'*Singing is no longer forbidden to me – it's like part of my human dignity has been restored.*' Adult non-singers learning to sing: An explorative intervention study

Ava Numminen[a]*, Kirsti Lonka[a], Anna Pauliina Rainio[a], Heikki Ruismäki[a]

[a] *University of Helsinki, P.O. Box 9, 00014 University of Helsinki, Finland*

Abstract

Singing is a universal activity, but many people believe that they are non-singers, or tone deaf, which may be interpreted as a singing disability. Singing is often seen as an on-off phenomenon: either you can sing or cannot. Music education contains practices which emphasize innate abilities instead of broader views offered in modern learning theories. We present the learning results of ten adult non-singers who were taught to sing in an intervention study using a socio-culturally oriented student-activating and process-oriented framework. Because of their negative singing experiences in childhood, all of the participants suffered from serious emotional and belief system blocks when starting the project. Most of them also had grave perceptual problems while singing as well as production blocks, e.g. a narrow voice range. In the relatively short intervention, the participants made remarkable singing progress. Further, the participants started to enjoy singing and to see themselves as people who sing. In the Karma musicality test, the participants received mostly average or high scores. The study shows that singing is a multifaceted, deeply culturally rooted phenomenon, and problems in singing are not to be reduced to individual bases. Correspondingly, music education should be developed according to recent learning studies.

* Ava Numminen Tel: +358404802113
  E-mail address: ava@lauluavain.fi

1. Introduction

Singing has been profoundly rooted in human culture from ancient times (Blacking, 1976; Cross, 2001; Mithen, 2006; Sepp, Ruokonen, & Ruismäki, 2014; Small, 1980). Although singing is a commonplace activity, not all people in Western societies sing, even when they would like to. Many report themselves to be tone deaf, which is often synonymous for "can't sing" (Sloboda, Wise, & Peretz, 2005). Both professional musicians and lay people often concur with the common folk psychology belief that the singing skill is an "on-off phenomenon": either you have it or you do not (see Abril, 2007; Knight, 2011; Richards & Durrant, 2003; Welch, 2001). As Wise and Sloboda (2008) argue, the field of music, including singing skills, is particularly susceptible to the talent explanation of success. Further, commonly used concepts such as tone dumb, monotone, uncertain singer, poor pitch singer, and *onchi*, in Japanese meaning "tone idiot", (Murao, 1994) refer to permanent singing disabilities. Additionally, most people who have not received vocal training believe that they are inaccurate singers (Dalla-Bella & Berkowska, 2009) and self-report to be tone deaf, which often, however, is not the case (see Cuddy, Balkwill, Peretz, & Holden, 2005; Pfordresher & Brown, 2007; Sloboda et al., 2005).

Modern learning theories see learning as a process of participating in a culture and developing one's identity and attributions as a learner (e.g. Bruner, 1996; Wenger, 2003). Belief in innate fixed abilities is generally harmful (Dweck, 2008). If learning is reduced to an individual, innate ability (Schommer, 1990), a distorted picture forms of the potentiality of learning (see Vygotsky, 1978). For instance, if the ability to write in an academic style is seen as an on/off, innate characteristic, a writer would be less likely to revise his or her texts or develop him – or herself as an author – in other words, the development of writing skills may stop (Lonka, Chow, Keskinen, Hakkarainen, Sandström, & Pyhältö, 2014). Moreover, attitudes and expectations affect learning results, as the Pygmalion effect argues: teachers' expectations of their students' abilities have been shown to influence students' learning outcomes and student performance in school (see e.g. Jussim & Harber, 2005). Socio-cultural research has convincingly shown that learning and teaching form a multifaceted, deeply culturally rooted net where e.g. situated possibilities, motivation, received support, and conceptions of oneself as a learner play a role (Bruner, 1996).

