Raymond Ammann, Andrea Kammermann, Yannick Wey

THE YODELING MIND

Findings of a Music-Cognitive Study in the Swiss Alps

Translated by Gary Martin

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Introduction: "They all sound the same!"

In Switzerland, natural yodels are called yodel melodies, which are sung exclusively with 'meaningless'[1] syllables. Experienced yodelers in the region around the Alpstein possess an impressive repertoire of natural yodels, which they can clearly distinguish, name individually and call up at any time, but of which uninformed people may say: "They all sound the same!" The typical characteristics of polyphony, slow tempo and repetitive yodel syllables make it difficult for outsiders to recognize the structure and form of individual yodel melodies. Since yodelers in this area can easily differentiate a large number of natural yodels similar in form, the question arises as to whether they employ special listening and memorization strategies. These special skills, together with the fact that yodelers transmit natural yodels orally, make this singing culture of special interest to music-cognitive research. Since the processes of differentiation and memorization of melodies play out individually, both consciously and nonconsciously, the present research combines music-analytical approaches with results of ethno-musicological field research. The research results presented here contribute to understanding the cognitive aspects of yodeling in the Alpstein region and to bringing them into current music cognition research as material for discussion. Yodeling has experienced a popularization in the last 20 years that extends beyond the region studied. Many people who have not dealt with folk music in more detail can find various offerings such as courses, workshops, concerts and other events on yodel music. Music-cognitive research on the possibilities of acquiring large oral yodel repertoires can contribute to a developing yodel pedagogy.

The project team, consisting of project manager Raymond Ammann and co-researchers Andrea Kammermann and Yannick Wey, completed a three-year study on the musical relationship between alphorn music and yodel in 2018 and published the results in the 2019 monograph *Alpenstimmung*[2] (Ammann et al. 2019). During this research, a collaboration with the Roothuus Gonten was established, from which the present study derives. The research project *A Music-Cognitive Study Based on the Collection of 1400 Natural Yodels at the Center for Appenzell and Toggenburg Folk Music, Gonten*, funded by the Swiss National Science Foundation (SNSF) and based at the Lucerne School of Music, was subsequently carried out collaboratively. The Roothuus Gonten, Center for Appenzell and Toggenburg Folk Music, is a hub of northeastern Swiss folk music and yodeling culture. In addition to the organization of thematic evenings, courses, workshops and the publication of relevant writings, the Roothuus Gonten archives audio documents and

1 The word 'meaningless' is not entirely satisfying. More precise suggestions are, among others, 'sense-neutral' syllables, 'non-lexical' syllables, or 'singing without words' (cf. Wey 2019). The term 'meaningless' is, however, still common and with some reservation is used in this work also.

2 Full title: *Alpenstimmung: Musikalische Beziehung zwischen Alphorn und Jodel – Fakt oder Ideologie*. English edition: *Alpine Vibes: The Musical Connection Between the Alphorn and Yodeling – Fact or Ideology?* (Ammann et al. 2023).

notations of yodel melodies. The extensive archive of natural yodel transcripts provided the initial spark for this research and served as valuable base material.

In addition to the present written explanation of the research results, the film *Jodeln im Kopf* (The Yodeling Mind) presents further insight into the yodel culture and the memorization strategies around the Alpstein. Further information and other publications can be found on the project website www.hslu.ch/naturjodel.

Chapter 1: Natural yodeling around the Alpstein

Situated in the middle of the Alps, in the northeast of Switzerland, lies the Alpstein region. It encompasses the canton of Appenzell Innerrhoden (67 square kilometers), the canton of Appenzell Ausserrhoden (94 square kilometers) and the St. Gallen Toggenburg (189 square kilometers) (Fig. 1 and 2). This approximately 350 square kilometer area around the Alpstein mountain range represents a specific and highly interesting region owing to its cultural peculiarities.

Among thriving cultural practices of this region is the natural yodel, which is sung by a large portion of the population. Natural yodels are called *Rugguusseli*[1] in Appenzell Innerrhoden, *Zäuerli* in Appenzell Ausserrhoden and simply natural yodels in Toggenburg, whereby the performance of the same is there referred to as *johle*. Many yodelers in the area around the Alpstein organize themselves in yodel clubs,[2] which unite under the umbrella of the Federal Yodeling Association (EJV[3]). The region has 38 such yodel clubs, seven in Appenzell Innerrhoden, eleven in Appenzell Ausserrhoden and 18 in Toggenburg.[4] Together, these yodel clubs have around 600 members, with the size of the clubs varying and usually amounting to eight to 20 people. Since not all yodelers are members of a yodel club, an exact numbering in comparison with the population of 118,714 (as of 2020)[5] is not available. In addition to membership in the EJV, yodel clubs have the opportunity to join the Toggenburg-Appenzell Natural Yodeling Association, which organizes a large natural yodel concert every three years. Members organized in yodel clubs usually meet weekly for rehearsals; additional rehearsals may be arranged before concerts or performances. After rehearsals, the path often leads to the local inn, where discussions and spontaneous yodeling take place in a comfortable, relaxed atmosphere. Yodelers come from all areas of society and all professions. The repertoire of yodel clubs includes both natural yodels and yodel songs (verse songs with text and yodel choruses), which are written in standard notation.[6]

The Roothuus Gonten promotes yodeling in the region in a variety of ways, for example, by the project initiated there by Noldi Alder, *Yodel So Lo*, which was conducted for the third time in the summer of 2020. Over the course of several weeks, individual yodelers perform at different locations and let their natural yodels ring out (Camp 2019). Through

1 Various spellings exist.
2 Here the term yodel club is used for all choirs in which yodelers organize themselves. The individual groups have different designations; along with yodel club also yodel choir. German spellings include Jodlerklub, Jodlerclub, Jodelclub, Jodlerchörli. In general, "yodel club" is used in this translation.
3 EJV, Eidgenössischer Jodlerverband.
4 From Untertoggenburg, the yodel club Degersheim is also considered here as well as the yodel club Bergg finkli in Grabs from the constituency of Werdenberg.
5 Population figures as of 31 Dec 2020: Appenzell Innerrhoden 16,295, Appenzell Ausserrhoden 55,477, Toggenburg 46,942.
6 Standard notation is the globally known music notation with a five-line system, clef and key signature.

Fig. 1: Map of the yodeling regions around the Alpstein: Toggenburg with the capital Wattwil, Appenzell Ausserrhoden with the capital Herisau and Appenzell Innerrhoden with the capital Appenzell. In the northeast, the two-part district Oberegg, which belongs to Innerrhoden.

Fig. 2: Map of Switzerland with Alpstein region highlighted (light grey: Appenzell Innerrhoden; dark grey: Appenzell Ausserrhoden; shaded: Toggenburg).

this uncomplicated performance of solo yodeling, often outdoors, the Roothuus Gonten aims to highlight the role of yodeling in everyday life and offer it a suitable platform.

One of the customs known throughout Switzerland in the canton of Appenzell Ausserrhoden is the *Silvesterchlausen*, which takes place at the turn of the year. Both on 31 December (New Silvester, according to the Gregorian calendar) and on 13 January (Old Silvester, according to the Julian calendar), groups of different figures ("mummers"), *schöni Chläus*, *wüeschti Chläus* and *schö-wüeschti Chläus*[7] move from house to house in various communities beginning in the early morning hours and wish the listeners a Happy New Year with so-called *Chlausezäuerli* (Rickenmann 2012, Hohl 2015, König 2018).

The Alpaufzug (alp ascent) and the Alpabzug (alp descent), both called *öberefahre* (alpine procession) in the Appenzell and Toggenburg regions, is accompanied by the singing of natural yodels, usually together with a rhythmic extension by Senntumsschellen (musical cowbells) (cf. "Schölle," p. 98). In addition, natural yodeling can be heard at folk festivals, wrestling and alpine festivals, music and dance evenings (*Stobede*, "festivities"), church events, yodeling festivals of all kinds and at the cattle shows taking place in the region. Although many yodelers learn other styles of music through musical notation, and yodel songs sometimes through music scores, natural yodeling is taught through listening and yodeling in response. For documentation and for private or institutional archiving, on the other hand, natural yodels are notated; these transcripts are helpful for the present research by rendering yodel structures visible.

The natural yodel melodies in the area around the Alpstein today are based on a diatonic scale dominated by triads and a harmonic structure based mainly on degrees I and V. The yodel of the first voice (*Vorzaurer* or Vorjodler [lead yodeler]) begins with the melody and a second voice (*Noezaurer* or *Noofahrer* ["Nachfolger" or accompanist, second voice])[8] enters a little later and complements or ornaments the main voice. Some natural yodels are accompanied also by a third voice, which can have its own entrance. At the time the second voice enters, or shortly afterwards, the choir enters to accompany the melody with chords. Divided into a first and a second bass as well as a first and a second tenor, the choir members sing a chord, which only changes when the harmony changes. The function of the second voice is now commonly referred to by the dialect term *gradhäbe*, but the use of this term is non-uniform. Depending on the source, *gradhäbe* stands for one of two accompanying forms of the natural yodel: on the one hand for the second voice, on the other hand for the choir accompaniment with long-held chords in the tenor and bass registers. The different uses of the term occasionally lead to disagreements among yodelers. The word *gradhäbe* has been in use for about 200 years. In the Lexicon *Appenzellischer Sprachschatz* of 1837, Titus Tobler explains the word "Grâdhäba,

7 According to their appearance, the mask-wearing *Silvester-Mummers* are divided into three groups: a) *schöni Chläus* (beautiful mummers) with elaborately crafted costumes and headgear; b) *wüeschti Chläus* (ugly mummers) with coarse costumes made of natural materials (fir branches, etc.) and corresponding headgear; and c) *schö-wüeschti Chläus* (beautiful-ugly mummers) with costumes also made of natural materials and with headgear matching those of the *schöni Chläus*.

8 In German, feminine forms are in use for all designations, for example "Vorjodlerin."

grâdhéba" as "to second"[9] a shepherd's song (Tobler 1837: 234), but without specifying what is meant by "to second." The definition in the Swiss Idiotikon, published about 50 years later, is: "Gerad-Heber:[10] those who sing only the fundamental tone or the chord in Zauren [yodeling], i.e., give the melody the harmonic basis" (Staub et al. 1885: 939, square brackets in the original). Similar explanations can be found in recent publications, for example in the Lexicon *Innerrhoder Dialekt*: "graadhäbe[:] to sing an accompanying chord to the Rugguusseli (without words)" (Manser 2008: 90). In the *Historical Dictionary of Switzerland*, *gradhäbe* is explained as "steadily holding simple scale-degree chords" (Baumann 2015: n.p.). Conversations conducted in this regard with active yodelers, directors and experts from music practice show that the term is increasingly used in oral parlance today for the second voice.[11]

The structures described for first voice, second (possibly third) voice and choir match the polyphony of the natural yodel of other Swiss yodel regions,[12] but Appenzell and Toggenburg natural yodels have certain peculiarities of their own. Yodeling is generally defined by the change of register between chest and head voice, but this does not occur in some *Zäuerli* and *Rugguusseli*. The vocalization in the Appenzell and Toggenburg region also has its own typical style; the ethnomusicologist Hugo Zemp writes: "…the Zäuerli nevertheless have the same essential characteristics: relatively deep voice range, relaxed voice, mostly in slow tempo, free rhythmic character with extreme drawing out of notes, 'dragging' from one tone to the next and rising intonation" (Zemp 1981, quoted from Bendix 1985: 65, emphasis original). The composer, teacher and yodel expert Heinrich Leuthold (1910–2001) attributes these peculiarities above all to the local language character: "…the timbre born of the dialect, which is unique to people from Appenzell and distinguishes it considerably from those of the Muotathal and Bern," forms the timbre of this natural yodel (Leuthold 1981: 77).

Changes that transpired throughout Switzerland with yodeling also influenced the form of the natural yodel around the Alpstein. While natural yodels used to consist of one or two parts, today they are usually composed of two to five parts (cf. p. 58). There is no clear indication of the period in which this change took place, though certain assumptions suggest the beginning of the 20th century. The Switzerland-wide tendency mentioned by Leuthold to memorialize the name of the composer with the name of the yodel melody is also evident in the Alpstein region. Leuthold's statement also suggests that in earlier times yodeling was designed more freely and that certain melodies and forms developed through this naming convention: "In the past, yodeling was simply done without giving this melody a name" (Leuthold 1981: 92).

9 "sekundieren".

10 "evenly/steadily held/sustained".

11 The vocal accompaniment of natural yodeling can also be compared to typical Appenzell string music. Sometimes natural yodels, so-called "Giigezäuerli" (Manser 2010: 143), are presented purely instrumentally. Sequences within the piece, the leading of the melody by the violin and the *Noofahre* by the second violin, function similarly to the vocal Vorjodeln (lead yodeling) and *Noofahre* (accompanying).

12 In Switzerland, a distinction is generally made between the three yodeling regions of northeastern Switzerland, central Switzerland and the Bernese Oberland. All three regions can be further subdivided according to local natural yodeling characteristics (Ammann et al. 2019: 155).

Fig. 3: *Silvesterchläuse (schöni Chläus)* at the performance of a *Chlausezäuerli* near Urnäsch (Photo: Mozarteum University Salzburg).

In the region around the Alpstein, however, natural yodel melodies still show a certain flexibility for individual structuring. Zemp notes: "Even a single singer sometimes makes melodic and rhythmic variations and puts the parts together in different ways. Nevertheless, the parts cannot be combined in just any fashion, they must fit together (zemmepasse)" (Zemp 1981, quoted from Bendix 1985: 67).

In the area around the Alpstein, in addition to vocal polyphony, the natural yodel is sometimes accompanied by special instruments, either by Appenzell string music (cf. note 11), Senntumsschellen (musical cowbells) or Talerbecken (thaler bowls). With Talerschwingen (taler swinging),[13] silver coins, nowadays five franc-pieces, are set in circular motion in the bowls, whereby a penetrating, whirring sound is generated (Manser 2010: 127, Bachmann-Geiser 1981: 17), which continuously accompanies the entire yodel

13 Talerschwingen is "a practice in which several musicians spin a coin on the inside of a bowl to create a musical tone and form chords in a group." From: www.appenzell.ch/en/culture-traditions/appenzeller-music.html, 11 Aug 2022.

performance like a bordun. In the *Schölleschötte*,[14] three tuned cowbells (cf. Fig. 39) are brought to sound in a certain rhythm in a similar way (Bachmann-Geiser 2019: 133). The playing of cowbells and taler bowls each consists of three instruments of different sizes and differently tuned sounds (cf. p. 95). Today, the pitch intervals of a minor third and a major second (ascending from the largest and deepest instrument) as well as those of two consecutive major seconds are common for cowbells and bowls. This sound of the three instruments does not correspond to the accompanying chord of the choir, but the pitch of the natural yodel is tuned to the overall sound of the cowbells or bowls. These bordun instruments thus support the tonality in which the yodelers move.

14 *Schölleschötte*: "musical chords created with cowbells" from: www.appenzell.ch/en/traditions/appenzeller-music.html, 11 Aug 2022.

Chapter 2: Historical excursus

In comparison with other yodeling regions in Switzerland, historical references to yodeling in the Alpstein region date back much farther. The collection of two-part songs by the cantor Georg Rhaw (1545) from Wittenberg contains a musical notation entitled *Appenzeller Kureien Lobelobe*. Kuhreihen[1] refer to various vocal and instrumental pieces, possibly predecessors of the yodel (Ammann et al. 2019: 48). The word Lobelobe in Rhaw's title probably refers to the term Lobe (Lioba), which can be used in texts of old herdsmen songs as a designation for cow, which in turn suggests the function of a Kuhreihen as a cattle call. Syllables that refer to a vocal or yodeled performance are not provided in the musical notations. Regardless of whether this melody was intended for singing or for an instrument, Rhaw's transcript from 1545 is the first surviving notation of a Kuhreihen, and the title refers to Appenzell.

Almost 200 years later another literary reference to a Swiss Kuhreihen appears, again with reference to the Appenzell region. The songbook from the Appenzell monastery of Maria der Engel (Mary of the Angels), dated 1730, contains a notation supplied with text entitled *kue reien*, which is thought to refer to a yodeled melody.[2] The booklet is attributed to Maria Josepha Barbara Brogerin, baptized in Appenzell[3] in 1704, who entered the monastery at the age of 18 (Tunger 1999: 366). This handwritten musical notation is the oldest known musical score with a structure similar to a yodel song, in which sections underlaid with yodel syllables placed between lyric texts are similar to a yodeled refrain (Fig. 4). The melody handed down by Brogerin bears no resemblance to Rhaw's notation, which is about 200 years older. The notation leads to the assumption that in the first half of the 18th century in the Appenzell region parts of Kuhreihen were yodeled, in this case on the syllable "lo."

A detailed travelogue by the German physician Johann Gottfried Ebel (1764–1830) contains references to the singing technique of Appenzell yodelers toward the end of the 18th century: "This song [Kuhreihen] does not consist of articulated sounds and is never sung with words by the herdsmen and shepherds;" furthermore, sounds are formed "in the glottis without anything other than the pharynx [of the throat]" (Ebel 1798: 152, cf. Ammann et al. 2019: 57).

The reference to unarticulated sounds means that a Kuhreihen in the Appenzell area at that time was not sung with words, but with meaningless[4] syllables (yodel syllables) (Wey 2019: 90). Ebel completed his travelogue with several notations of Kuhreihen

1 The term Kuhreihen is used both for singular (a Kuhreihen piece) and plural (Kuhreihen pieces).

2 The original is kept in the Roothuus Gonten.

3 The German phrase "in Appenzell" refers to the town of Appenzell in the canton of Appenzell Innerrhoden, while "im Appenzell" refers to the region that includes the cantons of Appenzell Innerrhoden and Appenzell Ausserrhoden. This text here refers to the town.

4 Cf. p. 9, fn. 1.

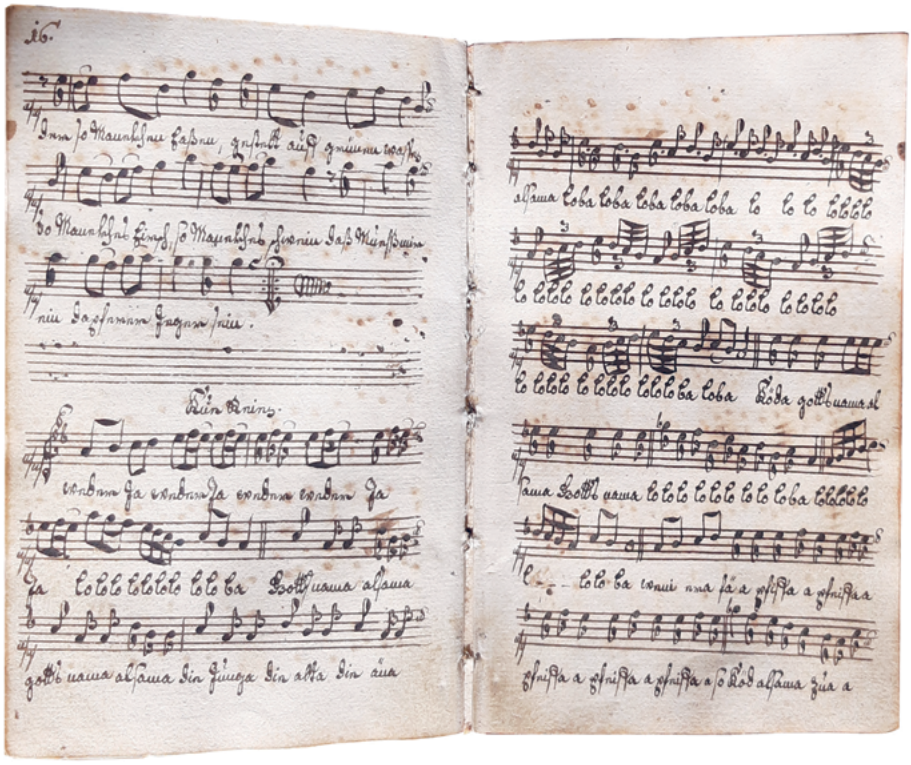


Fig. 4: The first two of seven pages of the *kue reien* from the song booklet of Maria Josepha Barbara Brogerin (1730: n.p.) kept in the Roothuus Gonten.

and other songs, including the oldest known notation of a *Rugguusseli* (Ebel 1798: Appendix), which also appears in the estate of the Appenzell physician Nepomuk Hautle (1765–1826) (Fink-Mennel 2011: 167).

There are different opinions about the origin of the Innerrhoder term *Rugguusseli*. In the first half of the 19th century, Titus Tobler explains it as an instrumental piece: "as they are wont to say, an old Appenzell [song], that is either fiddled on the violin, or played on the flute, to the delight of both young and old" (Tobler 1844: 21, bracketed text inserted). Regarding the vocal genres, Tobler speaks of a "jumble of Kuhreihen, Ruggüssler, Locker, Sennelied, Seealper-Lied,"[5] in which it is actually difficult to situate the well-known song *Min Vater isch en Appezeller* (My father is from Appenzell) (Tobler 1844: 21). At the beginning of the 20th century, Alfred Tobler (1845–1923) understood the *Rugguusseli* as a cowherd song

5 The *Seealper song* is mentioned by Firmenich (1846: 658) and its lyrics are printed. According to Firmenich, the Seealper song is "sung by the herdsmen in a peculiar way." The name derives from the "Seealp," a "mountain pasture on Lake Seealp" in Innerrhoden. About yodeling in connection with the Seealper song, however, neither Tobler nor Firmenich provide any information.

(Tobler 1903: 74), without explaining this in more detail. The local yodel expert Johann Manser (1917–1985) refers to the special register-changing singing style of *Rugguusseli* and explains it by the name itself. This is said to derive from French word "roucouler," which stands for the gurgling sounds of doves (Manser 1980: 156). Manser bases this connection on the French "Roucoulez! Roucoulez!" which was called out to Appenzell mercenaries in Paris to stimulate them to yodel (Manser 1980: 156). After the return of the mercenaries, this French term was distorted, which eventually led to the expressions *Rugguusseli* and *rugguussen*. According to Manser (1980: 156), fewer mercenaries from the Protestant Appenzell Ausserrhoden were in foreign service and they were stationed less frequently in France, which is why the term *Rugguusseli* was not introduced in Ausserrhoden.

As mentioned, the first notation of a *Rugguusseli* from the Appenzell region surfaces at the turn of the 19th century with Ebel and Hautle. This transcription shows parallels to the way the *Rugguusseli* are still sung today. The vocal melody suggests a change of register with sometimes large intervals, and the notated accompaniment forms a steady bordun sound, which is described by Hautle as follows: "always the same bass, as the hurdy-gurdy holds steady according to our expression" (Fink-Mennel 2011: 167). However, the form of this *Rugguusseli* differs significantly from that of Barbara Brogerin's Kuhreihen, which is about 60 years older.

While the Kuhreihen were also played as instrumental pieces in some Swiss regions, especially on the alphorn, they are said to be exclusively sung in Appenzell in the late 18th century. The Göttingen professor of medicine Johann Friedrich Blumenbach (1752–1840) wrote in 1783 regarding the Kuhreihen: "Nor is it blown with the Alp-Horn like the others – as such the Appenzell Sennen do not have at all, – but simply sung" (Blumenbach 1783: 742, cf. Ammann et al. 2019: 51), and Ebel confirms Blumenbach's statement 16 years later: "On my extensive journeys through Switzerland, I have had the opportunity to notice that nowhere is the Kuhreihen sung as often as in the canton of Appenzell" (1798: 152). Regarding the *Rugguusseli*, Ebel adds that these are mainly sung by girls, and he refers in this regard to the tonal difference between the two vocal genres:

> The girls sometimes sing those shepherd songs for hours and with constant change; those songs are called Ruguser in Innerooden; that's why they say: "The girls rugusen"… The sounds of these Ruguser [songs] are not only formed in the throat, as those of the Kuhreihen, but also other parts of the mouth contribute to it; therefore, they resemble the singing of the human voice. (Ebel 1798: 157, bracketed word inserted)

Ebel's description of the singing technique and the explanation of the difference between *Rugguusseli* and Kuhreihen is difficult to interpret. It is also surprising that Ebel specifically refers to girls who *rugguussen*, because according to Manser (1980: 156), the *Rugguusseli* were sung by mercenaries at that time.

In 1805, a few years after the publication of Ebel's travelogue, the first Unspunnenfest took place in Interlaken.[6] Although the festival was held in the Bernese Oberland, the publications of this festival include a source of a natural yodel from Appenzell. In a

6 Since 1805, alpine shepherd festivals have been held at irregular intervals on the Unspunnenwiese (meadow at Unspunnen) near Interlaken.

festival report in the *Avis-Blatt für Herisau und die umliegenden Gegenden* (Avis-Blatt for Herisau and the surrounding regions), Anton Joseph Fässler of Appenzell is mentioned as an "exceptionally good Rüggüsler, Kuhreihen singer and wrestler," who together with the stone-thrower Ulrich Joseph Thörig performed natural yodels at the festival "with good success for their purse" (Schäfer [ed.] 1805: n.p.). The Innerrhoder painter Johann Baptist Dähler (1810–1876) commemorated the *Rugguussler* Fässler in a depiction that shows him singing with two fingers in his ears.[7]

A modification of today's designation *Zäuerli* for the natural yodel of Ausserrhoden appeared for the first time in 1829, in the second volume of the series of historical German documents *Monumenta Germaniae Historica* (1829). In it, the editor Ildefons von Arx assumes the absence of the alphorn in the Appenzell area as mentioned by Blumenbach and Ebel and mentions that instead the cows and goats are called with the natural yodel. He uses the words "sauern" (*zauren*) and "rungusen" (*rugguussen)*: "*Hirtenhörner*, et in montibus *Alphörner* vocabantur hae tubae. Earum in Helvetia a longo tempore nullus est usus, armentarii iam gargaridiando sonos (*mit Kuhreihen sauern, and rungusen*) ad tuguria vocare consuescant vaccas et capellas"[8] (von Arx 1829: 103, emphasis original). Titus Tobler writes in his work *Appenzellischer Sprachschatz*: "The Zaur is a single short Gejauchze,[9] which can be given as uho or u bu hu lui lui" (Tobler 1837: 453). As already mentioned, Tobler describes the *Rugguusseli* at the beginning of the 19th century as a herdsman's song, and the *Zaur* as a short "shout" (Jauchzen). Alfred Tobler connects *Zäuerli* with the verb *zauren*, which he also equates with cheering (jauchzen). Joe Manser (2010: 114) suspects that the name *Zäuerli* (or *Zöherli*) may have come from the "original meaning of this verb," and translates "en Zaur abloo" with "shout of joy" (Freudenjauchzer)." Thus, it can be speculated that *Rugguusseli* and *Zäuerli* once stood for different forms of singing, namely for a yodeled herdsman's song (*Rugguusseli*) and for a short, spontaneous shout (*Zäuerli/Zaur*), and only later developed into regional terms for the natural yodel. On the other hand, these could be independent names for the same practices. In Toggenburg there is no separate noun for the natural yodel in the local language, but, as with the verb *zauren*, the act of yodeling is called *johle*. The *Johle* and the singing of the Kuhreihen can be documented there back to the middle of the 18th century. In his autobiography *Der arme Mann im Tockenburg* (The poor man in Toggenburg), first published in 1789, Ulrich Bräker (1735–1798), born in Wattwil, describes how he grew up in Toggenburg and gradually became impoverished. Included are isolated references to the natural yodel, for example when the author writes: "Sometimes I began again to cheer (jauchzen) and yodel (jolen) and trotted off anew carefree over all the mountains" (Bräker 1945: 39). Elsewhere, Bräker recounts how he rounded up the goats

7 www.roothuus-gonten.ch/cms/images/PDF/Bildarchiv/Boo8Buuregsang_Jodler.pdf, 24 Feb 2020. It is also possible that Fässler is depicted in the painting by the artist Gabriel Lory (1763–1840) entitled "Appenzeller Ruguser," which was used as an illustration for the collection of Kuhreihen of 1826 (Wyss 1826: title) (Tunger 1993: 86).

8 "*Shepherd's horns*, and in the mountains, these horns were called *alphorns*. These have not been in use in Switzerland for a long time, as the cattle herders are now used to calling the cows and goats to the hut with a gargling [gargaridiando] sound (*with Kuhreiehen sauren, and rungusen*)" (Transl. by the authors, cf. Ammann et al. 2019: 41).

9 A "whoops" or short and loud cry or cheer, also the meaning of "Jauchzen, Jauchzer."

with *johle*: "At first, the goats of which I had 30 didn't want to do me any good; …when they all ran into the woods and bushes, and I mostly could not see a single one all around, half a day of running around, whistling and yodeling (jolen)…until I had them all together again." The description indicates that short yodel tunes were also used as cattle calls; moreover, the use of the word *johle* in Toggenburg for this era is documented here by Bräker.[10] However, such carefree moments became rare in Bräker's life; he had been recruited by a Prussian officer in order to escape poverty and fought in the Battle of Lobositz in 1756. In an episode that took place around 1755 in Berlin, he tells the following story:

> But as soon as the exercise was over, we took off together to Schottmann's cellar, drank our jug of Ruhiner- or Gottwitzer-beer, smoked a pipe, and trilled a Schweitzerlied (Swiss song). The people of Brandenburg and Pomerania always listened to us with pleasure. Often several gentlemen even called us out to a food stall so we could sing the Kuhreihen to them: Usually the player's wage was just a dirty soup; but in such a situation you make do with less. (Bräker 1945: 191)

Together with two other Swiss recruits, he was apparently able to acquire an emolument by singing Swiss folk songs and Kuhreihen. To which type of singing Bräker's description refers remains to be determined. At that time, Kuhreihen were both simple vocal and instrumental melodies as well as precursors of the yodel song later translated into compositions by Ferdinand Fürchtegott Huber. "Schweitzerlieder," such as those published in the collection of *Schweizerlieder mit Melodieen* (Swiss Songs with Melodies) by Johann Caspar Lavater and Johannes Schmidlin, were songs often containing patriotic and heroic content (Lavater/Schmidlin 1796). They were not notated with yodel parts at the time, which does not mean that yodel refrains were not known. Even the notation of yodel syllables only became common with new folk song editions at the beginning of the 19th century. The fact that the Zurich-born pastor of Uzwil, Johann Jakob Simler (1716–1788), described the Toggenburg songs in 1785 as "lively" is interpreted by the chaplain and natural yodeling expert Theodor Kappler (1907–2008) as an indication that Toggenburg natural yodel melodies were already rhythmically animated at the time of Bräker (Kappler 1984: 31). However, since no notations or descriptions of the songs have survived first-hand from this era, such theses remain speculative.

Natural yodel and yodel song in the 19th century

In the first half of the 19th century, the song with yodel refrain established itself as a singing genre in Switzerland. The St. Gallen composer Ferdinand Fürchtegott Huber, who in the 1820s composed yodel songs for choirs as well as for solo voices with instrumental accompaniment, is especially noteworthy (Kammermann et al. 2016: 22). At the same time in Appenzell Ausserrhoden, the local politician Johann Heinrich Tobler

10 Regarding the *Johle* in Appenzell and Toggenburg as an older name for the Toggenburg natural yodel, possibly also *Rugguusseli* and *Zäuerli*, there is a passage in Steinmüller's (1804: 257) last stanza of the Appenzell Kuhreihen: "Now you have heard the Kühreihen, it will not please you, you may not hear it, you will not teach it, it will be distasteful to you: so I want to be silent now, the singing and violin-playing, the cheering (Jauchzen) and yodeling (Jolen), the laughing and muttering (Gollen), is nothing new either."

(1777–1838), who came from Wolfhalden, worked as a composer of songs with yodel refrains.[11] At that time various groups of singers, mainly from Austria, popularized the song with a yodel part throughout Europe (Hupfauf 2016). Around the middle of the 19th century, a group from Appenzell, whose members saw themselves as Swiss national singers, toured in and outside of Switzerland. The founder of this group of singers, Johann Konrad Tobler, tells in his memoirs written in 1867 how his Appenzell Quintet performed on 10 Aug 1848 at the Swiss Federal Singers' Festival in Bern with such great success (Tobler 1867: 275, cf. Ammann/Carlone 2020: 115) that afterwards a seven-week concert tour with Appenzell songs in western Switzerland was organized. The major international tour began in February 1849, when the Appenzell singers traveled to Germany and on to the Netherlands. Their repertoire included classical songs, Swiss folk songs and songs from their native Appenzell. The tour was a failure (Tobler 1867: 302). Especially in the Netherlands, the Swiss singers were exposed to such fierce criticism that they ultimately cancelled the rest of the tour. Although the yodel songs were known in northern Germany through Tyrolean singing groups, the audience seems to have been perplexed by the Appenzell singing style. This is suggested by a very critical statement of a baron from Haarlem in the Netherlands (Ammann/Carlone 2020: 116).

The visits of Austrian singing groups increased in the second half of the 19th century, and some of their songs became part of the repertoire of various singing clubs in German-speaking Switzerland (Ammann/Carlone 2020: 109). On account of its geographical location, the region around the Alpstein shared an economic and cultural connection with Vorarlberg and Tyrol. These contacts led to a mutual exchange of songs and singing styles. Alfred Tobler mentions some songs of Austrian origin that were often sung in the Appenzell region in the second half of the 19th century (Tobler 1903: 60), including the songs *Uff de-n Alme drobe* (Up on the alp) (Tobler 1903: 58) and *Im Appenzellerland da ist es schön* (In the Appenzell land it is beautiful), which in 1818 was already included by Wyss in the *Sammlung von Schweizer Kühreihen und Volksliedern* (Collection of Swiss Kuhreihen and folk songs) under the title *Bernisches Küher-Leben* (Tobler 1903: 66).[12] In addition, Tobler discovered the same melody entitled *Wann i morgens in der Frua aufsteh* (When I get up early in the morning) on an old musical wall clock of the Uster doctor Hohl-Stämpfli (Tobler 1903: 66), which shows how melodies were underlaid with various texts from different regions.[13] Tobler explains that among the "songs imported from

11 Tobler practiced the profession of model engraver in the Ausserrhoden community of Speicher and worked from 1798 to 1803 as secretary of the district court of Teufen. In 1819, he joined the St. Gallen Singing Society "zum Antlitz" and five years later participated in the founding of the Appenzeller Sängerverein (Fuchs 2012: n.p.). In addition to yodel songs, Tobler created a large number of social songs, which he had printed in various collections. Many of his compositions refer in content and form to the local tradition of pastoral singing. In 1825, he published the *Ode to God*, which was posthumously declared the official Ausserrhoden Landsgemeindelied in 1877 (Fuchs 2012: n.p.). His composition *Appenzeller Sennenlied* is based on the text of the already mentioned Kuhreihen of Maria Josepha Barbara Brogerin (Ammann et al. 2019: 109).

12 Tobler probably refers to the song *Küher-Leben* by Wyss (1818: 82), which melodically has great similarities with the Appenzeller Lied notated by Tobler (1903: 66).

13 Furthermore, according to Tobler, in the forties and fifties of the 19th century, the song *Bin i net a lustiger Schweizerbue*, imported from the "Schwabenlande," was popular in the Appenzell region (Tobler 1903: 59).

Germany or Austria, there are some that have long been fully included in the Appenzell folk song repertoire" (Tobler 1903: 51). These borrowings changed the yodel-song repertoire in Switzerland, which gave rise to criticism. On the other hand, such changes cannot be shown directly in the Swiss natural yodels, even if the singing of Tyrolean songs or *Schnaderhüpfeln* from Austria is still common today at *Stobeden*[14] in Appenzell and Toggenburg as an intermezzo between natural yodels (Sammlung *Ratzliedli*, ZAV 2007).

The folk music researcher Heinrich Szadrowsky, who criticized Tyrolean influence on Swiss yodel culture, writes in a report on the Alpine Festival of 1869 in Siebnen, where yodelers from all over Switzerland came together, that only the performance of the Appenzell female yodelers showed no foreign influences:

> The Appenzell yodelers held the original Appenzell yodel firmly without spoiling it with borrowed figures. If the solo yodeler has also approached the uppermost limit with her rich, clarinet-like yodeling figures, this is not to be criticized, since it occurred based on great virtuosity in yodeling. In general, the choir of Appenzell yodeling women offered much of interest, especially the well-known "Appenzell Kuhreihen," which were sung with astonishing precision and rewarded with abundant applause. (Szadrowsky 1869: 636)

Like Ebel (1798: 157), Szadrowsky names Appenzell women who practiced yodeling and mastered it with great virtuosity (Szadrowsky 1869: 635). He describes the Appenzell song as lively in movement and usually in four-parts. In "figures and vocal range" it is an "immensely rich yodel with large intervals" (Szadrowsky 1864: 512). According to Szadrowsky, Appenzell singing differs from that of the Bernese Oberland, which "in the overall impression…is more moderate than that of Appenzell" (Szadrowsky 1864: 513). Appenzell singing shows similarities with that of western Switzerland but differs from the "nasal manner of performance" of the western Swiss and their French diction (Szadrowsky 1864: 513). Szadrowsky has not left any notations for this.

Information about natural yodel from that period, on the other hand, is provided by sources from Toggenburg, which were largely overlooked by the authors of that time. From the second half of the 19th century comes one of the oldest surviving Toggenburg natural yodels, *De Schtadel Wändeli*.[15] Theodor Kappler writes about its author, Wendolin Rutz (1850–1910), that this farmer and alpine herdsman created "from instinct" and "of course" knew no musical notation.[16] In the transcription published by Kappler (1956: 124), the yodel may "perhaps not be completely accurately reproduced." He thanks the two teachers Albert Edelmann (1886–1963), founder of the Museum Ackerhus Ebnat-Kappel, and Johann Steiner, who had transcribed this and four other yodels from oral tradition (Kappler 1956: 125).[17]

The transcription of *De Schtadel Wändeli* dispenses with bar lines in the first part, an indication that this part was interpreted metrically freely. The second part, on the other

14 Evening festivities with dancing.

15 See a newer version under the title *Stadelwendeler* in the Appendix (TO 08).

16 Unpublished manuscript of Kappler in the State Archives Nidwalden (StANW), Stans, Estate Leuthold, P 137/13.

17 Edelmann (1945) was able to record texts and melodies from Toggenburg in the 19th century (Kappler 1984: 40) and devoted himself to the research of Toggenburg's cultural heritage.

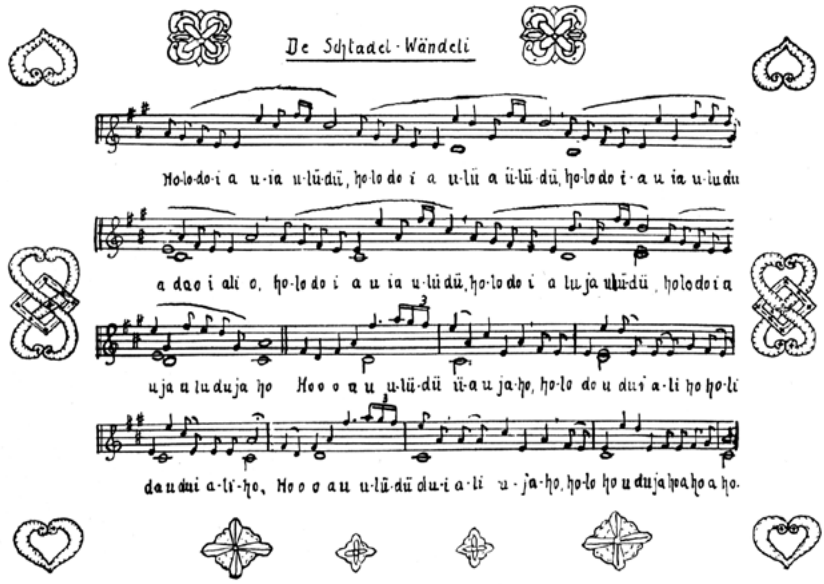


Fig. 5: *De Schtadel-Wändeli*, Toggenburger natural yodel by Wendolin Rutz (1850–1910), transcribed by Albert Edelmann (after Kappler 1956: 124, StANW, P 137/13).

hand, is set in 6/4, also rhythmically more differentiated with triplets, so this could have been yodeled in the style of today's widespread Toggenburg ending sections, that is, in a more moving manner and more rhythmically yodeled than the sennical[18] first part without bar lines. Beneath the melody runs an accompanying voice with long notes in a low register. As today, the accompaniment only begins after a solo opening sequence. The notated vocalization reveals how variably it was employed at the time of Wendolin Rutz. Although certain conventions can be seen that are reflected today, such as the frequent vocalization on "u" in the high register; an "a" and an "i" were also used one after the other on the same low note.

