model of the School of Empathy (SOE) (developed by Stueck 2013b), which consisted of both non-verbal and verbal aspects. It is understood that within the context of educational institutions, working with dance needs to be part of a 'larger' methodological and anthropological theoretical conceptualization, which needs to be evidence-based through scientific research while retaining a life-focused quality. As a life-focused approach, Biodanza for children involves the connection with oneself, with others, and with natural elements as central aspects (biocentric approach; Toro 2010). It has been adapted from Rolando Toro's system, which was used for adults by Cecilia Luzzi in Chile in the 1980s. For children, it is based on dances along four of the Lines of Experience: Vitality, Affectivity, Creativity, and Transcendence. The fifth Line of Experience (Sexuality) is excluded when Biodanza is used for children. In 2007, Stueck, Villegas, and others (Thinschmidt et al. 2012) undertook a four-year project for the German Ministry of Health and Education (Healthy Life Styles in Education, Technical University Dresden, Leipzig University, Department of Health for North Saxony). This was the first research worldwide on Biodanza with children. Stueck, Villegas and others adapted this method for work in institutions by developing evidence-based Biodanza programmes for kindergarten children and schoolchildren (Stueck and Villegas 2009; Stueck et al. 2010), based on the non-verbal aspects of the work as developed in the School of Empathy by Stueck (2013b). There is a verbal and non-verbal part. The Biodanza content as the non-verbal part of the School of Empathy uses TANZPRO-Biodanza for children and adults/parents (an evidence-based Biodanza programme based on the Biodanza model of Rolando Toro and the Biodanza-for-children work of Cecilia Luzzi). The verbal part of the School of Empathy is the evidence-based programme 'Respectful Communication' (Language of Life/way from the body to head)

based on Marshall Rosenberg's nonviolent communication (Müller and Pörschmann 2009; Schoppe and Stueck 2012). This aspect was based on the verbal-reflexive activity of describing and expressing feelings and emotions in words (see Figure 4.2).

The programme Respectful Communication (Müller and Pörschmann 2009; Müller 2016) assumed that depending on the exact verbal expression of feeling words, it was highly probable that children could also express associated needs and communicate

School of Empathy (Stueck, 2013)

School of empathy (verbal)

Language of the north:

"From the body into the head"

= Verbal, reflexive aspects of Empathy

Theory: M. Rosenberg (USA)

Method: Nonviolent communication

"The Language of Empathy & Life"

4 steps to be empathic:

1) observation 2) verbal expression of feelings 3) verbal expression of needs

4) asking please instead of demand.Rosenberg describe this as the language of Giraffe vs. Wolf

School of empathy (nonverbal)

Language of the south

"From the head in the body"

= Nonverbal, experiencial, actional, biological, natural aspects of empathy.

Theory: R.Toro; H. Maturana

Method: Biodanza

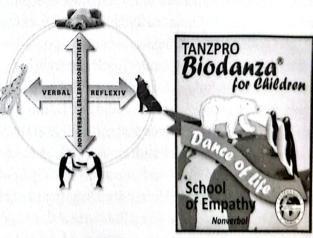
"The Dance of Empathy & Life"

Empathy as a nonverbal behaviour in a biological based social autopoietic network with behavioural aspects: e.g., to act what I feel, to act in group networks rather than as individual egoistic. Stueck describes this as the language of Penguins vs. Polar Bears









Evidence-based Program (Language-verbal)

RESPECTFUL COMMUNICATION®

(Marion and Norman Müller Pörschmann,

Marcus Stueck, Sebastian Schoppe)

Evidence-based Program (Dance-nonverbal)

TANZPRO-Biodanza®

Dance-oriented program with Biodanza for children (Marcus Stueck, Alejandra Villegas, Cecilia Luzzi, Rolando Toro)

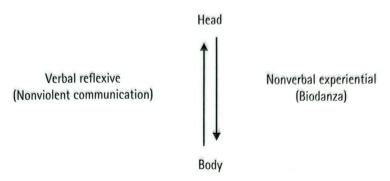


FIGURE 4.3. Two ways of intervention to gain empathy. (Credit: M Stueck.)

them to others as a basic ability for empathic behaviour. Stueck (2013b) called it the way '... from the body into the head.' The second way was to dance '... from the head into the body', which was necessary in order to experience physical arousal (feelings and emotions) and allow these to be expressed, without naming them. Thus, they were not immediately recognized by the rational structure of the spoken word.