However, a fracture often occurs between learning conceptions based on modern learning sciences and learning conceptions in music. For instance, singing is not traditionally taught to those who do not "naturally" sing in tune, which may be related to the identity formation of a non-singer (e.g. Knight, 2011; Numminen, 2005; Whidden, 2009). An orientation towards the end product frequently comes at the expense of the process: the emphasis on sight-singing skills and performance in Western choirs has created a situation where many "ordinary" people feel threatened by the thought of solo auditioning in order to join in choral activity. In addition, conductors tend to expect their singers to already be good rather than accept the responsibility of teaching and developing them (Richards & Durrant, 2003). In the Finnish music education system, students of singing pedagogy practice their teaching skills with highly selected trainee students who have demonstrated their singing skills in an entrance test. Consequently, future singing teachers may not learn to work with beginners with no, or a minor, singing background. Traditionally, singing pedagogy is based on a teacher modelling–apprentice approach, which focuses on the student's ability to sing according to the teacher's or other models. This approach emphasizes behavioural aspects and overlooks motivation and self-efficacy (see Bandura, 1997). School choirs are quite common in Finnish schools, as is playing in a band, which may also encourage pupils to sing solo. Yet school music education is still strongly connected to the evaluation of pupils'

abilities and numeric feedback. These aspects may increase pupils' negative associations towards learning music at school, in contrast with e.g. the experiences of free time karaoke singers, who mostly underline the positive, encouraging, and cooperative atmosphere in karaoke singing (Ruismäki, Antti, & Lehtonen, 2013). The aforementioned singing teaching practices consolidate a culturally shared, fixed mindset with a product orientation, beliefs on innate abilities, and ideas on the worthiness of receiving singing tuition. However, singing is bound to a context, and the skills needed when people sing together e.g. in a church have little to do with what is needed to perform on an opera stage (see Regelski, 1998). Even though very few become professional singers, the majority of people could enjoy singing instead of regarding themselves as tone deaf.

We wanted to see whether and how non-singing adults could be helped to develop their singing and find enjoyment in singing. We applied a holistic intervention, targeting not only how singing sounds, but also beliefs and a new identity as a developing singer (Numminen, 2005). In this article we present the main results from the participants' singing backgrounds and learning, and discuss them in a socio-cultural framework.

2. A short review of previous research on non-singing

2.1 Cognitive perspective

An increasing body of research exists on normal singing development and its problems from a cognitive perspective. Some essential factors behind tone deafness or poor pitch singing are perception (e.g. an inability to perceive pitch relationships), production (the physiological functions of vocal output), memory (e.g. the retrieval of a melody line of a well-known song), and sensorimotor integration in singing (a mismapping of stored pitches onto motor gestures) (see Pfordresher & Brown, 2007). Bradshaw and McHenry (2005) reported that inaccurate singers can be separated into two categories: those who discriminated pitches accurately but produced pitches inaccurately, and those who discriminated pitches inaccurately and produced them inaccurately. Berkowska and Dalla Bella (2009) discuss a diversity of impairments in poor singers and present a model of a vocal sensorimotor loop (VSL) involving perceptual and motor planning components, memory retrieval, auditory–motor mapping, and complex feedback mechanisms. Any of the components in the VSL can cause a malfunctioning in pitch singing, which is far from a monolithic deficit. Tsang, Friendly, and Trainor (2011) discuss the VSL in relation to the development of singing in childhood. They summarize that according to the VSL model, maturational factors related to age will affect singing proficiency, as well as external factors such as culture, language, training, and motor action. Practice is necessary in order to establish the detailed linking between perception and action needed for good singing ability. In their review about disorders of sung performance Berkowska and DallaBella (2009, 79) notify that 'increasing evidence indicates that occasional singers can sing proficiently, thus contradicting the widespread belief that the majority of people cannot carry a tune'.