The natural yodel takes its present form

At the turn of the 20th century, the aforementioned Alfred Tobler of Appenzell (son of the singer Johann Konrad Tobler) worked on the music of his homeland and wrote two books on the yodel, Kuhreihen and folk song (Tobler 1890, Tobler 1903). He refers to the connectedness of the Appenzell yodel with the character traits of the population: "The Appenzell inhabitant has a sociable nature, and the bond of this conviviality produces this

18 On the sennical (alpine herdsman) way of performing the Toggenburg natural yodel at the turn of the century, Kappler explains that one should yell out slowly, otherwise it would not be sennical (Kappler 1984: 33, Zimmermann 2012: 23). Kappler (1984) quotes Beat Alpiger from Wildhaus, who died in 1930. See also the letter to Heinrich Leuthold of 2 Mar 1980, StANW, Nachlass Leuthold, P 137/13.

type of singing. Of course, he also yodels alone, in the weaving cellar, in the stable, on the meadow, on the alp, or anywhere else he is driven to yodeling" (Tobler 1903: 77). In his musical description, Tobler mentions that Appenzell yodels are never sung in the minor mode (Tobler 1903: 130), that they are accompanied by "two- and three-part alternating intervals" (Tobler 1890: 38) and are vocalized according to certain rules related to the corresponding pitch. The change between chest and head voice[19] can be read from the vocalization. In the high register, according to Tobler, the syllables "u, ü, i, ö, ru, bu-lu, pu-lu, du; rü-bü-lü, pü-lü, dü; ri-bi-pi-li-di: rö-bö-pö-lö-dö etc." are used (Tobler 1903: 94), while in the chest position "a" and "la" are preferred to be sung. The vocalization notated by Tobler over 100 years ago has changed. Today, fewer consonants tend to be used in the region around the Alpstein, and the most popular vowels are "o" and "a" in the chest voice and "u" in the head voice.

In 1936, musicological field research led the German doctoral student Wolfgang Sichardt (1911–2002) to northeastern Switzerland. Sichardt made various audio recordings of yodeling in the villages of Appenzell and Nesslau (cf. p. 53). His audio recordings give valuable insight into the yodeling practice of that time. Sichardt was looking for the origins of yodeling and assumed that a yodel melody that stands outside the equal-tempered tone system and common metric subdivisions was particularly old. This assumption led him to regard the Appenzell natural yodel (and that of the Muotatal) as more original than those of the rest of Switzerland. He also explains this originality by the archaic timbre and vocalization as well as the Lydian mode with the sharpened fourth scale degree.[20] Sichardt's assumptions are considered obsolete today; the transmission of yodel melodies can be traced back historically, but their origin cannot be determined. Sichardt recognized the timbre, the special melody and the intonation as the main characteristics of the natural yodel around the Alpstein. His recordings give insight into the interpretation of natural yodeling in Appenzell and Toggenburg before the tendency to standardize vocalization, triggered by Robert Fellmann's *Schulungsgrundlage für Jodlerinnen und Jodler* (Foundational Course for Women and Men Yodelers) from 1943, even if only with a few examples. The foundational course shapes the yodeling styles that are still common today throughout Switzerland. The yodelers followed its instructions so closely that in many places the local sound and vocalization were adapted to Fellmann's suggestions.[21] In the Appenzell area, this has led to a leveling of vocalization, but the natural yodels from Appenzell and Toggenburg retained their local melodics and singing styles as well as their typical polyphony.

The developments toward a standardized vocalization led to lively discussions and in the following years to initiatives promoting regional yodeling styles. The Wattwil yodeler and composer Jakob Waespe (1909–1972) campaigned in a commission together

19 In male voices, "modal position" is also used for the chest voice ("normal" middle range), falsetto for the head voice.

20 A scale degree refers to a step in a scale; *g*, for example, is the fifth scale degree of the scale in C major.

21 This was not Fellmann's intention, but rather he wanted to create a guide for beginners. In a lecture (Fellmann 1948) he regretted the leveling of vocalization in natural yodel and advocated performance practice according to local dialects and traditions.

with Heinrich Leuthold and Hansadolf Waefler for the natural yodel and represented the Toggenburg region there. The commission looked at the characteristic features of natural yodeling in the different regions in order to counteract the perceived standardization. The distinct Toggenburg yodel vocalization was also a concern of the aforementioned Toggenburg natural yodeling specialist Kappler. About a Toggenburg natural yodel, which he got to know in 1919 and thus even before the distribution of sound recordings, Kappler writes that it had to be vocalized "namely with: Ho-u-dui-ali ~~ho-dui-ja-uia~~ ui-ali-daa-ulihoo, which Appenzell absolutely does not know" (crossed-out passage in the original).[22] A further tendency was shown in the expansion of the natural yodel in Toggenburg by more parts, up to five, and in an increased articulation with tongue stroke. Leuthold in particular took a critical look at these developments.[23]

Especially since the beginning of the 21st century, there has been an interest in yodeling that extends across cantonal and even national borders, which includes local natural yodeling. Many of the earliest written sources for yodeling in Switzerland refer to this area, and a historical reappraisal of all sources shows a continuity of form in natural yodeling. The earliest notations already show musical arrangements that are still present in today's natural yodels and are typical of northeastern Switzerland. These unmistakable musical peculiarities dating far back in time make it particularly attractive and interesting. Workshops and weekend courses offer interested parties the opportunity to learn the basics of Appenzell and Toggenburg yodeling. In addition, the promotion of traditions by the tourism industry in the region emphasizes yodeling. Cattle shows, *Stobeden* and yodeling evenings are not only appreciated by the local population, but also attract foreign visitors. The Festival Klangwelt and the Klangschmiede in Alt St. Johann offer the local natural yodel another platform.[24] Learning opportunities are enjoyed by people from different social backgrounds and supply a further level of investigation into the music-cognitive discourse.

22 Letter from Kappler to Leuthold dated 2 Feb 1981, StANW, Nachlass Leuthold, P 137/13. See also Zimmermann (2012: 24, emphasis original): "Old sound recordings and the utterances of my interlocutors confirm that vocalizations such as 'dü,' 'drü,' 'di,' 'je,' 'dra,' 'dro,' 'lü,' 'jobeli' were commonplace in the past. But when I listen to my yodel collection, I only hear 'jo,' 'ja,' 'ho,' 'li,' 'o,' 'u.'"

23 Leuthold writes to Kappler on 24 Feb 1983: "Be careful! First, five-part monsters no longer correspond to the original natural yodel. The same applies to yodeling, which is based only on a tongue-striking technique. They resemble too much an instrumental Ländler waltz, and so the yodel is downgraded to the level of dance music. But something like that has nothing to do with natural yodel anymore." StANW, Leuthold estate, P 137/13.

24 https://klangwelt.swiss, 28 May 2024.

Chapter 3: Cognitive basics for memorizing music

The transmission and learning of yodel melodies in the Appenzell and Toggenburg regions is primarily accomplished orally without the aid of musical notation. However, the recording of melodies for archival purposes or for analysis is also part of this yodeling culture. In addition, a local yodel vocabulary developed that differs from that of standardized music theory. Precisely because of this mixture of oral and written mediation and transmission, an investigation of the special yodeling culture around the Alpstein can produce interesting clues for comparisons with other musical cultures.

In this type of oral learning the possibility of mental visualization of sheet music as a memory aid is excluded, which must be considered in the present study. Since the second half of the 20th century, researchers in the cognitive sciences of music perception, music memorization, and musical creativity have focused their attention mainly on students at music schools and music academies (Gordon 2006, Hellmuth Margulis 2014, Gruhn 2008). They could assume that these people had a high degree of training in music theory and that they were familiar with standard musical vocabulary. For music cognitive studies in cultures where music is not notated and no analytical music theory is present, these methods need to be expanded. For this purpose, methods of cognitive anthropology can be employed as they were in the second half of the 20th century. Roy D'Andrade, one of the early researchers in cognitive anthropology, notes that cognitive anthropology "investigates cultural knowledge, knowledge which is embedded in words, stories, and in artifacts, and which is learned from and shared with other humans" (D'Andrade 1995: xiv), but he does not include music in this list. Music researchers, however, are convinced that music offers a fertile field of study for cognitive and cultural research, both in its function and structure as well as in its cultural significance. Alan Merriam (1923–1980) points out in his much-quoted publication *The Anthropology of Music* that music should be understood as culture and accordingly examined with socio-anthropological and cultural-scientific methods (Merriam 1964).

Although the fundamental publication *Music Cognition* (Dowling/Harwood 1986) does not examine any non-European musical cultures, the authors point to the importance of such a consideration: "Ethnomusicology for us has been a rich source of anthropological theories, methods, and descriptions of musical experience. We believe there is a need to extend the study of music cognition to a range of the world's cultures wider than those of western Europe" (1986: xiii). Although the music psychologist John Sloboda includes African musical cultures in the chapter "Culture and musical thinking" in *The Musical Mind* (Sloboda 2000: 240), he explains the lack of consideration of other musical cultures: "I have neither the competence nor the space to offer a survey of the world's musics, even at the most general level" (Sloboda 2000: 241). More than ten years later, in the preface to the 1999 edition, Sloboda refers specifically to the importance of a cross-cultural approach to music cognition: "Cross-cultural issues have continued to

be a neglected aspect of the study of musical cognition. Comparisons of oral and literate cultures are almost non-existent" (Sloboda 2000: xiv). In the *Oxford Handbook of Music Psychology* Hallam et al. (2009: 906) also write: "A limitation of research to date is that most has been undertaken within Western musical cultures. Its validity needs to be tested within other musical contexts and cultures to explore whether similar phenomena occur elsewhere." However, if music-cognitive research results are to have universal validity, both oral and written music cultures as well as mixed forms must be considered.

The ethnomusicologist John Baily, who already carried out foundational music-cognitive research in non-European cultures in the 1980s, incorporates in his investigations of Hindustani music in northern India and Afghanistan the mindset of the members of this music culture when he begins with the culture's own theory of music (Baily 1988: 114). Gerry Farrell also explains in his article "Music Cognition and Culture: A Perspective on Indian Music in the Context of Music Education" (Farrell 1994) the emic perspective[1] as the starting point of his research. In the late 1970s and 1980s, several researchers in ethnomusicology began to consider the emic approach (Feld 1981, Zemp 1979) and thus initiated an important turning point. The consideration of culturally specific music theories, which can range from music-relevant myths to detailed explanations of music structure and aesthetics, is today a prerequisite for emic-oriented ethnomusicological research. However, the inclusion of an emic view in ethnomusicological investigations cannot per se be regarded as a music-cognitive approach.

In the 1990's Ulrich Wegner declared in relation to his studies of xylophone music in the Kingdom of Buganda (Uganda): "Fostering an emic approach, musical cognition searches for conceptual frameworks and their manifestations within a given musical culture" (Wegner 1993: 202). He expresses satisfaction with this complementary approach between anthropology and psychology: "I have shown that the perception of inherent patterns (ethnomusicology) or auditory streams (psychology) appears to be a striking example for a strategy of the human perceptual apparatus to organize the input from a highly complex acoustic environment with its multitude of stimuli on different levels" (Wegner 1993: 227). Gourlay (1993) also emphasizes the advantage of combining ethnomusicological and music-cognitive approaches in his research on the predictability of structures in beer drinking songs of the Karimojong in northeastern Uganda. Ammann, Keck and Wassmann conducted an empirical, music-cognitive study in 2007 among the Yupno in the Finisterre Range of Papua New Guinea. There, each and every Yupno can recognize a large number of short melodies (*konggap*), which are firmly connected to a person. In this study, the survey conducted after participants listened to partially prepared sounds in the context of a combination of a musicological and sociological analysis, with inclusion of emic approaches, yielded valuable insight (Ammann et al. 2013, cf. p. 102). The examples of music-cognitive methods mentioned here, applied in ethnomusicological investigations, illustrate the diversity as well as the usefulness of a combination of methods.

1 In the social sciences, the term emic stands for the view from within (with the eye of an "insider").

Methodologically, a music-cognitive study of yodeling in northeastern Switzerland cannot be compared with a corresponding study in an exclusively oral culture. Although yodel melodies are generally conveyed through the ear, a musical culture cannot be assumed to be far from the European understanding of music, because the listening habits of the people of eastern Switzerland are shaped by European music concepts and music-aesthetic ideas, as in other central European cultures. Nor should the existence of a musical script be regarded as the sole criterion on which the research method is established.

Applied methods

The present music-cognitive research combines methods of musicology (musical analysis) and ethnomusicology (questionnaires, participatory observations) with theories of cognitive science. The resulting findings are brought together to formulate an interdisciplinary statement. The musicological approach leads through transcription and analysis, which enable an explanation of the musical peculiarities of the natural yodel in the Alpstein region. Collections of already recorded natural yodels as well as melodies that are transcribed especially for this study serve this purpose. The cognitive approach leads through an analysis and synthesis of various relevant and suitable theories to an empirical investigation in order to test these theories through real world practice.

The specific procedure is derived from these considerations and consists of several steps of data acquisition and evaluation. The repertoire of the yodel clubs is examined and recorded in its size and diversity, for which the presidents of the yodel clubs of the region received questionnaires by post in Autumn 2019 with the request to return the completed form. The questions relate to the manner of mediation in the yodel clubs and aim at an insight into the current repertoire and into the spread of natural yodel in the region (cf. p. 47).

To evaluate a representative number of natural yodels and to remain within the scope of what is feasible, yodels are examined using three analytical procedures applied in varying degrees of detail, depending on the number of natural yodels per procedure. The approximately 3,500 notated natural yodel parts that are archived and available in the Roothuus Gonten are subdivided and further examined based on already existing information in order to identify and situate the musical structure within the context of memorization strategies.

From this collection of natural yodel melodies, three examples, one each from the two Appenzell cantons and one from Toggenburg, are closely examined and structurally compared. This detailed investigation serves mainly as an explanatory example for extending the analytical approach to 30 natural yodels in order to render memorization processes visible and to compare them with existing music-cognitive studies. These 30 natural yodels were selected according to their local assignment (ten from Innerrhoden, ten from Ausserrhoden and ten from Toggenburg) and in consultation with local yodeling experts. With a view to the cognitive question, the analysis seeks answers that contribute to the understanding of memorization of natural yodel melodies (cf. p. 77). For the number and

sequence of parts, the harmonic and motivic structure as well as the structure of voice entrances are of fundamental importance in cognitive processing.

The empirical part of the study is based on interviews with experts in yodeling practice, carrying out an online survey and the aforementioned assessment by means of questionnaires. Some of the interviews that took place between 2018 and 2020 were filmed, excerpts of which can be seen in the film *Jodeln im Kopf*. The questions focus on individual learning and memory strategies as well as personal experiences of the yodelers. The audio survey, which took place online as a further empirical sub-study, provides clues as to how natural yodel melodies are perceived and understood by listeners with different musical backgrounds[2] and different approaches to the northeastern Swiss natural yodel (cf. p. 101).

The various sub-studies aim from different directions at the topic of perception and memorization of natural yodel melodies around the Alpstein. Although each sub-study stands on its own, there are reciprocal reference points that are used in a comparison as a control for the meaningfulness of the results.

Listening to music as an act between perception and memory

In order to perceive a sound as such, memory must be able to access past sound perceptions, whereby listening to music is based on an active exchange between the present and the past. For this exchange, information must be stored in memory and retrieved from memory simultaneously. Accordingly, listening to music is not understood exclusively as a comparison with sounds already heard, but rather as "an act of memorization, but also a constant effort to link past to present in a relationship that is ultimately of an intellectual rather than perceptual order" (Imberty 1969: 115, quoted from Bigand 1993: 231). As a result, the brain memorizes small musical units (such as timbre or motifs) practically at the same time for the perception and recognition of sounds or music: "Humans perceive a sound wave as tone through a synthesis across time" (Spitzer 2002: 115).

The processes that occur from the perception of a sound to acoustic reproduction take place in different phases, which, assigned to memory as names (long-term memory, short-term memory) refer to specificities in perception and memorization, but not to specific brain regions. Although some of these processes occur in parallel rather than serially, they are described separately and sequentially in the literature to explain these cognitive processes. Nevertheless, it must be noted that many processes that take place in memory are not yet known in their entirety. For Fried (2004: 81), memory corresponds to a psychological auxiliary notion:

> [Memory] refers to the sum of individual brain activities aimed at encoding, preserving, recalling and forgetting sensual and neuronal information, be it sensory impressions, body motor skills, perceptions, learning processes, consciousness or other experiences. How it happens in detail is only partially known.

2 Robert Jourdain (2001: 112) assumes that there are differences between musical laymen and professional musicians in recognizing melodic "contours."

In the perception and memorization of music, similar neuronal processes take place as in the perception of acoustic signals and stimuli in other areas, especially in the understanding of language (Snyder 2016: 167, cf. Patel 2008). Perceived events (both in one's own body and in the environment) cause changes in the microstructure of the brain that persist for different periods of time. For these changes, Snyder uses the term encoding in the sense of changes in mental representations of events that are related to the person in question (Snyder 2016:167).

The first moments in sound perception

When stimuli and information reach the brain via the sensory organs, they are recorded in sensory memory, also called ultra-short-term memory (Spitzer 2002: 116).[3] Just as the term iconic memory (Sperling 1960) is used for perceptions of the eye, the term echoic memory (Spitzer 2002: 116) has been adopted for the first sound perception, which is defined as follows: "Echoic memory is posited as very brief *sensory* image of an auditory stimulus that persists for a second or two at most" (Snyder 2016: 168, emphasis original). This very short perception impression is sufficient to distinguish timbres and to determine whether a sound can be calculated by its frequency as part of a known mode (for example, a scale) (Spitzer 2002: 117). Filipic et al. (2010: 340) found that 0.5 seconds are enough to recognize a familiar melody, and emotional judgments can be made even faster (after 0.25 seconds). Although echoic memory provides much information for an analysis of what has been heard, "this is fleeting and decays if it is not further processed" (Spitzer 2002: 117). A more thorough analysis of sound takes place in auditory short-term memory, where the distinction between echoic memory and auditory short-term memory cannot be clearly described (Crowder 1993: 113).

From short-term memory to working memory

Short-term memory refers to the first period of grasping impressions in which immediate perceptions and thoughts emerge. There are different specifics about the duration of this period: Snyder (2016: 168) speaks of four to 30 seconds, whereby he notes that usually four to eight seconds is assumed. Spitzer (2002: 117) mentions "a few seconds" as the time limit of acoustic short-term memory, while Hesse (2003: 24) gives a duration of "about 10–20 seconds." In addition to the time limit, short-term memory is also limited by its capacity (Cowan 2010: 51), which limits the number of elements that can reside simultaneously in short-term memory (Snyder 2016: 168).[4] The capacity of short-term

3 Other names are ultra-short-term storage, sensory register or immediate memory (https://lexikon.stangl.eu, 3 Mar 2021).

4 George Miller (1956) set the capacity limit of short-term memory at 7±2, while Cowan (2000, 2010) assumes 4±1. However, unlike Miller (1956), Cowan (2010) does not refer to short-term memory, but to working memory (cf. p. 33).

and working memory plays an important role in the cognitive study of yodel melodies in northeastern Switzerland and is discussed later in detail (cf. p. 67).

Short-term and working memory are used interchangeably in many publications, as both are limited in terms of time and capacity. However, there is comprehensive research discourse on the two related terms that distinguishes them from each other. Atkinson and Shiffrin (1968) presented a three-part concept of memory with interacting storage systems: "the sensory register, the short-term store, and the long-term store" (Atkinson/Shiffrin 1968: 93). Among other things, this model was criticized for the need for its own sensory storage as well as the unclear descriptions of short-term and long-term storage. Especially in reference to the elements of processing, the purely passive short-term memory was criticized, and this concept was extended by the more complex idea of a working memory (Baddeley/Hitch 1974). This actively draws on data from long-term memory. The prevailing opinion about working memory (Baddeley 1986) constitutes it from different parts that form their own memory systems: a "visuospatial sketchpad," a "phonological loop" and a "central executive," whereby Baddeley (2000) additionally added the "episodic buffer" (Snyder 2016: 170). In this way, the working memory "alongside of short-term storage of phonological and visual-spatial information can above all manipulate this short-term held information" (Zoelch et al. 2019: 28). In addition to Baddeley's and Hitch's (1974) model of working memory and Baddeley's (1986, 2003) specifications, there are also alternative working memory models with various orientations (Cowan 2000, Jonides/Smith 1997). The term short-term storage or short-term memory generally refers to the storage of information, "whereas the term 'working memory' is associated with the storage and processing of information" (Zoelch et al. 2019: 26). Working memory can thus mediate between sensory memory and long-term memory: "If information is not only stored in working memory for a short time, but also processed, this can happen both through comparison with newly incoming information and with content already stored in long-term memory. This gives working memory a function as an interface" (Zoelch et al. 2019: 26). Working memory, which is also associated with conscious attention, selects information from sensory memory for further processing, while "unimportant" content from sensory memory decays in fractions of a second. Incoming information is manipulated in such a way that it can be stored in long-term memory and retrieved from there. The storage capacity of the working memory can be shaped in musicians according to their special needs:

> We further propose a strong link between production and auditory WM [working memory]: data indicate that both verbal and tonal auditory WM are based on the knowledge of how to produce the to-be-remembered sounds and, therefore, that sensorimotor representations are involved in the temporary maintenance of auditory information in WM. (Schulze/Koelsch 2012: 229)

Nevertheless, it remains limited and the associated limitation of processing elements cannot explain everyday (musical) experiences in which large amounts of information (for example, the melody of one or more natural yodels) are processed: "Part of the explanation for this lies in the *associative* nature of human *long-term* memory (LTM); memories for items and events contiguous in space or time may become connected, and

the occurrence or recall of one such item may *cue* the recall of an associated item" (Snyder 2016: 168, emphasis original). Working memory is therefore linked to long-term memory, which enables information to be retrieved through its associative and hierarchical structure.

Storing melodies in memory over years

Long-term memory differs from short-term memory in that memories persist for a much longer period. The emergence of such memories causes lasting structural changes in the brain (Snyder 2016:169). Unlike short-term memory and working memory, contents of long-term memory remain nonconscious for most of the time, but these memories can be guided into consciousness by cues or triggers. These triggers stand at the beginning of associations between networks of nerve cells in the brain (Hebb 1949: 60). A group of content elements (so-called representations or items) that are connected by associations forms a consolidated network (Snyder 2016: 168). Content stored in long-term memory can be activated and retrieved by triggers. This process is hierarchically structured and enables the processing of information in which it is efficiently compressed by working memory. Miller (1956: 92) calls these compressed units "chunks." These are formed in working memory and are important for retrieving information from long-term memory. In his widely acclaimed 1956 article, Miller limited the number of units that human short-term memory can handle, without comparing the information to similar constellations in long-term memory, to 7±2 (Miller 1956: 81). Accordingly, information is grouped into meaningful units, chunks, to organize cognitive processing. Miller further argues that memorizing could be based on similar processes: "The process of memorizing may be simply the formation of chunks, or groups of items that go together, until there are few enough chunks that we can recall all the items" (Miller 1956: 95). Chunking is both a process used in working memory to extend the capacity limit of short-term memory and a hierarchical structuring of information storage in long-term memory. The criticism of Miller's theory in some later publications is mainly aimed at the fact that the memory span is not a constant and the number of elements that can be remembered depends on the type of information and its combinability. This combinability, which allows the formation of larger chunks, is determined by the number of repetitions as well as by the limits drawn by irregularities (Snyder 2016: 168). Cowan (2010), in his article "The Magical Mystery Four: How Is Working Memory Capacity Limited and Why," limits Miller's proposed number of 7±2 for short-term memory to 4±1 for working memory and assumes that this smaller number is ideal because it optimally ensures the functioning of working memory: "A relatively small central working memory may allow all concurrently active concepts to become associated with one another (chunked) without causing confusion or distraction" (Cowan 2010: 56). Opinions thus differ on the exact number of memorizable units, whereby chunking is necessary in any case. Snyder defines chunking in the context of music as follows:

> A memory chunk is a group of 3–5 items related by association; a musical grouping consisting of 3–5 notes would be a chunk, and a phrase consisting of several of these groupings would be a higher-level chunk. The limitations of chunking are implicated in both the formation and recall of memories. Prominent items in chunks can be used to cue other chunks, allowing for the recall of longer sequences. (Snyder 2016: 168)

Despite the limitation of capacities in working memory, chunking allows stored music to be retrieved in its entirety at any time: "The idea of chunking accounts for how immediate memory can have such a limited capacity, yet be effective" (Snyder 2016: 168). In connection with the natural yodel around the Alpstein, it would therefore be necessary to investigate how chunking is used here: whether yodelers group individual tones or tone sequences, for example the beginning of a natural yodel, into chunks in the form of motifs. In the sense of hierarchical storage, such motifs could then be further bundled into themes, and at the next hierarchical level themes combined into phrases until different parts of a natural yodel form a complete melody. If confirmed, such information stored associatively by chunking could be activated and retrieved by the working memory in long-term memory by means of trigger stimuli. For example, an initial motif of a natural yodel melody could serve as a trigger whose conscious retrieval by yodelers joins the entire chain of chunks together in order to reproduce the complete melody of a natural yodel from memory.

While chunking allows information to be stored in long-term memory and retrieved using working memory, the associative nature of long-term memory undergoes further differentiations, which in opposing terms express themselves episodically versus semantically as well as explicitly versus implicitly or declaratively versus procedurally.

Episodic versus semantic long-term memory

Episodic and semantic long-term memory can be summarized under the term declarative long-term memory (Bredenkamp 2019: n.p.), because they "are verbalizable and tend to go hand in hand with conscious memory. Therefore, declarative memory is often referred to as explicit memory" (Zoelch et al. 2019: 30). Zoelch explains the ongoing discussion on this as follows:

> To this day, there is a controversial debate as to whether episodic and semantic memory represent separate memory systems or together form a uniform system that only works differently in terms of order and context. Theoretically, semantic memory would be conceivable as the accumulation of many individual episodes and would represent those features and categorical aspects that are common to these episodes. (Zoelch et al. 2019: 31)

The term episodic long-term memory as opposed to semantic memory was introduced by the Canadian psychologist Endel Tulving (1972: 384) to enable communication and reflection on the two different storage systems, rather than understanding them as a functional and structural dichotomy. Accordingly, episodic and semantic long-term memory form two ends of a continuum (Snyder 2016: 169). Episodic (or autobiographical) memory includes memories of specific, experienced situations and events, while the more abstract semantic memory refers to general, conceptual knowledge developed through the experience of repe-

ated processes (Snyder 2016: 169, Tulving 1972: 385, Baars/Gage 2010: 325, Eichenbaum 2008: 352, Hasselmo 2012: 3). Semantic memory classifies melodies into categories (Omar et al. 2010), while episodic or autobiographical memory locates individual experiences in relation to music heard. Episodic memory behaves dynamically and can be changed by the pure act of remembering (Snyder 2016: 169, Hupbach et al. 2013).

Semantic memory is closely linked to the concept of schema, which is defined by Snyder (2016: 169) as "a general expectation about types and distributions of events." Schemas shape semantic memory but are also involved in episodic memories: "Memories for specific events (episodic memories) are reconstructed at each remembering on the basis of schematic (semantic) knowledge representing generic memories" (Chaffin et al. 2016: 561). In this sense, memories often do not represent an image of reality, but are reconstructed with the help of schemas. As a result, long-term memory does not store an accurate and highly detailed memory of the past, but structures it in generalizing categories, recognizes regularities in the world and appropriately controls future behavior:

> Schemas enable the consciousness to recognize the known in every current situation and thus also to be able to discriminate against the unknown, the new, the surprising without having to divert attention and activate explicit remembrance for recognition and cognition. We do not need to explicitly recall the schema "turn the door handle and press the door at the same time" in order to manage a door passage. Nor do we need to recall a past door opening, especially not the initial situations in which we had learned the schema. The schema is activated *by* "seeing" a door with a handle. As abstractions and in this sense simplifications, the schemas create that organization of perception on the background of which consciousness can register novelty, variation and complexity. (Maeder/Brosziewski 2007: 272, emphasis original)

Applied to the natural yodel, schemas would have to reflect structural regularities such as tonality, meter or established musical forms. If a yodeler hears a natural yodel, according to said theory, it would be compared with abstract schemas from long-term memory and thus the perception would be adequately organized, the memory structured and novelties and variations recognized accordingly. In keeping with this hypothesis, a specific natural yodel could also serve as a trigger for stored information in episodic memory and thus evoke memories of a concrete situation. Conversely, a specific situation would trigger the memory of a natural yodel. Schemas thus support the memory of past situations as well as the organization of newly arriving stimuli and perceptions, but they also contain sources of error. The psychologist Frederic Bartlett (1886–1969) also describes memory as "imaginative reconstruction, or construction" and consequently as "hardly ever really exact" (Bartlett 2003: 213). Memories can partly deviate from actually experienced constellations through their reconstruction with the help of schemas, but a successful retrieval of music nonetheless succeeds:

> Given the fallibility of memory, musician's routine reliance on rote memory[5] seems remarkable. How is accurate recall possible if memory for a piece must be reconstructed from generic musical schemas each time it is played? We would expect performances to be full of mistakes as the musician replaces the exact notes…with the musical gist based on generic knowledge of harmonic, melodic, metric, and rhythmic patterns. (Chaffin et al. 2016: 561)

5 Rote memory or rote learning (cf. p. 41) refers to a memorization strategy based on continuous repetition.

The high degree of accuracy that musicians achieve when remembering melodies is facilitated, among other things, by their inner structure, which offers limited design options. The recognition of musical elements and structures such as harmony, melody, rhythm, meter and form simplify the memorization of melodies and natural yodel:

> Music is constrained by genre and style, melody, harmony, meter and rhythm, and by repetition, which is much more pronounced in music than in language… All these constraints combine to make the task of memory reconstruction easier. This is why memorization is so much easier for experienced musicians than for novices…, experts have more constraints. (Chaffin et al. 2016: 561)

Well-known and frequently occurring musical structures, such as harmonics (which is often reduced to the tonic and dominant in folk music), and in particular the musical form, would therefore support the memorization and retrieval of melodies. Repetition is considered one of the most important features for memorizing musical forms:

> Although rules of harmony, rhythm, and melody provide much in the way of detailed moment-to-moment restrictions on musical sequences, they do not account for many larger-scale aspects of musical structure which arguably fall within the realm of musical syntax. The most general of such aspects is probably *repetition*. (Sloboda 2000: 55, emphasis original)

Sloboda's statement is directly related to the question of recognizing and memorizing natural yodeling. Musical structures such as harmony, rhythm, meter or form, characterized by repetition, are probably more familiar to experienced yodelers than to other people. The opposite pole to declarative (explicit) long-term memory is the procedural long-term memory, which stores "knowledge about procedures and skills," "which usually cannot be verbalized" (Bredenkamp 2019: n.p.) and is accordingly also referred to as non-declarative or implicit (Zoelch et al. 2019: 32). Procedural knowledge controls a large part of automated movement sequences, for example when riding a bicycle or playing a musical instrument.

Explicit versus implicit long-term memory

The two juxtapositions explicit versus implicit or declarative versus procedural long-term memory show parallels, since in each case the first form implies verbalizable stored knowledge, while the second one is associated with nonconscious or non-declarative knowledge, "a distinction between memories that are accessible to consciousness and those that are not" (Snyder 2016: 169). Large parts of memory activity are not consciously accessible, especially the acquisition of skills to which procedural memory is linked (Snyder 2016:169). For example, the finger movements when playing a musical instrument are often not consciously perceived by the performers. Although schemas related to long-term semantic memory are often associated with declarative memory, some are also implicitly shaped. Implicit schemas can be made explicitly accessible, for example by thinking about music, by music lessons or by verbalization in which a music-specific vocabulary is used, as is the case with the natural yodel around the Alpstein. When recognizing and retrieving information, implicit and explicit memory contents work

together, which in turn can be viewed flexibly: Implicit memory contents can become explicit (for example, through verbalization) and explicit memory contents implicitly (for example, through exercise). When driving a car, for example, it must first be explicitly learned when to press the clutch, engage the next gear, when to brake or set the turn signal. With increasing practice, these processes become implicit, they are carried out without having to think or be able to say how it all works. If an experienced person is to teach an inexperienced person how to drive, they must make such internalized processes explicit again through conscious thinking and verbalization. For the present study, the question arises whether yodelers use both implicitly and explicitly accessible information of long-term memory (procedural and declarative knowledge) when learning, memorizing and retrieving natural yodel melodies. The theory of associative chaining and the content-addressable memory (Chaffin et al. 2016) offers an explanatory approach to the interaction of implicit and explicit memory content. Such interactions are flexible in that cues create access to implicit or non-actively conscious information, which can then be accessed consciously (cf. p. 40). Although most experts are also convinced of the process of chunking when it comes to implicit learning, there are also voices that regard this strategy as too simple:

> A body of evidence suggests that implicit knowledge governs music acquisition and perception in nonmusicians and musicians, and that both expert and nonexpert participants acquire complex melodic, harmonic, and other features from mere exposure. While current findings and computational modeling largely support the learning of chunks, some results indicate learning of more complex structures. (Rohrmeier/Rebuschat 2012: 525)

As mentioned, the information stored in long-term memory is not consciously present. To explain various memory phenomena, different degrees of non-consciousness are assumed (Snyder 2016:170, Cowan 1988). Neural networks, which form the basis for schemas in long-term memory, can be more or less active. Three states are distinguished: a) inactive, b) active, but not conscious, c) active and conscious. The activities of neural networks change continuously and memories in long-term memory are thus semi-activated and thus nonconsciously involved in mental activities (Chafe 1994). In this respect, semi-activated neural networks can form musical expectations: "An expectation (which may be more, or less, conscious) is thought to be a group of networks (a *schema*) that have been *cued* and *primed* into semi-activity by current ongoing experience" (Snyder 2016: 171, emphasis original). Expectations are formed by the interaction of stored information in memory with current music listening situations and are considered one of the sources of emotions in connection with listening to music (Huron 2006, Meyer 1956). Sensory memory, short-term and working memory as well as long-term memory have three different modes of information processing, "namely the reception and processing of incoming stimuli, their preparation for immediate further tasks and the precipitation of information processing in the long-term changing strength of the connection between nerve cells" (Spitzer 2002: 118). The interaction of these three modes should therefore also enable the learning, memorization and retrieval of natural yodel melodies.

How music is learned, memorized and retrieved

The retrieval of music from memory works partly through nonconscious associative connections and partly through conscious addressing of content. Memory contents are stored as associative chains during the spontaneous learning of a piece of music in which previous passages are linked to subsequent ones (Chaffin et al. 2016: 559); however, the exclusive recourse to associative chains carries the risk that any forgetting of a link in the chain entails the need to mentally start the piece of music from the beginning. Targeted memorization therefore adapts the associatively linked content in a way that makes it consciously addressable: "Deliberate memorization transforms the motor and auditory chains created while learning the piece by making them content addressable" (Chaffin et al. 2016: 559). Retrieving associatively linked information works as long as the chain of associations remains intact (Chaffin et al. 2016: 564). As soon as the chain breaks, the act of singing stops, which necessarily leads to the re-beginning of the piece. To avoid this, experienced musicians also use the second strategy of "content-addressable memory," the conscious addressing of memory content: They prepare several starting points (Chaffin et al. 2016: 564), which allow onset of singing at various points within a piece. Incorporating such starting points admittedly requires a conscious approach, but it leads to greater security and flexibility. For example, if a person is asked what the last phrase of the birthday song *Happy Birthday* sounds like, they must sing the piece briefly in their head from the beginning to get to the answer, provided that this melody was stored solely by "associative chaining." Once the person has reached the last phrase in working memory, a new starting point can be created there (Chaffin et al. 2016: 564). After a few repetitions, which strengthen the connection of this trigger stimulus with the last phrase, the person can easily start singing at this point: "Simply thinking of the cue now activates the memories needed to start singing. The performance cue provides flexibility and control. You can now think of the passage at any time, without running through the whole piece from the beginning" (Chaffin et al. 2016: 564).

Associative chaining and conscious addressing of content mark two different strategies for retrieving music from memory, the former being applied rather nonconsciously or implicitly, while the latter is characterized by explicit, declarative knowledge, "[t]o memorize music for performance, the musician must smoothly integrate the two kinds of memory" (Chaffin et al. 2016: 559). Deliberately set triggers bring a piece of music in motion, and several starting points help to make associative chains more controllable. Nevertheless, the performance of music from memory is largely based on associative connections: "…what you are playing reminds you of what comes next. …Memorization is helped by the fact that what comes next is heavily constrained by what precedes it" (Chaffin et al. 2016: 560, Rubin 1995, 2006). This interaction in the perception, processing, storage and retrieval of music connects memory systems on several levels. For musical performances, various cognitive and physical systems are relevant, including the auditory, motor, structural, emotional, visual and linguistic memory systems (Chaffin et al. 2016: 561). The distinction between these memory systems illustrates the multimodal memorization of music on several levels: it becomes associatively stored through hea-

ring ("auditory memory"), physical movements ("motor memory"), recognition of musical form ("structural memory"), emotional experiences ("emotional memory"), visually imagined images or notes ("visual memory") and language in the form of a distinctive vocabulary with specific expressions ("linguistic memory"). Triggers activate the stored information in the different memory systems and initiate retrieval. It thus remains to be investigated whether nonconscious learning of natural yodel melodies also works via associative chaining and which of the mentioned memory systems are required. The more memory systems are involved in the storage of melodies, the more diverse the accesses that enable successful retrieval. Apostolaki confirms that different approaches accelerate the speed of retrieving the desired information: "…findings show that having more than one encoding option for the original stimulus is not detrimental, but in fact optimal for speed of storage and effectiveness of recall" (Apostolaki 2013: 220). The "multiple association formation means nothing else than that the probability of a successful retrieval increases via associations between many cues and a target stimulus" (Zoelch et al. 2019: 38). Memory systems, which are generally not primarily associated with cognition or thinking, also play a significant role in this. Thomas Fuchs (2017) aims in this direction by rejecting the dichotomy of neurological processes and subjective experience, and pleading that people always be seen holistically and inseparably linked to their physicality and not to limit cognitive performance exclusively to the brain (Fuchs 2017: 21). The theoretical differentiation of different memory systems as well as localization theories that examine specialized brain areas have their justification, but also their limitations, because in a certain way the brain always functions holistically (Fuchs 2017: 69):

> All special functional designations such as seeing, hearing, thinking, feeling, wanting, etc. trigger individual functions of consciousness, while actual subjective states of experience always remain holistic. Thus, all perceptions are not only embedded in a physical background experience, but also connected to feelings, memories and language concepts. (Fuchs 2017: 70)

In this sense, the model of associative chains, which are formed based on different memory systems and retrieved by consciously addressed triggers, forms a simplistic attempt to explain systems that always interact with each other. Masterpieces in the field of music must therefore not be seen as products of a special talent for memorization, but as the result of a deep familiarity with musical styles and conventions, combined with effective strategies to make memories consciously accessible (Chaffin et al. 2016: 560).