An integrative model of empathy with verbal and non-verbal parts of the development of empathy in Biodanza and nonviolent communication are well integrated, because verbal and non-verbal expression of children's needs and feelings are possible (see Figure 4.3). Garcia described, in his book Biodanza: Experience as a Therapy (1997), the importance of the experience of dancing without words ('way from head to body') and the opportunity to experience a new feeling as a biochemical structure, without expressing it verbally or putting it into existing conceptual categories, which would destroy it. This head-body way is non-verbal, experiential, and practiced through Biodanza (see Figure 4.3). In this way, Biodanza has been taught in educational settings and institutions internationally, such as in Indonesia, Sri Lanka, Latvia, Austria, and Germany. The evaluation of the effects has been conducted in different cultural contexts and circumstances. It has also been used as a therapeutic method for children suffering trauma after natural disasters in Nepal, Sri Lanka, and Indonesia (Senerath 2010; Trimulyaningsih, Novitasari, and Qudsyi 2014). Because of the evidence-based character of TANZPRO-Biodanza for children, it is possible to train trainers who work in institutions' how to deliver it. This project (Healthy Lifestyles in Education) started with pilot studies in Latvia and Indonesia, by educating instructors in the method of School of Empathy (verbal: respectful communication; non-verbal: TANZPRO-Biodanza for children, adults, and parents).

Figure 4.4a shows the depth of the quality of contact with children dancing in Riga (Latvia) and Leipzig (Germany), conducted by psychologist and Biodanza teacher Vineta Greaves, who gave TANZPRO-Biodanza for children sessions (duration six months) in a Latvian school and found remarkable changes in children⁸ (e.g. more openness and emotional differentiation, higher social competences, less internal behavioural problems, and less stress). Figure 4.4b shows the bioanalytic evaluation (saliva tubes for analysing cortisol, testosterone, and immunoglobulin A) which was carried out in Germany (Stueck and Villegas 2008) and, since 2014, also in Latvia (Greaves et al. 2016).



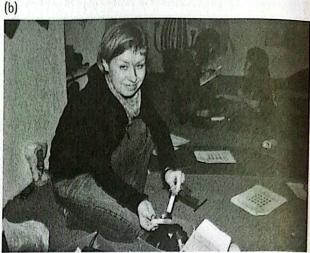


FIGURE 4.4. a) Celebrating life and joy of a group of 4–6-year-old children in kindergarten; b) scientific study (saliva and blood pressure). TANZPRO-Biodanza session with 8–9-year-old children in a school in Riga (Latvia) by TANZPRO-Biodanza instructor and psychologist Vineta Greaves from the Center of Educational Health Latvia (a), and bioanalytical evaluation at the University of Leipzig (b). (Credit: M. Stueck.)

Each session of the TANZRPO-Biodanza programme for children contains three parts. Firstly, there is a story about a journey in one country; for instance, reading aloud the story 'Travel to Egypt', which represents "joy". A Biodanza part follows which is accompanied by music and relatively energetic exercises, with faster music to promote not only the vitality but also the creativity of children. Then quieter exercises together with slower music are used to promote relaxation and interactive experiences through age-appropriate peer (partner) exercises. Finally, the session closes by encouraging the children to talk about their feelings, then to express them in paintings after the session. Further details of the content of a typical session can be found in Table 4.1, which introduces the exercises of the Biodanza part of the 'Egypt' session.

Table 4.2 shows the ten themes of the ten sessions of the basic version of TANZPRO-Biodanza. At the time of writing we are working on more sessions of TANZPRO-Biodanza for schoolchildren (sessions 11–20; 7–12 years of age) and on a version for adolescents. Every session is a 'journey' in a country and symbolizes a value or motive of life that is danced in the session: for example, in a Spanish session the value is 'love and care', and in an Egyptian session the value is 'joy'. In the kindergarten version the children produce little gifts which symbolize value and are put in their treasure box of life. In the end, the children receive a certificate, 'Master of Life'.

Effects of TANZPRO-Biodanza Among Children Aged 4-6 Years (Kindergarten Children)

The following effects in kindergarten children (ten sessions of TANZPRO-Biodanza, school version) can found in several studies (e.g. Stueck, Villegas et al. 2013; Stueck et al. 2015).

Table 4.1. Example of summary of TANZRO-Biodanza for children's session 'Travel to Egypt'.