Congenital amusia refers to severe difficulties in tasks such as detecting wrong notes in a melody, recognizing familiar tunes, and tapping to a beat. The assessment measure for congenital amusia, the Montreal Battery of Evaluation of Amusia (MBEA), covers the perception of music processing, including melody, meter, rhythm, and incidental memory. Although congenital amusia refers to an innate, permanent problem which is related to poor singing, empirical evidence for a genetic basis is currently lacking (Wise & Sloboda, 2008), and development may be possible. In a study of five amusic individuals who took part in singing workshops, improvements were observed in most individuals in perception, indexed via the MBEA subtest and in the vocal performance of

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familiar songs. Thus, congenital amusia may not be entirely immune to learning (Anderson, Himonides, Wise, Welch, & Stewart, 2012).

2.2 Developmental perspective

Cognitively oriented research tends to show a cross-sectional perspective, whereas more psychologically, socially, and culturally oriented research brings up broader developmental aspects of singing.

Studies by Knight (2011), Ruismäki and Tereska (2006), Ruismäki and Juvonen (2011), Welch (2001), and Whidden (2009) have shown how negative singing experiences in childhood or adolescence lead to a non-singing adulthood. Knight (2011) compiled a non-singer (NS) profile based on case study data and survey findings. She found that non-singers commonly believe they are unable to sing and that they accept the bi-polar, fixed folk concept that humans either can or cannot sing. Further, NS attribution typically arose in school or other ensemble sites, often involving authority figures; less often, it was self-inferred by singing skill comparison with others. At onset, attributors with authority were seen as experts, and a NS self-belief was accepted without resistance, persisting across the lifespan. Further, NS childhood singing environments had typically low exposure to, encouragement of, or instruction and support in singing. Being a NS reportedly created a host of negative emotions (e.g. anxiety, humiliation) and regret regarding their singing deficit or their NS identity and its related social marginalization. Whidden (2009) was interested in whether the non-singer label could be reversed through a positive singing experience. She taught 12 self-designated adult non-singers in eight singing sessions. The majority of the participants changed their perception of a self as a non-singer to a self as a singer. But a minority of the participants continued to view themselves as non-singers despite the positive experience with singing.

In order to promote singing development efficiently, teachers of children or adults should be aware of the multiple factors that define and influence the nature of singing, such as a) socio-cultural factors, including social class, gender, and opportunities for singing within the culture; b) physical/maturational factors, such as the vocal instrument's basic physical structure and the hearing mechanism; c) psychological factors, such as making sense of experiences and demands in a given social context, self-labelling, and stress-related aspects; d) musical factors, i.e. the nature of the musical task itself; and e) pedagogical factors regarding singing as a continuum of behaviour that is always context related (Welch, 1994). In a vast follow-up study which was part of the Sing Up project in England, the researchers showed that a rich and sustained singing education programme accelerates the singing development of primary school–aged children (Welch, Himonides, Saunders, Papageorgi, Rinta, Preti, Stewart, Lani, & Hill, 2011).

3. Research design and methods

3.1 Singing teaching intervention

A teaching intervention over three semesters took place for 18 months in 1999–2000. Ten adults participated in the intervention in both group and individual lessons. Their singing skills, their backgrounds in singing, and their learning results during the intervention were examined (see Numminen, 2005). The first author acted as a teacher–researcher in the project. She has worked as a professional singing teacher for over 15 years and has university degrees in speech sciences and psychology.

We applied a model by Lonka (1997) and Lonka and Ahola (1995; later revised by Lonka & Ketonen, 2012) as the general framework of our intervention. The model introduces the principles of student-activating and process-oriented instruction in Finnish higher education. Lonka's model involves an iterative process of 1) diagnosing the current level of knowledge or skills as well as activating a meaningful context to guide and direct learning, 2) going through and facilitating various levels of learning in which new understanding is produced, and 3) assessing possible gains and changes in performance so as to engage the participants in a deepening and shared learning cycle. During an intervention, the model in use is often refined and modified according to the needs of the participants. In our case, the general context was teaching individuals to sing; more specifically, most of the participants were future priests for whom singing skills are professionally desired. Our approach is a typical example of action research (Carr & Kemmis, 2002) and a design-based intervention.