Against this background, the statements of yodelers that they do not use strategies for retrieving natural yodel melodies, but can simply do them, should be reconsidered. How does this ability differ from the strategy of using mnemonics (such as initial motifs, people, yodeling syllables)? Is this difference limited only in terms of the number of deliberately set triggers? While the first strategy draws almost exclusively on nonconscious knowledge in the form of associative chains, in the latter stored natural yodel contents could be addressed more consciously.

Figure 6 shows a schematic representation of the two systems of remembering (content addresses, associative chaining) related to the learning, memorization and retrieval of natural yodel melodies according to the strategies presented. Accordingly, natural yodel melodies would be perceived via sensory memory, organized by working memory and stored in long-term memory in the form of associative chains. The working memory not only functions as an organizer of the information when it is stored, but also takes over the function of retrieving melodies from long-term memory via conscious addressing of content by cues.

The deliberate creation of several starting points for a melody makes it possible to begin at the next starting point if a person forgets. During a musical performance, the need to start from scratch is eliminated. However, additional starting points are also accompanied with a risk: "Thinking about what you are doing can interfere with skilled performance, a phenomenon known as choking" (Chaffin et al. 2016: 564). One challenge is to combine the two strategies of nonconscious "associative chaining" and the conscious addressing of content: "One of the main challenges in memorizing for performance is to integrate the two retrieval systems" (Chaffin et al. 2016: 566).

Various cognitive strategies serve for consciously set mnemonics or trigger stimuli which musicians can acquire individually, and which do not have to be dependent on a generally held background knowledge of music theory. Four particularly well-known strategies could play a role in memorizing music or singing. Loci theory (Strategy I) refers to a mnemonic technique in which content to be remembered is classified in a fictitious structure and can thus be localized. For example, a visual positioning of information in an imaginary building is used for structured memorization. Thus, an imaginary palace[6] can contain three wings, for example one with natural yodels from Ausserrhoden, one with those from Innerrhoden and another with Toggenburg natural yodeling. In a next step, further criteria can determine in which room a natural yodel is positioned. A music-theoretical background is a possibility, but not a condition, for the use of loci theory.

The mnemonic peg system (Strategy II) is based on the assignment of data to an already known system. For example, the digits 16545 refer to the song *My Bonnie Lies over the Ocean*, in which each digit represents a diatonic interval (Gordon 2006: 84). This mnemonic peg system for music works well with Solfège as a tool for linking music and language (Apostolaki 2013: 223). Applied to the natural yodel, yodel syllables could act as a peg system: Like solmization or song lyrics, yodel syllables can be linked to short melodic motifs stored in long-term memory. Although yodel vocalization is characterized by local dialects and is also subject to individual choice, the usual employment of specific vowels for the lower and upper registers, as well as the application of consonants for the connection of tone sequences, could contribute to the memorization. The order of the syllables can therefore be considered a mnemonic technique. A sequence of syllables such as "jo lo lo u lu" could be associated with a particular melodic phrase. However, their

6 Often referred to as a "memory palace." The concept dates as far back as the first century BCE in *Rhetorica ad Herennium* and the Cicero's *De oratore*.

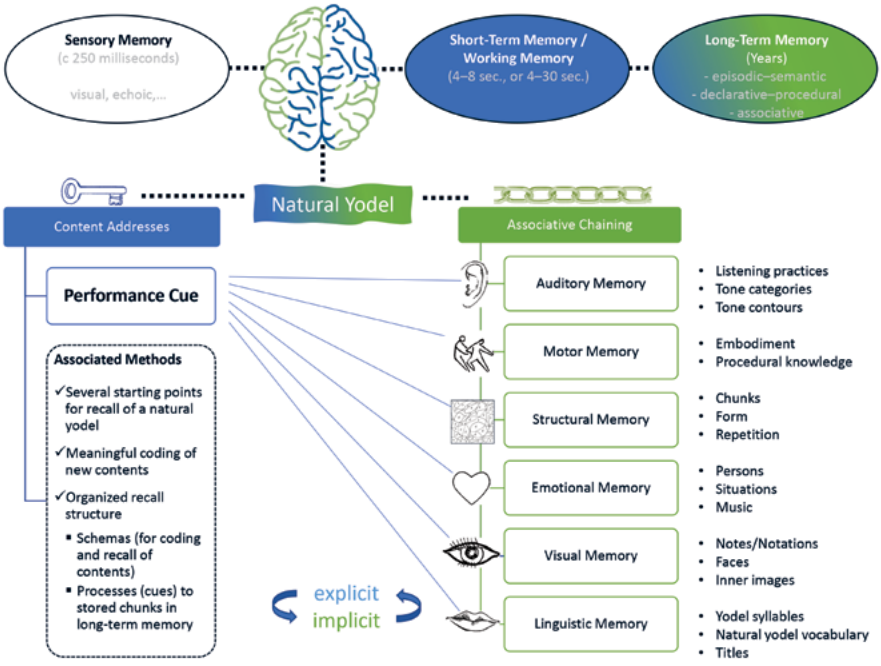


Fig. 6: Schematic representation of the idea of how the two systems of remembering (associative chaining, green, and content addresses, blue) could interact in the learning, memorization and retrieval of natural yodel melodies.

uniqueness is limited, as vowels in Appenzell and Toggenburg natural yodels can always be placed on different pitches.

"Rote learning" (Strategy III) plays a key role in learning and memorizing melodies (Mayer 2002: 227). Rote learning is based on a mentally active and continuous repetition of the data. This can easily be applied to singing, as song melodies can be heard internally through thinking, and sung during everyday activities such as driving or showering. Rote learning also includes frequent listening to the music to be learned. The level of importance that regular active repetition and repetitive listening can have for successful storage and retrieval of melodies in yodels was requested in interviews.

Finally, it is also possible to offload knowledge (Strategy IV), for example by recording the melody with a mobile phone or by writing it down. Baily (1988: 114) distinguishes between an operative and a representative use of music theory, and he cites music notation as the most important indication of this distinction.[7] The fact that directors of yodel clubs sometimes use musical notation operationally was mentioned at the beginning. The ways in which yodelers offload their knowledge about natural yodel melodies

7 Musicians use notation operationally if they can write and read musical notes themselves and use this in music practice. Representative means that the notation is only used for documentation purposes.

must also be requested in interviews. This offloading could include both the music recordings with the mobile phone, which are easy to create today, and writing the first yodel syllables on a notepad.

Interaction of different memory systems

The four memorization strategies mentioned reach back to the different memory systems identified and use them in various configurations. Loci theory (Strategy I) and the peg system (Strategy II) superficially occupy structural memory, while the offloading of knowledge (Strategy IV) makes greater use of visual and linguistic memory. Continuous repetition, which corresponds to the core of rote learning (Strategy III), can be less clearly assigned to separate memory systems and therefore points to the holistic functioning of memorization. In this respect, the distinction between memory systems serves as a theoretical description of different processes that only function as a whole and together.

Auditory memory includes the ability to hear a melody imaginarily in the head, as well as the storage of information in tonal categories (absolute pitches) or tone contours (relative pitches) influenced by listening practices (Chaffin et al. 2016: 562). Assuming that auditory memory supports the perception and storage of the characteristically used sound system as well as the timbres that characterize this music, this could signal to yodeling individuals during a performance where they are in the piece and activate memories of what follows. Experienced musicians develop their auditory memory and related schemas in a more differentiated way than people unfamiliar with music, because "[d]eveloping this ability is a normal part of advanced musical training" (Chaffin et al. 2016: 562).

Information stored in motor memory is largely implicit. This includes motor skills of all kinds, such as knowledge of movement sequences, which is often automated by practice and cannot be consciously described. This motor memory is particularly pronounced in musicians in whom physical activities dominate, such as finger movements when playing the piano or flute. Musicians say that their fingers know what to do:

> Perhaps the most important feature of motor memory for musicians is that it is implicit (nonconscious). Musicians know that they can play a particular piece (declarative knowledge), but the knowledge of how to play can only be exhibited by actually playing (procedural knowledge). (Chaffin et al. 2016: 562)

In yodeling, motor memory seems at first glance to be of less importance than in instrumental playing. But here, too, lip positions, laryngeal positions or voice pressure are nonconsciously carried out by the body and here also the frequency of repetitions when learning a melody determines the ability to remember mentally and physically. In this sense, memory denotes "not an internal storage, *but the ability of a living being to realize its dispositions acquired in previous learning processes*. This realization is linked to the dynamic coupling of body and environment" (Fuchs 2017: 130, emphasis original). As with other forms of memory, the linking of actions (associative chaining) also plays an essential role in motor memory:

> Motor memory necessarily involves associative chaining; each action cues the next. This is what makes motor memories implicit: to be accessed, they must be performed. Adding content addressable access makes it possible to jump around in a piece, skipping backwards or forwards. What is required is a retrieval cue – a thought in working memory that activates the motor memory, restarting the associative chain at a new location. (Chaffin et al. 2016: 562)

In the context of motor memory, there is also mention of "embodied knowledge" and "embodied cognition" (De Vega et al. [eds.] 2008, Klatzky et al. [eds.] 2008), which belong to implicit knowledge and are based on the sensorimotor system (Gibbs 2005). Accordingly, one's own body sensation can also affect the performance, storage and retrieval of natural yodel melodies. A sensual feeling for the tension of certain muscles as well as conscious breathing serve the successful execution of melodies, comparable to body techniques of other singing expressions. In connection with "embodied cognition," Gibbs (2005: 18) refers to the body's connection to the outside world. When retrieving a stored melody, spatial elements play a role, for example whether singing is done while sitting or standing, whether a certain posture is taken or a certain location in the room is sought.

Musical structure provides a way to organize music based on melodics, harmonics, rhythm or meter, and to organize it hierarchically in memory. Chunking in the form of summarizing meaningful units, from individual notes to motifs, phrases and parts, represents a part of structural memory (cf. p. 41). Hierarchical organizations of this kind offer a frame of reference to make content consciously addressable. The recognition of musical form and structure creates a decisive basis for conscious memorization: "Without a clear understanding of the structure, there is no mental map, and no content-addressable memory" (Chaffin et al. 2016: 563). The understanding of the musical form grows through increased practice and frequent engagement with a specific type of music and does not necessarily require knowledge of music theory. Based on the literature cited, experienced musicians recognize structures, repetitions and musical forms better than people who are unfamiliar with this material. Structural musical elements are recognized by their connection in the melody. What a person perceives as musically significant (foreground) or insignificant (background) depends on their prior knowledge and individual cognition:

> [T]he listener is engaged in building up a multidimensional representation of the music he hears, and…depending upon his knowledge and cognitive style, his early memory for the music will select different dimensions from the many available ones. What is crucially important is that these memories will not necessarily be composed of isolated episodes in the music. It is equally possible that he will have extracted quite global information which specifies some parameter of the overall structure (such as metrical construction or harmonic framework, recurrent melodic types, or emotional 'argument'). (Sloboda 2000: 191)

According to Sloboda, inexperienced listeners distinguish a comparatively small number of features of a piece of music as foreground units (e.g., motifs), while more experienced ones perceive several such features as background ("background units") and thus grasp the musical form of the piece through the hierarchy of structures (Sloboda 2000: 5). By accessing information from different storage levels, even very long melodies can be retrieved in structured form from long-term memory. Assuming that such hierarchical structu-

res form the basis for memorizing melodies, the question arises as to which background units exist on the different levels. One possible answer would be that yodelers with their previous knowledge and individual cognition select from different levels when retrieving a melody and its vocalization. Although most of them do not rely on knowledge of music theory, but learn the natural yodel purely from practice, the knowledge of structural characteristics seems to be helpful for memorization; this includes the form of the yodel (entrances of the accompanying voices, harmonic changes, cadences).

On the one hand, emotions are responsible for the fact that a melody is consciously perceived at all; on the other hand, an emotional connection supports its storage in long-term memory (Bower 1981, Talmi et al. 2007). The latter applies both to emotionally charged listening to music (Schulkind et al. 1999) and to the active practice of music (Chaffin 2011). Natural yodels could thus be more easily stored and retrieved by yodelers in long-term memory if there is an emotional attachment to this music. Although everyday experience and each storage of information are always carried with emotional coloring, these connections of natural yodel and emotion vary in their strength. Memories of emotional situations, such as natural yodel concerts, yodel festivals or people with whom natural yodel melodies are associated, or occasions such as weddings and funerals at which natural yodels are performed, could serve as triggers to make these melodies consciously addressable.

Visual memory includes memories of images of all kinds. Some musicians speak of photographic memories (especially in relation to the memorization of notes or notations), while others state that they hardly make use of visual memories (Chaffin et al. 2016: 563). The imprinting of music notations is of little importance in connection with the natural yodel around the Alpstein. Nevertheless, inner images can act as a trigger for associatively stored melodies. For example, the mental image of a situation or a person who is related to a certain natural yodel melody could trigger the retrieval of associated information.

Verbal instructions that experienced musicians use to remember what they have to do at key points in a piece can be attributed to linguistic memory (Chaffin et al. 2016:564). The memory of yodel syllables is also part of linguistic memory and can thus trigger a melody sequence. Furthermore, the local natural yodel terminology (*gradhäbe*, *noofahre*, *Cheerli*, *schlääzig*) could help to make the characteristics of polyphony, the form or the style of performance of a natural yodel explicit. This use of a locally specific yodel vocabulary, "folk taxonomies" (D' Andrade 1995: 92), and culture-specific conceptual systems and orders would have to be considered. A vocabulary particularly oriented for certain music genres allows for a deeper approach to the musical peculiarities than the vocabulary of Western music theory and can thus favor memory performance. Similarly, specific title designations could support the memory of specific natural yodels. In this sense, yodelers would consciously address natural yodel melodies through linguistic triggers that give them access to associatively stored information in long-term memory.

The present research focuses on a limited region where natural yodel is characterized by fixed structural norms, aesthetics of timbre, great popularity among the local population and presence in cultural life. The peculiarities of natural yodeling in northeastern Switzerland partly determine its cognitive processing by yodelers. Cultural knowledge

also determines the way in which other people interact, either directly or indirectly or through artifacts (D' Andrade 1995: xiv). These interactions in relation to music arise from an engagement on different levels and require a familiarity with the corresponding musical culture. An individual's cultural background knowledge that conceptualizes sound includes information that contributes to the understanding of music and is counted among a person's explicit and implicit knowledge. Such "extra-musical elements" or "non-sonorous sensations" (Godøy 2003: 317) help listeners to classify a melody: the more cultural background knowledge a person can connect with a piece of music, the better memorization and retrieval works. Regarding the natural yodel, this includes understanding and speaking the local dialect, which affects the timbre of natural yodel melodies. Frequent listening and mental engagement with certain music by being involved in this musical culture refine the perception and differentiation of music. Accordingly, memory develops certain taxonomies more broadly and with greater sophistication over time, which makes musical expectations more targeted.

Summary

The cognitive processing of music takes place via different memory systems that store auditory, motor, structural, emotional, visual and linguistic knowledge associatively. Associative chains activated by trigger stimuli bring this knowledge into consciousness and thus enable the successful retrieval of melodies. In this process, working memory retrieves information in the form of chunks to efficiently use its limited processing capacity. Specifically developed cognitive skills must be employed when learning to yodel in order to distinguish and retrieve similar melodies with the same timbre and possibly the same syllable structure. The harmonic structure and the form of the melodies create clues that simplify the cognitive processes. The question arises whether not only aesthetic preferences and cultural conditions determine the form of natural yodeling in northeastern Switzerland, but also whether it is formed by cognitive abilities and limitations. The natural yodel repertoire around the Alpstein includes hundreds of melodies that correspond to typical characteristics and whose form is confirmed and enlivened by singing together in the yodel clubs. Based on this repertoire, it can be examined whether the assumptions mentioned in this chapter on music cognition with regard to the structure of the natural yodel around the Alpstein can also be confirmed. Information about the number of natural yodels sung in practice and its distribution among different yodelers has important implications for an understanding of storage and transmission.

Chapter 4: The natural yodel repertoire: Distribution and transmission

The term repertoire includes different meanings in music; Bent and Blum (2001: 1) distinguish seven definitions of repertoire, two of which are relevant here. First, repertoire refers to the stock of music pieces that an artist has ready to perform (personal repertoire). Transferred to the natural yodel, this repertoire consists of the retrievable melodies that members of a yodel club store in their memories. The second relevant definition summarizes under repertoire all those elements that are available for performance at a certain location (Bent/Blum 2001: 1). In this sense, the natural yodel repertoire consists of the collection of melodies that are sung at one time among the yodelers of a village, a canton or the entire yodeling region around the Alpstein (regional repertoire). In order to estimate the regional repertoire, it must be determined how many natural yodels are currently sung in yodel clubs and how many yodelers are assigned to the first and second voices. As a result, an overall picture of the repertoire of the entire region and its sub-regions emerges. Not included are those melodies that are passively recognized while listening but not actively sung.

A questionnaire-based study among yodel clubs

How a regional repertoire is formed from the personal repertoires of the active yodelers, and how the dynamics of transformation progress over the decades, depends on the interaction of the yodel clubs. Regarding the present research, the question arises as to how a large stock of natural yodels can be handed down in view of the limited capacities of individual memories. In order to answer this question, a paper questionnaire was sent to the presidents of all 38 yodel clubs in the Appenzell Innerrhoden, Appenzell Ausserrhoden and Toggenburg regions.[1] They were asked to fill out the questionnaire for their club and return it in a prepaid envelope. The response rate was very high at 29 questionnaires (76%). Of the 29 participating yodel clubs, seven are from Appenzell Innerrhoden, eight from Appenzell Ausserrhoden and twelve from Toggenburg as well as one club each from Untertoggenburg and the district of Werdenberg, representing all regions.

The yodel clubs surveyed provided data on their membership numbers and the number of yodelers singing the first and second voices (Fig. 7). The evaluation shows that the clubs comprise an average of around 18 members, but there is a wide range of six to 26 members. A large percentage of the clubs has 15 to 25 members, but smaller memberships exist, though these are rarer. Often members meet in smaller groups for yodeling also

1 All yodel clubs were included that are in the respective regions and are on the list of the Northeast Swiss Yodeling Association (NOSJV). The data acquisition took place from September 2019 to February 2020.

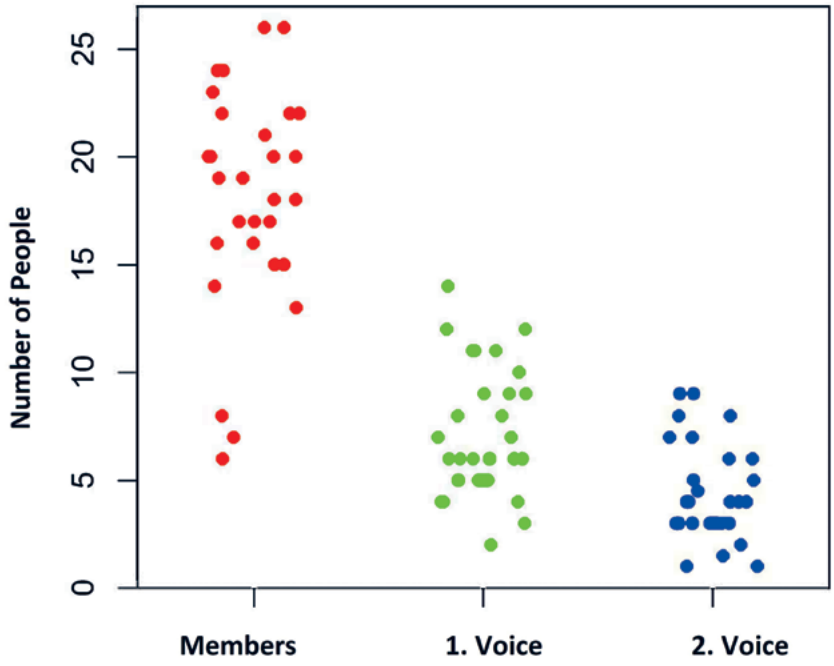


Fig. 7: Number of members, lead yodelers (first voice) and yodelers of the second voice in yodel clubs (each point represents a yodel club).

as *Chlauseschuppel*.[2] Such groups that are not organized in the Northeast Swiss Yodeling Association (NOSJV) are not included here. Clubs in Appenzell Innerrhoden tend to be smaller in terms of membership (13 members on average) than those in Appenzell Ausserrhoden (22) and Toggenburg (19).[3]

The function of the lead yodeler (first voice) is distributed among several members in a yodel club. Between two and 14 members per club sing the first voices, with half of all clubs having five to nine lead yodelers. This does not preclude other club members from lead yodeling in special situations. On average, 43% of club members yodel the first voice. As a result, the repertoire of a yodel club can be distributed among different lead yodelers, each of whom only needs to have a small part of the first voices of the club's entire melodies available for recall.

Between one and nine members sing the second voice (*noofahre*, *gradhäbe*), with half of all clubs having three to six singers on the second voice. These figures are thus lower than those of the lead yodelers. On average, 28% of club members sing the second

2 Cf. *Silvesterchlausen*, p. 13.

3 One explanation could be the fact that the smaller canton of Appenzell Innerrhoden has a comparably high density of small, local yodel clubs.

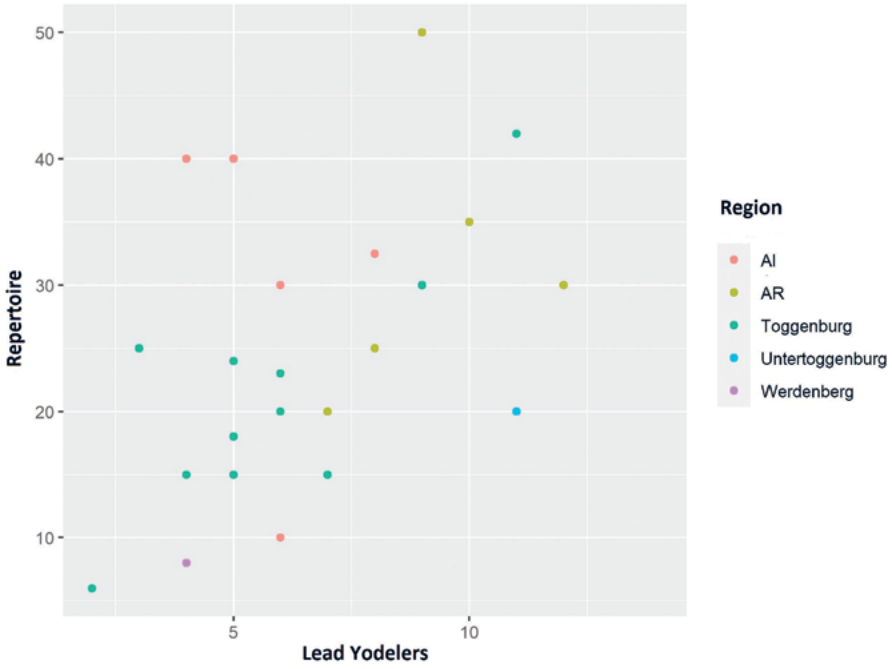


Fig. 8: Ratio of the size of repertoire to the number of lead yodelers in yodel clubs. The points with the coordinates 6/20 and 6/30 each stand for two clubs with matching information.

voice. The lower number compared to the first voice indicates that *gradhäbe* requires expanded skills and knowledge of natural yodeling, which is possessed by around a fourth of yodelers.

Regarding the repertoire, four yodel clubs surveyed did not provide a specific number of natural yodels. One club gave "100–200," although this information is far outside the others. 25 clubs gave exact repertoire sizes (Fig. 8). The average number of natural yodels in the repertoire of the yodel clubs is 25, with a range of six to 50 natural yodels in a relatively even distribution. In half of all yodel clubs, the repertoire includes 20 to 30 natural yodels. The repertoire of eleven yodel clubs consists exclusively of yodels from their own canton; 17 sing natural yodels also from other cantons (no information: one). In order to get an impression of the change in the repertoire, the number of new natural yodels rehearsed in 2019 was asked, which lies between zero and ten and an average of three to four. Most of the clubs rehearsed between two and five new natural yodels in 2019. Regarding the entire repertoire of the clubs, in many cases about one in eight natural yodels was learned from anew, although differences from club to club are great. The number of newly rehearsed natural yodels indicates the considerable dynamism and liveliness of this practice.

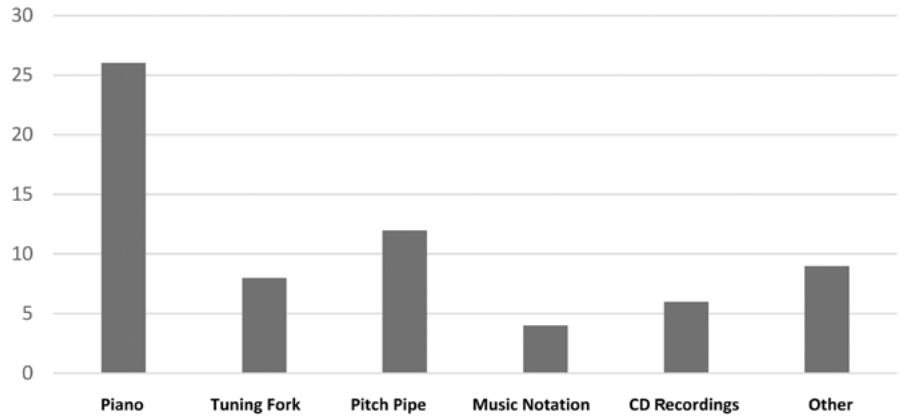


Fig. 9: Number of yodel clubs (vertical axis) in which the indicated aids are used for rehearsal work. Multiple answers were possible.

The size of the repertoire of natural yodels of a yodel club depends on how many people contribute to it and make their individual repertoire available to the club. As can be seen from Figure 8, yodel clubs with more lead yodelers tend to have a larger repertoire, although it should be considered that although relatively few lead yodelers were mentioned per club for yodel clubs from Innerrhoden, they each sing more than ten natural yodel melodies. Overall, the assumption is confirmed that splitting the first and second voices increases the limit for the number of natural yodel melodies memorized in the group. Interviews confirmed (pers. comm. Neff, 17 Aug 2020, Koller 20 Aug 2020) that within the group each lead yodeler is assigned certain natural yodels and other members only take on their melodies if the others are unable.

In 13 yodel clubs, almost half of them, members bring their own yodel creations, which are practiced in the rehearsals. Yodel clubs in which the members themselves create new natural yodels, have on average a larger repertoire (30.5 natural yodels) than those clubs learning natural yodels exclusively from tradition (from audio recordings, notations or by sing-and-response of existing melodies) (21.8).

In a second block of questions, the appropriation and mediation of natural yodeling was asked. It turned out that various aids are used in the rehearsals to sing or accompany yodel melodies. Figure 9 shows these educational tools with their frequency within the total of 29 yodel clubs. The piano is used by a large majority (26) of the clubs in rehearsals. In about one third of the clubs, directors use a pitch pipe (12) or a tuning fork (8). Musical notation plays a subordinate role; only four clubs stated that they are used for learning natural yodels in rehearsals. The playback of CD recordings was mentioned in six cases. Under the option "Other," "accordion" was entered by four clubs.

The musical instruments piano and accordion are suitable for both the playing of melodies and their harmonic accompaniment, as both instruments can also produce

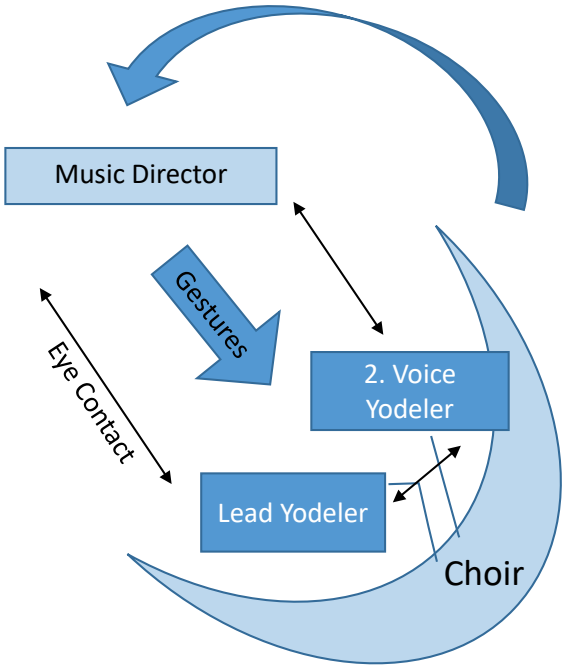


Fig. 10: Communication channels and participants in a yodel choir rehearsal.

chords. The tools tuning fork and pitch pipe are used for the specification of the first pitch and the intonation of the melodies.[4]

The members of a yodel club face the director in rehearsals. For appearances and concert performances, a semicircle is formed with the opening toward the audience. In this way, the sound is better perceived by the audience and the choir members can give each other signs through eye contact during the performance. Successful communication among singers forms the basis of functioning polyphony in the natural yodel of the Alpstein region, and this often takes place non-verbally, as is characteristic of musical activities (cf. Fig. 10). Polyphonic singing requires not only exact timing, but also a sensitive interplay of dynamics and timbre.

4 In contrast to tuning forks, pitch pipes are more flexible to handle and one can use them to specify different pitches. The main difference between the two is that with the pitch pipe, the sound projects to everyone and can be perceived individually. When using the tuning fork, the conductor hears the sound, transposes it mentally into the desired range and then sings the pitch to the group.

Summary
The natural yodel repertoire of the region around the Alpstein cannot be absolutely quantified, as it is not known how many different yodels are sung in different yodel clubs at the same time, and since the numerous *Chlauseschuppel* and other informal groups were not included in the study. Because natural yodels are divided among several lead yodelers in the clubs, relatively few melodies must be memorized individually to present a full-length program together. For example, three lead yodelers of a club can each sing four natural yodels, as the number of lead yodelers is large enough for this in most clubs. Very experienced individual lead yodelers nevertheless possess a much larger personal repertoire, which can include several dozen natural yodels.

De Looser, a representative of the Toggenburg natural yodel repertoire

The transmission of natural yodels in the sense of an oral or written transmission of yodel melodies to the younger generation differs in terms of their popularity, age and means of transfer. As a rule, the age of traditional natural yodels cannot be determined, as it is rarely possible to clearly establish when and where a natural yodel was sung for the first time. In some cases, however, transmission can be demonstrated over several generations. In some examples, the oral tradition can be traced by comparisons with music recordings. The advent of recorded music such as records from the 1920s, cassettes from the 1960s, but especially CDs from the 1980s onwards, gave rise to a canon of natural yodels that are known across regions. In the course of this development, fixed sequences of yodel parts were established, which were learned during the playback of recordings and reproduced by yodelers. Natural yodels were increasingly titled or named after people in order to list them in title directories.[5]

As an example of a firmly anchored tradition, the Toggenburg natural yodel *De Looser* can be traced back over almost 100 years based on audio recordings and transcriptions. A transcription of this yodel, named after the owners (Family Looser) of the Wirtschaft Freihof in Nesslau (pers. comm Valotti, 25 Mar 2020) was made by Willi Valotti and published online by Roothuus Gonten.[6] On page 76, this transcription is used to analyze *De Looser's* structure and to compare it with exemplary natural yodels from Innerrhoden and Ausserrhoden. Kappler writes that it is an example of "the lively and high-pitched type of yodel, whose pitch and rhythm is very different from the melodies of the Appenzell yodelers" (Kappler, Letter to Heinrich Leuthold, 2 Mar 1980, StANW, Nachlass Leuthold, P 137/13), and Valotti describes it as a very typical, unique Toggenburg natural yodel (Valotti 2016: 1). Valotti's transcription is based on a shellac recording of the Jodelklub

5 This also made it possible for natural yodels to be recognized under copyright by registering with the Swiss Cooperative of Authors and Publishers of Music (SUISA: "SUISse Auteurs" or Schweizer Genossenschaft der Urheber und Verleger von Musik).

6 www.roothuus-gonten.ch/mediendateien/jodel/pdf/De%20Looser.pdf, 27 Aug 2022.

Männertreu Nesslau from 1930 (Ultraphon A 25035).[7] The Jodelklub Männertreu was under the direction of Engelbert Lichtsteiger in 1930 and the solo voice in *De Looser* was sung by Georg Kuratli, who for a long time personally shaped the Toggenburg natural yodel and from 1922 to 1950 was a lead yodeler in the Jodelklub Männertreu Nesslau.[8] However, based on the sources, it can be assumed that Kuratli did not create this natural yodel himself and that *De Looser* was already a well-known yodel melody before the recording in Nesslau.

Among Sichardt's already mentioned audio recordings from 1936 are several recordings from Nesslau: two solo yodels by the cheesemaker K. Hochstrasser[9] (recordings 3a and 3b), a yodel duet by K. Hochstrasser and Jakob Losser (3c), a solo yodel by Ulrich Losser (3d), a two-part yodel by K. Hochstrasser and Jakob Losser (3e) and a solo yodel by Walter Losser (3f) (Sichardt 1939: 171). Sichardt writes Losser and not Looser; apparently Sichardt noted the names of his informants by ear, and thus some orthographic deviations resulted.[10] Sichardt notes that the yodeler Ulrich Looser (Losser) was about 70 years old at the time of the recording (Sichardt 1939: 171), which must have been an outstanding age, as this is the only age indication for Sichardt. Ulrich Looser clearly sings the first part of the yodel *De Looser* on this recording like Kuratli on his recording six years earlier. Further yodel parts of the same piece were sung by K. Hochstrasser and Jakob Looser as a duet (Sichardt 1936: 3c). It can be assumed that one or more of the mentioned yodelers were members of the Jodelklub Männertreu. In the almost 100 years since then, *De Looser* has been passed on unchanged: A current recording can be found on the CD *glebte Bruch* (Jodlerklub Männertreu 2019: 12); here the natural yodel was interpreted similarly as in the recordings from the 1930s. Traditions of *De Looser* can also be found in other municipalities; for example, a version of the yodel club Wattwil is available in the archive of the Roothuus Gonten (natural yodel database Roothuus, No. 1257). In the case of *De Looser*, the exact tradition is remarkable, because this motivically complex yodel with its large range of tones is a challenge for the performers. Rhythmically sometimes very freely performed, in the aforementioned transcription (Valotti 2016) time signatures were adapted to the meter actually sung, which required alternating between 6/8, 8/8 and 10/8 time. The early audio recordings with Georg Kuratli and later Jakob Metzler may have contributed to the fact that the natural yodel was handed down in this version (pers. comm. Valotti, 25 Mar 2020).

The tradition of *De Looser* demonstrates that this natural yodel was part of the repertoire in Nesslau at the latest in the 1930s. The melody was sung, possibly several decades before and after, by the yodelers Ulrich Looser, K. Hochstrasser and Georg Kuratli and probably by various others. Even today, this natural yodel is part of the repertoire of the

7 Shortly after the founding of the Jodelklub Männertreu Nesslau in 1911, primarily folk songs were sung, and a first record was produced (1913).

8 www.jk-maennertreu.ch/geschichte.xhtml, 28 Aug 2022.

9 The information on yodelers in Sichardt is not uniform. For some the profession, for some first and last name, for some only the last name, or the last name with initial of the first name is given.

10 The Appenzell yodeler, who is given under the name Franz Spuk (Sichardt 1939: 171), was actually named Speck (Ammann et al. 2019: 182).

Jodelklub Männertreu Nesslau, but whether this has been the case since 1930 without interruption remains open. The case study on *De Looser* sheds light on the mediation of a yodel melody along a timeline and shows the importance of music recordings for the formation of a repertoire. Not for every natural yodel around the Alpstein is the tradition as transparent as with *De Looser*.

The local manner of transmission over several generations, as illustrated by the example of *De Looser* and its tradition in Nesslau, has an impact on the repertoire. However, this process is changed by the increasing spread of audio recordings, especially CDs. Some natural yodel or natural yodel parts are known across regions, which, according to Zimmermann (2012: 23), leads to the alignment of village repertoires with each other. The multimedia storage and learning of yodel melodies, which also plays an important role in other yodel regions, shapes the cognitive processes of memorizing natural yodels. Therefore, these forms of mediation, which no longer take place only from mouth to ear, are also considered in this study in connection with already discussed memory systems and memorization strategies.

In the 38 yodel clubs in the region around the Alpstein, a membership of about 700 people can be assumed (extrapolated from 525 persons from 29 questionnaires), of which almost half are lead yodelers. How many different natural yodels are actively sung cannot be determined, but a few very well-known ones may be in the repertoire of many yodelers. The clubs have different sized natural yodel repertoires, in addition to yodel songs and other folk songs, which also make up a large part of a club repertoire and tend to require more rehearsal work. These are often rehearsed according to notations and the exact lyrics; syllables and rhythms must be learned anew with each song.

The dissemination and learning of melodies with the help of digital audio recordings, which every yodeler can make for themselves, has played a role in relation to the natural yodel repertoire for decades, but opportunities for exchange with other yodel clubs and getting to know sung melodies were already possible earlier through personal contacts.[11] Through borrowings and exchanges at personal meetings, the repertoire of yodel clubs grew. Furthermore, the number of members today is greater than 100 years ago; many clubs have between 15 and 25 members according to the data presented (cf. Fig. 7). Manser lists the number of 13 yodel groups for the period between 1884 and 1914 (Manser 1980: 159) for Appenzell Innerrhoden, but their names suggest that they were often small formations with two to four people, for example the Siblings Rempfler, Kegel and Ullmann as well as Josef Anton Manser and Son. More about the musical characteristics of the Appenzell and Toggenburg natural yodel repertoire can be learned thanks to an evaluation of the extensive database of the Roothuus Gonten.

11 In his detailed documentation of the music from Appenzell Innerrhoden at the end of the 19th and early 20th centuries, Manser (1980: 158) names the participants of a yodeling competition on the occasion of the Cantonal Wrestling Day 1922 in Appenzell. Among the seven yodeling groups were three from the village of Appenzell, one from Kau (Appenzell Innerrhoden), two from St. Gallen and one from Degersheim. Through such meetings with yodel clubs from neighboring regions, melodies could be adopted, and the repertoire enlarged.

Chapter 5: Evaluation of the natural yodel database in the Roothuus

The database to be evaluated here contains the entire catalogued natural yodel collection in the Roothuus Gonten, Center for Appenzell and Toggenburg Folk Music.[1] This collection of 1,556 natural yodels, which together contain 3,564 yodel parts,[2] forms the basis for the present research. As early as the period from 2013 to 2015, within the framework of the research project "Natural Yodels" of the Roothuus Gonten, Erwin Sager began the cataloguing of music notations and audio recordings from the archive of the Roothuus using a database created with the software Filemaker Pro. For this purpose, he developed a precise method for capturing every natural yodel with numerous parameters. Title, composer, melody and rhythm code, keys, structure of the natural yodels and sources are the main data categories of the currently recorded melodies.[3]

A workgroup consisting of Nadja Räss, Erwin Sager, Willi Valotti and Barbara Betschart was commissioned in 2014 with the further project "Natural yodeling around the Alpstein" (Betschart 2016: 35). For this purpose, a selection of natural yodels was to be transcribed, digitized and published[4] from the mentioned database in order to make some older audio recordings and transcriptions accessible online.[5] In this way, the workgroup wanted to ensure that forgotten natural yodel melodies with original vocalization are readmitted to the repertoire of yodel clubs from the region, without first having to search for these natural yodels in the local archive.

The natural yodel database serves as a visual memory

The natural yodel database of the Roothuus Gonten is based on the estates of a large number of engaged collectors. While the tradition of natural yodel melodies has been and continues to be cultivated from mouth to ear, many musicians nevertheless captured

1 The archive of the Roothuus Gonten includes various musical genres in audio, image and sheet music in connection with the region. Natural yodels form a rather small part of the archive's holdings. They are scattered among the texts and audio recordings and only in exceptional cases summarized as a group.