No	Session	Description
1	Introduction	Loud reading the story 'Travel to Egypt'
2	Biodanza part	 In circle Round dancing: go to the music Rhythmic variations: all children move after requested; Stop and Go Go as a pair: walking in pairs Play the mirror: children mirror the movement against other children Silent dance / relax movement: smooth movement with arms; children stay in circle Silent dance / relax movement: smooth movement with hips; children stay in circle The snake: going in row; on the back start lying and wriggle around the room Cradle in circle: relax dancing in circle; swaying movement Progressive activation: increase of movement intensity
3	Closing part	Free painting after thoughts and music time

Table 4.2. Overview of sessions and related themes of basis version of TANZPRO-Biodanza.

Sequence	Theme	Notion (life focused value)
1	Travel to Spain	Love and care
2	Travel to Egypt	Joy
3	Travel to Tanzania	Leisure and courage
4	Travel to Chile	Wishes and risk
5	Travel to Brazil	Feeling of security and embrace
6	Travel to Mexico	Diversity and friendship
7	Travel to Ireland	Acceptance and integration
8	Travel to Russia	Humbleness and sportsmanship
9	Travel to China	Creativity and solidarity
10	Travel to Germany	Respectful communication

Note: Adapted from ©? 2011. Stueck, Villegas, and Toro (2010b)

Change in Cortisol Level in Kindergarten Children because of TANZPRO-Biodanza

This study showed the change in cortisol of kindergarten children after taking ten sessions of TANZPRO-Biodanza. Children initialized with high cortisol level seemed to be 'normalizing', whilst those with low cortisol level seem to be already 'normalized' (Stueck et al. 2015). Furthermore, the findings from this study suggested that there might be an autoregulatory effect of TANZRPO-Biodanza sessions in children of kindergarten age.

Effects on Emotional Recognition and Its Relation to Cortisol Reduction

The same study (ten children, aged 4-5; ten sessions of TANZPRO-Biodanza) confirmed that cognitive performance in children (e.g. emotion recognition, measured with the Emotion Recognition Test in the Vienna test system, whereby the children had to recognize different emotions from photographs) could be developed by dancing. The effects were on average greater when participants had higher initial cortisol levels in their saliva (before the TANZPRO-Biodanza sessions) than those with lower levels of cortisol (Stueck et al. 2015).

Heart Rate and the Improvement of Physiological Auto-regulation

In the same study, looking at the heart rate for each child before and after the TANZPRO-Biodanza course, there was a significant decrease in the average score, which was statistically significant ($p = 0.04^*$, d' = 0.77, $1-\beta = 0.68$). The low-level and high-level groups showed significant change of heart rate (average over ten session) between pre-session and post-session, towards the value of the medium heart-rate group (see Table 4.3).

Table 4.3.	(100 beats/	THE RESERVE OF THE PARTY OF THE			ups with pre- min), and higl	
Cluster time	Mean	SD	N	Significance (two-tailed)	Effect size d'	Power 1-β

Cluster time		Mean	SD	N	(two-tailed)	Effect size d'	1-β
Low heart rate	Pre	95.52	4.95	8	0.00**	1.66	0.53
	Post	114.75	10.97				
Medium heart rate	Pre	119.95	10.74	64	0.76	0.04	0.77
	Post	120.46	11.37				
High heart rate	Pre	175.75	26.04	14	0.00**	1.35	0.53
	Post	128.24	20.52				

(Credit: IVI. Stueck.,

Table 4.4.	Post-session changes in average heart rate in greatures low (100 beats/min), medium (120 beats beats/min).	
	Significance	Power

Cluster time		Mean	SD	N	Significance (two-tailed)	Effect size d'	Power 1-β
Low pre-mood	Pre	3.13	0.96	16	0.036*	0.63	0.49
	Post	3.94	1.18				
High pre-mood	Pre	5.00	0.00	83	0.002**	0.34	0.85
	Post	4.81	0.59				

It seems that when children had a low and high heart rate they normalized significantly their vegetative working state (optimum of excitement; Stueck and Stueck 2011) and found a balance between sympathetic and parasympathetic activity. None of the samples was measured as hypersensitive. It means that none of the children were chronically stressed. The hypersensitivity itself was measured by observing the electrodermal activity (Balzer and Stueck 2013).