The teacher had adopted non-traditional practical teaching ideas and exercises from drama, vocal improvisation, and mind–body workshops. The group lessons included versatile training, warm ups, song singing, and reflective discussions. All the exercises could be executed without needing to sing correctly in tune. Exercises such as vocal whines and singing games encouraged the participants to use their voices in versatile ways. Easy movements included in voice production were practised, and well-known songs (children's songs, folk songs, pop songs, and hymns) were sung in a variety of ways. The exercises increase voice range and voice flexibility, promote natural breathing, and create expressive skills. The teacher emphasized the process of learning instead of the outcomes, for instance, that difficulties are a normal part of learning, not signs of permanent incompetence. The teacher aimed to create an enabling and supportive atmosphere, and to be as conscious as possible about the possible vulnerability of the participants, who were acting in their zones of proximal development (Mahn & John-Steiner, 2002; Vygotsky, 1978).

The individual lessons also included the same phases as the group lessons. When working individually, it was possible to probe each student about his or her difficulties, discuss them in detail, and give precise feedback (see Welch, 1985).

3.2 Participants

The participants (N=10) were recruited at the Department of Theology at the University of Helsinki. The recruitment announcement read: 'You are a student of theology who doesn't sing. Would you like to sing or learn to sing but doubt your singing skills? Perhaps you have not sung for a long time, or you perhaps never really have sung. Welcome to a project which aims to explore a new approach to teaching singing.'

In few days 19 people responded. After a preliminary telephone interview, 12 people were invited to meet the first author. She conducted *an interview, a production test, and an estimation of voice range. The interview* focused on past singing experiences and feelings and attitudes about singing. The ten who had the most problems with singing were chosen for the project. The participants' ages ranged from 20 to 54 years old. Six women and four men participated. Eight of the participants were studying theology to become priests.

3.3 Research questions and data collection

In this article our research questions are:

I. What were the singing problems of the participants, who defined themselves as non- singers?

II. What were the learning results of the singing teaching intervention?

The data were gathered when selecting participants for the project, through the three teaching phases, and at the end of the project. The meetings and the tests were tape- or video-recorded, forming 65 hours of data together. The data included the following materials.

(a) The past singing experiences of the participants

Before the first teaching period, the participants were asked to write about their past singing experiences, e.g. what feelings and thoughts arise about singing.

(b) An estimation of voice range

When assessing an initial voice range (the minimum to maximum pitch that can be produced), the participants were encouraged to sing as low and as high tones as they could. All sounds which resembled singing quality were accepted. A continuous assessment of the voice ranges was conducted during the teaching.

(c) A production test

The production test consisted of a matching task (single tones and intervals) and four invented melodies (Figure 1). The participants were asked to listen to a single task, a single tone, an interval, or a melody, and then to sing it.

Figure 1 Production test

The same test has been used as an entrance examination test in a music institute in the Helsinki area. Similar tests are commonly used in many music institutes in Finland and for special

music classes or choirs. The first author, who conducted the test, has conducted this test or similar tests in several traditional entrance test situations.

The candidates were allowed to sing the tasks (a) with the teacher playing the tasks simultaneously on a piano, (b) with the teacher singing simultaneously along, (c) with the teacher playing on a piano and singing simultaneously along, or (d) alone from memory. The intervals were played in arpeggio. All the tasks were modulated to fit the person's comfortable voice range.

The participants were encouraged to try the tasks in every different way from a) to d) as many times as they wanted. Thus, it was not necessary to sing a task from memory; if a person succeeded in singing e.g. a triad in tune with the help of a simultaneous piano, she or he scored a maximum one point. From several attempts, the best results were scored. Only the correctness of the tones was taken into account, not the quality of the voice.