2 Roothuus Gonten: Natural yodel database as of 20 Apr 2020. The database is continuously being developed and expanded with new information.

3 Roothuus Gonten: Natural Yodel Database, 20 Apr 2020.

4 Betschart writes about the creation of the database (2016: 35, emphasis original): "The impetus for this work was given by Joe Manser, head of the ROOTHUUS GONTEN at the time. For a long time, he has collected, annotated and edited a large number of natural yodels in collaboration with Erwin Sager and Noldi Alder. During the last two years, this work group has changed and now consists of Nadja Räss, Erwin Sager, Willi Valotti and Barbara Betschart. The aim of this immense collection has always been to make it accessible to the public, and of course above all to active yodelers. A first milestone was achieved in 2016."

5 www.roothuus-gonten.ch/cms/index.php/de/naturjodel-rund-um-den-saentis, 27 Aug 2022.

instrumentals and natural yodels in notation in order to preserve them permanently in a specific form for future generations. Some of the older transcriptions of the natural yodel database date from the time around the turn of the 20th century, and by no means have all of them been passed on to this day orally without interruption. Some have arguably been forgotten and, in some cases, rediscovered and revived thanks to retention in the collections by younger generations. The advantage of this collection is obvious: While for the loss of an oral yodel only the missing transmission from one generation to the next is sufficient, the written form can survive such disruptions. The most extensive estates, which fill a large part of the archive, come from Emil Fürstenauer, Johann Manser, Josef Peterer and Ueli Alder. The following biographical information comes from the documentation of the estates and is cited with shelf mark.

Josef Peterer (called Gehrseff senior, 1872–1945) was an important Innerrhoden folk musician and co-founder of the Moser Quintet. He had a large repertoire of memorized dances and melodies at his disposal, played violin, dulcimer, piano, cello and double bass, and also possessed a large collection of sheet music. A handwritten listing of the Gehrseff-Senior-Collection mentions 17 books and booklets with the accompanying numbers of pieces (Pa.017: 2), resulting in a sum of 2,256 dances and *Rugguusseli*, many of which are doubly or triply listed. The total number is thus likely somewhat less than 2,000 pieces (documentation Gehrseff sen., Roothuus Gonten). From Peterer 68 natural yodels are available, all in written form, including eleven original compositions.

Carl Emil Fürstenauer-Mazenauer (1891–1975) was a string musician (violin, double bass, cello), piano tuner and repairer, music and instrument dealer as well as collector of Appenzell sheet music. Fürstenauer learned to play the violin in childhood, first with Joseph Anton Fässler (1828–1898), later with Josef Peterer (1872–1945) and Anton Moser (1853–1921) in Appenzell. These musicians (Quintet Appenzell) gave him access to Appenzell music (cf. Pa.018). The estate contains a variety of notebooks, folders and individual sheets, including dances and marches along with natural yodels.

Johann Manser (1917–1985) completed an apprenticeship as a postman at the College of Appenzell after graduating from secondary school; until his retirement he worked at the Appenzell post office and as a railway post officer. Already at a young age he encountered music and learned to play the hand organ and the E♭-horn. Manser's earliest transcriptions of Appenzell music date back to 1932. From 1955 he was increasingly occupied with the collection, research and documentation of Appenzell music, especially from Innerrhoden. In 1980 he published his book *Heemetklang us Innerrhode*. Manser's handwritten sheet music collection comprises 554 pieces, some of which have never been recorded in sheet music before. Of the 554 titles, 174 are natural yodels, the rest concern instrumental dances in musical notation and as audio recordings. In 1983 he received the Culture Prize of the Pro-Innerrhoden Foundation (Pa.025) in appreciation for his commitment to Appenzell folk music.

Ueli Alder (1922–2014) was a farmer who came from the Alder family of musicians and at the age of nine learned to play the violin from his grandfather Johannes Alder. At the age of 19, his first public appearances began, together with a dulcimer player. For more than 75 years, Ueli Alder shaped the group Streichmusik Alder foun-

ded in 1884. He composed about 50 pieces of music and made an international career as a musician thanks to connections in the USA, where there was a lively demand for concert tours of Streichmusik Alder. From Alder's estate, found in the Roothuus Archive (Pa.051), 49 natural yodels are available in written form, among which are twelve of his own compositions.

These important collectors were primarily instrumentalists, so natural yodels make up only a part of their archival activities. Their estates form a visual memory for local music and an extensive platform for the external memorization of hundreds of melodies, many of which are present in the various repertoires of yodelers. The natural yodels are interpreted in different versions, since in the area around the Alpstein a yodel notation is never to be taken as strictly prescribed. The free treatment of natural yodels explains why some yodel parts in various versions were entered in the natural yodel database. There are dozens of variants of some yodel melodies, which differ only in musical details or in key.

Characteristics of the natural yodel reflected in the database

The 3,564 entries denote individual yodel parts and are encoded in the natural yodel database with different variables as a result of the relatively long and dynamic creation process of the database. For example, for around 300 entries the tonal range of the melody is indicated, but this was only assigned in a certain phase of the creation of the database (pers. comm. Sager, 14 Apr 2020). Several variables were added in a later phase of data acquisition, for example, the assignment of the origin of the natural yodel to Innerrhoden, Ausserrhoden and Toggenburg. For around 1,000 more recent additions, we know the estate to which they belong, but not the place of origin of the yodels themselves (pers. comm. Sager, 14 Apr 2020). Musical peculiarities and differences between the three regions can hardly be extracted from the metadata in the database.

Vocal and instrumental music were not listed separately, unless specifically noted.[6] When individual variables of the database are subsequently consulted (for example, the key or the tonal range), the evaluation refers to those entries for which the corresponding information was captured. For the evaluation of the database, the consultation of the archivist, Erwin Sager, was indispensable. Sager explained the creation and handling of the database and provided decision-making assistance for the categorization and delimitation of examined source holdings. The remark "vocal" was assigned if there is also an audio recording of the sung source. The natural yodel parts with this remark represent a larger component with 1,831 entries. In addition, there is other vocal music that has been handed down exclusively in notation and does not bear this remark. Specifically, this concerns the yodels from the publication of Alfred Tobler (1903), a very early transcription of Appenzell yodels.

6 The natural yodel database includes instrumental melodies that are titled *Rugguusseli* or *Zäuerli* (pers. comm. Sager, 14 Apr 2020). It thus also covers such titled brass music, string music, music for alphorn, dulcimer and hand organ, for example from the Dörig Chapel (hand organ), the Zürcher-Oertle Collection (brass scores for trumpet, horn) and *Rugguusseli* for zither by Josef Peterer.

An entry in the database refers to a yodel part and not to a whole, multi-part natural yodel. This classification considers that yodel parts are independent units, which in the past were alternately combined with other parts and assembled into different natural yodels. In many cases, three or four entries (yodel parts) belong to the same natural yodel. The number of yodel parts of a natural yodel varies between one and eight, but most entries belong to yodel notations with two (1,361 entries) or three parts (1,411 entries).

Meter, rhythm and harmonics

Although natural yodels are performed with considerable rhythmic freedom, the transcribers have each adapted them to a pattern of a time signature. Therefore, old transcriptions have to be reinterpreted to create the rhythmically free flowing feeling typical for Appenzell yodels (pers. comm. Koller, 4 Jun 2019). Time signatures are coded in groups according to their division into two, three or four count measures. A total of around 3,580 meters were entered in the database; the number is slightly higher than the number of yodel parts, as a small part of them contain more than one time signature. 2,117 entries are in the three-beat patterns (triple meter) 3/2, 3/4 and 3/8, which is 59%.[7] The next larger group with 928 transcriptions (26%) are the two-beat patterns (duple meter) 2/2, 2/4, 6/8 and 6/4. 124 Natural yodel parts were written in 4/4 or 4/2 time (3%), five in 5/4 time (rounded 0%) and for 404 yodel parts no meter specification was entered (11%).

The database registers the rhythm of the first bar of each yodel part with the first motif or part of it[8] in all 3,564 notations. The rhythm is recorded with a code in which a letter of the alphabet stands for a sequence of (equal or unequal) note values. According to its time signature, a bar comprises two to four letters, depending on whether the bar is divided into quarter notes or half notes or whether it is a 6/8 bar (pers. comm. Sager, 14 Apr 2020). The exact notation of the rhythm is also derived from the described division of the bar, for example, the letter "f" stands either for ♪. 𝅘𝅥𝅯 or ♩. ♪ or ♩ ♪. Some letters, including "f," can also stand for the mirrored or a similar rhythm (in this case for 𝅘𝅥𝅯 ♪./ ♪ ♩./ ♪ ♩). Figure 11 shows which rhythmic patterns are particularly frequent.[9] By far the most frequent pattern is "fbb" with 441 natural yodel parts (12%) (for example: ♩. ♪, followed by ♫ ♫). The frequency peak becomes even clearer when the patterns beginning with "fb" are considered in total, which is the case for 961 yodel parts (27%). Thus, the beginning with a dotted pair of notes and followed by at least two quarter or eighth notes represents a characteristic initial rhythmic formula that occurs in just over a fourth of the notations transcribed. A second frequency peak results from the combination of natural yodel beginnings that carry the rhythmic code "a." However, these beginnings remain less meaningful, since "a" can simply stand for a quarter note, a half note or a dotted quarter note, depending on the time signature. The code "b," which was also

7 Percentages are always rounded to integers. The sum of the percentages given is therefore not always 100.

8 The significance of the initial motifs for the recognition of the yodel melody is explained beginning on p. 86.

9 This sum considers all codes above a threshold of at least four yodel parts.

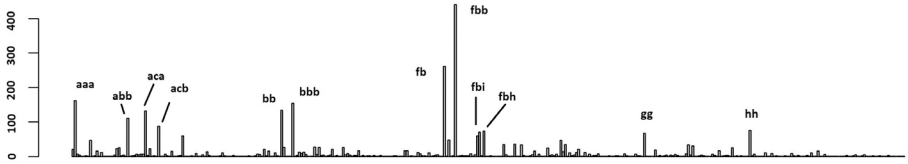


Fig. 11: Rhythmic patterns in the first bar. On the horizontal axis are the different patterns, on the vertical axis their frequency. Frequent patterns are marked with the rhythm code.

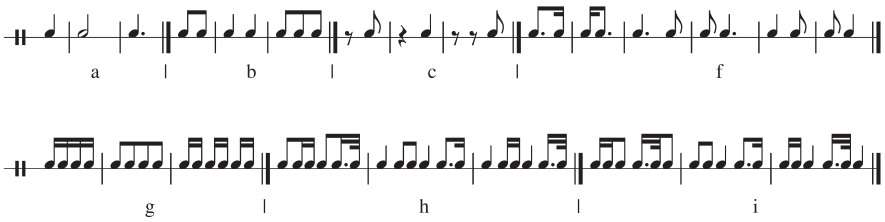


Fig. 12: Explanation of the rhythmic patterns noted in Figure 11. Under each letter, three notation types of the pattern (divided by single vertical lines) are subsumed (in the case of "f" six, since the rhythm can also be mirrored).

frequently noted as "bb" or "bbb," stands for the chain of two or three eighth notes or two quarter notes; "bbb" thus stands for six to nine eighth or quarter notes in a row (Fig. 12).

In total, there are 379 different combinatorial rhythmic patterns in the notations, although most of them occur only a few times (short beams in Fig. 11). The most common ten codes, the majority of which belong to the "fb" and "a" groups, refer to 1,634 entries (46%). This shows that certain patterns are preferred among rhythmic motifs. The patterns described represent simple forms; more complex rhythms and triolic divisions do not play a major role. It should always be noted that the rhythms here occur within the scope of notation. In practice, however, natural yodels are performed with rhythmic freedom, which is especially true for the first bar, the form of which is the sole responsibility of the lead yodeler.

In a way similar to the rhythm, Sager coded the harmonics of the first bar; 3,311 of the 3,564 entries in the natural yodel database bear the remark "harmony." The harmonic of the first bar can only be guessed, because it is sung soloistically without accompanying tones, yet it forms a very reliable feature (pers. comm. Sager, 24 Jan 2021) for the recognition of natural yodels. The first bar may be harmonized throughout on the initial scale degree or characterized by harmonic progressions indicated in Table 1.

For each initial scale degree there are several options for a harmonic progression in the first bar. If, for example, a natural yodel starts on the fifth degree, the first, second or fourth degree can follow. Progressions can be implicitly generated in memory, yet without memorizing concrete degree numbers, but rather with a schematic awareness that the

pitch and intervals of the melodic motifs change in a certain way. When certain harmonic progressions occur in several yodel melodies of a yodeler's personal repertoire, synergies in learning and memorizing are provided and a sense of the harmonic framework can develop. As already described (cf. p. 36), the first and fifth scale degrees occur frequently and stand for the traditional harmonization of the natural yodel, while other harmonic levels are employed less frequently.

Table 1: Possible harmonic progressions according to the annotation "Harmony in the first bar" in the natural yodel database, based on an initial scale degree (left).

Initial degree	Possible first harmonic progression	Possible second harmonic progression (if present)
I	II	V
	IV	V
	V	I
		IV
	VI	
II	I	V
	V	
IV	I	V
	V	
V	I	V
	II	V
	IV	

Key, ambitus and register change

Keys are not specified in orally transmitted yodels; the intonation on a certain pitch is determined by the lead yodelers. In addition, the key is not only based on the vocal skills of the yodeler but is also determined in such a way that the register change (chest voice/head voice) can take place at the appropriate height and in the corresponding places (pers. comm. Sager, 24 Jan 2021). The key can be so imprinted by frequent repetition of the melodies that natural yodels can be tuned to the same pitch even without the help of a tuning fork or another reference instrument. The lip position and air pressure are coupled with initial intervals and rhythm (pers. comm. Scherrer, 21 Aug 2020). However, the survey among yodel clubs (cf. p. 50) has shown that instruments with fixed pitches, such as the piano, the tuning fork and the pitch pipe, are often used in rehearsal work.

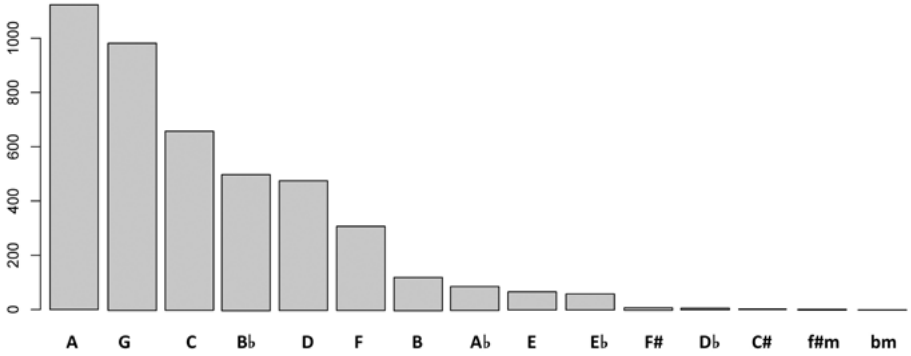


Fig. 13: Frequency of keys entered in the natural yodel database: uppercase letters for major, lowercase letters for minor with subsequent m.

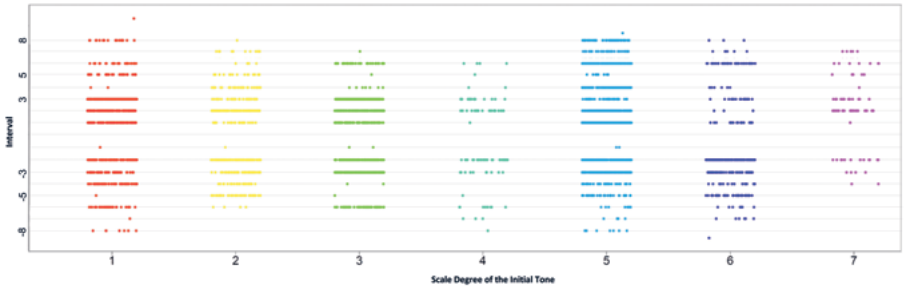


Fig. 14: Intervals that follow the initial tones. All yodel parts in the database were evaluated. Both axes are quantified as intervals of the diatonic scale. The prime is denoted by 1 or -1.

Nevertheless, the tone can change during a performance. Yodelers tend to rise rather than fall in pitch (pers. comm. Sager, 24 Jan 2021).[10]

A compilation (Fig. 13) of all registered keys of vocal audio recordings from the collection shows that the natural yodels are most often notated in A major and G major. The instrumental versions of the natural yodel melodies in the database were not considered because other aspects of the choice of keys come into play there, for example, instrument-technical requirements such as open strings for string instruments or grip combinations for the hand organ.[11] The evaluation is based on 4,414 entries; this number is significantly higher than that of the recorded yodel parts, since there are several variants

10 *Zäuerli* by *Chlausenschuppel* can easily end up to a major third higher in the course of a performance. Not infrequently, for example, a lead yodeler sets the next part a tone lower again in order not to reach unsingable heights (pers. comm. Sager, 24 Jan 2021).

11 While, for example, the harmonics and the time signatures remain the same when transferred to instruments, the key is often transposed.

for a number of them. While these variants have similarities in relation to other variables, they differ in key and have only been recorded separately in this respect.

In notations for instruments, the keys that have fewer signs in the respective tuning of the instrument are much more common than those with more signs. Accordingly, the question arises as to why singing concentrates on the keys A, G, C, B♭, D and F, and not on A♭, G♭, B or E♭.[12] The two most popular keys are A major and G major, which are only one whole tone apart and therefore allow the explanation that these keys correspond well with the range and pitch of many yodels, both for the melody voices as well as the choral accompaniment. Additionally, A as the tuning tone of the tuning fork may be related to the frequent choice of this key. The natural yodel melodies usually move in major keys (labeled with capital letters in the graphic). Exceptions are individual transcriptions in F sharp minor and B minor (labeled as f#m and bm), which can be understood as parallel keys of A major and D major respectively.

All entries in the database provide information on the first scale degree and the first interval. Both are given as digits, the first scale degree (this can also be part of an anacrusis or pickup) according to its position within the diatonic scale, the degree step to the second scale degree according to the interval. General tendencies can be gleaned from initial intervals. Many natural yodels start on the first or fifth scale degree, a smaller number on the second or third scale degree and only a few on the fourth or seventh. The first interval, regardless of the initial tone, often consists of a small step upwards (seconds, thirds). The ascending fourth rarely follows the first scale degree, but often does when the melody begins at the fifth degree. Very rarely do large intervals (sevenths, octaves) occur at the beginning, both in upward and downward movements. Although a *Zäuerli* is not defined by the first two notes, this interval already contains information that can help with retrieval. An ascending fourth often signals that the natural yodel begins with the dominant tone. Rare intervals (e.g., sevenths) can be regarded as a characteristic recognition feature for a natural yodel. Many yodelers say that the beginning of natural yodel melodies acts as an important trigger stimulus for the initiation of the associative chain and thus for its recognition. Although in many cases the allocation to a harmonic degree cannot be clearly determined, the first motifs formally show typical distinguishing features and thus help in retrieving the natural yodel.

The systematic designation of the register change by Sager has shown that this change takes place around the sixth scale degree.[13] The sixth scale degree tends to be sung in the chest voice when the melody rises and in the head voice when the melody descends (pers. comm. Sager, 14 Apr 2020). The exact pitch, on the other hand, is variable; the register change is not, or at least not only, dependent on vocal physiological conditions. The key may be chosen out of habit in such a way that the register change can be carried out at the desired location. This means that the change of register takes on a structure-forming function in the

12 The reduction to a few keys with relatively few signs can also be a choice of the transcribers. Such a recommendation was given by the Austrian folk song researcher Josef Pommer (Wey 2019: 137). The preferred keys for Appenzell string music are F, C, G, D, A major, especially D major (pers. comm. Sager, 24 Jan 2021).

13 The position of the register change was noted at an undetermined stage of data collection. After the knowledge of the change of register had been consolidated, entries were no longer pursued.

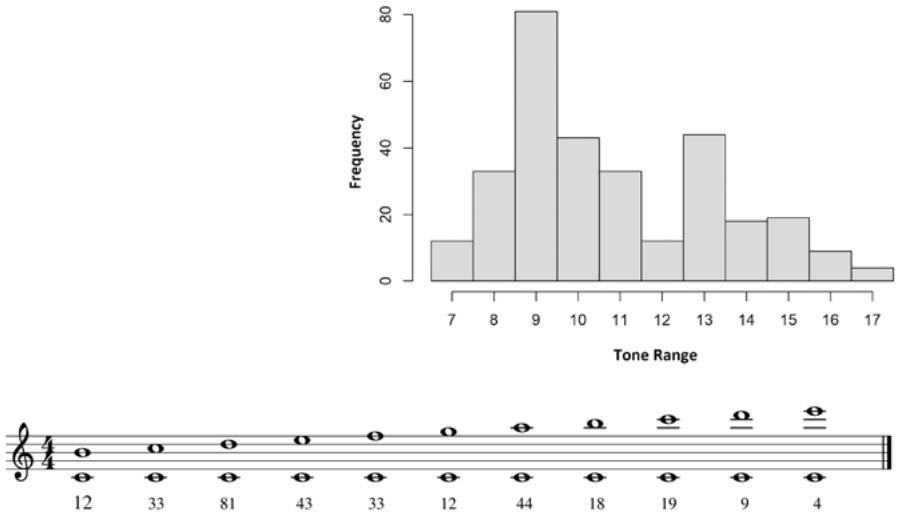


Fig. 15: The range is given in the database in scale degrees within the major scale, 7 stands for a seventh, 8 for an octave. Above: frequency of the individual range intervals; below: notation of the range intervals with the number of their entries at the bottom.

melodic framework of a natural yodel, especially since it is explicitly taught by directors of the yodel clubs. The key is divided in two in terms of vocal registers, with five to six degrees in the chest voice and three to four in the head voice. The inclusion of both registers allows a large range of tones but does not mean that natural yodels have to take advantage of this range. On the one hand, certain natural yodels are sung exclusively in the chest voice, on the other hand, the register change not only serves to expand the range of tones, but also emphasizes the variety of timbres and thus represents an aesthetic stylistic device.

The range of the melody was recorded in 308 entries. Tone ranges refer to a yodel part and are shown in Figure 15 according to the size of the ambitus at intervals from the fundamental tone C. The ninth is the most common, and the largest range of a yodel part extends over two octaves plus a third.

If a natural yodel is sung only in the chest voice, the range is of course lower than if both registers are included. The frequency of tone ranges between an octave and an eleventh indicates an ambitus that yodelers are able to cover relatively well, while tone ranges of over two octaves require a great vocal skill and occur only in four natural yodel parts.

Differences in tempo

The natural yodels in northeastern Switzerland are often performed slowly, a characteristic feature that distinguishes them from the yodel styles of other regions of Switzerland. In

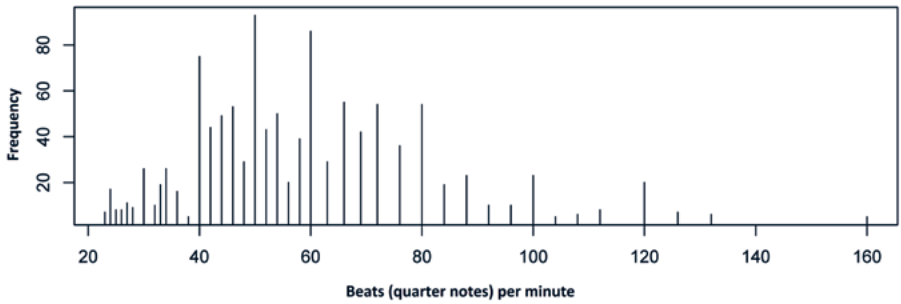


Fig. 16: Distribution of tempi in the natural yodel database.

the database there are different variations of tempo entries, some indicate a range, others a performance description (such as "slow"). To achieve comparability of the entries, only those that clearly indicate the number of beats per minute (bpm) were used for the evaluation, namely a total of 1,165. The variable "tempo" was introduced at a late stage in the setup of the database and given in bpm (where 𝅗𝅥 = 40 is equal to ♩ = 80).

Figure 16 shows clearly that natural yodels are usually sung in tempos between 40 and 80 beats per minute. The high values for units of ten can be explained by the fact that round numbers (for example, 50) are preferably notated. Natural yodels are performed quite freely both rhythmically and metrically; due to resulting fluctuations, a tempo indication can only represent an approximate value. At very slow tempos, the difference between 50 and 52 bpm is perceived more strongly than between 120 and 122 bpm. This relative perception of the tempo must be considered, even if tempos of over 80 bpm are rare and are usually limited to fast *Chlausezäuerli* or moving final parts of some Toggenburger yodels.[14] Overall, however, the range of the tempos is large, as between the slowest yodel melodies of just over 20 bpm and 80 bpm, a two-fold doubling of the tempo takes place. The claim that natural yodels are sung equally slowly in northeastern Switzerland must therefore be put into perspective. A familiar tempo can help differentiate between different melodies and increase their recognition value.

Relative similarity of melodies

The size of the database allows for an analysis of the extent to which the natural yodel parts are melodically like each other and whether some melodies differ so much that they are to be regarded as independent natural yodels or as variants. First, it must be pointed out that this question cannot be answered objectively for various reasons. Whether two melodies are recognized as the same depends on the individual auditory perception and

14 Alfred Tobler (1903) also records a number of *Trüllerli* (fast yodels) that are rarely sung today (pers. comm. Sager, 24 Jan 2021).

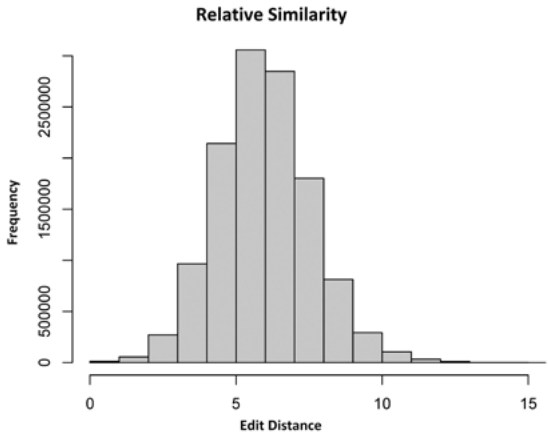


Fig. 17: Distribution of the edit distance between melody beginnings.

listening experience. In addition, melodies that seem similar in comparative listening do not have to go back to a common origin.

The first 15 intervals[15] of 3,523 yodel parts are also provided with the so-called Parsons code (Parsons 1975). The code consists of the three characters U (up, for when a note is higher than the previous note), D (down, for when a note is lower than the previous note) and R (repeat, for when a note has the same pitch as the previous note) and depicts the course of a melody in a highly simplified notation. Two melodies with the same Parsons code do not have to be identical, as the intervals can be of different sizes. However, they have a relative similarity, because two natural yodel parts with the same Parsons code are more similar than two melodies with very different codes.[16] The proximity of two codes is calculated with the so-called edit distance. The edit distance is the number of changes that must be made by replacing, deleting, or adding individual characters to get from one string to another. The words 'back' and 'buck,' for example, have an edit distance of one. The calculation of the edit distance of each recorded yodel melody to every other melody results in a table of around twelve million entries, of which only 1,490 have the value zero and thus have the same melodic contour for the first 15 notes of a natural yodel part.[17] This means that a natural yodel melody matches on average only 0.42 other melodies in relation to the Parsons code of the first intervals. Thus, the possibility that many identical melodies are listed in the data set under several entries can be excluded.

Figure 17 shows the distribution of the edit distance for the whole dataset, with a clear distribution around an average distance of six. About half of the characters would have to be exchanged (average: 6.46) to form a similar melodic movement of the first

15 As a rule, 15 intervals are encoded. Exceptions exist.

16 However, even melodies that differ slightly in their sequence, for example through ornamentation, can sound confusingly similar.

17 5,013 values in the table are 0, of which 3,523 are the matches of a melody with itself.

15 notes. A tendency toward certain melodic progressions cannot be determined, as this would result in a smaller average edit distance.

Summary

The archive of the Roothuus Gonten has the largest database of natural yodels in Switzerland, and these were evaluated here for the first time in terms of their form. The evaluation and interpretation of the individual variables must be considered with respect to the focus of the present study.[18] Regarding the structure of the natural yodels investigated, several specific features should be emphasized. Among the countless possibilities of the rhythmic form of the first bar, a few patterns dominate. These result in a style-defining feature and help to establish characteristic motifs. The harmonics of the first bar also shows preferred schemas, which facilitate the orientation of the yodelers both for the melody voice and the accompanying voice. According to the information in the database, the progression of these harmonies in the first bar is not standardized and does not follow any specific rules.

The notated natural yodel parts of the database show a preference for the keys of A, G, C, B♭, D and F major. This can have come about out of habit or as a side effect of the transcriptions since the notation is usually based on keys with fewer signs. The singability of the range as well as the change of register, which according to Sager is placed at a certain point, namely at the sixth scale degree, also contribute to this. Consequently, the keys must be tuned to the appropriate vocal position by habitual practice. The range of natural yodel melodies varies between a fifth and more than two octaves, often comprising a ninth. That some natural yodels have a small range is sometimes explained by singing them exclusively in the chest voice.

Although many natural yodels in the region around the Alpstein are perceived as slow by outsiders, there is a large spectrum of tempi that contributes to the differentiation or recognition of a natural yodel. The predominantly slow tempo allows the second voice to follow gradually and adapt with a slight delay. According to the Parsons code, the melodies coincide only in very rare cases, and identical natural yodel parts were not entered multiple times in the database under different names.

18 Features such as rhythm and harmonics were originally assigned to each entry in the database as search criteria for individual melodies; the possibility of evaluating them scientifically was later recognized.

Chapter 6: Musical structure of selected Appenzell and Toggenburg natural yodels

As already established, the ability to memorize natural yodel melodies and retrieve them in concrete situations depends on the way in which the information is organized during listening, in connection with already existing and subsequently stored knowledge (cf. p. 38). Assuming that long-term memory stores information associatively and at the same time structures it hierarchically, chunking, i.e., the cognitive aggregation of individual elements into memorizable groups, can be understood as a basis for explaining the mental ordering principles in connection with the natural yodel. A formal and motivic analysis of selected Appenzell and Toggenburg natural yodels will identify mental structuring possibilities with three natural yodels in detail, and in summary fashion with 30 other natural yodel melodies.

Heinrich Leuthold's (n.d.) unpublished instructions for the form analysis of yodel songs and natural yodels contain definitions and explanations of the musical structure of natural yodels which are used to support the present analyses.[1] He writes that the motif consists "of at least two tones and [could] be both rhythmic and melodic in nature" (Leuthold n.d.: 2). Motifs build the underlying structural elements of the natural yodel. They are varied in different ways, for example by rhythmic change, the shift to other scale degrees and thus a change in harmony, the narrowing or extension of the intervals, by variations of the motif as well as the dividing of the motif into smaller parts (motif elements) and by the repetition of motif elements (Leuthold n.d.: 4). These variations are included in the following natural yodel analyses and a connection with chunking is discussed, whereby motifs lie at the lowest hierarchical level of the cognitive ordering principle, thus forming the smallest chunks of a natural yodel, which correspond to the processable quantities of working memory or short-term memory specified by Miller or Cowan.

Leuthold uses the same terms for the subdivision of a yodel part as for songs and speaks of the opening section and the closing section, which together form a period and correspond to a yodel part. Instead of period, the present study uses the term phrase, which is more commonly used among yodelers. Leuthold mentions the typical ends of the parts of the yodels, which are characterized by a "caesura, a natural conclusion of the melody" (Leuthold n.d.: 4). In some natural yodels the second part consists of a variation of the first, whereby in some cases only the first phrase is varied, while the second phrase is a repetition of the closing section of the first part: "The motif of the 2nd part (only a variation of the 1st part) is only retained as an opening section over 4 bars. As a closing section, the four final bars from the first part are appended" (Leuthold n.d.: 8). Leuthold made this observation in connection with the *Juiz* in Nidwalden, but the phenomenon

1 Leuthold (1981) published excerpts from this theory of forms specially developed for yodels in the publication *Der Naturjodel in der Schweiz*.

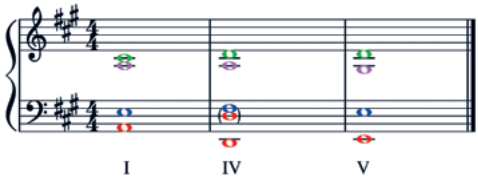


Fig. 18: Version of a four-part accompaniment for a natural yodel in A major (red: second bass, blue: first bass, purple: second tenor, green: first tenor). The key of A major is relatively common in natural yodels in the Alpstein region (cf. p. 61).

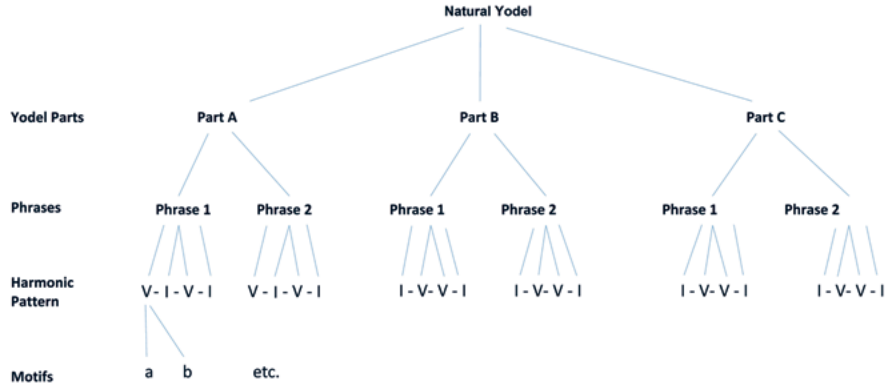


Fig. 19: Structural analysis of a typical natural yodel from the region around the Alpstein (cf. Appendix *Em Franze Johann sis* [AI 04]).

can similarly be found in the region around the Alpstein. The harmonic accompaniment of the choir consists mostly of long chords of the tonic and the dominant; the subdominant rarely sounds. Figure 18 illustrates a typical natural yodel four-part choir accompaniment (A major). The second bass (red) sings the deepest chord tones, followed by the first bass (blue), the second tenor (purple) and the first tenor (green) as the highest accompaniment voice.[2] In addition to the three main degrees (I, IV, V), degree II (with major or minor thirds, as subdominant), or degree VI are sometimes used (cf. p. 83). Yodel clubs take the liberty of designing the polyphonic accompaniment of natural yodels according to individual preferences, for example, individual choir members can complement accompanying tones in octave positions.

2 Singers of the second bass, who do not reach as low as the note d_1 of the degree IV switch to the note d (an octave higher) set in brackets.

Table 2: Diacritical signs in the transcriptions and their meaning.

Signs	Meaning
A, B, C, …	Natural yodel parts
Notation line	Phrase
Roman numeral (I, V)	Harmonic degree
U	Unaccompanied beginning of the phrase
①	First yodel voice sings as solo
②	Entrance of the second yodel voice
③	Entrance of the third yodel voice
④	Choir entrance
Bracketed: a, b, c, …	Motifs
a', a'', a''', …*1	Variations of motifs (a prime, double prime, triple prime, etc.)
Long brackets*2	Connected motifs

*1 Strokes following the motif letter use the prime symbol, always in the form of a straight single apostrophe (') instead of the curvilinear apostrophe (') used in text.

*2 The composite motifs, which are marked with long brackets, can represent chunks on different levels, at the motif, harmony or phrase level.

The memorization of natural yodel melodies is not only based on the explicit storage of the structure but is also determined by cultural knowledge (cf. p. 45) and experience. While inexperienced listeners (Sloboda 2000: 5) perceive only a small group of characteristics, such as some tones or tone sequences, experienced yodelers distinguish different levels that form a hierarchical structure (cf. p. 43). With these perceptions of different levels, longer melodies can be ordered in memory and retrieved. The harmonic alternation between the first and fifth degree can become meaningful, as well as the repeated phrases and the division of natural yodels into different parts. The beginning of a melody is connected in memory not only with motif-forming intervals, but also with superordinate structures, such as a harmonic progression or the beginning of the following yodel part. In this respect, the motif forms a chunk on the lowest hierarchical level. In connection with other motifs it forms a phrase and ultimately an even larger chunk – a natural yodel part. The following analyses include four levels of hierarchical structure: the yodel parts (for example, the three of them), two phrases of each part, the harmonic changes within the phrases (for example, I-V-V-I) and at the lowest level the motifs (a, b, …).

This hierarchical structure is subsequently analyzed in detail in connection with three natural yodels; their elements relevant for cognition and their variations are highlighted and placed in the context of larger form units. To emphasize the formal structure

and its relevance for cognitive processing, the transcriptions of the natural yodel melodies were provided with labels (cf. Table 2).

In the transcriptions, hierarchical levels of chunks are marked with brackets below the note lines. Considering that the division into motifs (chunks of the first level) depends on the individual perception as well as the interpretation of the melody by the lead yodeler, different persons can divide a natural yodel melody into different chunks: the subdivision given here is only one interpretation possibility. The same applies to the temporal division into meters and bars, for which several possibilities and readings can also be applied.

Three natural yodels examined up close

In the following sections, the formal structure of selected natural yodels is examined to recognize whether a direct connection can be established between the structuring of the natural yodel, as illustrated in the previous chapters, and its cognitive processing. The *Heewehzäuerli* from Appenzell Ausserrhoden, the *Anna-Koch-Yodel* from Appenzell Innerrhoden and *De Looser* from Toggenburg, which has already been discussed in connection with its transmission, serve as the basis for the detailed analysis. The transcriptions each correspond to a specially selected audio recording. Since meter and tempo fluctuations occur in many natural yodels, note values in the following transcriptions are to be understood as approximations.[3]

Heewehzäuerli

The analysis of the *Heewehzäuerli* (Homesickness-*Zäuerli*) shows the typical structure of a natural yodel melody from northeastern Switzerland and the musical relationships between different motifs. The first part of the *Heewehzäuerli* enjoys special popularity in the yodel region of northeastern Switzerland. The natural yodel database of the Roothuus Gonten contains 24 notations of this part, which differ only slightly in terms of rhythm and individual tones. Although lead yodelers practically never improvise, oral transmission has created variants of this same natural yodel as different people shape the melody with their individual interpretation. The transcription of the *Heewehzäuerli* was generated from the 1981 audio recording by the *Saumchörli* Herisau from Appenzell Ausserrhoden (Saumchörli Herisau 1981: Title B4, cf. Fig. 20).

The *Heewehzäuerli* exhibits a three-part form (A, B, C), with each part consisting of two phrases, a four-bar opening section and a four-bar closing section. Rhythmic and melodic motifs are repeated on several levels. The melody of the first phrase (bars 1–4) is repeated with a slightly varied ending in the second phrase (bars 5–8). Part B begins

3 Likewise, different interpretations characterize the performance practice, so the respective detailed analysis represents only one of many possible performance variations of the corresponding natural yodel.