Psychological Findings

In the psychological evaluation, a significant improvement of self-rated mood (in a five-point rating scale) can be seen in the group which started from a low level. Children who already had a high score of positive mood regulated their mood even further (see Table 4.4).

Furthermore, additional findings were determined when course instructors observed the children, which included significant increases ($p \le 0.05$) in empathy, interest, relaxation and motoric resting ability, and concentration. In the ability of social exchange, a significant tendency ($p \le 0.10$) was found. Finally, parents observed a significant increase in social competences in the observation scale in their children (p = 0.019, d = 0.84, $1-\beta = 0.78$), in comparison to the teachers (p = 0.47, d = 0.23, $1-\beta = 0.17$).

Effects of TANZPRO-Biodanza Among Children Aged 7–12 Years (Schoolchildren)

The following effects for schoolchildren (TANZPRO-Biodanza school version; ten sessions; age 7–12 years) were found, concerning cortisol levels, immunoglobulin, testosterone, and hypersensitivity. In an extended study in a Latvian school, twenty-two TANZPRO-Biodanza sessions were carried out to measure psychological effects and the effects on cortisol.

Change in Cortisol because of TANZPRO-Biodanza for Children

In a study of twenty-three children of 7 and 8 years of age, who took part in ten TANZPRO-Biodanza sessions, their cortisol levels were tested. The results in Table 4.5 and the graph in Figure 4.5 show a significant stress reduction effect in cortisol (accepted at p = 0.001 level of significance). Averaging over all sessions, there was no significant decrease in testosterone in the whole group (p = 0.195, d' = 0.14, $1-\beta = 0.39$). Also, there could not be found a significant increase in immunoglobulin A (IgA) (p = 0.145, d' = 0.16, $1-\beta = 0.46$). Looking more closely, an immune-enhancing effect (increased IgA) was seen in the last sessions (Figure 4.5).

Cluster time		Mean	SD	N	Significance (two-tailed)	Effect size d'	Power 1-β
lgA	Pre	150.06	76.45	95	0.195	0.14	.39
	Post	162.25	92.78				
Cortisol	Pre	0.093	0.046	95	0.001**	0.41	0.99
	Post	0.075	0.042				12,564
Testosterone	Pre	84.38	38.26	95	0.145	0.16	.46
	Post	77.72	36.81				

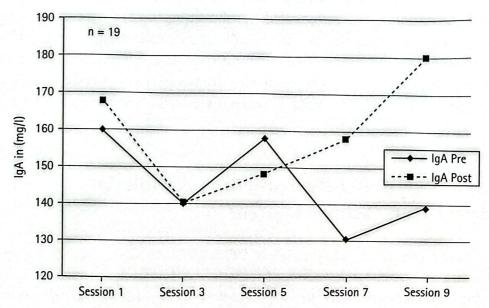


FIGURE 4.5. Pre-session and post-session IgA levels. After the later sessions (7 and 9) there was a visible IgA increase. (Credit: M. Stueck.)

Testosterone Levels in Boys and Girls after TANZPRO-Biodanza for Schoolchildren

Taking a closer look at testosterone levels, there was a difference between boys and girls. The hypothesis that the immune system could be regulated by TANZPRO-Biodanza was supported by the decrease in testosterone concentrations in the saliva of boys after the sessions (statistical tendency p = .071, d' = 0.44, $1-\beta = 0.68$) (see Table 4.6). The same level of reduction in testosterone levels was not observed amongst girls, but this would be due to the lower levels of testosterone in girls prior to the intervention.

Physiological Findings Concerning Hypersensitivity of the Skin (Chronic Stress State) and the Heart Rate

The concept was investigated among twenty-three children, in which four children (17.4%) in at least one out of the ten sessions were hypersensitive. In Table 4.7 the result

Table 4.6. Post-session changes in average testosterone in boy groups groups.									
Cluster time		Mean	SD	N.	Significance (two-tailed)	Effect size d'	Power 1-β		
Girl (aged 7)	Pre	81.56	37.33	70	0.54	0.11	0.13		
	Post	78.28	38.48						
Boy (aged 7)	Pre	92.29	40.48	25	0.071	0.44	0.68		
	Post	76.14	32.33						

	Session 2		Session 4		Session 6		Session 8		Session 10	
Hypersensibility	pre	post	pre	post	pre	post	pre	post	pre	post
S1	/ c	1	+ ^a	= b	+		+		=	-
S2	÷	<u></u> 27.	+	=	Ē	=	+	+	=	-
S3	-	÷	+	# = 4.1	Ė	Ē	1	1	1	1
S3	+	7	+	÷	-	_	-	1	_	_

Note: a = hypersensible state; b = not in hypersensible state; c = not participated in this session. The amount of hypersensibility decreased because of TANZPRO-Biodanza in six cases (35.3%). In two cases (11.8%) there is no change (Chi/Pearson = 0.11). The results of the hypersensibility analysis are shown in a cross-tabulation in Table 4.8.

can be seen among four children before and after the session. The results of the hypersensitive analysis are shown in a cross-tabulation in Table 4.8.