Our method and the traditional method of conducting the test were remarkably different. Traditionally, the task, e.g. an interval, is played only once or twice, and the applicant is expected to sing the task alone from memory. If she needed to be assisted by the teacher or a piano or would need several attempts, her performance would probably be rejected. When conducted in our way, the test was part of a student-activating and process-oriented approach.

After the selection procedure, *the production test* was taken four times. The first author rated the performances from the tape recordings by ear with a coherent scoring system.

(d) Amateur church choir singers' assessment of the participants' singing skills in a randomized pre-post design

Amateur church choir singers (N = 35) assessed the participants' singing skills on the basis of a sample on a CD. The CD contained in randomized order two examples of each students' singing before teaching started and at the end of the last teaching period, in total 20 examples lasting all together 15 minutes. The excerpts on the CD represented each participant's best possible singing (assessed by the first author) before and after the teaching. The samples consisted of either the melodies of the production test or simple well-known tunes.

Since the main context of this study was the field of theology, it was important to measure singing skills in this context. We asked the choir members to imagine two different situations and to assess each sample: 1. A group singing situation: *Does the person sing in tune well enough to be able to sing together with other people in a group? 'Singing together' refers to occasions where people may sing together such as in church, at a birthday party, etc.* 2. A ceremonial solo singing situation: *Does the person sing in tune well enough to sing solo ceremonial parts as a priest in a church in front of the parishioners? The solo ceremonial tasks of a priest may involve acting as a liturgist in a ceremony.* Both questions were rated on a six-point scale, from excellent (6) to not at all (1). The instructions pointed out, 'Your task is only to assess the singers' ability to sing in tune, in other words, how correctly they sing'. The choir singers were informed about the research after they had conducted the ratings.

(e) The Karma musicality test

The Karma musicality test was conducted before and after the first teaching period. The test is based on perception and includes no singing. It contains 40 items produced electronically on a CD. In each, the subject first hears a sequence of sounds played unaltered three times. After a short pause, the theme is heard once again, in the same or a structurally different form; the answer alternatives are thus 'same' or 'different'. The maximum score is 40 points (Karma 2007).

3.4 Data analysis

The first author familiarized herself in depth with the research data by reading about the past experiences written by the participants, reviewing and listening to the recorded materials (the interviews, the tests, and the lessons), and reading the transcriptions of the recorded material.

The data were analysed using a mixed-method design. Qualitative content analysis was undertaken through an abductive strategy. The essential features of the past singing experiences, the singing problems, and the changes in singing skills were identified and categorized. The process of analysis was iterative, and it was continuously conducted by the first author during the teaching periods as a part of diagnosing the needs and activating the learning process. In the spirit of Lonka's student-activating and process-oriented model, the participants were encouraged to make comments and suggestions throughout the process. After the teaching periods, every participant's individual singing and learning profile was compiled and then individually commented on and accepted by everyone. The Karma musicality test was exploited qualitatively. The amateur church choir members (N = 35) assessed the singing excerpts of the participants in a randomized pre-post design.

4. Results

4.1 Past singing experiences of the participants

Half of the participants reported positive singing experiences in early childhood, but every participant described how singing later in childhood or youth evoked negative emotions either at school or at home. These emotions included e.g. *fear*, *tension*, *anxiety*, *embarrassment*, *humiliation* and a *sense of inferiority*. None of the participants reported having received any support for handling negative experiences. The childhood experiences led to a non-singing life: most of the participants had not sung for years or even decades. Those few who sometimes sang, did it only when they were sure no one could hear them. None were ever offered tuition in singing or had sought tuition. Two students had applied to a music institute to play piano but were not accepted.

The childhood experiences were related to the participants' attributions and self-efficacy beliefs on singing (Numminen, 2005). Test situations or comments from a teacher, peers, or family members without any remedial support emphasized their singing disability as an innate permanent quality. Clearly, these experiences had a remarkable impact on the participants' self-attributions as non-singing persons.