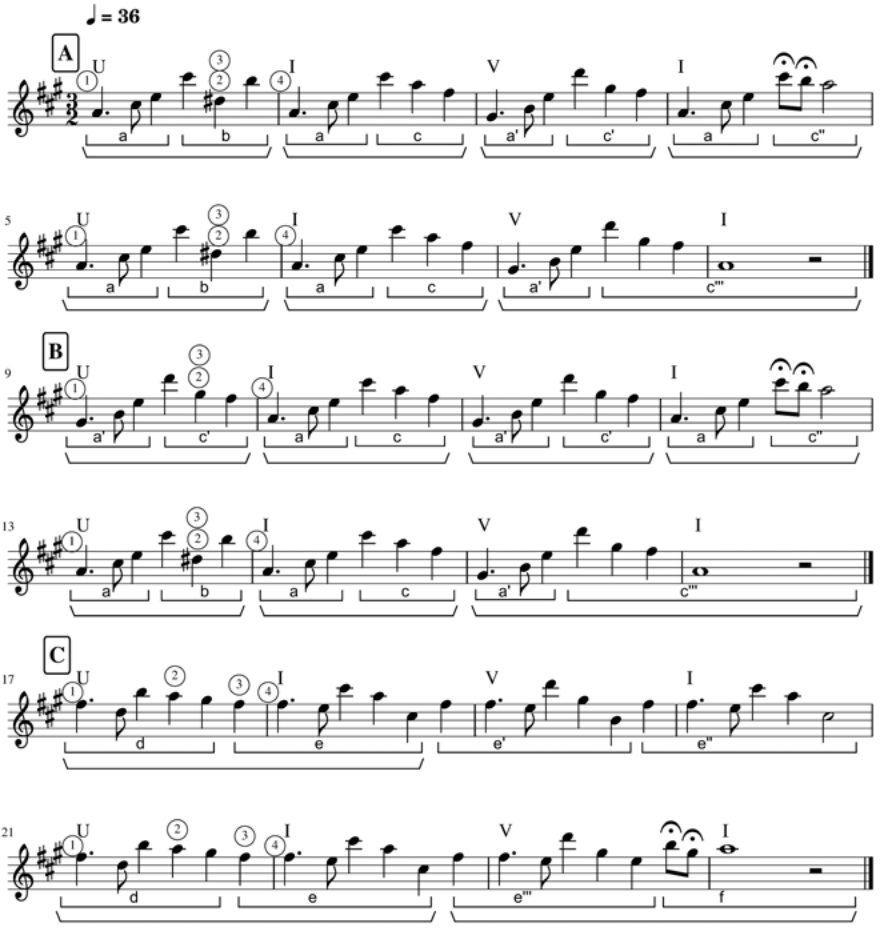


Fig. 20: *Heewehzäuerli*, transcribed from the audio recording of the *Saumchörli* Herisau in 1981.

with two motifs (bar 9, a' and c'), which are already known from bar 3; then bars 2–8 from Part A are repeated. Part C consists of a phrase (bars 17–20) that has the same rhythmic form as most previous bars, and a repetition of this phrase with a varied ending (bars 21–24). This musical form with diverse repetitions can be easily tracked in the transcription shown, but it may not be automatically perceived as such by inexperienced listeners, as it is obscured by the slow tempo and mixing of the voices. To retrieve the natural yodel from memory, the lead yodeler only needs to remember the first three or six notes of the *Heewehzäuerli*. In addition, the two motifs with the first six notes (Fig. 20, bar 1, a and b) form a larger chunk on a next hierarchical level (connecting bracket in the transcription), which in turn is repeated several times. Accordingly, there are several ways to group chunks on each level: notes are grouped into motifs, motifs into phrases,

phrases into parts and parts into complete natural yodels. Repetition as one of the most principal elements for the recognition of forms in music (Hellmuth Margulis 2014) is of crucial importance for the structuring of memory and the processing of information. Repetitions of motifs facilitate memorization, as thereby the cognitive processing of a melody is compacted: A yodeler implicitly or explicitly internalizes the structure of the natural yodel for the retrieval of the *Heewehzäuerli*, both from large to small units (three parts with six phrases) and from small to large (individual motifs and their variations) and combines both of these strategies with the knowledge of the repetition structure. In this respect, the memorization of six musical ideas (motifs a–f), which in combination with variations and repetitions form the entire piece, is sufficient. Cognitive demand is reduced by chunking and by the recognition of repetition of a total of 128 independent notes to six musical ideas (motifs a–f).

The entrances of the second voice (*Noofahrer* or *Noofahrerin*), which in the case of the *Heewehzäuerli* often proceed in sixths or thirds below the melody, are designated in Figure 20 with ②, entrances of the third accompanying voice with ③ (when there is a third voice) and the choral entrances with ④. The first voice begins soloistically, after four notes the second and third voices enter, then the choir begins with harmonic accompaniment after a total of six notes of the melody. These sequenced entrances form a characteristic of the polyphony in the natural yodel of the Alpstein region. The second voice follows the melodic line of the first with a slight delay, intoning different but corresponding tones and rhythmic variations. Interviewed yodelers emphasize the importance of the leading of the first voice in terms of coordinating timing, agogics and dynamics, which is also detected in the audio example of the *Heewehzäuerli*. The second voice and the choir follow the leading of the first voice and harmonize the natural yodel with their accompaniment.

Harmonically, the beginning of some natural yodels of the Alpstein region cannot be precisely defined (cf. p. 84). In some cases, the harmonic structure may be deduced from the melody of the solo voice, in others it remains unclear. Using the example of *Heewehzäuerli*, this circumstance can be clearly recognized: While the first motif (cf. Fig. 20, bar 1, a) is harmonically attributable to the tonic, the second motif (cf. Fig. 20, bar 1, b) changes this impression through the notes $d\#^2$ and b^2 and creates a harmonic ambivalence.[4] This dissolves as soon as the choir begins in the second bar on the tonic and reveals the harmonic structure of the natural yodel by switching to the dominant in bar 3 and ending in bar 4 on the tonic. The same harmonic schema (U-I-V-I) occurs in the second and fourth phrases (bars 5–8 and 13–16). Although the remaining phrases are also not accompanied by the choir at the beginning, they suggest a clearer harmonic picture: V-I-V-I for the third phrase (bars 9–12) and IV-I-V-I for the two phrases in Part C. Despite the different harmonic structure of individual phrases, the choral accompaniment in the entire natural yodel is carried out by exactly the same pattern: The first bar of each phrase remains unaccompanied, after which I-V-I is alternately harmonized. Recognizing this consistent accompaniment pattern simplifies cognitive tracking by choral singers.

4 Accordingly, the unaccompanied places designated with U in bars 1, 5 and 13 could be harmonized with degree I or alternatively with a harmonic change within the bar from degree I to degree II (with a major third).

Anna-Koch-Yodel

Anna Koch from Gonten (AI) was sentenced to death by the sword in 1849 at the age of 18 for the murder of her rival Magdalena Fässler. "Lack of religious instruction, vain addiction to pleasure, penchant for beautiful clothes as a soon-to-be bride, are the main reasons for this gruesome murder" (Signer 1849: 1), can be read in the minutes of the meeting of the Grand Council of the Canton of Appenzell Innerrhoden from 3 Dec 1849. Tobler (1903: 88) writes that the melody known today as *Anna-Koch-Yodel* was her "Leib-Jodel" (lit. 'Body-Yodel,' a yodel known as the personal favorite of a person) and demonstrates with a transcription (Tobler 1903: 79) that the melody had already been handed down for over 150 years. In fact, since the early 20th century, various audio recordings of this yodel have existed, both as a solo yodel and with choir accompaniment, and additionally with accompaniment of the hammered dulcimer or string instruments. A historical recording of the *Anna-Koch-Yodel* with Cäcilia Dähler-Koller, published by Roothuus Gonten (Dähler-Koller 2010: Title 12), forms the basis for the present analysis. Even a first glance at the transcription reveals the clearly comprehensible structure of this two-part natural yodel (Fig. 21). Both parts, except for the final bar, consist of two congruent phrases which are each clearly divided into four-bar opening and closing sections. The first phrase is characterized by a single motif (a), which varies in bars 2 and 3 and is transposed to the fifth harmonic degree. The motif of the melody line leads in a straight line one tenth, and in the variation (a') a twelfth upwards. The following motif and its repetition begin a semitone lower, repeating the upward movement three times before the melody flows into the final motif b, which descends in broken chords. The first phrase closes on the third degree e^1. The second phrase of the first part remains the same in the sequence of motifs a and a', but instead of motif b, a long final note is held. The first yodel part corresponds to the typical structure of the Swiss natural yodel from Leuthold's theory of forms presented above. Striking here are the long continuous motifs of six to eight notes; for the memorization of this yodel part, only a motif and a coda must be remembered on the motif level; the sequence of motifs can be anticipated due to the harmonic framework. Part B is more moving than Part A and is characterized by the sequence of short, differently varied motifs. After motif c is harmonically sequenced several times, two new, equally short motifs (d and e) are introduced in the middle part of the phrase, transposed and varied. The first phrase in Part B does not lead to a separate final motif, but to a variation of the motif d (d'') and the short-held fundamental tone c^1. The last phrase picks up to half of the melodic line of the previous one. After the first execution of motifs d and e, these are not sequenced together, but split off from motif e and repeated. At the end, the same splitting off from motif e is hinted at again, but not completed. The first two longer tones of the motif finally merge into the fundamental tone c^2.

The conclusion suggests that the *Anna-Koch-Yodel* was not forgotten for a long period of time as a result of its clear structure and catchy melody. The harmonic rhythm assists the orientation within the melody since a motif in the first part corresponds to a harmonic segment. The slightly varied repetition of several basic motifs illustrates one of

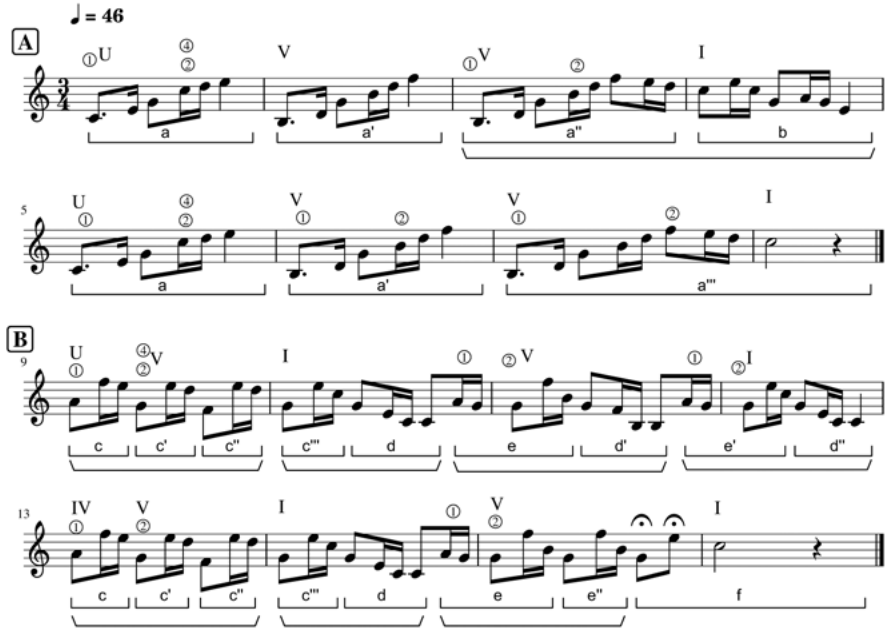


Fig. 21: *Anna-Koch-Yodel*, transcribed according to Dähler-Koller (2010: Title 12). The piece is accompanied by string music and dulcimer. Accordingly, the choral entrances (④) do not denote vocal entrances, but the instrumental accompaniment.

the most important aspects for the memorization of many melodies, whereby also more intricate forms exist.

De Looser

The transmission of the Toggenburg natural yodel *De Looser* was examined on p. 52. In terms of its formal and motivic structure, *De Looser* is one of the more complex natural yodels with a large number of cognitive chunks and connections. Such complex structures are found in natural yodel melodies of all three regions studied but occur frequently in Toggenburg. The very beginning of this natural yodel shows this complexity: The yodel begins with a pickup of two eighth notes and the whole first bar can be understood as leading to the high note e^2 (major third of the key of C) in the second bar (Fig. 22). Motif b corresponds to a diminution of a in the first bar, which forms sequences only at the fifth scale degree and afterwards in the upper octave. A distinct motivic transition point only occurs in bar 2, where the lead yodeler[5] takes a breath after the low note c^1. The two notes e^2 and c^1 together form a final motif (c), which clearly differs from the previous motifs and

5 Georg Kuratli from Nesslau sings here.

signals a first climax of the yodel melody, at which the accompanying voices enter. This self-contained theme of the first bar with prelude and target tone (e^2) can be memorized as a sequence of four chunks, which contain between two and six notes and form the first half of the first yodel phrase.

The motifs d and e of the second half of the opening section differ so much from those of the first half that they must be memorized as elements and cannot be derived from the initial motifs. At the end of the first phrase an augmentation of the motif b' is followed by the final motif c. For the repetition in the second phrase, the pickup is ornamented with sixteenth notes, the course of the melody remains the same as in the first phrase and, following on motif e, the harmonics resolve to the fundamental tone c^2 (e'). This shortening of the phrase toward the final tone is typical; it occurs in this form in most of the yodel melodies examined.

The second part (B) of *De Looser* is composed of the two motifs g and h, each of which is varied in the second half of the phrase. A pickup of four sixteenth notes corresponds to motif f from the first part, though an octave higher. This agreement can be interpreted as simplifying the entry into the second part, since the motif is still present from the previous phrase. The motifs g and h are characterized by large interval jumps (tenth and twelfth respectively) in the middle; unlike in the first part, the large jumps into low positions do not mark the end of a motif but continue the melodic line upwards without interruption. The harmonic structure with a sequence on the first degree, a variation of the motifs on the fifth degree and the resolution on the tonic each in the last bar of the phrase is retained. Part C begins again with a pickup, a triplet, with grace notes performed with virtuosity. The initial motif i is related in form to that of the preceding phrase (g), but with a different continuation: The lead yodeler moves in a melodic turn (notated as a quintuplet) upwards to degree V and the new motifs k and i'. While the first phrase of Part C still leans on Part B, the second phrase does not consist of a repetition of the first, but of variations of the initially introduced motif i. Thus, here lies a rather unusual form, which requires special memorization of the relevant passages: At the end of the first phrase, its first half cannot be repeated as is otherwise usual. Part D, on the other hand, follows a well-known schema with two phrases congruent except for the final phrases, for which two motifs (l and m) must be memorized. The two motifs alternate within the phrases and are varied.

The complex structure and the large number of motifs in this natural yodel raises the question of how it has been preserved in the same form over such a long period of time. Perhaps this could be explained by the yodelers already mentioned, who were among the experts of their time and transmitted the yodel, even though learning *De Looser* is a considerably difficult task. In the end, its individual character might itself facilitate its memorization, since *De Looser* can hardly be confused with similar natural yodels and is thus more clearly differentiated from other melodies.

The natural yodels presented here, *Heewehzäuerli*, *Anna-Koch-Yodel* and *De Looser*, served as examples to show motivic structures that are reflected in the memorization of chunks. As the detailed analyses of these three examples demonstrate, bar lines do not represent limitations for motifs, and in most cases, bars include several motifs.

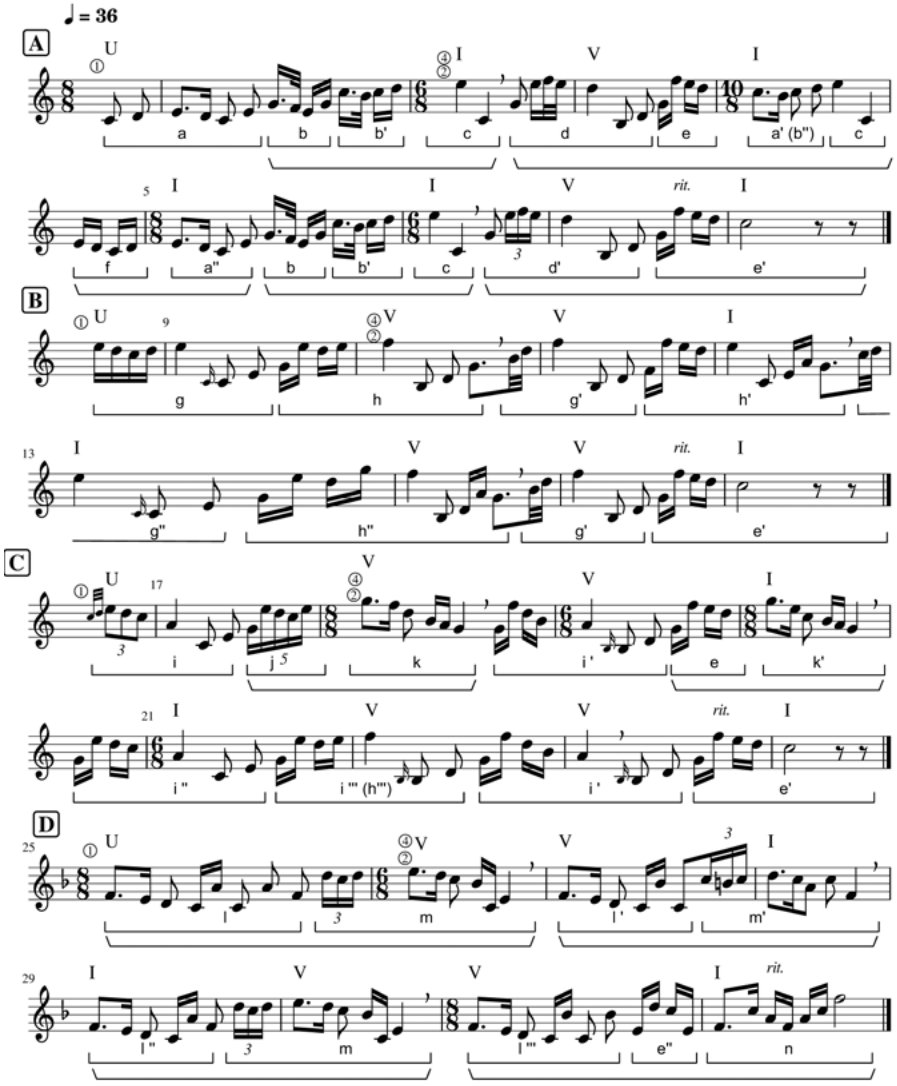


Fig. 22: *De Looser*, transcribed from the shellac record Ultraphon A 25035. The recording begins in D flat major and was transcribed a semitone lower for better readability.

Accordingly, bar lines and motifs represent independent structuring systems in the natural yodel of the Alpstein; the former are based on the written notation, the latter on perception of form. On a higher level, motifs can be combined into larger units on account of their structure. How formal and motivic structures shape melodies is investigated next using the same analytic method in connection with 30 natural yodels, where the focus is not on structural details of individual melodies, but on comparable overarching phenomena.

30 natural yodels at a glance

The selection of the 30 natural yodels to be analyzed here was generated in collaboration with Erwin Sager and was facilitated by the natural yodels in the collection from the Roothuus Gonten that were already transcribed and published online along with audio samples in the project *Naturjodel rund um den Alpstein* (Natural yodels around the Alpstein).[6] The detailed transcriptions of Toggenburg natural yodels by Willi Valotti could be used as a baseline. Since different ways of interpreting the same natural yodel determine the performance practice around the Alpstein, the analyzed audio recordings each reflect only one performance variant.[7] The 30 examples are distributed across different generations; on older recordings the second voice sometimes sounds a little less clear and enters a little more often together with the choir than in more recent practice. Of the natural yodels analyzed, ten each come from the regions of Appenzell Innerrhoden, Appenzell Ausserrhoden and Toggenburg. All transcriptions[8] can be examined with associated motif divisions, vocal entrances and harmonic schemas (cf. Appendix). Some of the audio recordings can be listened to online via the links in the Appendix, others are only available locally in the Roothuus Gonten. Statements of the generated results apply only to the examined corpus.

The 30 natural yodels consist of a total of 93 natural yodel parts, of which just over a third of the melodies examined (twelve natural yodels) are three-part, about a quarter two- or four-part, two melodies five-part and one melody one-part (Fig. 23). This distribution roughly reflects that of the database as a whole (cf. p. 58).

The musical analysis confirms the characteristic type of polyphony in the natural yodel around the Alpstein, which was previously described by the three examples. Thus, 91 of the 93 parts (98%) begin as solos, while the second voice and the choir enter later.[9]

6 https://www.roothuus-gonten.ch/forschen/forschungsprojekte, 29 Aug 2022.

7 Three natural yodels (TO 06, AR 02 and AR 07) are accompanied by taler bowls in addition to the choir accompaniment, two more (AR 01 and AR 06) with *Senntumsschellen* (musical cowbells), and in another two natural yodels (AI 01 and AI 03), including the discussed *Anna-Koch-Jodel* (AI 01), the choir is replaced by string music.

8 The transcriptions were set in a uniform layout for this publication (one phrase per line) and adapted to the associated audio recordings. The Appenzell transcriptions were generated by Erwin Sager from the original sources; their authorship is known in some cases (or at least assigned to an estate), but often no original transcriber is explicitly named.

9 The two yodel parts which begin directly with choir accompaniment each represent the last part of a four-part yodel (TO 05 and TO 08).

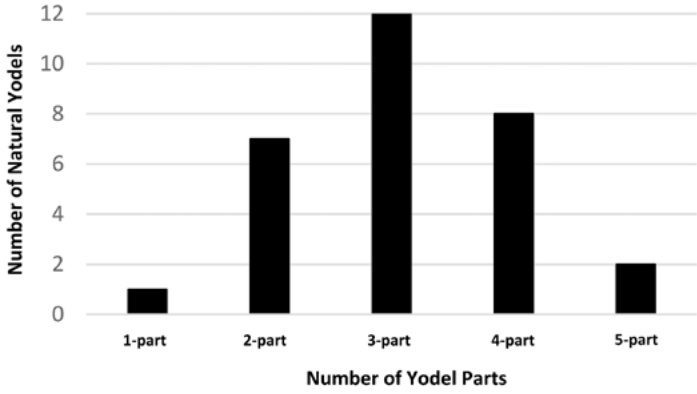


Fig. 23: Number of yodel parts in the analyzed 30 natural yodels.

This solo beginning means that singers of the accompanying voices do not necessarily have to know the melody at the beginning of a yodel part. Both the second yodel voice and the accompanying choir can rely on the lead yodeler, from whom the melody is given and thus the memory of the tones for the accompanying voices is evoked. With one exception, all the yodel parts examined consist of two phrases.[10] The second phrase enters more often directly with choral accompaniment than at the beginning of a natural yodel part. Although 61 closing sections (66%) begin unaccompanied, the comparatively lower percentage of opening sections that begin unaccompanied allows for the choir to recognize the repeated beginning and thus accompany the closing section without delay.

The keys of the natural yodels were determined based on the corresponding audio recordings (cf. Appendix). All 30 natural yodels stand in a major key. Twelve natural yodels are sung in A major, clearly the most frequent key. B flat major was second most frequent with four natural yodels, C major with three examples the third most frequent (Fig. 24). The notations in the entire database also reflect this distribution, with the exception that G major occurs relatively less frequently in the 30 recorded examples than is observed over the entire database (cf. p. 61).

In a natural yodel, the most common keys in A major and B flat major usually lead to tone ranges that are easily accessible for both the yodel voices and the accompanying choir. In three of the examined natural yodels, key changes occur. These are all attributable to the Toggenburg region and alternate between D flat and G flat major (TO 01), B flat and E flat major (TO 03) as well as F and B flat major (TO 05), thus from the fundamental key to the subdominant key. In terms of meter and beat, a little more than half, namely 17 of the 30 natural yodels, have individual parts in different times, whereas with 9 of these 17 natural yodels the beat changes within a part. Whether and how often

10 A three-part natural yodel (AR 09) contains only four bars in the B part, which are not repeated.

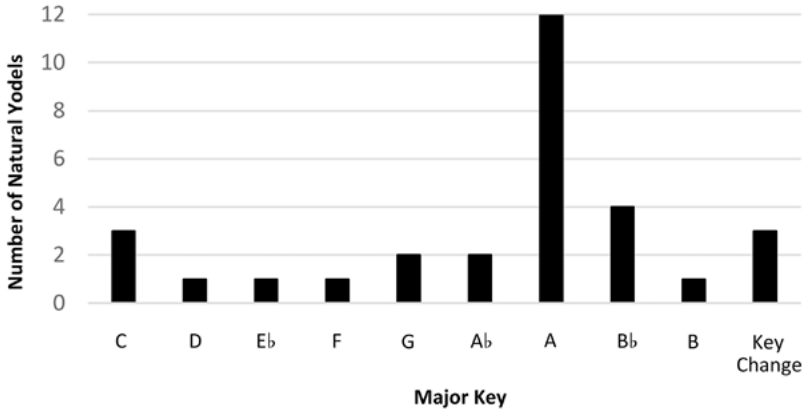


Fig. 24: Distribution of the keys of the 30 natural yodels.

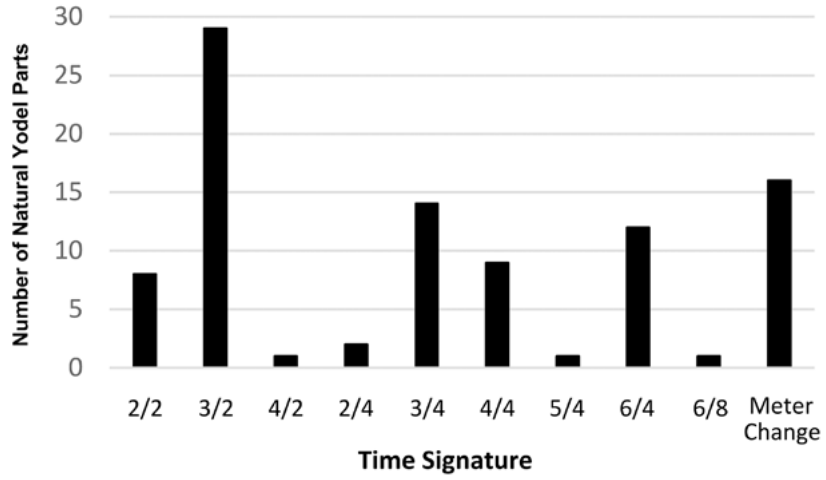


Fig. 25: Distribution of time signatures in 93 natural yodel parts.

meter changes are notated depends on the structural understanding of the transcribers. If they want to hold to the eight-bar form, this may require a change of beat. Tempo, rhythm and meter are often designed very freely in the natural yodel around the Alpstein, which is quite challenging for transcribers.

The distribution of time signatures in connection with the 93 examined natural yodel parts is shown in Figure 25. 29 parts are in 3/2 time and correspond to triple meter in slow tempo, which is shown by notation in half notes. The musically related times of 3/4 (14 natural yodel parts) and 6/4 (twelve natural yodel parts) are comparatively frequent. Notated far less frequently is 6/8 (one natural yodel part). The group of duple meters is slightly smaller with a total of 20 natural yodel parts, with nine

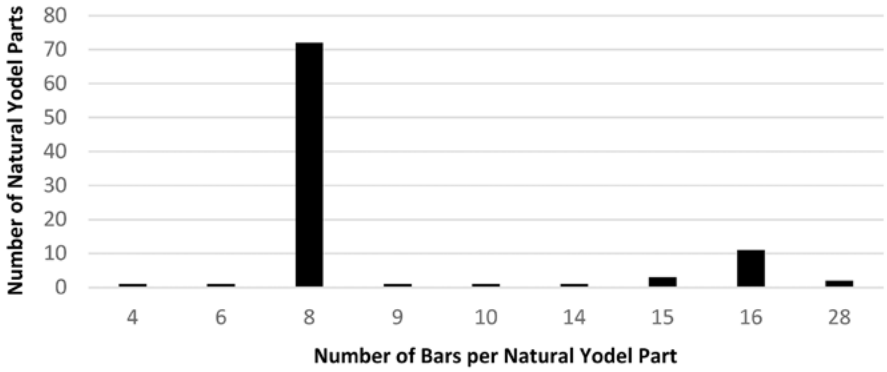


Fig. 26: Distribution of the number of bars in the 93 natural yodel parts.

natural yodel parts in 4/4, eight in 2/2, two in 2/4 and one natural yodel part in 4/2.[11] In an interview, the director of an Innerrhoder yodel club remarked that "one should actually not distinguish rhythm from a Rugguusseli" (pers. comm. Koller, 4 Jun 2019). Therefore, if one learns a *Rugguusseli* from archived notations, one must reinterpret it and "cast out" the rhythm by "perhaps consciously singing one note a little longer, another perhaps a little faster, so that no rhythm is noticeable" (pers. comm. Koller, 4 Jun 2019). According to this statement, rhythm and meter are deliberately obscured when reinterpreting written archived natural yodels from notations. Yodel tunes written in quarter notes are not necessarily slower than those based on eighths, since the meter in the notation depends on the intentions and choices of the transcriber (pers. comm. Koller, 4 Jun 2019). The vast majority of natural yodel parts have an eight-bar form, the second most common is the related sixteen-bar form.

An eight-bar form with opening section and closing section may be easier to memorize and retrieve than a less schematic form. This illustrates repetitions on several levels and, in particular, structures harmonic and motivic patterns. Also, in Appenzell string music (Alder 1995: 9) and in Ländlermusik (Ringli 2017: 118), individual parts often have an easily comprehensible eight-bar or sixteen-bar form that facilitates memorization. These parallels exist in various musical styles and are therefore particularly helpful for yodelers who are also musically active in other genres. The eight-bar form could have been shaped by cognitive conditions: If the number of units is efficiently retrieved from the working memory by chunking, this favors the establishment and dissemination of such musical forms in the oral tradition.

11 Of the total of 16 natural yodel parts with meter change, 13 alternate between two time signatures and the rest between three. In addition, meter-changing natural yodel parts contain the previously not yet mentioned 7/4, 8/4, 8/8 and 10/8 times (cf. AR 03, TO 01, TO 04 in the Appendix).

Motivic organization supports memorization

As presented earlier, chunking can take place in the context of a natural yodel on different structural levels. Based on statements of yodelers on the question of the grouping of tone sequences, it must be assumed that these are perceived individually. Therefore, the motifs marked in the transcriptions (cf. Appendix) represent one possible classification among several. The following analysis considers motifs as chunks of the lowest hierarchical level that occur in the 30 natural yodel melodies. The listed motifs comprise two to fourteen notes. The average of the longest motifs of all yodel parts is seven, that of the shortest three notes and is therefore within the limit of 7±2 units proposed by Miller, but above the 4±1 of Cowan (2010). Almost half of the analyzed natural yodel parts (41 out of 93) consist of four musical ideas which were recorded in the transcriptions as motifs with lowercase letters (a, b, c, d, etc.). Slightly less than a third of the natural yodel parts (27 out of 93) manage with three motifs, while natural yodel parts consisting of two motifs (16 out of 93) occur less frequently. Rarely does a natural yodel part consist of five (eight of 93) or seven motifs (one natural yodel part, Fig. 27).

Variations of individual motifs occur in all natural yodel parts and, as in the A part of the Innerrhoder natural yodel *A de Vechschau*, have been provided with up to four strokes[12] (Fig. 28). The awareness of motivic kinship (a, a', a'', etc.) reduces the requirement for retrieving a yodel melody. Instead of eight independent motifs, a yodeler remembers motif a, which sounds in a varied form throughout the A part and is only concluded at the end by a motivically new conclusion (b). The A part of the natural yodel *A de Vechschau* belongs to the group that consists of two motifs (a and b) (cf. Fig. 27, left column). Like the awareness of variations of motifs, the combination of smaller chunks into larger units facilitates the structured storage of information. Motifs can be combined to form larger units, as the example of *Schwäberg-Zäuerli* in Figure 29 shows.

By the grouping of chunks a and b in bar 1 and a' and c in bar 2, the formal structure of a musical call and response typical of many natural yodels is highlighted. The same structure can be found at the next higher level, in which bars 1 and 2 form a musical call, which is answered in bars 3 and 4 and at a higher level by bars 5–8. The ability of a yodeler to implicitly recognize musical structures, such as call and response, opening section and closing section as well as repetitions, enables the structured storage of natural yodel melodies in long-term memory. Of the 30 natural yodel melodies examined, two from the Toggenburg area, each with 16 motifs, have the largest number of different musical ideas per yodel (cf. Appendix, TO 03 and TO 05). Longer, multi-part natural yodels tend to contain more motifs than shorter natural yodels. The natural yodel with the fewest motifs is a one-part *Zäuerli* with three motifs (Appendix, AR 01). Figure 30 shows to what extent the number of motifs that a yodeler remembers when learning a natural yodel corresponds to the number of natural yodel parts. Two-part natural yodel melodies contain four to eight motifs, three-part ones between six and twelve.

12 The prime symbol (cf. note *1 on p. 69).

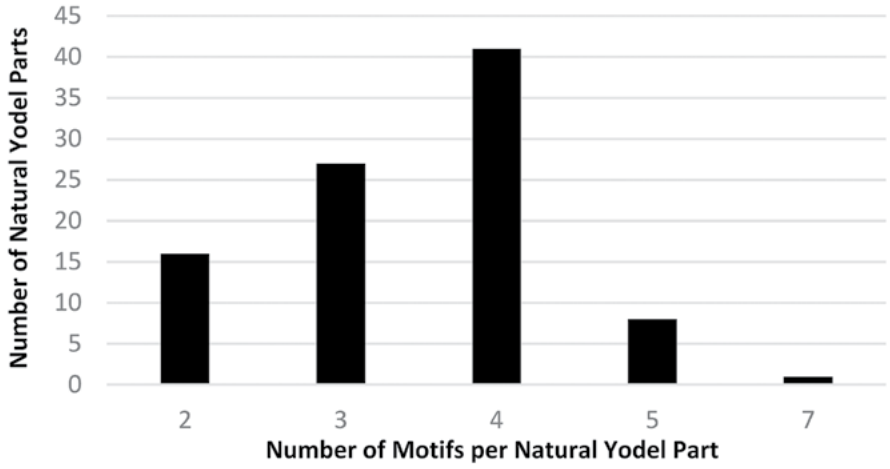


Fig. 27: Distribution of the number of motifs in 93 natural yodel parts.

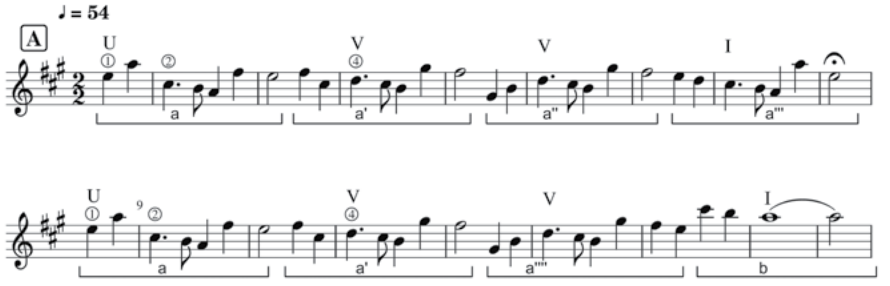


Fig. 28: *A de Vechschau*, Part A with two motifs a and b, where a is varied four times (Appendix, AI 09).

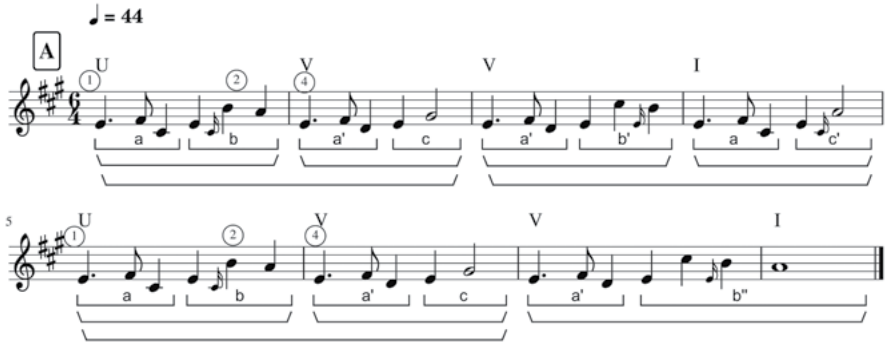


Fig. 29: *Schwäberg-Zäuerli*, Part A (Appendix, AR 07).

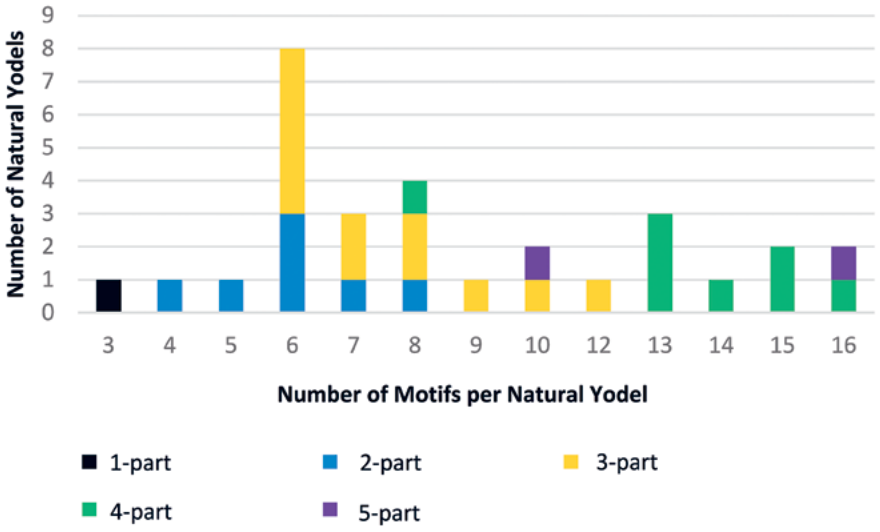


Fig. 30: Distribution of the number of motifs in the 30 natural yodels.

The average number of motifs per natural yodel is nine, with natural yodel melodies from Toggenburg tending to have slightly more motifs (and more parts) than those from Appenzell Innerrhoden and Ausserrhoden. Motifs from the first parts of a natural yodel can be resumed or varied in the following parts. Such repetitions facilitate the understanding of form and reduce the number of units to be remembered.[13]

Change of harmony as orientation aids

An analysis of harmonic structure confirms that tonic and dominant predominate as accompanying chords; 25 of the 30 natural yodels are accompanied by the choir exclusively on these chords, four additionally on the subdominant, one on degree II with a major third (double dominant, assigned in Fig. 31 under "other"). On the other hand, natural yodels often contain unaccompanied sections, which, based on the melody, allow multiple harmonic interpretations and harmonization outside of degrees I and V (cf. *Heewehzäuerli*, Fig. 20). These appear usually at the beginning of the phrase and are not accompanied by the choir. To illustrate the diversity of harmonic schemas within the 30 natural yodels, all unaccompanied places were plausibly harmonized for the following table, and harmonic changes were entered for each natural yodel phrase.[14]

13 This leads to the observation that the sum of the motifs of all 30 natural yodels examined here is 269, but the sum of all 93 parts considered individually is 324.

14 As mentioned, all 30 natural yodels begin without choral accompaniment. Applied to the 93 natural

The harmonic schema I-V-V-I occurs most frequently, in 32% of all phrases, of which 44 phrases consist of four bars (black), the remaining 15 phrases contain more than four bars, which are also regularly structured (green). The second most common harmonic schema V-I-V-I comprises 51 phrases (28%), again mostly four-bar. Nine phrases are longer (green) and six phrases contain a harmonic ambiguity (blue) at the beginning. The latter is due to the melody in this unaccompanied beginning section containing several harmonically foreign tones that cannot obviously be assigned to degree V. The third most common harmonic structure (I-I-V-I) characterizes 32 phrases (17%), with more than half of these phrases showing harmonic ambiguity in the unaccompanied first bar (blue). Some of the natural yodels use the sharpened fourth scale degree as a stylistic device at certain moments (especially in the unaccompanied initial part). However, consistently sharpened fourth scale degrees in the sense of a clearly Lydian mode do not occur in the 30 natural yodels examined (cf. Appendix). Harmonic ambiguity is mainly due to the singing of the sharpened fourth note (*f#* in C major) (cf. Appendix, for example AI 10, AR 04, TO 06).[15] Phrases with an ambiguous beginning were assigned to the harmonic schema I-I-V-I, whereby the accompaniment of the solo beginning could be harmonized either consistently with degree I or with a change from degree I to degree II with a major third (double dominant, if followed by degree V) (compare here the possibility of harmonizing the initial sequences in the database according to Sager, p. 60).[16] After a harmonically ambiguous passage in the first bar, the choir usually enters on degree I, as can be seen both from the harmonic schema I-I-V-I and from the schema V-I-V-I (cf. Fig. 31, blue columns).