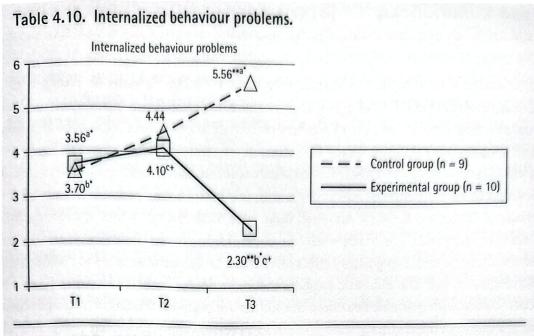
In the same study we also looked at the heart rate for each child before and after the TANZPRO-Biodanza course (see Table 4.8). The low-level and high-level groups showed a significant change of heart rate (average over ten sessions) between presession and post-session, compared to the medium-level group (see Table 4.9), which means that the heart-rate values reached a balance between sympathetic and parasympathetic excitement.

Psychological Findings

A psychological evaluation of TANZPRO-Biodanza (school version 7–12) with twenty-two sessions (extension of the structurized programme) (Greaves et al. 2016), working with ten primary-school first-grade children aged 6–7 (experimental group) and nine children (control group) in a Latvian school, was carried out from the beginning of October 2014 until the end of May 2015. The parents' version of the Emotion

Table 4.8. Cross-tabulation of frequency change of hypersensitivity.							
			Post				
Hypersensibility		No	Yes	Total			
Pre	No	9	0	9			
	Yes	6	2	8			
Total		15	2	17			

Cluster time		Mean	SD	N	Significance (two-tailed)	Effect size d'	Power 1-β
Low heart rate	Pre	95.11	3.56	43	0.03*	1,44	0.96
	Post	113.18	14.49				
Medium heart rate	Pre	119.82	11.52	7	0.54	0.14	0.23
	Post	121.63	16.19				
High heart rate	Pre	171.28	19.53	10	0.00**	2.31	1.00
	Post	125.50	19.28				



Note: ^+p < 0.1; *p < 0.05; $^{**}p$ < 0.01. a, b, c – within-group differences. T1 – before intervention, T2 – after 10 sessions, T3 – after intervention.

Questionnaire (Rydell et al. 2003) was used to evaluate emotional competence: emotionality and emotion regulation. The parents' versions of the prosocial scale, internalizing and externalizing scale of the Strengths and Difficulties Questionnaire (SDQ; Goodman 1997) were used to measure social competence; that is, prosocial behaviour and nonexistence of behavioural problems. Testing was performed in three time points: before intervention, after ten sessions, and after intervention (twenty-two sessions). Pre-intervention and post-intervention results of social and emotional competence revealed different changes in experimental (n = 10) group and control (n = 9)group pupils. Experimental group pupils showed statistically significant improvement in emotion regulation results, prosocial and internalizing behaviour, but control group pupils showed decrease in emotion regulation results and an increase in internalizing behaviour results. Both between-group and within-group analyses indicated that internalizing behaviour results have most pronounced changes. Repeated measures with ANOVA and post hoc tests with Bonferroni adjustment revealed a statistically significant time effect for experimental group pupils (F(2,18) = 4.81,p = 0.02, $\eta^2 = 0.35$) and a tendency level with 90% probability for control group pupils $(F(2,16) = 3.40, p = 0.06, \eta^2 = 0.30).$

Internalizing behaviour problems includes emotional symptoms and peer relationship problems. Results suggest that the TANZPRO-Biodanza intervention programme of twenty-two sessions causes a decrease of emotional problems and improves peer relations, or at least prevents children from experiencing an increase in internalized problems, as was shown by the control group. Along with these psychological changes, a significant decrease of cortisol was also found (Greaves et al. 2016).