4.2 The participants' singing difficulties at the beginning of the project

The teacher classified the students' singing problems into three categories: 1) *production blocks*, 2) *perceptual blocks, and* 3) *emotional and belief system blocks*. The speaking voice of every participant functioned normally. None had ever had any special problems with their speaking voice or hearing.

Production blocks were manifested by a narrow singing range, problems in shifting between an upper register and a chest register, and frail voice quality. *Perceptual blocks* were seen in difficulties in differentiating tones while singing; that is, it was difficult for the student to assess whether she or he had sung correctly according to a model. *Emotional and belief system blocks* were clearly stated by the participants and were directly observable in signs of anxiety while the person was singing, e.g. a rigid body posture, tensed neck and chin, or shortness of breath. All the participants suffered from serious emotional blocks and misgivings about their ability to learn to

sing and their musicality, whereas in the domains of production and perception there were clear variations among the participants.

For those five who had the most serious production and perceptual blocks (Ida, John, Laura, Nick, and Willy), attempts to sing a given tone, an interval, or a short melody line were characteristically random; sometimes the student succeeded in a task and the very next moment he or she did not. None of these students could assess confidently whether they sang correctly. Songs sung had no clear tonal centre and consisted of often diminished intervals. The teacher playing the melody on the piano and/or singing along with the student did not always help; a few students commented that they were not able to remember how the melody goes – which may be related to deficiencies in memory traces regarding the melody lines of well-known tunes. The females/males had no singing voice over E4/E3 respectively (tones refer to the note index system A4 = a1 = 442 Hz) (see Table 1). Therefore, the singing voice was available only within the speech range, produced using a chest register. Their voice ranges varied from six semitones to about an octave. The voice quality was either frail (four participants) or over-tensed (one participant).

As for Ed, Emma or Rose, none were able to assess for sure whether he or she had matched a given tone, interval, or melody line correctly. When singing without the support of a piano or the teacher's voice, melody lines and intervals frequently deviated, and there were alterations in key stability. The support of a piano and/or the teacher's voice helped them only occasionally. They had a voice range of about an octave. Emma and Rose reached the scale up to F4 and G4 sharp respectively, and Ed up to G3. The voice ranges, however, were not established; sometimes they sung upper tones easily, and sometimes they were not produced at all.

Contrary to the others, Ann and Vera sang parts of the production test immediately correctly from memory without support of a piano or the teacher's voice. They also sang songs mostly correctly in tune. Their voice ranges were 14 and 15 semitones, but the highest notes they could sing were not higher than G4/B4 flat. Ann's and Vera's problems characteristically lay in emotional and belief system blocks. Vera, for instance, stated definitely that *if I do not make progress in singing, I will never sing when others can hear me*.

4.3 The changes in the voice ranges

The voice ranges of the participants expanded, especially upwards (Table 1). Learning to sing higher tones reflects development in larynx functioning and register shift. With the achieved voice ranges, the participants were able to sing common songs with an amplitude circa of an octave (12 semitones).

4.4 The changes in the production test and in song singing

Every participant sang correct intervals, chords, and melodies more often after the project than before it in the production test (Table 1). Because the scores improved linearly in each of the four tests, only the first and last scores are depicted. The same progress was noticeable in song singing. For instance, in the very first group lessons the participants were not able to find a common starting tone for a well-known children's song. Gradually finding a starting tone was more and more successful for every song. The students' ability to correct themselves after a mistake also improved. If e.g. a person sang a higher tone too flat (which easily happens e.g. in the highest tone of 'Happy Birthday'), she or he was able to return to the correct melody track immediately. Previously, the whole melody line was more or less lost after such a mistake. The development of the participants' singing skills is remarkable, especially given the relatively small number of lessons (Table 1). Still, emotional and belief system blocks occasionally hindered the efforts. In addition, occasionally,

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situational effects such as fatigue, loss of concentration, or an insufficiently warmed-up voice caused obstacles in singing.