In addition to the three most common harmonic schemas, 17 natural yodel phrases (9%) contain a change of harmony within the first bar from degree I to degree V. Afterwards, the change between tonic and dominant continues. This change of harmony within the first unaccompanied bar was marked in yellow in Figure 31 and recorded in the schema with a dash (I/V-I-V-I). Two of these 17 natural yodel phrases contain more than four bars (yellow-blue striped in Fig. 31), one of which does not repeat the opening section. Closing sections that proceed harmonically different from the opening section occur in various forms and were designated in Figure 31 by dotted backgrounds. Overall, the proportion of natural yodel parts, the closing section of which does not represent a variation of the opening section, is nevertheless low with nine phrases (10% of the natural yodel parts). As a rule, such phrases do not represent repetitions of the directly preceding opening section, but closing sections from earlier natural yodel parts, which in turn affects the memorizability of the melody. Eight phrases have the harmonic schema IV-I-V-I, but none of these phrases is at the beginning of a natural yodel, nor do other schemas with degree IV appear in the first

yodel parts, 98% start as solos and 66% are not accompanied by the choir at the beginning of the second phrase (cf. p. 78). A melody can be harmonized differently in the vast majority of cases; the proposed harmonization is one possible variation.

15 Tobler (1903: 90) has described the perception of the sharpened fourth scale degree as Alphorn-fa and introduced the term "Alphorn-Fa-Yodel" (Ammann et al. 2019: 176).

16 A natural yodel part (AR 01) could be harmonized at the beginning of the phrase by the change I-II-major-V instead of degree I.

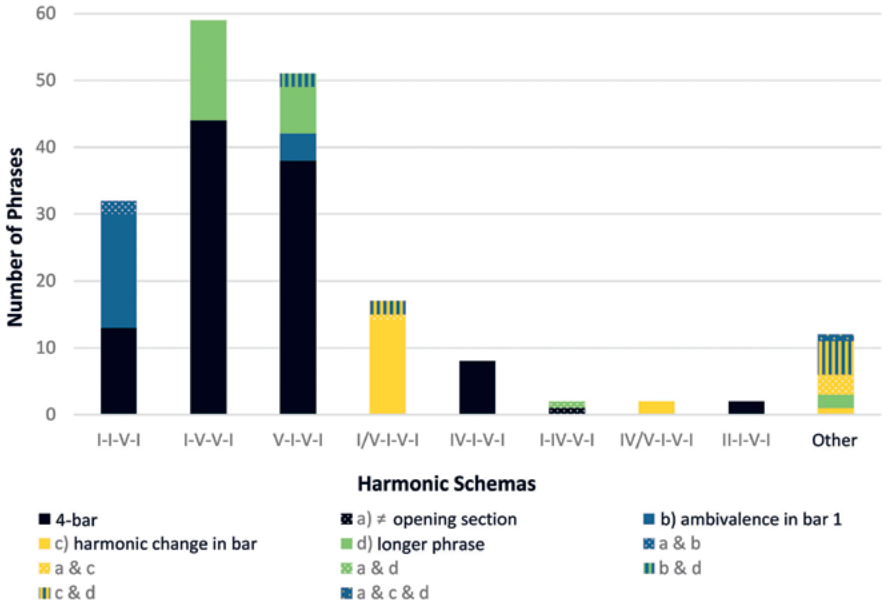


Fig. 31: Distribution of harmonic schemas in 185 natural yodel phrases. Four-bar phrases without further special features were rendered black, phrases with characteristic combinations (a–d) were reproduced in color. The characteristic combination a (dotted color) refers to closing sections that do not have the same harmonic schemas as in the opening section. Phrases marked in blue (characteristic b) have no clear harmony in the first bar, phrases marked in yellow (characteristic c) contain harmonic changes within a bar and phrases marked in green (characteristic d) consist of more than four bars.

part of natural yodels. The harmonic schema II-I-V-I requires degree II with a minor third in the unaccompanied initial part (cf. Appendix, AI 05). Twelve phrases were listed under the category "other" (cf. Fig. 31), including longer phrases, some of which have harmonic changes within bars or contain irregular harmonic changes.[17]

In summary, 77% of the analyzed phrases can be assigned to one of the three harmonic schemas I-V-V-I, V-I-V-I or I-I-V-I. Phrases that require accompaniment on the harmonic degrees IV or II are rare in comparison and are never found in the first part of a natural yodel. In addition, these, as well as harmonic ambivalences, usually fall in the unaccompanied beginning of a phrase. Since particularly the opening section of a natural yodel part begins as a solo, there are no difficulties for the accompanying choir due to rarer harmonic degrees or harmonic ambiguities that fall in these opening sections. This only enters afterwards, usually on the tonic or the dominant, as the following section illustrates.

17 Cf. Appendix, AI 08 (Part A), AI 09 (Parts B and C), AR 05 (Part B), TO 05 (Part D), TO 09 (Part C).

The beginning counts

For a concert performance, yodelers can compile a list of titles to determine the order in which the natural yodels are presented. In contrast, during a spontaneous yodel performance (for example, in an inn), a lead yodeler can sing any natural yodel to which the accompanying voices spontaneously join in. Within the first few seconds, the structure of a natural yodel must be recognized in order to accompany the melody adequately. Especially the singer of the second voice anticipates the course of a natural yodel melody, as he or she usually enters before the choir. In interviews, lead yodelers (first voice) confirm the significance of the beginning and remark that if they remember the first notes, they do not have to think about what follows: the beginning sets the entire piece in motion (cf. p. 38, associative chaining). In the 93 analyzed natural yodel parts, the initial motifs last a few seconds until the choir entrance and contain two to 15 notes. These values vary in individual cases and appear to reveal regional peculiarities. Since *Rugguusseli* and *Zäuerli* are often sung in slower tempos than the Toggenburg natural yodels, their soloistic beginning tends to contain fewer notes.[18] Natural yodels from the Toggenburg region, on the other hand, often contain parts that are sung at a faster tempos and have more solo notes at the beginning; this also applies to *Chlausezäuerli*.[19] The distribution of entrances of the second voice (grey) and the choir (black) within the 93 natural yodel parts is shown in Figure 32.

The illustration shows that the second voice often begins after the first two to four notes sung soloistically by the lead yodeler, while the accompanying choir most often waits between six and eight notes of the melody. In relation to all 30 natural yodels, there are an average of two notes between the entrance of the second voice and the choir, whereby these can also enter together (Fig. 33).

The number of notes by which the lead yodeler defines the beginning of a natural yodel (and thus its progression) is associated with cognitive prerequisites of memory. If these initial tones are deliberately called up by the lead yodeler, they form a chain of associatively linked content (motifs, phrases, harmonic schemas). A few notes are sufficient to let the accompanying voices know with which melody or chord they must enter (cf. Appendix).

The cognitive demand required by the spontaneous performance of a natural yodel differs between lead yodelers and accompanying persons in that the former consciously learn the melody and can retrieve the stored information through the trigger stimuli (cf. p. 33) of the first motifs, while the latter must anticipate and follow the melody. In doing so, they rely on their understanding of form and hearing so that they can accompany the melody with a slight delay. The choir most often enters on the tonic; based on the

18 Regarding the analyzed natural yodels, the median of the second voice for *Rugguusseli* is three and that of the choir is seven notes that are awaited before entrance. Similarly, the median of the second voice for *Zäuerli* (except *Chlausezäuerli*) is four and for the choir six notes.

19 In the ten natural yodels from Toggenburg, both the median of the second voice and that of the choir are eight notes before entrance. Two of the ten analyzed natural yodels from Appenzell Ausserrhoden are two-part *Chlausezäuerli* and have about nine notes before the second voice and the choral performance.

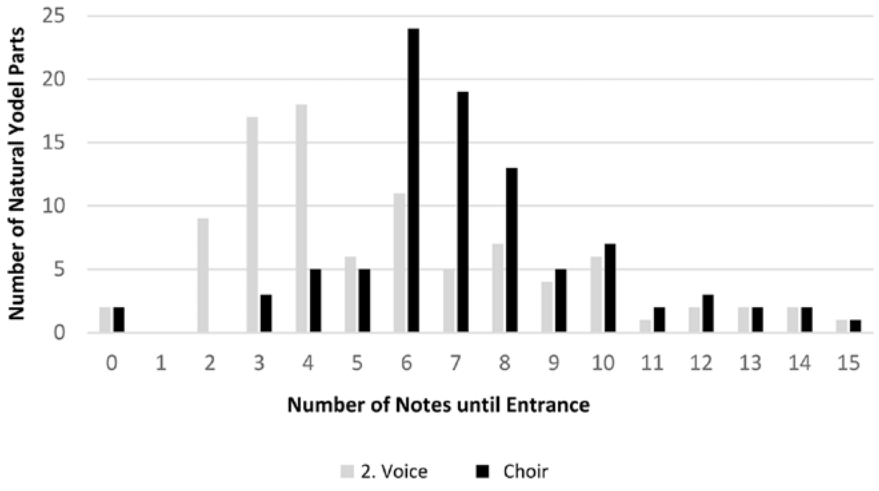


Fig. 32: Number of notes up to the entrances of the second voice (grey) or the choir (black) in 93 natural yodel parts.

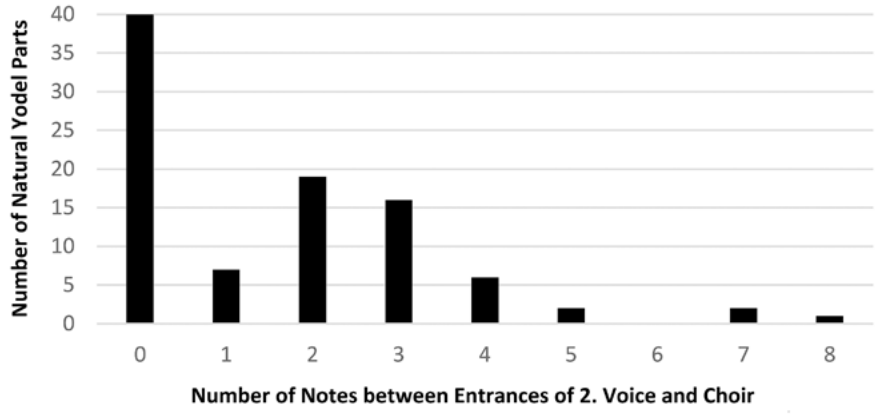


Fig. 33: Number of notes between the entrance of the second voice and that of the choir in 93 natural yodel parts.

93 natural yodel parts examined, this applies to 62%. In 37% of the natural yodel parts, the choir enters on the dominant and in only one natural yodel part (1%) on the subdominant. After solo opening sections of natural yodel parts, only choral entrances on the three main harmonic degrees follow. In the course of the yodel melody there are also secondary degrees, but the choir never enters directly on such a degree. The first choral

entrance of a natural yodel part takes place 71% of the time immediately after a change of harmony (related to the anticipated harmonization of the solo melody).

Summary

Successful retrieval of a natural yodel melody is related to meaningfully organized storage of the corresponding information in long-term memory (in the form of chunks) as well as the construction of cognitive bridges (conscious triggers, cf. p. 41). These bridges regulate access to stored content and associatively related information during a performance. By consciously memorizing the beginning, the following information is spontaneously retrieved, both when singing the first voices and when accompanying them.

Based on these observations, a natural yodel can be interpreted as a multi-layered hierarchical structure of chunks that contains melodic information. In general, the structure of a natural yodel includes one or more parts (A, B, C), which can be sub-divided into two phrases. These two phrases often form a connection in the form of a musical call and response. In most cases, each phrase consists of four harmonic sequences, which mainly alternate between tonic and dominant. A harmonic sequence typically contains one or two motifs (chunks at the lowest level). The four hierarchical levels – motifs, harmonic sequences, phrases and natural yodel parts – form a structure that enables cognitive grouping into a small number of chunks at each level. Depending on individual perception, each of these layers can become a foreground or background unit. This process usually takes place without conscious control. Yodelers say that they possess an internalized awareness of the harmonic changes. Especially the beginning of a natural yodel serves as an important trigger and sets in motion an associative chain that becomes a natural yodel melody with superordinate structures (phrases, parts, repetitions, harmonic sequences).

Chapter 7: Several voices shape the overall sound

We have seen how chunking provides memory support for singers of the first voice (lead yodelers) in the natural yodel. For singers of the accompanying voices, chunking plays a less supportive role. Yodelers of the second voice (*noofahre*) acquire their technique over a longer period by listening and singing along. The second voice is sung by relatively few yodelers (28%) in a club (cf. p. 48). To maintain orientation when singing the second voice, yodelers use a kind of "mental map" (Chaffin et al. 2016: 563), whose function is to create the relationship between the first voice (the melody) and the second. The melody of the first voice is associated with a limited number of accompaniment options. The smaller the set of options, the clearer the orientation that takes place within the framework of the second voice. Among possible options, the singer explores a small number of melodic lines to carry out spontaneous combinations with the main melody and thus adapt the accompaniment to his or her own vocal possibilities or preferences. In any case, there are several possibilities of melodic lines for the second voice.

According to yodelers, the organization of the accompanying voices in the natural yodel is now more complex than in the past. The number of choral parts has been increased, which has resulted in octave parallels in the melodic lines (Rubin 2014: 54).[1] Although the accompanying voices evaluated for this study were recorded in writing for personal purposes, accompanying voices are based on current practices and music styles typical of the time and do not remain historically constant, in contrast to the main melodies handed down in many cases over several generations (Weidmann 2015: 48).

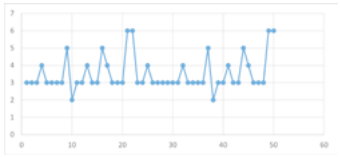
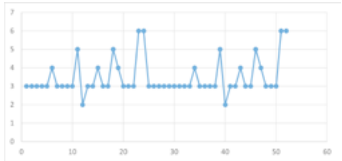
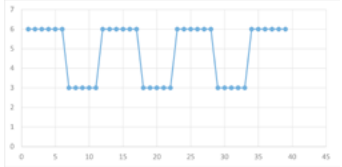
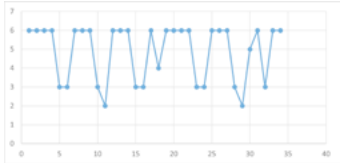
How does the second voice follow the first?

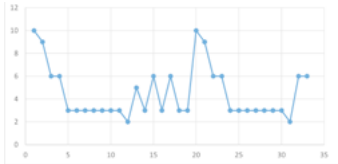
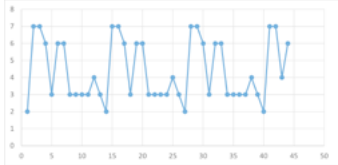
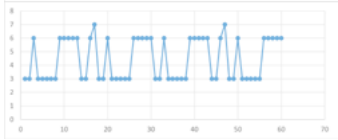
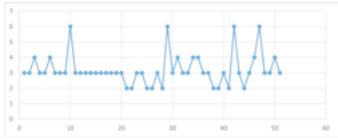
For the analysis of the melody line with which a second voice reacts to the first, two-part notations by Walter Neff are drawn upon here and serve as the basis for the following tables.[2] The reference to the first voice usually remains isorhythmic and follows the melody progression, with both voices often continuing in parallel.

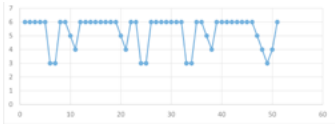
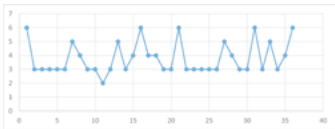
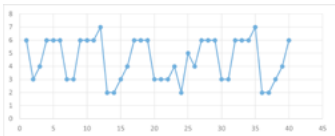
1 The harmonic progressions, which were explained from page 68 onwards, are not limited to eastern Switzerland, but also dominate, for example, in the Bernese Oberland natural yodel (Rubin 2014: 55).

2 The unpublished sheet music was provided to us by Walter Neff, for which we thank him very much.

Table 3: Intervals of the Second Voice in Relation to the First Voice in the Natural Yodels of Walter Neff.

Name and Part	Description	Relation between second and first voices (intervals) (per one yodel part with two phrases)	Type
De Waisehuus Walti (A)	Parallel thirds with occasional deviations to fifths and seconds (in degree V); sixths in cadences.		1
De Waisehuus Walti (C)	Parallel thirds, in some places with adjacent intervals returning to thirds; cadences in sixths.		1
Alpebetter ond Suure Moscht (A)	Regular shifts between sixths (in groups of 6 notes) and thirds (in groups of 5 notes).		2
Alpebetter ond Suure Moscht (B)	Predominantly changes between thirds and sixths.		2

Name and Part	Description	Relation between second and first voices (intervals) (per one yodel part with two phrases)	Type
De Chäs Michi (A)	Large intervals more than an octave at entrance, then parallel thirds. Shift between sixths and thirds in cadences.		1
De Chäs Michi (B)	Shifts between intervals of thirds and sixths with dissonances in between (seconds and sevenths).		2
De Chäs Michi (C)	Regular shifts between parallel thirds and sixths with additional short shifts occurring in the middle of the phrase.		2
S'Wagerad (A)	In the first half, parallel thirds with occasional deviations; in the second half, irregular lines containing seconds and fourths.		1

Name and Part	Description	Relation between second and first voices (intervals) (per one yodel part with two phrases)	Type
S'Wagerad (C)	Parallel in intervals of sixths. Cadences in thirds, fourths and fifths.		3
No De Faschned (A)	Irregular, rarely parallel lines of voices.		(1)
No De Faschned (C)	Parallels in thirds, in some places with adjacent intervals returning to thirds; cadence in shifting intervals.		1
De Weechtüüfel (A)	Short sequences in parallel sixths, otherwise irregular lines with modulation to thirds, also seconds and fourths.		(3)

The horizontal axes of the graphics show the melodic line (number: sequence of notes in the melody), the vertical axes show the interval (diatonic) in relation to the first voice.

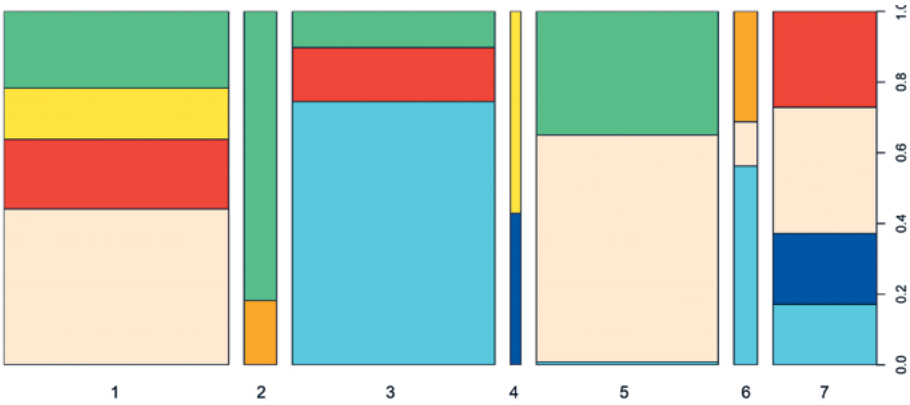


Fig. 34: Scale degrees of the second voice in relation to the first voice. Labeling under the columns: Degree of the first voice. Column thickness: Frequency of scale degree in the first voice. Size of the fields: Relative frequency of the respective degree in the second voice. Light blue = scale degree 1, dark blue = scale degree 2, beige = scale degree 3, orange = scale degree 4, red = scale degree 5, yellow = scale degree 6, green = scale degree 7 of the diatonic major scale.

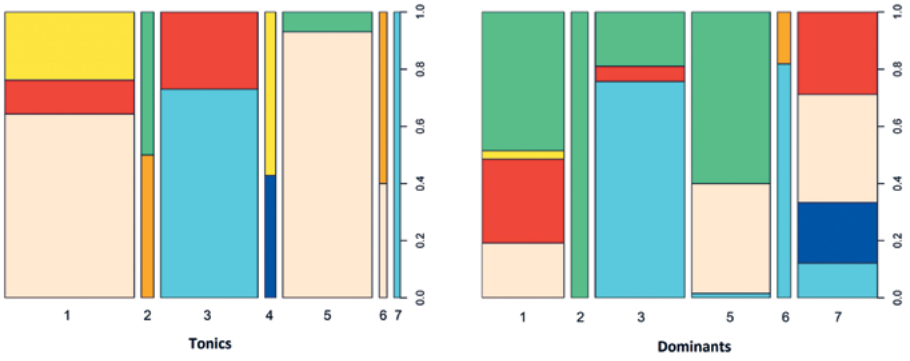


Fig. 35: Scale degrees of the second voice, divided into yodel sequences on the tonic (left) and those on the dominant (right). The scale degrees refer to the corresponding harmonic level. Light blue = scale degree 1, dark blue = scale degree 2, beige = scale degree 3, orange = scale degree 4, red = scale degree 5, yellow = scale degree 6, green = scale degree 7 of the diatonic major scale.

Some yodelers say that they often follow the first voice at intervals of thirds or sixths. Whether this is accompanied in individual cases with minor or major thirds or sixths is determined by the melody of the first voice and is not differentiated in the following analysis, since only scale tones of the respective degrees are used. The analysis of the second voices reveals structures that limit the possibilities of accompaniment and allow associations between the hearing of the voices and the awareness of their structures. Each accompanying pattern has its own profile which, however, can fundamentally be assigned to one of three types – Type 1: progression in parallel thirds with modulation of other intervals; Type 2: regular shift between third and sixth parallels; Type 3: progression in parallel sixths with modulation of other intervals.

All three types contain partially dissonant intervals (seconds, sevenths) or continue completely consonant. The regularity of patterns and their deviations in the harmonization of the two voices is of interest to the question to be pursued. In Table 3, only the diatonic intervals between the first and second voices are recorded for purposes of analysis, with the second voice running below the first in all the melodies studied. The three types are indicated in the last column (unclear allocations in two cases are noted in brackets).

Figures 34 and 35 show the importance of scale degrees in the melody of the first voice and how often they are accompanied with which scale degree of the second voice based on 527 pairs of notes. The width of the columns indicates how often the corresponding scale degree is sung. The sizes of the colored areas, in turn, show how often which scale degrees of the second voice are sung. The colors stand for the different scale degrees. From this it can be seen how natural yodel melodies spread over all twelve examples tend to be accompanied by the second melody voice.

The first voice moves mainly on the tones of the triad (first, third, fifth scale degrees, represented by the width of the bars). As an accompaniment to the third and fifth scale degree, only two or three accompanying notes occur in each of the analyzed examples, but more as an accompaniment to the fundamental tone (1) and the seventh scale degree. For the first scale degree of the tonal scale (horizontal: 1), for example, the third (vertical: beige), fifth (red), sixth (yellow) or seventh (green) scale degree of the same scale can be sung, matching the harmonic pattern of the natural yodel, which has already been discussed.

Figure 35 shows the same degree relationships, divided between sequences that are accompanied on the tonic and on the dominant. On the dominant, the seventh note (green) is sung much more frequently, both in the first voice (wide column 7 in the figure on the far right) and in the second voice (green areas in the figure on the right), with the melody consisting mostly of the tones of the triad. However, the scale notes outside the triad play a subordinate role. Regarding the intervals between the two voices, Figure 36 shows that intervals other than thirds (beige) and sixths (yellow) occur mainly together with the first and seventh scale degree. A certain confidence is provided by the second, third and fifth notes, on which 60–80% of all notes are accompanied by the third.

The application of the structures shown in the tables make up the typical polyphony of the first and second voices of the natural yodel around the Alpstein. However, as can

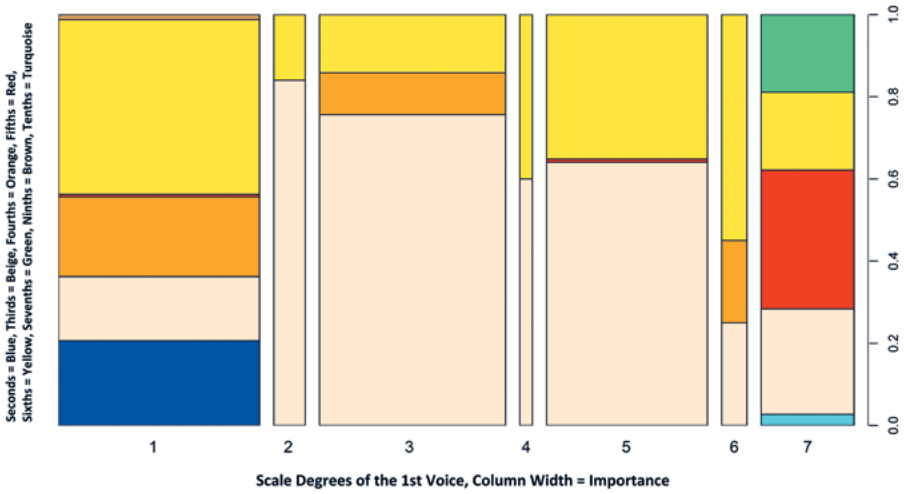


Fig. 36: Intervals of the second voice in relation to the first voice. Caption under the bars: Scale degree of the first voice. Column thickness: Importance of the scale degree of the first voice. Size of the fields: relative frequency of the respective intervals in the second voice.

be seen from Table 3, there are various formulas to change and connect scale degrees and thus meet music-aesthetic expectations. The structural features of polyphony are usually not explicitly learned, but implicitly stored in memory through imitation and practice.

Talerbecken and Senntumsschellen as Bordun

While the vocal accompaniment of yodel melodies takes place in changing chord degrees, an actual bordun is created by the accompaniment with Senntumsschellen (musical cowbells) and taler bowls. The bells, which are traditionally used in alpine farming communities on festive occasions, as well as the taler bowls, are manufactured in three different sizes and used as a group of three. Both the bells and the taler bowls serve mainly as a natural yodel accompaniment. The bells create a rhythmic drone, while the taler bowls create a continuous soundscape that is held without interruption throughout the yodeling performance. Silver coins placed in the bowls by yodelers (also choir singers) are made to sound by setting them into uniform circular movements; this process requires stamina, especially when using heavy bowls with a low tuning.

This soundscape creates a foundation for the voices of yodelers who coordinate their pitch accordingly. There are usually two variants for the tuning of the bowls, either the interval of a major second each between the bowls, or the interval of a minor third between the large and the middle bowl and a major second between the middle and the small bowl. With the latter variant, the Toggenburg natural yodel with the descriptive

Fig. 37: A set with three taler bowls (Photo: Roothuus Gonten).

name *Beckijodel* is accompanied by the yodel club Ebnat-Kappel, the first part of which is shown in Figure 38. The bowls produce the notes b^1, a^1 and $f\#^1$.

The middle bowl produces the fundamental tone of the yodel melody in A major. However, this lies as a middle voice between the tones of the other bowls and does not markedly stand out. Although the notes b^1 and $f\#^1$ are notes of the A major scale, they do not belong to the triad, which as a basic figure makes up a large part of the melody progression.[3] However, the note b^1, which sounds first, has structural importance for this yodel, as it stands for the fifth of the dominant key in E major. The melody begins after the bowls have held their sounds for about four seconds on the fifth scale degree e^1. The lead yodeler, in this case Lina Bösch-Lusti, can either derive the opening tone from this fifth scale degree or continue the entrances of the bowls themselves as a descending series downwards and enter a whole tone lower than the largest bowl. At the same time, the taler bowls continuously create dissonances due to their tuning at second intervals and so charge the overall sound with a certain tension. They are not bass accompaniment, but sound within the range in which the voice of the lead yodeler moves.

As with the taler bowls, a bordun accompaniment is also created with the bells. In the region around the Alpstein, a distinction is made between the large Senntumsschellen and the small, consequently higher-sounding *Rollschellen*. As a yodel accompaniment, the Senntumsschellen have the function of supporting both the meter and the pitch.

3 For the emphasis of the triad tones in the yodel melody, see page 94.

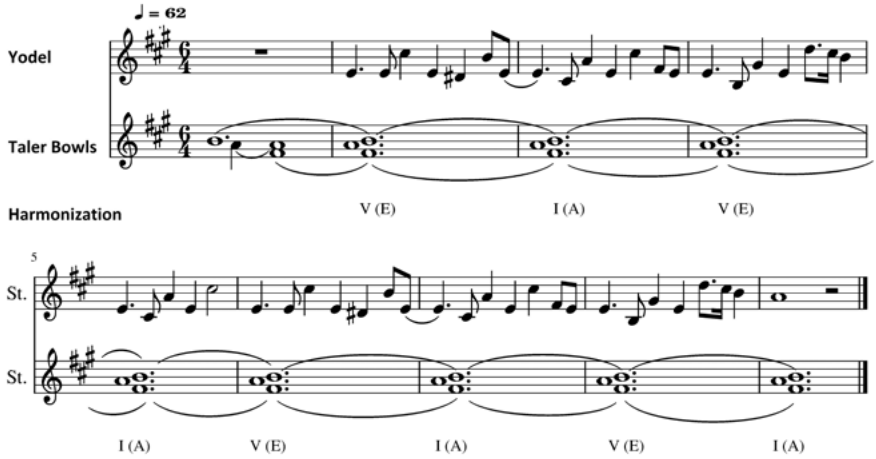


Fig. 38: First part of the *Beckijodel* with notation of the melody and the taler bowls (Jodlerklub Ebnat-Kappel: LP *Toggeburger-Lüüt*, cf. Appendix, TO 06).

The bells are tuned to pitches, analogous to the bowls, at intervals of thirds and seconds. Usually, two yodelers face each other when ringing the bells, one of which swings the large and the medium-sized bell and one the smaller (Manser 2010: 125). To hold the rhythm, some use rhythmic sayings when ringing bells (Manser 2010: 126).

Senntumsschellen influence the tone-setting during yodeling, since a reference tone can be taken from them, explains yodeler and director Bruno Inauen (pers. comm. Inauen, 19 Aug 2020). However, the individual pitches of the bells are difficult to differentiate by ear during their ringing, although the appropriate tone can still be derived from their sounding together. The decisive factor remains that it is not the sound of a single bell that serves as a reference, but the overall sound of the ringing bells. Using the example of the *Zäuerli* with the title *Vor em Ablooh* in Figure 40, the rhythmization of the accompaniment function is shown. Other accompanying patterns, such as augmentations or dotted notes, may occur. In the transcription both the pitches of the lead yodeler and those of the cowbells are indicated. The yodeler sings the melody in A major, while the bells are tuned to the notes g^{1}, $f^{\sharp}$ and d^{1}, but sharpened microtonally. Nevertheless, the vocal and bell voices fit together audibly. This may be due to the very bright and penetrating sound of the bells as well as a strong dissonance in the interaction of the middle and the small bell ($f^{\sharp}$ and g^{1}). However, the rhythm with which the bells are rung can also sound slightly offset (Klangwelt Toggenburg [ed.] 2017: 17). The bells are played in such a way that the small one sounds together with one of the others, in the present transcription with the medium-sized one. Metrically, yodel and bell rhythms almost completely coincide; rhythmically and in relation to individual tone lengths, the yodel melody remains free in form.

Fig. 39: A set of three Senntumsschellen (musical cowbells) (Photo: Roothuus Gonten).

Since the bells in connection with animal husbandry in the area around the Alpstein represent a part of the acoustic environment (Bachmann-Geiser 1977), the sound has a formative effect on the local identity. Bruno Inauen explains that the sound of the bells is associated with memories of yodel melodies (pers. comm. Inauen, 19 Aug 2020). Since bell ringing can be traced back over many generations, Inauen's statement, according to which the tonality of the bells is imprinted and therefore the pitch of the yodel melodies is recalled in memory, can certainly be regarded as a detail of a cultural knowledge that has grown over a long period of time: The bells and their musical function have been documented in sources for over 200 years.[4]

Both the handling of taler bowls and musical cowbells indicates that embodied knowledge supports the memorization of the natural yodel. The physical activity, the swinging of the bowls and the ringing[5] (by moving to make the bells sound), can support the retrieval of natural yodel melodies. Even less noticeable body movements shape the cognitive handling of melodies of the Alpstein region. Breathing techniques can be just

4 In his extensive treatise *Rindviehzucht* (Beef Cattle Breeding), the German philosopher, teacher and writer Johann Wilhelm David Korth (1783–1861) writes about the bells of the Appenzell alpine herdsmen: "Every alpine herdsman has a set of at least 32 iron cowbells, that harmonize with each other and with the singing of the Kuhreihen [probably means here: *Rugguusseli*, *Zäuerli*]. At all markets held in Canton Appenzell, the Tyrol iron handlers therefore bring many such bells of all sizes" (Korth 1815: 68). The indication of 32 bells is probably an error, since sets of bells of this size are not known in the region, are not mentioned elsewhere and would probably have been much too expensive for most farming families.

5 *Schötten* (cf. fn. 14, p. 16).

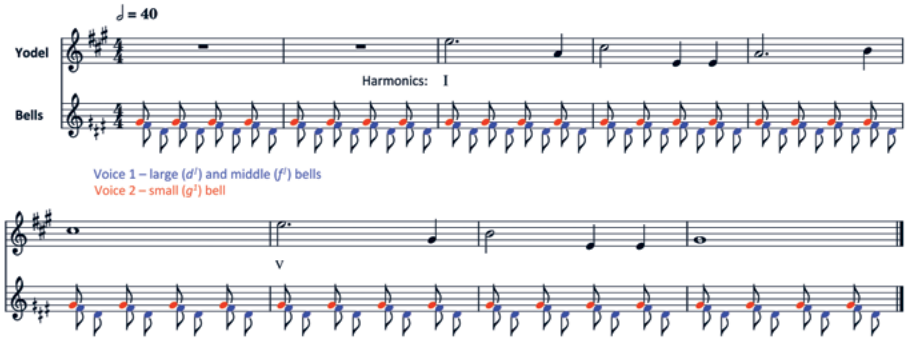


Fig. 40: The first half of the first phrase from the *Zäuerli* entitled *Vor em Ablooh* with bell accompaniment. The slightly sharpened tuning of the bells is marked with simple crosses. For transcription and motivic analysis of the whole yodel, cf. Appendix, AR 06.

as crucial for yodeling as, for example, the position of the tongue, jaw, lips and throat, which enable yodeling.[6] Even a certain posture or position in the yodel group can lead directly to the memory of a natural yodel melody. In line with this, some works in the field of cognition (e.g. Gibbs 2005) assume that concepts in our memory are absorbed and coded based on the sensorimotor system (cf. p. 43). From this point of view, cognition is anchored not only in the brain, but throughout the body as motor memory. In relation to music, we consider not only the auditory perception of sound and its transformation in memory, but also the experience of positions, gestures and other body movements. Under this aspect, the term embodiment refers to the interaction of perception, emotion and movements.

Summary

Polyphony in the Appenzell and Toggenburg natural yodels is based on experiential knowledge and on the interplay of listening and the targeted and rapid retrieval of accompanying chords and voices. There are no fixed rules for the course of the second melody voice, but there are usual practices, as the evaluation on page 90 has shown.[7] From practice, certain forms emerge that are maintained to confirm the shape and timbre of the natural yodel of the area. Whether the second voice is more parallel to the first (Type 1 or 3, cf. Table 3) or rather changeable (Type 2) represents a margin in which it can move freely, yet it is often practiced and not invented ad hoc. As a principle, the lead yodelers determine the pitch and agogics of their pieces. Since the melodies of the first voice are fixed in certain natural yodels, deviations are not so great that a melody would no longer

6 "The first and most obvious sense in which the body is implicated in musical performance is in the production of vocal sound" (Clayton/Leante 2013: 195).

7 When rehearsing, however, yodelers do not speak of scale degrees; they learn the second voice purely by ear and sing tones to each other if necessary.

be recognized. In spontaneous yodeling, however, it happens that an unknown melody is intoned, which experienced yodelers of the second voice accompany with simple patterns of parallelism in thirds and sixths.

The singing practice, especially in groups, is based not only on the already discussed forms of music-structural and tonal knowledge, but also on internalized body knowledge, which is characterized by the movements and postures during singing as well as the contact with fellow yodelers. Embodiment refers to the natural yodel around the Alpstein both to body tension, such as the vocal apparatus or the use of accompanying instruments such as taler bowls and musical cowbells, as well as to the position of the members in the group and their eye contact, facial expressions and gestures. These aspects create the basis for successful memorization, for the recognition and retrieval of natural yodel melodies as well as the focused memorization of a melody. While the above-mentioned explanations of the polyphony of the natural yodel around the Alpstein refer above all to its organization, the following listening study is dedicated to subjective perception.

Chapter 8: Original versus modified yodel melodies in a listening experiment

To this point, musical-formal analyses of natural yodels in the Alpstein region have shown that they exhibit superordinate and typical structures facilitating the memorization of melodies. It was further demonstrated that the units to be retrieved from memory, such as initial motifs or concise passages, each consist of a small number of discrete tones. Often these are two to three tones, in more complex and rhythmically eventful melodies five to seven tones. These units form mnemonic chunks and can be associated with other chunks (cf. p. 38), both vertically with a superordinate formal level such as harmony, the phrase or even another voice, and horizontally with the motif that occurs directly before and after. Now the question arises as to how the connection of individual motifs is carried out on a horizontal level. Since a motif can contain clues about the course of the melody, this implies an anticipation of information. A melodic continuation cannot be completely arbitrary, since the melody of the natural yodel follows a certain schema according to the evaluations presented so far. Studies on the perception and recognition of melodies have already been carried out several times based on the playing of modified audio examples (Ammann et al. 2013, Kuusi 2009, Hebert/Peretz 1997, Andrews et al. 1998). To better understand the perception of motivic chains and their function in the natural yodel around the Alpstein, it is constructive to carry out a corresponding listening experiment.

Experimental set-up

In an online survey, people listened to audio samples containing excerpts of natural yodel melodies and answered the question of whether they sound melodically cohesive. About half of the examples were altered by the exchange with a different sequence, each matching an unaltered example from the same yodel melodies. The appended sequences came from the same piece and thus had strong tonal and tempo-related similarities with the melody before the cut.

The survey was conducted with 136 participants, 85 of whom belong to a yodel club. Before listening to the music examples, the respondents stated whether they yodel themselves and in which region they currently live (Appenzell Innerrhoden: 31, Ausserrhoden: 19, St. Gallen[1]: 49, others: 37). This made it possible to determine whether familiarity with the music genre and its schemas (Prior 2013, cf. p. 35) as well as the connection to the region ("cultural knowledge," Strauss/Quinn 1997: 45) have an influence on percep-

1 The participants from Toggenburg, whose number was not recorded, are included here.

tion and musical expectations.[2] In addition, respondents reported their age (average: 43) and gender (female 46, male 90).

The software *Audacity 2.1.3* was used to create the audio samples. Audio recordings of the Natural Yodel Concerto in Bazenheid from 2007 were used as raw data (Durandi [ed.] 2007). This choice was appropriate because only yodel clubs from the two Appenzell cantons and from Toggenburg were represented and a colorful picture of natural yodeling emerged reflecting the current repertoire of the yodelers. When creating the audio samples, care was taken to ensure that modified excerpts do not differ from unmodified ones due to artificial effects (for example, clicking sounds). Click noises that can occur when cutting in *Audacity* were minimized with the appropriate tools, so that test subjects did not detect any such cutting noises.[3] Before a cut, at least one complete motif was to be heard consisting, depending on the melody, of two to seven (in some cases even more) notes. This requirement led to a length of the audio recordings of ten to 20 seconds. This duration is sufficient, since according to a study by Filipic et al. (2010: 335), musically meaningful units of form can be recognized after fractions of a second if the music is familiar to the listeners. In compiling the modified yodel sequences, a comparison can be drawn with the study already mentioned regarding music cognitive research by Ammann et al. (2013) in Papua New Guinea (cf. p. 28).[4]

All audio samples were transcribed to secure the edited recording for discussion. The results were to show which motifs are considered reasonable continuations of a melody and which do not seem reasonable. In the questionnaire, created on the online platform SoSci Survey,[5] the 39 audio samples were played in random succession. Respondents could listen to and assess any number of examples. Each audio sample was assessed between 100 and 112 times.