DISCUSSION

The studies described in this chapter investigated the two versions of TANZRPO-Biodanza among children of ages 3-6 years and 7-12 years). The selected studies produced a first view of the potential effects of TANZPRO-Biodanza for schoolchildren and kindergarten children. In the first study of ten children in kindergarten (ages 4-5 years), each taking ten TANZPRO-Biodanza sessions, those with high initial cortisol seemed to be 'normalizing', whilst those with low cortisol seemed to be already 'normalized' (Stueck et al. 2015). Although there were methodological limitations (e.g. no control group) and a small sample size, the findings from this small study suggested that there might be an autoregulatory effect of TANZRPO-Biodanza sessions in children of kindergarten age. The literature suggests that reduction of cortisol has many positive correlations with desirable behaviour in children; for example, relaxation leading to the deactivation of the cortisol release process. In a previous study, Ockenfels (1995) found that emotions, related to wellbeing, correlate well with lower cortisol levels. Kirschbaum (2008) also suggested that self-efficacy and anti-depressive optimistic-joyful reactions, and viewing a situation as challenging in conjunction with coping with problems, have been associated with low cortisol concentrations. The effects on emotional reduction and its relation to cortisol reduction were on average greater when children had higher initial cortisol levels in their saliva (before the TANZPRO-Biodanza sessions) than with lower levels of cortisol. Watamura, Coe, Laudenslager, and Robertson (2010) also found in a study of children aged 3-6 years that higher cortisol levels were associated with an increased risk of disease symptoms developing, especially in relation to the upper respiratory tract. The measured cortisol reduction suggested that TANZPRO-Biodanza (with its stress-reducing, prosocial nature) could potentially promote the development of emotion recognition abilities, thus enhancing the social skills of young children (Stueck and Villegas 2015). However, further studies are necessary regarding the effect of cortisol reduction among children. Another finding in this study showed the significant changing of heart rate for the low-level and high-level groups of children before and after TANZPRO-Biodanza. This indicates that low-pulse and high-pulse cases normalize significantly their vegetative working point in order to balance between sympathetic and parasympathetic activity. Similar results could also be shown in yoga among children through the use of the evidence-based programme 'relaxation training with elements of yoga for children/EMYK' (Stueck 1997, 2010; Stueck, Gloeckner, and Balzer 2002), whereby these physiological changes correspond to lower anxiety and stress scores (Stueck 2009).

The second study showed a significant stress reduction effect in cortisol among school-age children (7–8 years old). Cortisol is released when the hypothalamic-pituitary-adrenal axis has been activated and influences among others these immune regulatory processes (Ockenfels 1995). Accordingly, Ockenfels presented, with respect to the cortisol concentration in the saliva, a relationship to psychological variables whereby a negative affect correlates with higher cortisol levels, and positive emotions

with lower cortisol levels. Lohaus et al. (2007) indicate in their discussion of mental stress effects a negative impact of stress on cognitive performance in children. Also, Jeong et al. (2005) found this modulation of neurohormones (increase of serotonin, decrease of cortisol level) in adolescents with mild depression after dancing (dance movement therapy). The decrease in testosterone concentrations in saliva among boys after the sessions was a significant finding that differentiated this group from the girls who participated in this study. A reduction in cortisol and testosterone most probably indicates an increased feeling of relaxation, which is connected with a higher sensibility and ability to enjoy contact (see studies by Spangler and Schieche 1994, cited in Stueck and Villegas 2010, about maternal sensitivity and cortisol reduction).

Taking a closer look at the low, middle, and high cortisol groups and the cortisol changes in the two studies, children with high pre-cortisol level benefit most from the dance-oriented programme after the interventions. With testosterone levels there was a difference between boys and girls. As Watamura (2010) has stated, the production of testosterone could be positively related to the amount of cortisol in saliva. In addition, there should be a closer examination of oxytocin, because this 'wellbeing hormone with others' which motivates tenderness and social interaction could influence cortisol and IgA. Immunoglobuline A showed in both studies no average effect, whereas in single sessions 7 and 9 there is an intended increase of IgA visible. The stable significant effects of the increase of IgA in adults after Biodanza in teachers (Stueck 2007) are obviously not found in children. It is assumed that the immune system still develops among children. Furthermore, the psychological effect relating to hypersensitivity has been investigated among school-age children. The hypersensitivity in the skin is a parameter which has been investigated in the context of chronic stress (Balzer and Stueck 2013). It can be defined as the pre-step before exhaustion and burnout, and was investigated by the authors in high-stress activities such as mountain climbing (Stueck, Balzer, Schroeder, and Rieck 2003), with teachers (Stueck 2007), and in Biodanzainterventions (Stueck and Villegas 2008). In general, it is reported that few studies exist regarding heart rate, blood pressure, cortisol, testosterone, IgA, and hypersensitivity in this age group.