Table 1. The pre-post changes in the voice ranges, production tests

1. Name, age when starting the project/ gender	2. Initial/ final voice range	3. Initial/ final production test	4. Choir singers' assess-ment initial/ final group singing	5. Choir singers' assessment initial/ final solo singing	6.The Karma musi-cality 1.test/ 2.test	6. Number of group/ individual lessons
Ida 21/f	E3-E4/ A3-B4	7.75/15	2.62/2.63	2.03/1.89	25/23	11/6
John 21/m	A2-Eb3/ A2-C4	8.25/14.75	2.60/3.09	2.11/2.20	36/36	20/13
Laura 20/f	G3-E4/ G3-A4	8.75/15.25	*	*	25/33	16/14
Nick 29/m	A2-E3/ F2-B3	5/15.25	2.37/3.80	1.77/3.23	31/29	14/13
Willy 48/m	F2-Eb3/ G2-B3	5/15	1.94/4.06	1.54/3.51	34/33	16/16
Ed 22/m	G2-G3/ A2-C4	14.25/15.25	3.17/3.40	2.63/2.60	38/39	19/8
Emma 54/f	F#3-G#4/ G3-C5	11.25/16	3.11/3.17	2.37/2.31	25/32	11/8
Rose 23/f	G3-F4 G3-C5	10.75/14.5	*	*	26/23	13/10
Ann 21/f	F3-G4/ F3-Eb5	14.25/15.5	3.26/4.71	2.74/4.11	37/36	15/4
Vera 20/f	G3-Bb4 G3-F5	14/15.75	3.42/5.00	2.94/4.46	36/38	13/5
Average	10.9./16.9 semitones	9.9/15.2	2.74/3.81	2.19/3.14	31.3/32.2	14.8/9.7

In table 1 are listed the pre-post changes in the voice ranges, production tests (the maximum score is 16 points), randomized CD-singing samples (1 = not at all, 6 = excellent), Karma musicality test (the maximum score is 40 points), and number of lessons of each participant (each group lesson lasted 2.5 hours, and each individual lesson 45 minutes).

4.5 Amateur church choir singers' assessment

The amateur choir singers' assessments of the participants' singing excerpts support the learning results described above. The data on the pre-post situations (scores given to examples representing a pre-teaching situation vs. scores representing a post-teaching situation) were analysed with a paired samples t-test. In both the group singing and in the ceremonial solo singing situations, the choir members assessed that the participants sang better in samples representing the post-situation. The difference was significant in both cases ($p < .05$). For a technical reason, the t-test results are shown for only eight people (Laura's and Rose's results are missing and marked by *) (Table 2).

Table 2. The results of the paired samples T-test

	Mean 1	Mean 2	df	t	*p*
The group singing situation	2.81	3.73	7	-3.20	.015
The solo singing situation	2.27	3.04	7	-2.47	.043

4.6 The Karma musicality test results

The students' average results both in the first and second Karma test (31.3/32.2 points respectively; Table 1) were better than the average scores of Finnish persons without music training, 28.6 points (Karma 2007), roughly representing the average results of the amateur level, 32.1 points (Karma 2007). John, Ed, Ann, and Vera scored at the level of a musician, 38.0 points (Karma 2007), or close to it. Laura's and Emma's second test scores were clearly higher than the first scores. Although Ida and Rose scored the lowest, they showed similar singing progress to the others.

4.7 The participants' subjective learning experiences

Before the project, the students had never been offered any tuition to develop their singing. They had felt like anxious and passive outsiders in situations where others sang. Now for the first time in their lives they had an opportunity to enhance their singing skills.