Melodies follow anticipatory patterns

This online survey gave no indication that perception differs according to gender. Although perceptions and memories could vary according to age (Huber 2017), the present evaluation of the sequences does not correlate with the age of the respondents. Most of the participants have a musical background, 9% stated that they practice music as a profession, 70% as a hobby.

2 Since most of the participants live in the Alpstein region, it can be assumed that they have a certain cultural knowledge of yodeling.

3 In a previous test, experts checked and confirmed that the avoidance of cutting noise was sufficient so that cut melodies could not be identified as such for this reason.

4 In the study, the researchers played short original or modified personal vocal motifs (*konggap*) to the test subjects: "…we used the same set of konggap but modified them with the help of a music-editing program and in a changed order, according to our specific study schema. …The idea of the experiment was to show whether a konggap is heard and analysed as an inseparable unit, that is, on an unconscious psychophysiological level, or whether the konggap is considered to contain several parts that need to be detected before being able to identify the person in question" (Ammann et al. 2013: 77).

5 www.soscisurvey.de: Platform for generating surveys.

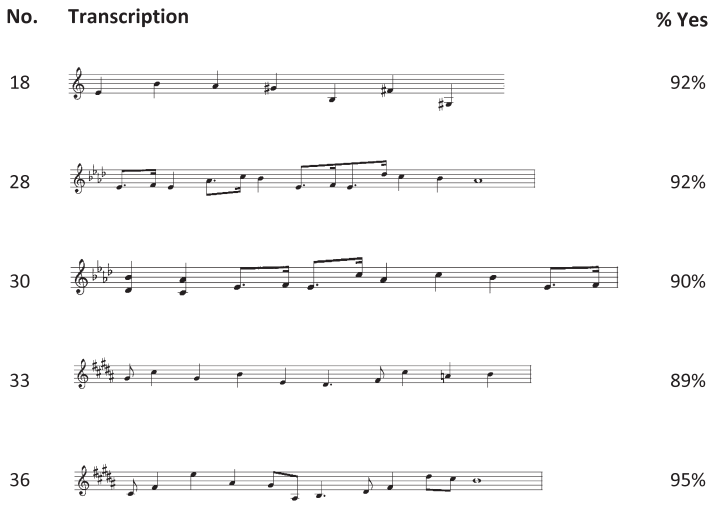


Fig. 41: Transcriptions of the sequences that were perceived as particularly cohesive. In addition to the transcriptions, the numbers of the examples on the left and the percentage of participants on the right who answered yes to the question of consistency are noted.

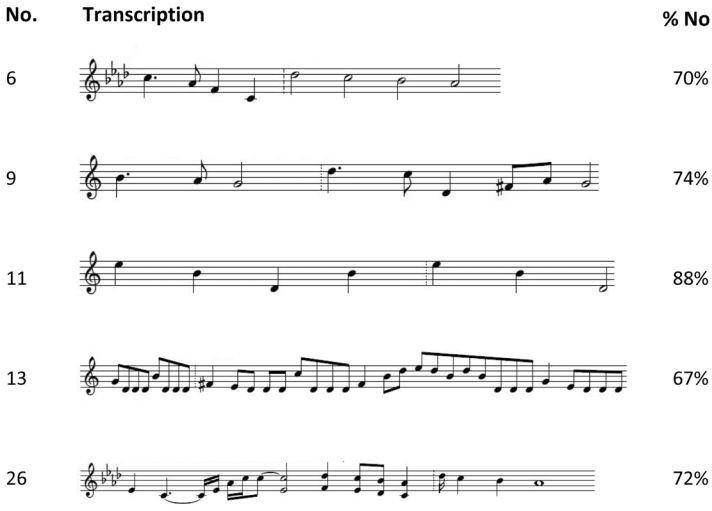


Fig. 42: Transcriptions of the sequences that were particularly often perceived as not cohesive. In addition to the transcriptions, the numbers of the examples are noted on the left and the percentage of participants on the right who answered no to the question of cohesiveness. All of them are modified recordings. The cut location is indicated by the dashed vertical line.

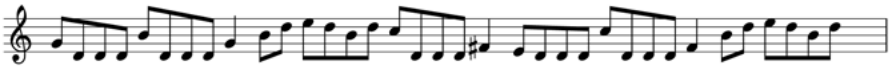


Fig. 43: Sound Example 12, which corresponds to the original excerpt of the edited Example 13 (Fig. 42).

Members and non-members of yodel clubs tended to assess the examples similarly. This corresponds to the statement of Jourdain (2001: 112) that non-professional and professional musicians alike recognize melodies. The survey, on the other hand, showed that the unchanged original melodies were on average rated as more suitable by all participants (81%) than the changed melodies (46%). Already this large difference shows that natural yodel melodies are structured according to a certain logic of melody and that this was recognized by the respondents. Motifs cannot be continued arbitrarily; the design of the phrases follows models that serve as orientation. That in natural yodeling there is in principle no improvisation and that clear deviations from the given melody can lead to confusion, making accompaniment more difficult, is also confirmed by the statements of interviewed yodelers. From a melodic structure, conventions are implicitly derived that allow predictions about the further course of the phrase (Krumhansl/Castellano 1983: 326), for example the final cadence to the tonic (Boltz 1989).

Twelve unchanged examples were perceived as cohesive by more than 80 percent of the participants. They tended to assess the totality of the examples as logical (64%) rather than not logical (36%). Figure 41 shows the five examples (all unchanged) that were most often assessed to be consistent in themselves.

To construct possible reasons for these assessments, the five examples that were most often perceived as not logical are used for comparison. The focus is on melodic and rhythmic transitions at the cuts (indicated by dashed vertical lines), illustrated in Figure 42. Studies (Hebert/Peretz 1997, Kuusi 2009) have shown that rhythmic patterns play a subordinate role compared to melodic ones for memorization and recognition. This applies in particular here to the very slow natural yodels. The examples listed in Figure 42 were particularly often assessed by the respondents as not coherent; all of them are modified samples.

In Example 6, a descending minor triad is followed by an interval of a ninth upwards after the cut, then the melody descends in long notes. On the first note after the cut, the choir begins. This choir entrance seems illogical, as the singers have to anticipate the opening tone of their entrance on the basis of the previous melody. The interval of a ninth in the melody before the choir is therefore unsuitable. In addition, the rhythm slows down with the entrance of the choir. Again, this would be impractical for accompanying voices to stay together and make timely changes, which 70% of the participants seem to have noticed.

Example 9 consists of a typical short motif often repeated and varied in natural yodel melodies. After the cut, a rhythmically similar motif follows, which, however, leads to a final cadence. While the interval structure at the cut, the transposition of the first

two motif tones, does not seem unusual, the transition to the final cadence evidently does not seem plausible. Since these differ in principle from the otherwise identical melodies in the previous phrase (cf. p. 67), one must also be able to anticipate them. The motifs must lead to the following ones in terms of their harmony, which happens too abruptly here. As already shown, short motifs are often reproduced in a slightly modified form. This is illustratively the case in the unchanged Examples 18, 28 and 33 (Fig. 41), which are perceived as very cohesive. However, a simple repetition with the same tones sounds atypical, which can be seen in Example 11 (Fig. 42). Before the cut, a motif of fifths and octaves is yodeled. After the cut, this is not varied, but repeated with the exact same notes. This seems to run counter to the harmonic rhythm and is not heard as cohesive.

In Example 13, a fast yodel part from a Toggenburg natural yodel has been altered and abridged. In the original (Sound Example 12, Fig. 43), the initial motif is continued until the phrase-ending tone (*f#*^{1}) sounds. Smaller motifs are combined into larger units within the phrase, which represents another level for orientation within the melody and corresponds to both the harmonic rhythm and the length of the entire phrase. Example 13 gives listeners the impression that a motif or at least a sound is missing in the process. This creates a melody that is difficult to understand, even if the two examples (original and modified example) do not differ significantly from each other in terms of the intervals used.[6] However, the rhythmic structure only stands out here because this part is sung with accents and at an exhilarating tempo. In a quasi-rhythm-free *Zäuerli* or *Rugguusseli*, this aspect would probably not have a similar significance. Nonetheless, a third of the respondents rated this sequence as realistic, more than twice as many as in Example 11 discussed above. In Example 26 (cf. Fig. 42), awareness of the structure of a yodel part is decisive. The sequence starts soloistically with the beginning of a *Rugguusseli* and the entrance of the second voice on the eighth tone. After the cut, the melody proceeds to a cadence, as it also occurs in Example 28 (cf. Fig. 41; 92% of the respondents have assessed it as plausible). Although tonally appropriate to the sequence before the cut, the short duration of this phrase seems unusual for Appenzell and Toggenburg yodel melodies. For one familiar with the typical shape of natural yodels, this sequence would not be considered as cohesive simply because of its brevity and the lack of variations in the initial motif. This is confirmed by the fact that active yodelers (yes: 21%, no: 79%) rejected this example more clearly than people less familiar with this music (yes: 41%, no: 50%). Such a discrepancy is not found in most examples, as already mentioned.

In several of the examples described, structural knowledge played a decisive role in the assessment of the melody sequences. According to the findings of pedagogical research, structural knowledge is not only learned explicitly, but also implicitly (Stoffer 2000),[7] and the assessment of yodel sequences based on changed structural features con-

6 Note: Perhaps this is a case where the edit distance is very small, but the resultant difference in perception is comparatively large. This happens frequently in analyzing textual differences using the Levenshtein distance.

7 "The product of implicitly acquired musical-syntactic knowledge constitutes a representation that arises as an automatically formed by-product of the sensory processing of perceived music, though as a processing that takes place focusing attention on the musical structures of constituent features" (Stoffer 2000: 234).

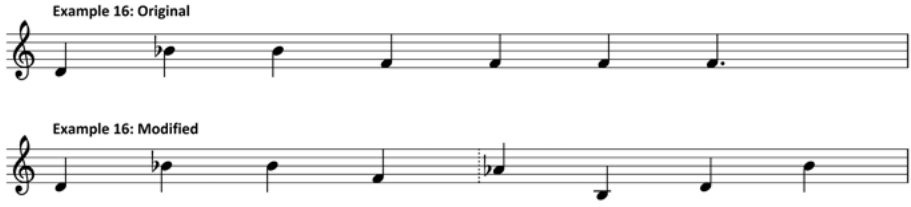


Fig. 44: Above: original melody; below: corresponding sound example modified.

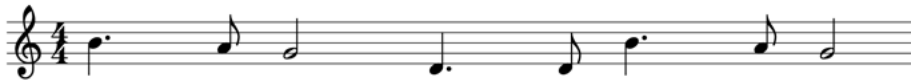


Fig. 45: Excerpt from a *Zäuerli* (Example 8), which was classified by most respondents as not cohesive, although it is an unedited melody.

firms the relevance of musical-syntactic knowledge, although this does not necessarily have to be learned with music-theoretical concepts (cf. p. 40).

A clear majority of respondents rated individual cases of altered sequences as cohesive. The modified audio sample 17 (Fig. 44) was observed as correct by 75%, the corresponding original by 87%. In contrast to the examples already discussed, in which the cut between two motifs was not plausible (cf. Fig. 42), in this case there are no tonal or structural features that would be perceived as illogical or obviously atypical for the course of the melody of a natural yodel. The melody at the cut, which is located directly after the choir entrance, merges into an easily singable interval and follows rhythmically consistent with a new motif. The fact that an initial motif is followed by a second motif before the former is repeated or varied is not atypical for natural yodel melodies (see the analyses from p. 67). However, similarly high values for the consistency of changed melodies are not found in any other example.

Another special case is an example of an unprocessed excerpt from a *Zäuerli* that was perceived as cohesive by a minority (43%) of the respondents (Fig. 45). The sequence begins with a three-tone motif (b^1-a^1-g^1), which is later repeated at the same level. Thus, like Example 11 (cf. Fig. 42), a problem could arise that instead of a transposed repetition or a variation, an exact repetition of the motif follows, which is more difficult to place for orientation in the melody and does not correspond to the typical melody progression. The modified variant of the sequence was considered to be coherent even more rarely (26%) (Example 9, Fig. 42).

The two special cases discussed provide information about structurally melodic features that may support an assessment. Due to their small number, these examples are not representative of the overarching tendency to recognize original melodies as such and to perceive modified versions as less plausible. Nevertheless, it seems reasonable to con-

clude that the structural-melodic features and the style-typical variations of motifs form fundamental characteristics by means of which natural yodel melodies can be recognized. Deviations from these characteristics sound unusual in the ears of both experienced and non-specialist listeners in many cases.

Summary

The listening experiment supports the results discussed so far regarding memorization techniques and the analyses of yodel notations. The described characteristics of yodel melodies form clues for both active yodelers and listeners to connect a sequence heard with one's own mental "musical lexicon" (Peretz et al. 2009: 256), which contains representations of heard melodies.

As part of the described listening experiment, the participants assessed the melody of natural yodels according to their anticipation and the fulfillment of this anticipation. The melodic phrase structure plays a central role here (Temperley 2001: 55). Since the individual elements of the melody are grouped together and these groups (such as motifs) in turn are found in a context that gives an idea of the sequence of groups of elements, contradictions in these contexts lead to a perception that a natural yodel melody as such no longer seems cohesive. Stoffer (2000: 224) interprets the perception of musical features on different levels as variations and constant configurations:

> Both covariations between characteristics and what appears in the variability of the characteristics as a constant configuration and is therefore constitutive for objects are learned: structural invariants, i.e., spatially and temporally structured regularities of characteristic bundles.

As an example, Stoffer mentions the transition between the opening section and the closing section of a folk song, which is marked by a long tone and a pause, while the boundary between two motifs is indicated by one of the two features alone (Stoffer 2000: 224, Stoffer 1979). Such features are necessary in the perception of yodel melodies to form a comprehensible conception of melodic, harmonic and structural elements. In examples that were judged by more than two-thirds of the respondents to be not cohesive (cf. Fig. 42), features could be identified that melodically or structurally contradict the typical stylistic forms of Appenzell and Toggenburg natural yodel, such as the duration of a phrase or the variation of motifs on changing harmonic levels. This observation supports the hypothesis of implicit knowledge applied to orientation within a melody. This is present in the yodelers themselves, but also in the singers of the accompanying voices and in the audience. The latter is shown in that non-members of yodel clubs also tend to share the assessments of active yodelers.

Chapter 9: The yodeling mind: Interplay of memory strategies and music structure

The combination of linguistic content with music is of great importance especially in non-writing cultures, because here the continuity and immutability of content over generations must be guaranteed (Ammann 1997: 59). Important lyrical content, such as in epic songs, is often conveyed through rhythmic forms or melodies: "The embedding of words, skills, or sequences in melody and meter is uniquely human. The usefulness of such an ability to recall large amounts of information, especially in a preliterate culture, is surely one reason why musical abilities have flourished in our species" (Sacks 2007: 239). The fundamental connection between song and text, which simplifies memorization for both elements, does not exist when singing textless songs, for example when yodeling, and must be differently balanced. A sequence of yodel syllables can naturally take on a similar role, and, as mentioned, some yodelers confirmed that they remember the vocalization of the beginning of a natural yodel as a memory aid, but the selection of yodel syllables remains limited and many natural yodel melodies begin with the same yodel syllables. This wordlessness makes yodeling an interesting object of investigation for music cognitive studies. The implementation of this research work has found answers to the formulated objective and produced insights that are characteristic of the investigated music culture.

This study was based on non-written music mediation of the natural yodel in the region around the Alpstein, and the investigation methods were aligned with this factor from the outset. Only in the course of the research did the complexity of this natural yodel transmission become apparent, which takes place on both oral and written levels and determines the regional repertoire and the handling of natural yodel melodies. In principle, the teaching of natural yodels in the rehearsals of a yodel club proceeds exclusively by mouth and ear, whereas their revival from archived notations requires not only knowledge of musical notation, but also the knowledge and experience to adapt notated melodies from the archive holdings to the musical properties of natural yodel in use today. The more than 3,000 natural yodel parts recorded in the database come from various estates as well as collections of the Roothuus Gonten and were catalogued by Erwin Sager. The first evaluation of the database in the context of this research referred to formal similarities of the natural yodel melodies around the Alpstein, but also showed that the recorded melodies differ significantly in various points, such as the course of the melody or the tempo, and thus represent independent forms. The database offers interested yodelers the opportunity to engage with the diversity of traditional natural yodels and to include little sung or forgotten melodies in their personal repertoire. This step from musical notation back to oral transmission requires knowledge of the musical characteristics of the natural yodels around the Alpstein. When writing yodel melodies, transcribers bring the melodies into a certain form (rhythm, metrics, intervals), from which they are released in a reinter-

pretation. This transfer from a written to an oral mediation forms the link between these two types of transmission. The coupling of these mediation strands can have an impact on the regional repertoire of the yodel melodies in the natural yodel around the Alpstein. According to Sloboda, an essentially unchanging transmission of music only occurs in societies transmitting in writing, while in oral societies melodic variants emerge that are accepted as such. The written and oral transmission of natural yodeling in northeastern Switzerland creates a versatile regional yodeling repertoire. The repertoire consists of natural yodels that have been handed down for several generations, partly bear a name and are defined in their form, as well as those which, according to oral tradition, do not necessarily have a proper name, but are simply considered *Zäuerli* or *Rugguusseli*.

Advances in recording technology represent significant turning points in transmission of yodel melodies and must be considered for the question of form stability of natural yodel melodies. The earliest commercialized yodel recordings were made in the 1920s[1] and could serve as role models for yodelers. However, the personal possession of records and associated playback equipment was not as widespread among yodelers in the first half of the 20th century as it was later. With the advent of music cassettes in the 1960s and the possibility of producing natural yodel recordings at little cost, their exchange expanded more strongly. Individual models of recorded natural yodels gained in importance and cassettes revived the strategy of rote learning, listening and singing back. In addition, recordings of yodel samples could be generated and used at home as exercise material. The distribution of the CD from the 1980s onwards increased the selection of high-quality yodel recordings again, and now yodel clubs could record their own selection of natural yodels in recording studios and market the product themselves. According to statements of interviewed yodelers, learning a yodel melody from CD still often occurs. The spread of mobile phones with their recording function allows an even more spontaneous recording of yodel melodies, which can be rehearsed by singing along. The commercialization of cassettes, LPs and CDs and the individual possibilities to record natural yodel can lead to a consolidation of the common natural yodel repertoire. Accordingly, the combination of natural yodel parts was handled more freely before the distribution of sound recordings. However, the individual creation of natural yodel melodies still takes place in a wide variety; additionally, variants of already existing natural yodel are created, which in turn is facilitated by the oral transmission. Along with the repertoire practiced in yodel rehearsals, on unofficial occasions, at festivals or in the inn, lead yodelers can also intone yodel melodies that are not known to those singing along but who are able to accompany them spontaneously. These processes require an implicit understanding of the musical structure that goes beyond knowing individual natural yodel melodies. The perception of the musical structure and its melodic expressions is a prerequisite for the cognitive processing of the natural yodel.

One motivation for this research was the assumption that many yodelers can draw on a large personal repertoire of natural yodel melodies. The results show that there are

1 Earlier yodel recordings are known, but not those made for commercial purposes (Ammann/Carlone 2020: 133).

significant differences in this respect among active yodelers. The allocation of the voices (first voice, second voice, possibly third voice and choir accompaniment) distributes the learning and memorization work of a yodel club among several members. While yodelers of the first voice memorize and call up the melody, the choir singers have the task of harmoniously accompanying a natural yodel. Knowledge of the first voice simplifies this task for choir members, but this is not a mandatory prerequisite. Since a member of a yodel club can take on different musical functions, this division of tasks is redesigned for each natural yodel in the repertoire. However, highly engaged yodelers, who perhaps sing in one yodel club, conduct another and are also active in a *Chlauseschuppel*, have internalized both the melodic lines and the harmonic structures of an astonishing number of natural yodels. The majority of respondents stated that they could retrieve between 15 and 30 natural yodels; one person gave the peak value between 80 and 100 natural yodel melodies.

Creating, thinking and storing a yodel: Cognition and tradition

Descriptions of regional characteristics remain elusive other than rough information, for example, that the natural yodel in Toggenburg generally consists of more parts and is sung in a more animated fashion in the final part. Yodelers also agree on the statement that the *Chlausezäuerli* are rhythmically accentuated and performed somewhat faster. Regional assignments are also underscored by the dialect, which may affect yodel vocalization, as well as by local names of the natural yodel or the manner of its implementation (*rugguussen*, *zauren*, *johlen*). The ongoing discussion among active yodelers about how the natural yodels of the three regions differ formally was not primarily pursued in this work and a conclusive answer to this issue cannot be provided here. The subdivision of the yodel culture around the Alpstein into the regions of Innerrhoden, Ausserrhoden and Toggenburg can contribute to the systematization of the natural yodel repertoire for some yodelers by categorizing the melodies according to the Loci Theory (pers. comm. Neff, 17 Aug 2020). This subdivision is based less on clearly definable and distinguishable musical peculiarities of the natural yodel than on an individual memory of certain places and circumstances with which corresponding melodies are linked.

Memorization of music does not happen exclusively on a tonal level but includes non-musical associations. Every act of listening combines musical characteristics with extra-musical cultural, individual or emotional associations: "At some level of analysis, all musical behavior is structured, whether in relation to biological, psychological, sociological, cultural, or purely musical processes; and it is the task of the ethnomusicologist to identify all processes that are relevant to an explanation of musical sound" (Blacking 2000: 17). Bringing all these factors together is a fundamental prerequisite, especially in studies of the perception and storage of music.

Although the natural yodels around the Alpstein may sound similar to outsiders, there are considerable differences in the melodic lines, which are detected by connoisseurs. According to the evaluation of the interviews conducted, the perception of a few upward or downward movements of the melody is sufficient to recognize a certain natural

yodel. Sloboda's remarks in relation to music are thus confirmed: "…contour information does form the basis of our musical memory in some real listening situations, and can be useful even when more exact scalar or intervallic representations are not achieved" (Sloboda 2000: 183). This allows yodelers to recognize a melody in the shortest possible time when it is sung by the lead yodeler.

The knowledge of typical melodic movements and polyphonic structures, which makes the accompaniment possible in the first place, is strongly connected to familiarity with this music. As soon as the structure of a natural yodel is recognized (for example, whether the melody begins with degree V or I), this first information leads to anchor points for further perception.[2] When yodelers acquire a natural yodel by means of audio recordings, formal structures such as repetitions of motifs or alternations of harmonies are recognized and memorized through constant repetition. A rough picture of the rhythmic form must also be perceived and captured. Although only a few rhythmic features stand out in these slow natural yodels, they contribute to memorization. The rhythmic form is also created by pauses or long-held tones, which especially characterize the agogics of different natural yodel performances. The structural division of what is heard is consolidated when it takes place on several levels, for example based on rhythmic constellations or motivic forms. A person's affiliation to a musical culture also implicitly or explicitly includes corresponding cultural knowledge.[3] Many active yodelers say that they were very challenged and influenced by their colleagues of the same age, especially in their youth. Even decades later, memories of the early, emotionally colored experiences and thus often also of certain yodel melodies are strongly present in the memory. The more accesses to a natural yodel melody are internalized, the greater the probability of a successful retrieval.

The appropriation and performance of any kind of music takes place within the framework of multi-layered cognitive processes that develop differently depending on the practice. In instrumental playing, people can count more on embodied memory to retrieve a melody than in singing or yodeling, where movements of fingers are not evidently embedded in these processes. There is a motor memory storage while singing and yodeling, but this remains mainly limited to the vocal tract and breathing.

The musical perception of structure and the memorization based on it can be trained, but they remain within cognitive limits. Sloboda refers to Miller (1956) and his memorization by chunking: "The only way to overcome such limitations appears to be to find some way of linking or relating the items together" (Sloboda 2000:190). This merging of chunks into higher-level units, for example from motifs to phrases, enables the efficient memorization of complex musical information. When retrieving a melody, yodelers link triggers with associative chains. Initial motifs are of particular importance as triggers, because the first few notes of a natural yodel melody have the greatest recogni-

2 Cf. Blacking (2000: 10): "Insofar as music is a cultural tradition that can be shared and transmitted, it cannot exist unless at least some human beings possess, or have developed, a capacity for structured listening. Musical performance, as distinct from the production of noise, is inconceivable without the perception of order in sound."

3 Although cultural affiliation provides the musical listening experience, only people who are interested in it and absorb this knowledge become experts in their musical culture.

tion value. Interviewed yodelers stated that the memory of the beginning was decisive for retrieving a melody, the rest usually followed by itself. Nevertheless, difficulties can arise during performances, for example if the wrong beginning of the following part is sung after a cadence. Such "errors" when retrieving a melody can be partly due to the lack of text as well as the formal similarity of many natural yodels. At the same time, knowledge and experience allow the accompanying choir to react in such situations and to "save" the performance. Due to the mentioned characteristic of the slight delay and the anticipation of the melody progression, experienced choral singers can react to an unplanned restructuring by the lead yodeler. Yodelers emphasized in interviews that in principle the melody voice is not improvised but noted that a practiced accompanying choir is quite capable of harmonizing melodies ad hoc. This observation refers to the different cognitive abilities required to learn, memorize and retrieve a natural yodel from the region around the Alpstein. Singers can rely to a large extent on their cultural knowledge and the associated implicit understanding of the musical form of natural yodel melodies. This allows them to follow the first voice at the moment of a natural yodel performance and to anticipate suitable accompanying tones. Lead yodelers, on the other hand, internalize melodies exactly and use different memory strategies. Continuous repetition is indispensable for many, but at the same time the implicit or explicit recognition of formal elements of a structured storage of the natural yodel melodies in memory also serves here. In addition, the context in which melodies are learned shapes their storage. In this way, they are memorized together with emotional or visual impressions, which in turn are activated on a successful retrieval. Inner images of situations where a melody was heard for the first time (perhaps in the important teenage years mentioned above), faces of people involved or certain places associated with melodies can trigger the retrieval of the first few notes. Furthermore, emotional connections or linguistic aids such as titles, attributions to persons or yodeling syllables support memorization. According to their individual requirements, yodelers use different retrieval strategies that are applied consciously or nonconsciously and can include knowledge of music theory. The more approaches to a melody they establish, the better it can be successfully retrieved from memory. Such approaches can include cultural knowledge, structural elements such as motifs, phrases, parts, harmonic schemas or rhythmic anchor points, but also emotional, linguistic, motor or visual connections. If the beginning of a natural yodel melody has been called up by the possibilities discussed here, the knowledge of the structure, strengthened by associative chaining and chunking, helps to follow the melodic form until the end. Personal natural yodel repertoires encompass different dimensions and are enlarged due to the forms of social performance and the flexible distribution of roles in the yodel clubs. Individuals contribute their melodies, which, due to formal characteristics of natural yodels, can be easily accompanied by people familiar with the music system associated with it.

In the listening experiment carried out in the present research, active yodelers and other interested persons assessed the melodic coherence of motifs. The results show that the sequence of motifs, although not based on fixed rules, nevertheless corresponds to aesthetic ideas and listening habits. The style-forming structure of a phrase with one or more motifs, its variation or transposed sequencing and a cadence that either targets

repetition or completes the yodeling part is recognized when listening and clear deviations from it are perceived as wrong. The variation of the motifs as well as their different harmonization are anticipated when listening; an exclusive repetition of the motifs, on the other hand, does not occur. The fact that people who are not active in a yodel club also share this assessment shows on the one hand that the participants, the majority of whom come from the cantons of northeastern Switzerland, have a cultural knowledge of natural yodeling and come into contact with yodeling without being specifically interested in this music. On the other hand, the outcome of the investigation indicates that the described forms and motivic reference types (variation, sequencing, transposition) are characteristic of many forms of music and thus an implicit transfer of knowledge, for example from popular music to yodeling, may be assumed. The results presented raise the question of whether the formal structure of the natural yodel goes hand in hand with its cognitive processing, mutually influencing each other. The limitations in the storage of elements may have influenced the development of shaping elements in the natural yodeling tradition as well as the aesthetic preferences of people and the functions of yodeling in everyday life.

The present research addressed the memorability of textless, mostly oral singing employing several approaches. Oliver Sacks (2007: 212) notes the uniqueness of retrieving music: "We recall one tone at a time and each tone entirely fills our consciousness, yet simultaneously it relates to the whole." In the inherent structure of music lies both the key to its memorability and its potential to evoke a wealth of recollections and emotions in humans.

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Pa.017: Nachlassverzeichnis Josef Peterer-Wild, Gehrseff (1872–1945), viewed 15 April 2020.
Pa.018: Nachlassverzeichnis Carl Emil Fürstenauer-Mazenauer (1891–1975), viewed 15 April 2020.
Pa.025: Nachlassverzeichnis Johann Manser-Gmünder (1917–1985), viewed 15 April 2020.
Pa.051: Nachlassverzeichnis Ulrich Alder-Solenthaler, Giigeli-Ueli (1922–2014), viewed 15 April 2020.

Appendix

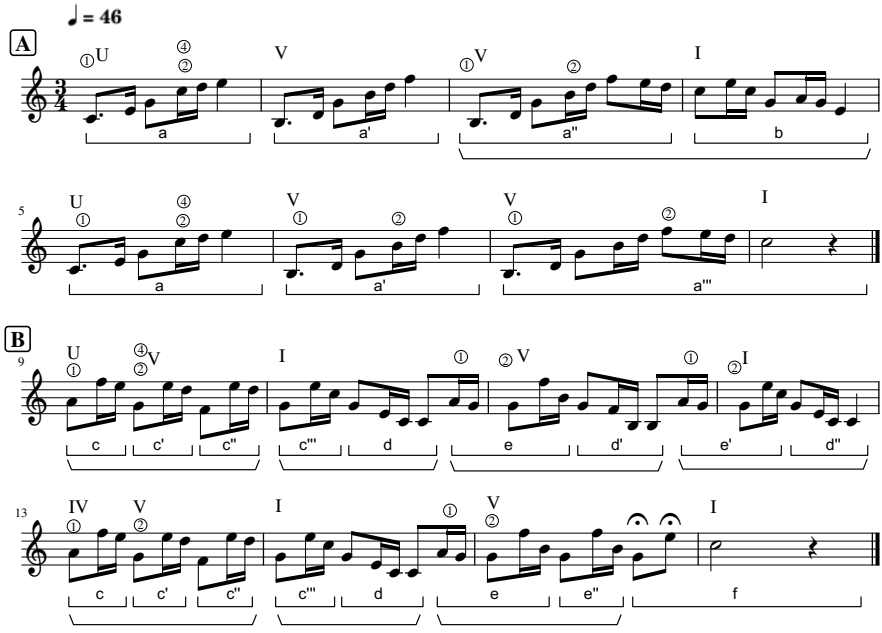
30 Natural Yodel Transcriptions

Some of the following 30 natural yodels are based on the natural yodels transcribed in the project *Natural Yodels around the Alpstein* from the collection from the Roothuus Gonten (cf. p. 77). Ten natural yodels each are attributed to the regions of Appenzell Innerrhoden, Appenzell Ausserrhoden and Toggenburg. The transcriptions are based on the audio recordings given in the table at the end of the appendix. The 30 transcriptions contain information on vocal entries and harmonic schemes as well as motif divisions. The latter were marked with brackets below the staves. The compound motifs which are marked with long brackets can represent chunks on different levels, on the level of motifs, harmonics and phrases. The following designations are used in the scores (cf. p. 69):

Signs	Meaning
A B C …	Natural yodel parts
Notation line	Phrase
Roman numeral (I, V)	Harmonic degree
U	Unaccompanied beginning of the phrase
①	First yodel voice sings as solo
②	Entrance of the second yodel voice
③	Entrance of the third yodel voice
④	Choir entrance
Bracketed: a, b, c, …	Motifs
a', a'', a''', …	Variations of motifs (a prime, double prime, triple prime, etc.)
Long brackets	Connected motifs

The division into motifs (chunks of the first level) is determined by individual perception; thus individuals divide a melody into different chunks: the division given here is only one possibility of interpretation. The same applies to meter indications and bar divisions, as well as to the proposals for harmonizing unaccompanied phrase beginnings. The harmonics was defined in such a way that the harmonic rhythm and the usual schemes (for example, I-V-V-I or V-I-V-I) become visible. A natural yodel section consists of two staves, one line per phrase.

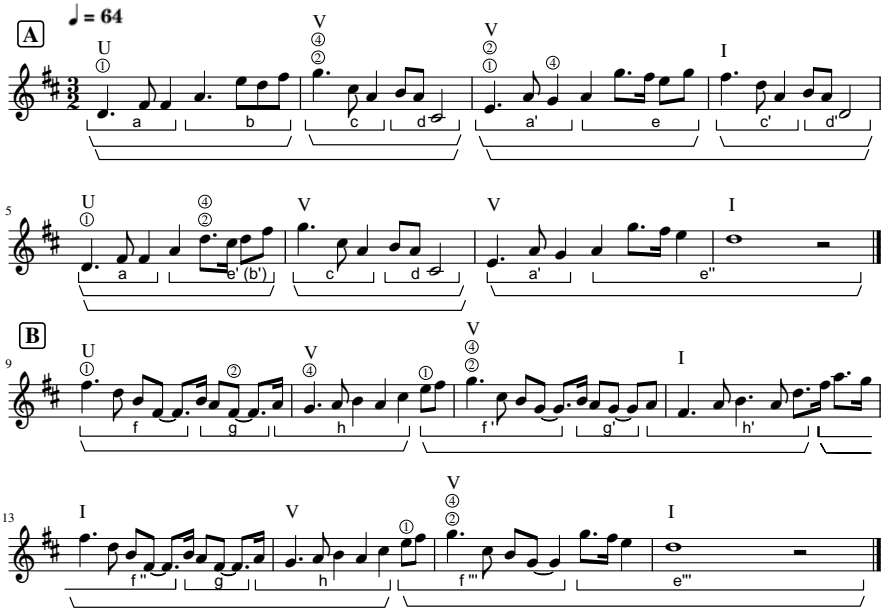
Anna-Koch-Jodel



The piece is accompanied by string music and dulcimer. The choral entries (4) therefore do not refer to vocal voices, but to the accompaniment by string music.

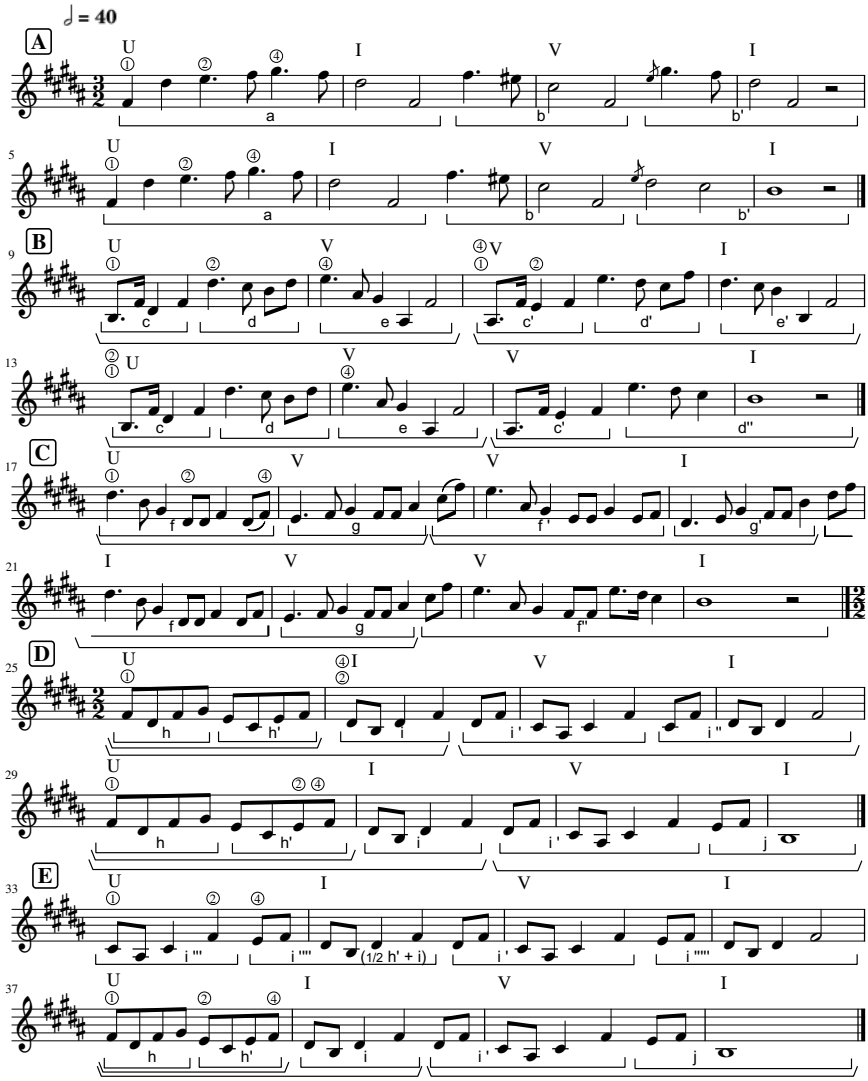
U: Unaccompanied
Bars 1 and 5: Possible harmonization with degree I.
Bar 9: Possible harmonization with degrees IV and V (alternatively II and V, also in bar 13).

Rugguusseli Marie Sutter



U: Unaccompanied
Bars 1, 5 and 9: Possible harmonization with degree I.

Innerrhoder Rugguusseli



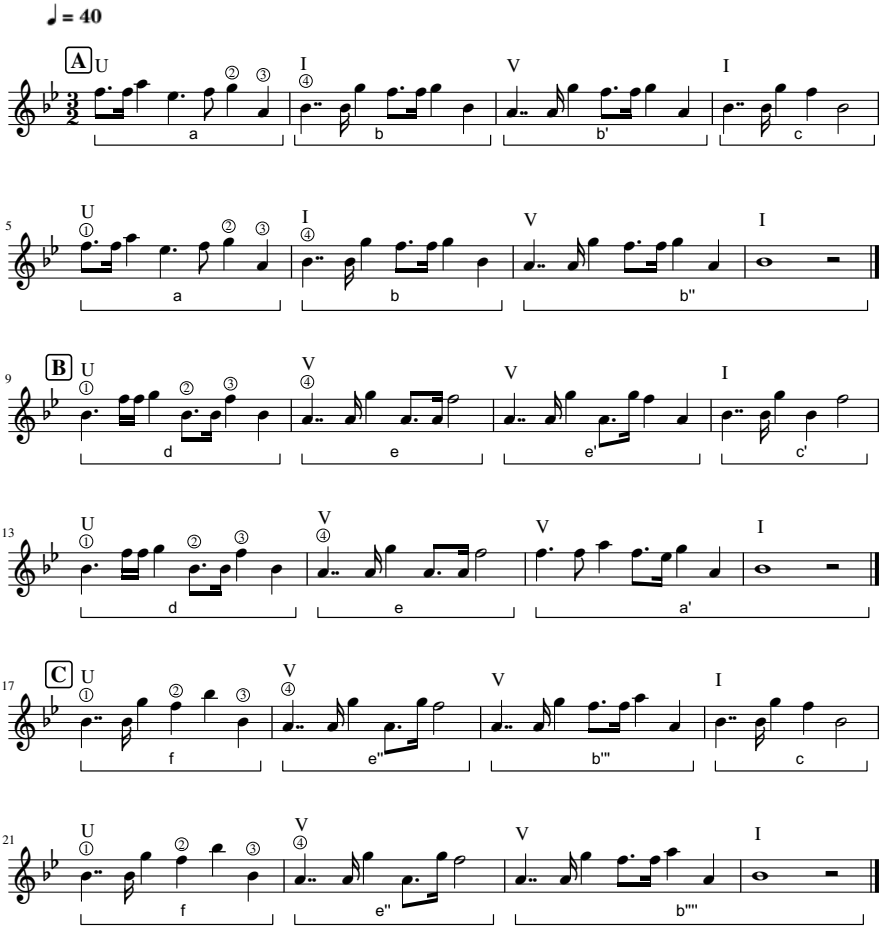
The piece is accompanied by string music. The choral entries (4) therefore do not refer to vocal voices but to the accompaniment by the entire string music (e.g. in bar 9 the violin is heard a little earlier, but the 'choral entry' is not notated until the beginning of bar 10).