Being an early study, the number of the sample sizes, deeper data exploration, and the lack of a control group were limitations. Thus, it is recommended that better-designed studies can take place on the same topics to determine whether the findings can be replicated. It could be helpful to make a comparison between experimental and control groups in TANZPRO-Biodanza and in interventions such as yoga for children (relaxation method), for example. Despite this fact, the results of these studies are worthy, because no studies of dance-oriented methods with children of this age range have been carried out until now. The cortisol in the two programmes decreased significantly, so that it could be argued that there was a stress reduction effect on the participating children, which may be connected with the particular intervention. It is possible that a particular intervention can help children concentrate and better recognize the emotions of other children. Because of this finding and the auto-regulative effect of decreased heart rates among children after the sessions, especially in the subgroups' low-pulse and

high-pulse rates (in the programme for ages 3–6 years), it is possible that the intervention could be used in programmes relating to the prevention of violence or stress reduction in schools.

Conclusion

This chapter provides an overview of some studies on hormonal, physiological, and immunological effects of an evidence-based programme, using Biodanza for children. Research into the use of evidence-based Biodanza training for children (TANZPRO-Biodanza) was carried out in German schools and kindergartens. Because of its non-verbal focus on dancing, it can also be used in institutions in other countries, such as Latvia or Indonesia. There is no contradiction or expected conflict concerning religious attitude in this method, although a researcher should always bear in mind the possibility of these arising, in order to maintain the quality and to adjust the indication and contraindication of the intervention.

To promote the wellbeing of children, it is necessary to support and maintain the interest of the adults and teachers in a systemic approach. This approach can give children the possibility to move freely to express feelings and needs autonomously. This could become the focus of further studies.

Other aims of TANZPRO-Biodanza for children are to reduce chronic stress, to enhance empathy, and to support the development of nonviolent behaviour in schools and kindergartens (Lahm et al. 2009).

Finally, TANZPRO-Biodanza for children has a role to play within a MasterPlan for Healthy Education (or a similar meta-plan), in which teachers, parents, and the conditions (such as class size, social differences, and financial status) are taken into consideration (Stueck 2009, 2013a). Further research in this area could explore ways in which this promising intervention can be incorporated within such policies.

Notes

- 1. <http://www.bionet.name >
- 2. See the videos of Marcus Stueck and others on the YouTube BIONET channel: 'Biodanza Aquatica/Evidencebased Biodanza,' 'TANZPRO Biodanza for children,' 'Biodanza and stress reduction,' 'Biodanza en el espejo de la Ciencia'.
- 3. E.g. Villegas et al. (1999); Stueck et al. (2015).
- 4. See the video on the YouTube BIONET channel: 'Investigation about psychological and physiological effects of Biodanza' (Villegas and Stueck 2000).
- 5. In 2008, Rolando Toro, Marcus Stueck, and Alejandra Villegas compiled a list of past and future research challenges and created an overall research concept. This contains eight aspects, and seeks to integrate and coordinate global Biodanza research: (1) developing and updating the theoretical model of Biodanza; (2) experimental life sciences basic research on the effects of Biodanza (since1998); (3) quasi-experimental psychology studies with

- weekly Biodanza classes (since 1998); (4) quasi-experimental research on Biodanza extensions (since 2006); (5) cross-cultural studies of Biodanza (since 2005); (6) studies on the quality of Biodanza teacher training (since 2003); (7) Biodanza with children (since 2008); (8) publications in scientific journals and high-quality scientific work (since 1998) (Stueck and Villegas 2012).
- 6. Since 2012 at the Educational University Riga, where Biodanza teachers listen to scientific presentations and scientists are dancing; see http://www.bionet.name>.
- 7. Information at http://www.bildungsgesundheit.de>.
- 8. With an extended TANZPRO-Biodanza programme (twenty-two sessions) (Greaves 2015; Greaves, Stueck, and Svence 2016).

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