In the end phase and after the project finished, the participants shared that they had begun to sing openly in church, in family gatherings etc. Singing was described with expressions such as: *It's cool*; *Yes, I can sing!*; M*y relationship to singing has been normalized: Sometimes you sing better, sometimes worse, and it's ok*; *Singing is no longer forbidden to me – it's like part of my human dignity has been restored.*

Willy reported that 's*uddenly in a party gathering it was me who was leading the singing'*. Ed's friend had asked him to start a supper with a hymn because 'you sing so well'. Vera stated, '*A fellow student asked me after an obligatory rehearsal of liturgy singing whether I had done lots of singing because I sounded so good.'* Ida sent the teacher a text message in the middle of the project: *'Progress in my career: I conducted the whole church service alone and succeeded in liturgy singing too, and the scale was an original one, not lowered.*

5. Discussion

In this intervention study, ten adult non-singers were taught to sing. We explored the nature of their singing problems and their learning in a socio-cultural framework. Depending on their ages during the study the participants had been non-singers from 7 to up to 45 years. The participants had negative, even humiliating experiences in childhood or youth, and they had become non-singing persons. Their early singing experiences resemble those described by Knight (2011), Ruismäki and Tereska (2006), Ruismäki and Juvonen (2011), Welch (2001), and Whidden (2009).

In the participants' previous experiences, a vicarious circle had taken place: The participants had been in singing situations in which they felt and/or were told that they had failed. Each started to have inferior feelings in singing situations and began to avoid them. Consequently, they had sung less and less, which made developing their singing impossible. Situations in which others sang became a source of further diminishing singing self-efficacy (Numminen, 2005), and increased anxious feelings towards singing. Hence, the person herself, her surroundings, and/or her culturally shared attributions about talent-based musicality and singing skills reinforced a fixed mindset with a strict borderline between singers and non-singers. No tuition was ever offered, and the participants had never sought it – according to their culturally shared beliefs, tuition would have been useless for an 'originally disabled' person.

We do not know why the participants had been unsuccessful in their childhood singing attempts. They may have been so anxious in a demanding singing situation that it affected their singing. The given singing task may have been inappropriate for the participant, as Welch (2001, 22) notes: 'The "out-of tune-singing" should be understood commonly as a mismatch between the designated musical task and current singing competency'. A person's singing development pace may not have been matured in a given (testing) moment, and 'it is normal, [therefore], for children to exhibit a range of singing behaviours and competences as part of their musical development' (Welch, 2001, 21).

The singing difficulties of the students were classified into production, perceptual, and emotional and belief system blocks. All three blocks were alleviated for each student, although situational aspects such as fatigue still hampered singing. During their participation in the singing project, the students started to see themselves as people who sing. They no longer interpreted singing difficulties as signs of an innate permanent inability and began to enjoy singing. This remarkable progress took place in relatively few lessons: the average number of group lessons was 14.8. Those with major singing problems received from 6 to 16 hours of individual lessons, while the rest received only 4 to 10 hours (Table 1). The positive changes in singing were observable (p < .05) to the church choir members who assessed the participants' singing in the pre-post design (Table 2).

The average results of the Karma musicality test (conducted twice) were above the average results of Finnish individuals without music training (Table 1). Four participants scored close to a professional level, and two under the average, but none of the test scores had a clear connection to the participants' singing abilities and development in singing. Importantly, practising singing seemed to affect how tones are perceived. This tendency was also seen in a study by Anderson et al. (2012), where a music people made progress both in perceiving indexed by MBEA and in singing after receiving singing lessons.

An innovative pedagogical approach was explored to help the previous non-singers to sing. Central to this approach was the creation of an emotionally safe context in which to guide the

participants to practice singing in multiple creative ways within the student-activating and process-oriented framework. Singing teachers and music educators should be keenly aware of the fact that singing disabilities should not be reduced to an individual basis but are connected to a complex net of social, educational, psychological, and physiological dynamically interacting contexts (see Bruner, 1996; Welch, 1994). Intensive research is further needed to reveal the complex phenomenon of singing and to develop singing pedagogy that meets the broad needs of children and adults and enables them to discover the joy of singing.

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