U: Unaccompanied

Bars 1, 5, 9, 13 and 17: Possible harmonization with degree I (alternatively with change to V in bars 1 and 5).
Bars 25, 29 and 37: Possible harmonization with degrees I and V (alternatively I and II).
Bar 33: Possible harmonization with degree V.

Siglum: AI 03

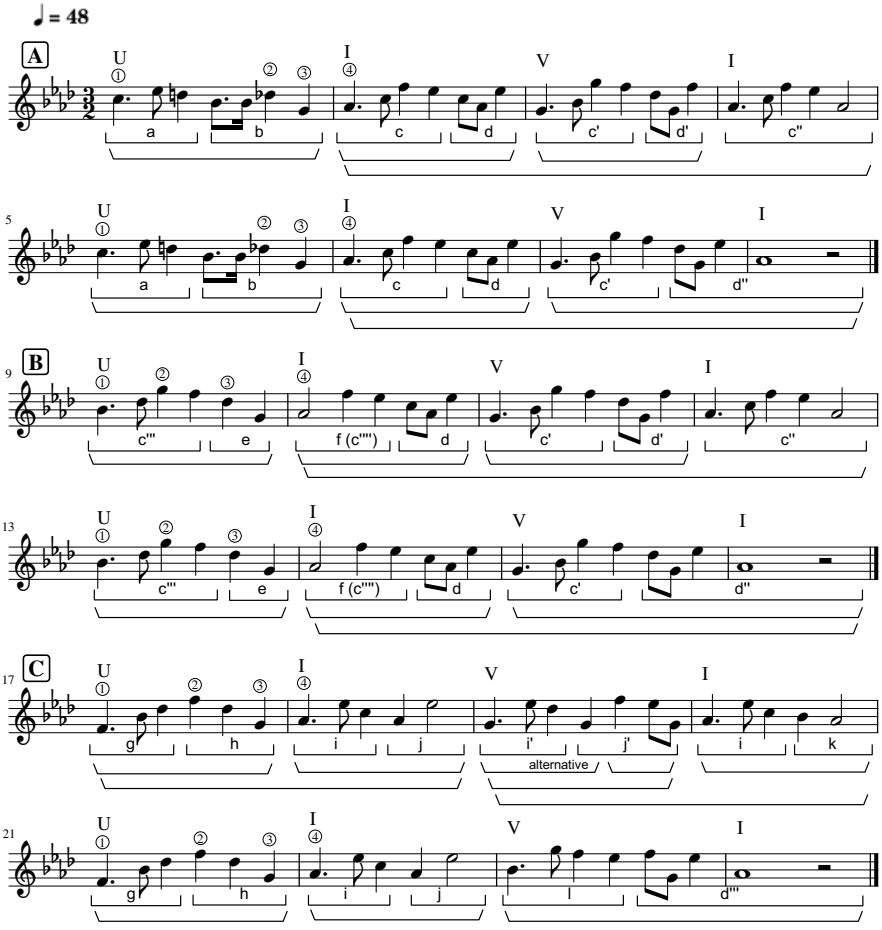
Em Franze Johann sis



U: Unaccompanied
Bars 1 and 5: Possible harmonization with degree V.
Bars 9, 13, 17 and 21: Possible harmonization with degree I.

Siglum: AI 04

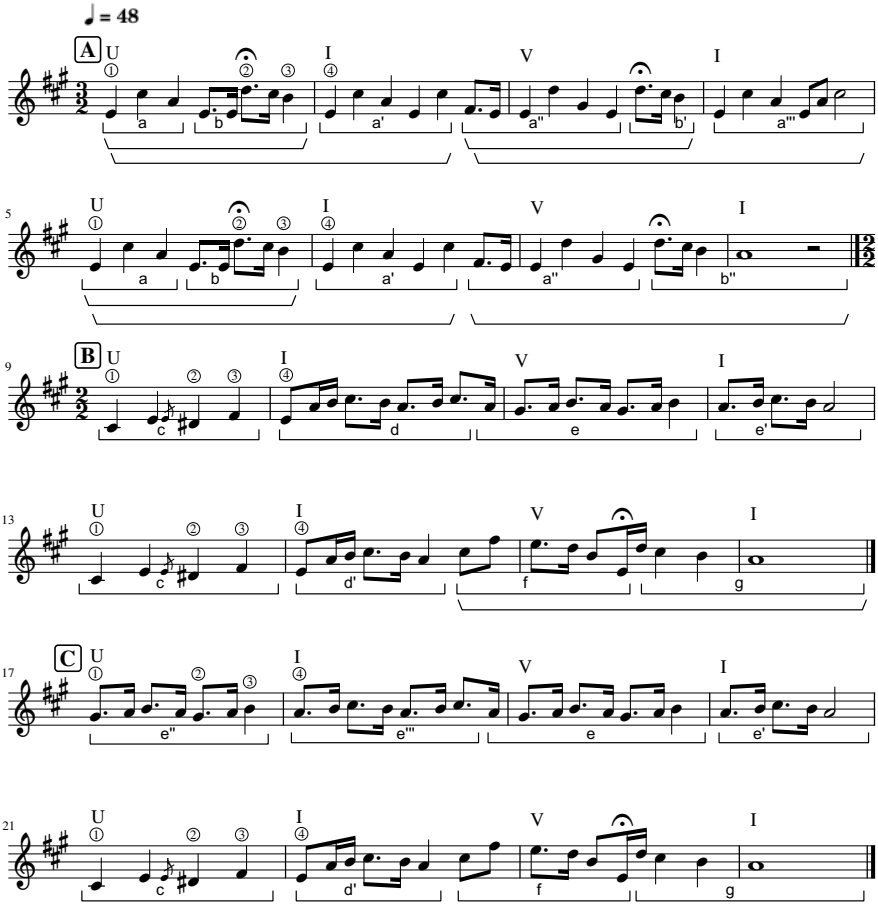
Rugguusseli (Sepp Dobler sen.)



U: Unaccompanied
Bars 1 and 5: Possible harmonization with degree I, although also harmonically foreign tones are sung.
Bars 9 and 13: Possible harmonization with degree V.
Bars 17 and 21: Possible harmonization with degree II (alternatively with IV).

Siglum: AI 05

Am Jodlerfest z Rorschach

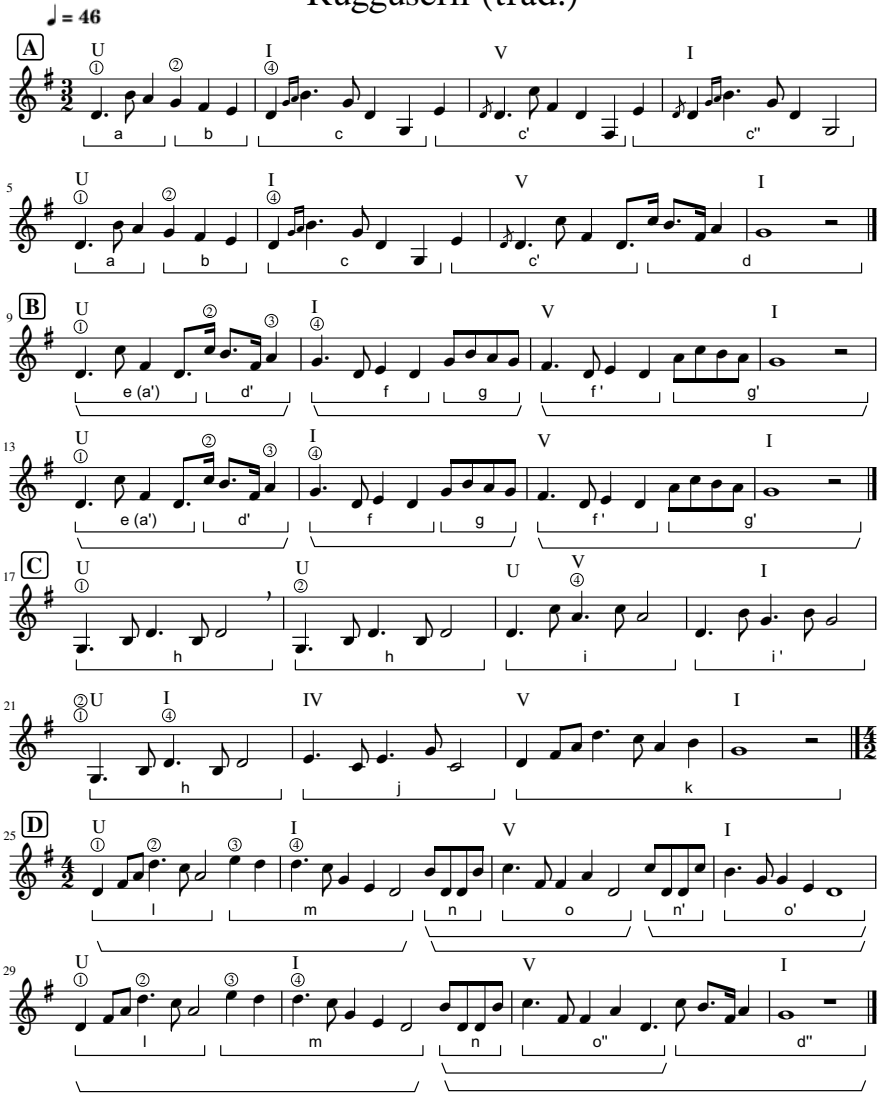


U: Unaccompanied
Bars 1 and 5: Possible harmonization with degrees I and V.
Bars 9, 13 and 21: Possible harmonization with degree I (alternatively with I and II-major).
Bar 17: Possible harmonization with degree V.

At the entries marked with '3' presumably part of the accompanying choir enters, while at '4' the entire choir sings. So it is not explicitly a third voice.

Siglum: AI 06

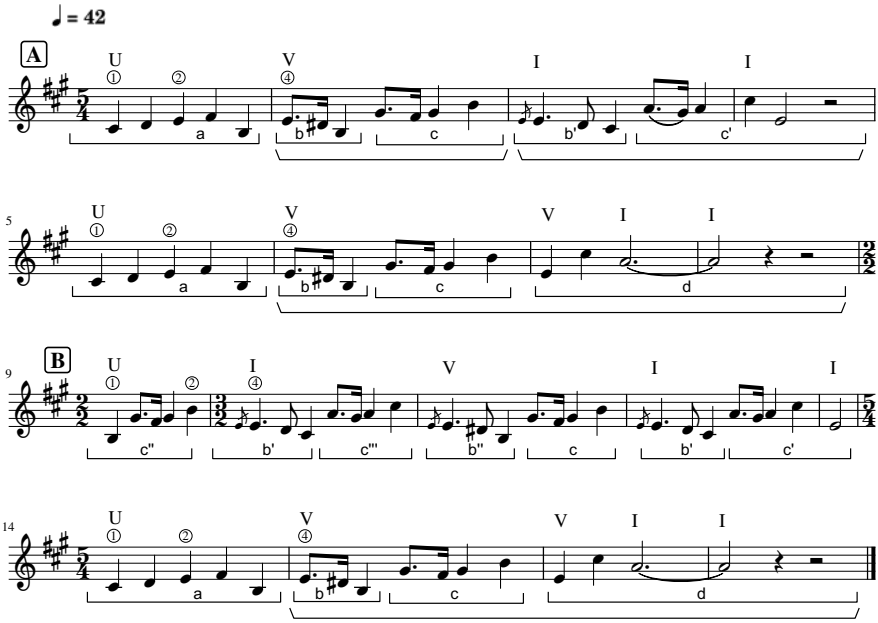
Rugguserli (trad.)



U: Unaccompanied
Bars 17, 18 and 21: Possible harmonization with degree I.
Bars 1, 5, 9, 13, 25 and 29: Possible harmonization with degree V.
(Alternatively bars 1 and 5 could also be harmonized with degree I.)

Siglum: AI 07

Rugguusseli (trad.)

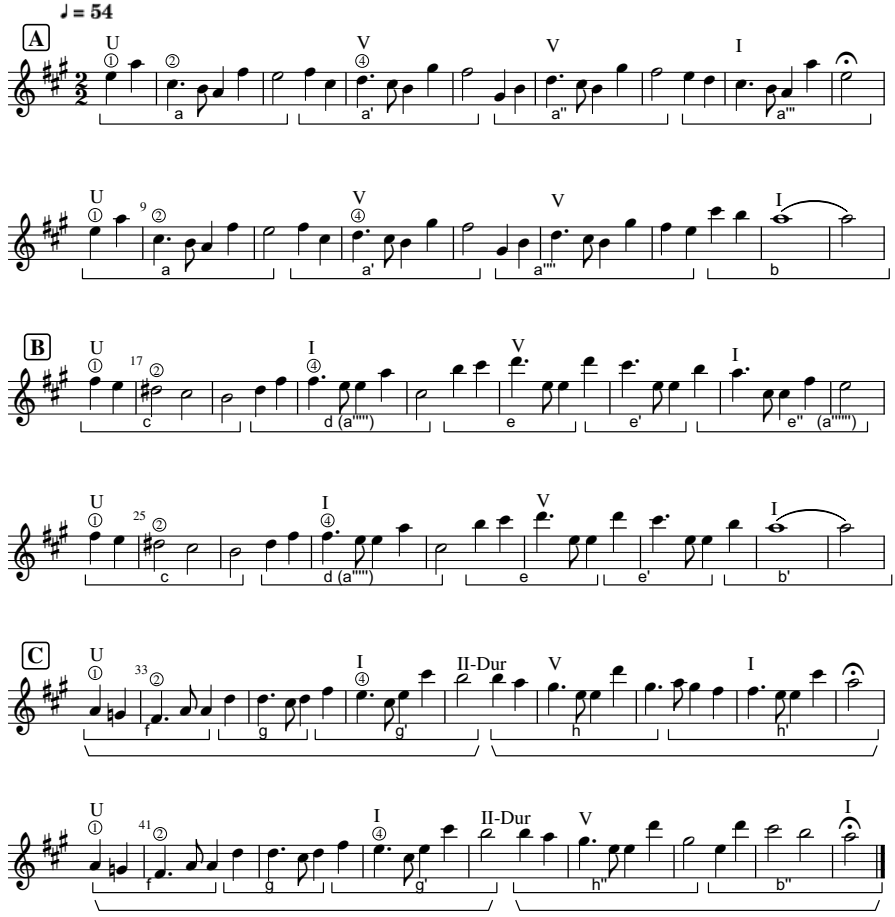


U: Unaccompanied
Bars 1, 5 and 14: Possible harmonization with degrees I-V-I-II (alternatively I-II or I-IV).
Bar 9: Possible harmonization with degree V.

There are many versions of this melody which have been recorded in the database of the Roothuus Gonten in different ways (also with regard to the bar notation). The 1st part is also known as *Höttebuebes* or *Im Grünfeld.*
The melody is also designated as Zäuerli in the database of the Roothuus Gonten.

Siglum: AI 08

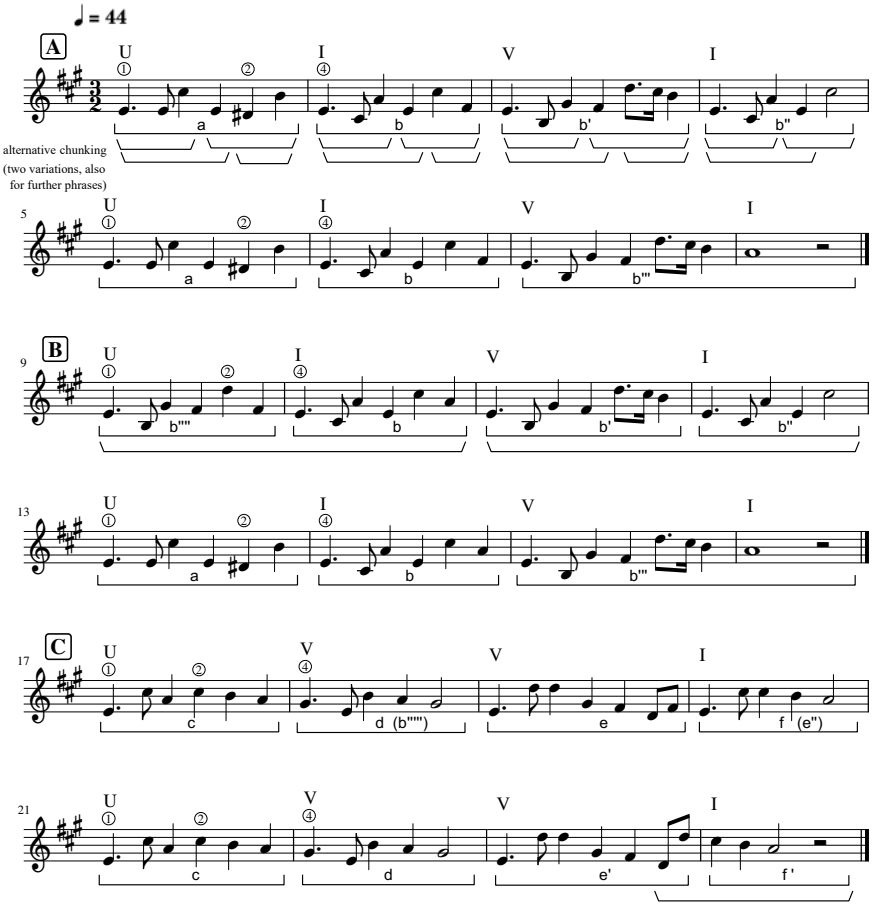
A de Vechschau



U: Unaccompanied
Bars 1, 2, 9 and 10: Possible harmonization with degree I.
Bars 17 and 25: Possible harmonization with degree II-major.
Bars 18 and 26: Possible harmonization with degree II (alternatively with V).
Bars 33, 34, 41 and 42: Possible harmonization with degree IV (alternatively with change to V).

Siglum: AI 09

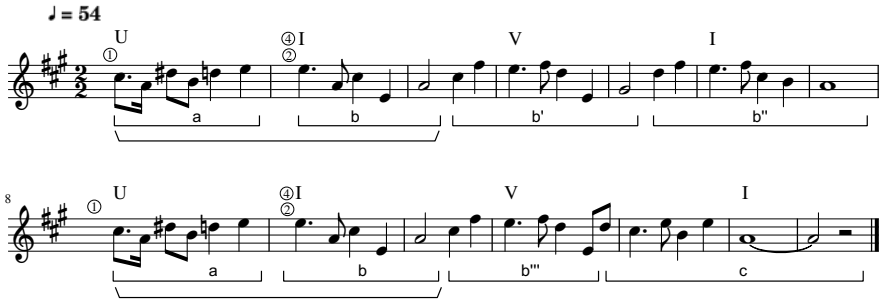
En Alt's



U: Unaccompanied

Bars 1, 5 and 13: Possible harmonization with degree I or with I and II-major.
Bar 9: Possible harmonization with degree V.
Bars 17 and 21: Possible harmonization with degree I.

D' Striichmusig Alder zaured

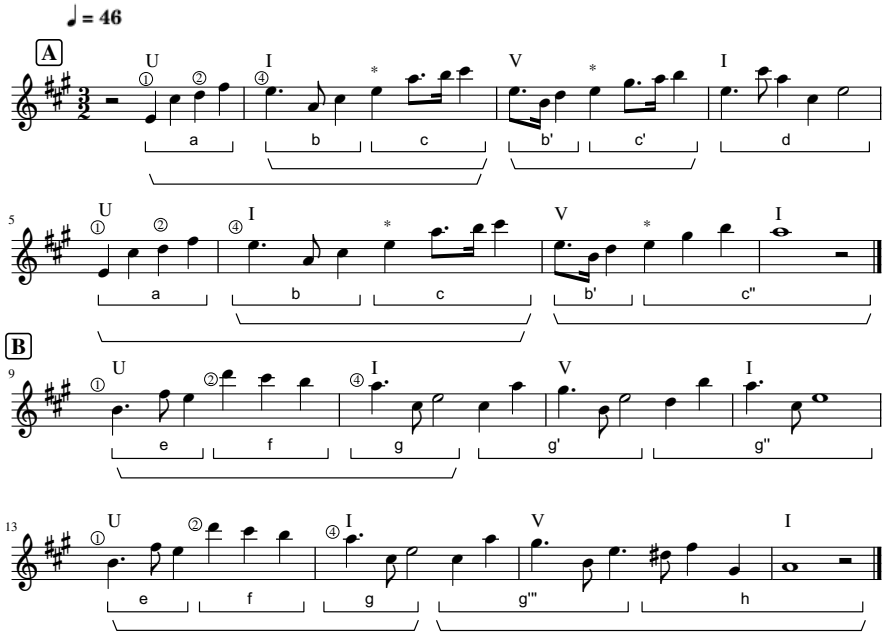


The piece is accompanied with Senntumsschellen (musical cowbells).

U: Unaccompanied (without choir accompaniment, only Senntumsschellen)
Bars 1 and 8: Possible harmonization with degree I (alternatively with I / II-major / V).

Siglum: AR 01

Em Hansruedi si's



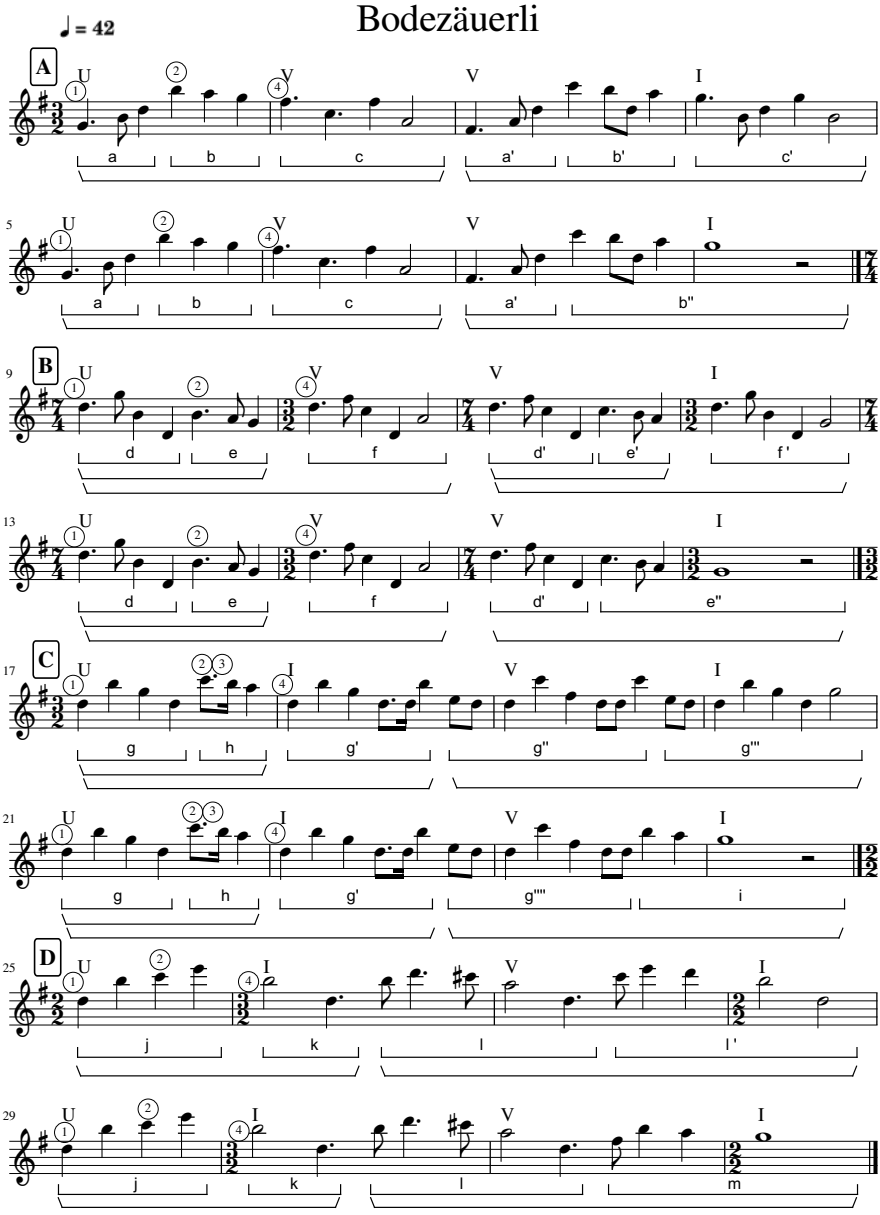
The piece is accompanied with taler bowls.

U: Unaccompanied (without choir accompaniment, only taler bowls)
Bars 1 and 5: Possible harmonization with degree I (alternatively with I and V).
Bars 9 and 13: Possible harmonization with degree V.

*: Note e^2 can belong to motif b or c.

Siglum: AR 02

Bodezäuerli



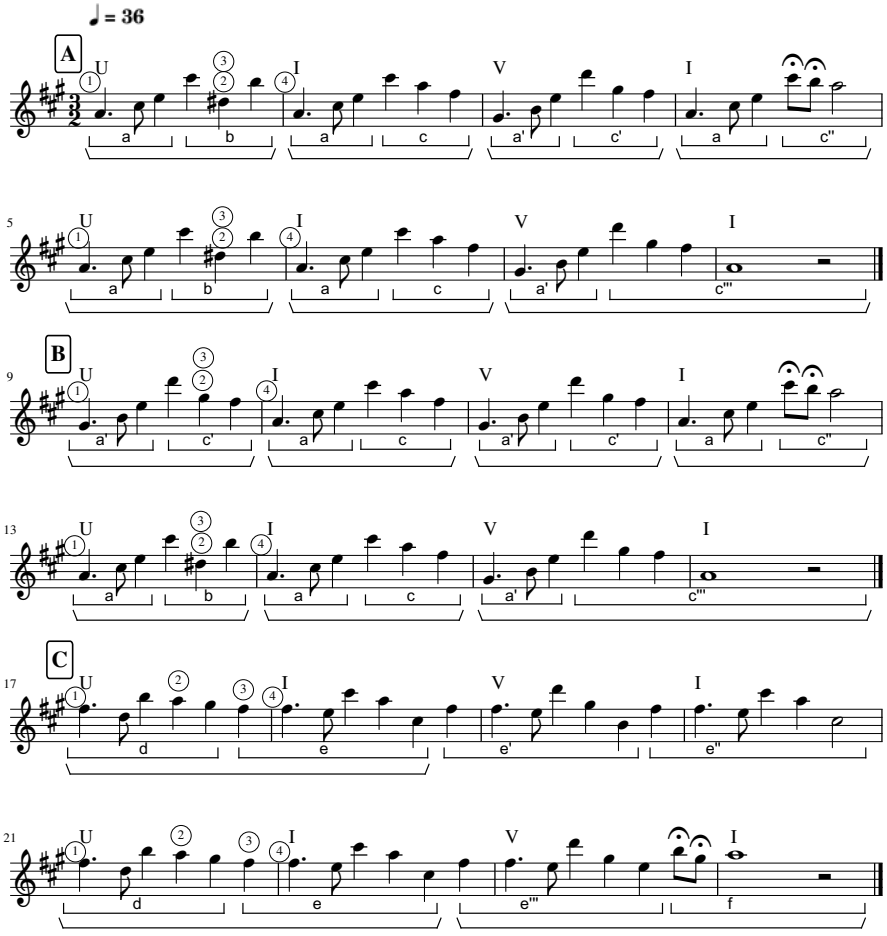
U: Unaccompanied

Bars 1, 5, 9 and 13: Possible harmonization with degree I.

Bars 17, 21, 25 and 29: Possible harmonization with degrees I and V (alternatively bars 25 and 29 with I and IV).

Siglum: AR 03

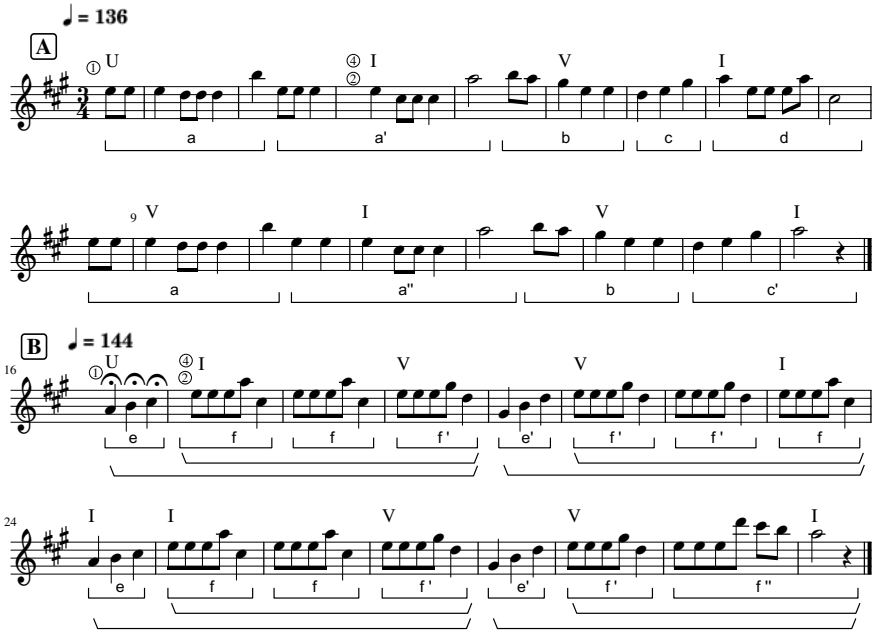
Heewehzäuerli



U: Unaccompanied
Bars 1, 5 and 13: Possible harmonization with degree I (alternatively with I and II-major).
Bar 9: Possible harmonization with degree V.
Bars 17 and 21: Possible harmonization with degree IV.

Siglum: AR 04

Chlausezäuerli

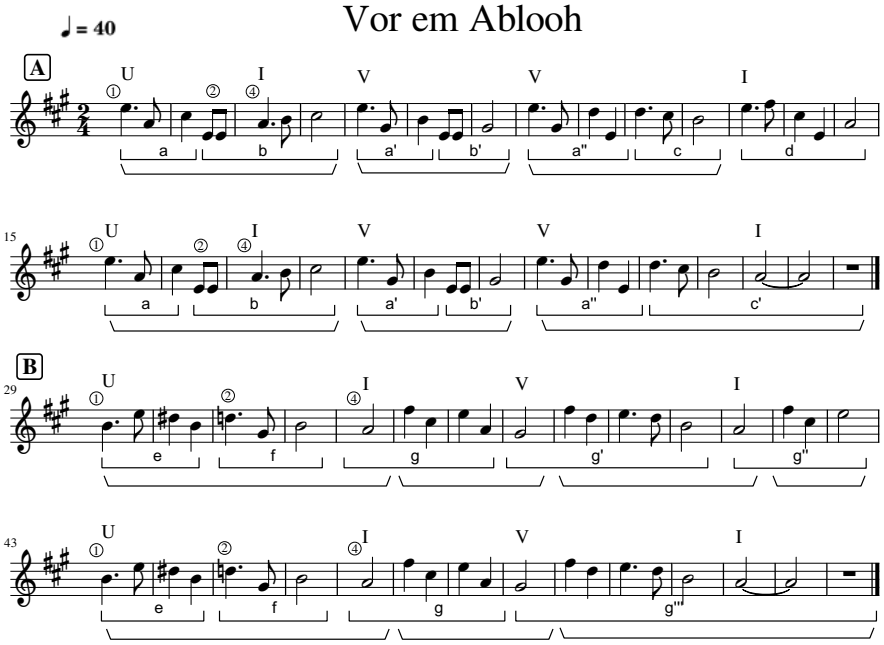


During the Intro and the Outro, bells are heard; in between there is cheering.
The natural yodel itself is performed without bells, accompanying string music can be heard softly at certain points.

U: Unaccompanied
Bars 1 and 2: Possible harmonization with degree V.
Bar 17: Possible harmonization with degree I.

Siglum: AR 05

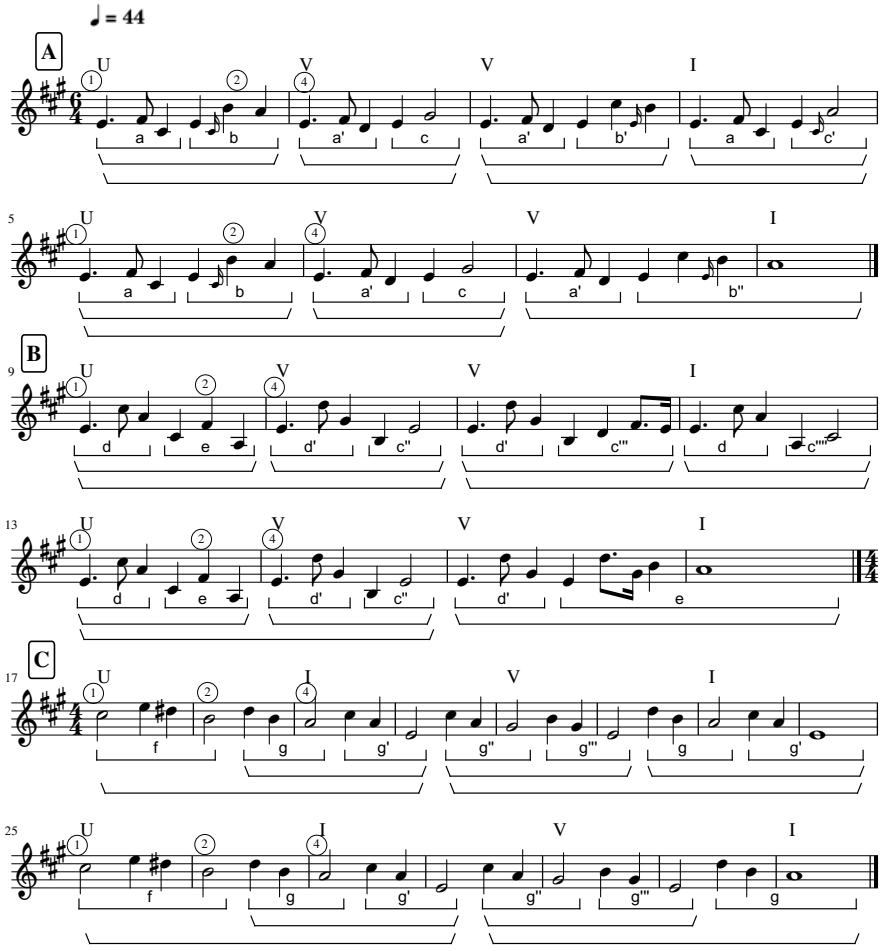
Vor em Ablooh



The piece is accompanied with Senntumsschellen (musical cowbells).

U: Unaccompanied (without choir accompaniment, only Senntumsschellen)
Bars 1, 2, 15 and 16: Possible harmonization with degree I.
Bars 29, 30, 31, 32, 43, 44, 45 and 46: Possible harmonization with degree V.

Schwäberg-Zäuerli

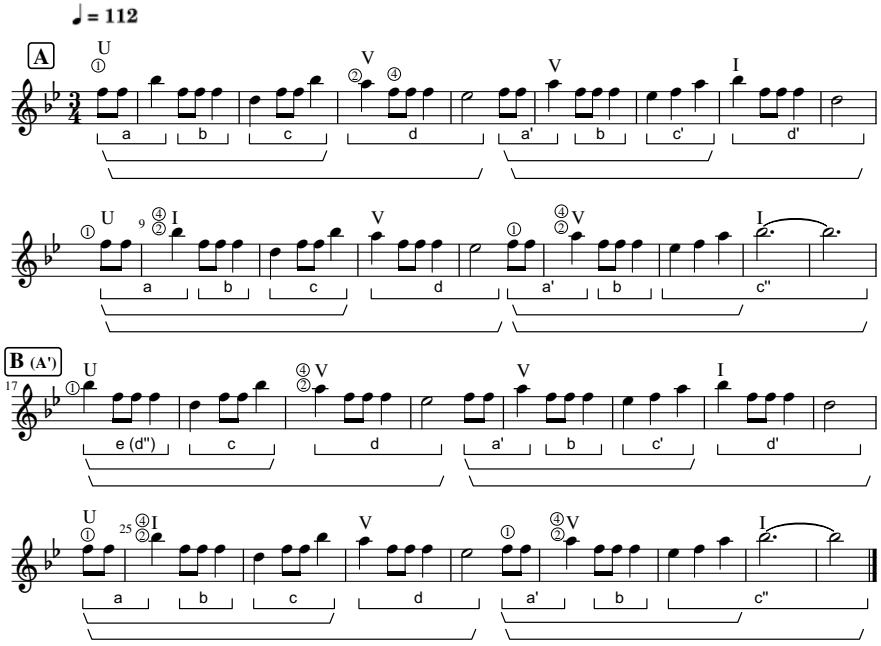


The piece is accompanied with taler bowls.

U: Unaccompanied (without choir accompaniment, only taler bowls)
Bars 1, 5, 9 and 13: Possible harmonization with degree I.
Bars 17, 18, 25 and 26: Possible harmonization with degrees I and V.

Siglum: AR 07

Chlausezäuerli Buebe

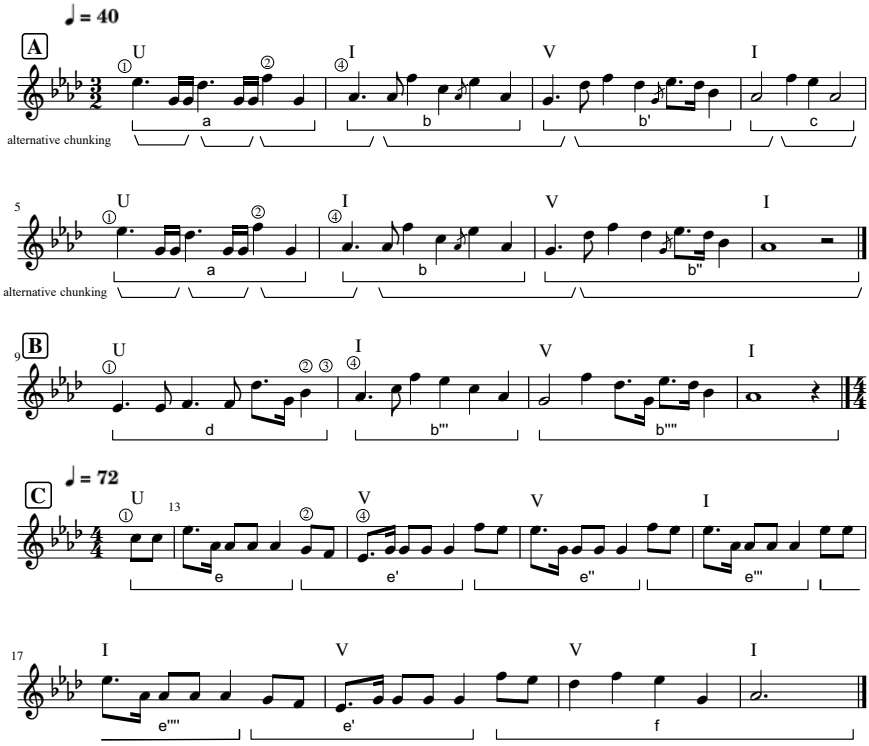


U: Unaccompanied
Bars 1, 9, 17 and 25: Possible harmonization with degree I.

The non-prelude beginning to Part B creates the perception of a new motif (e).
At the end, bells are heard.

Siglum: AR 08

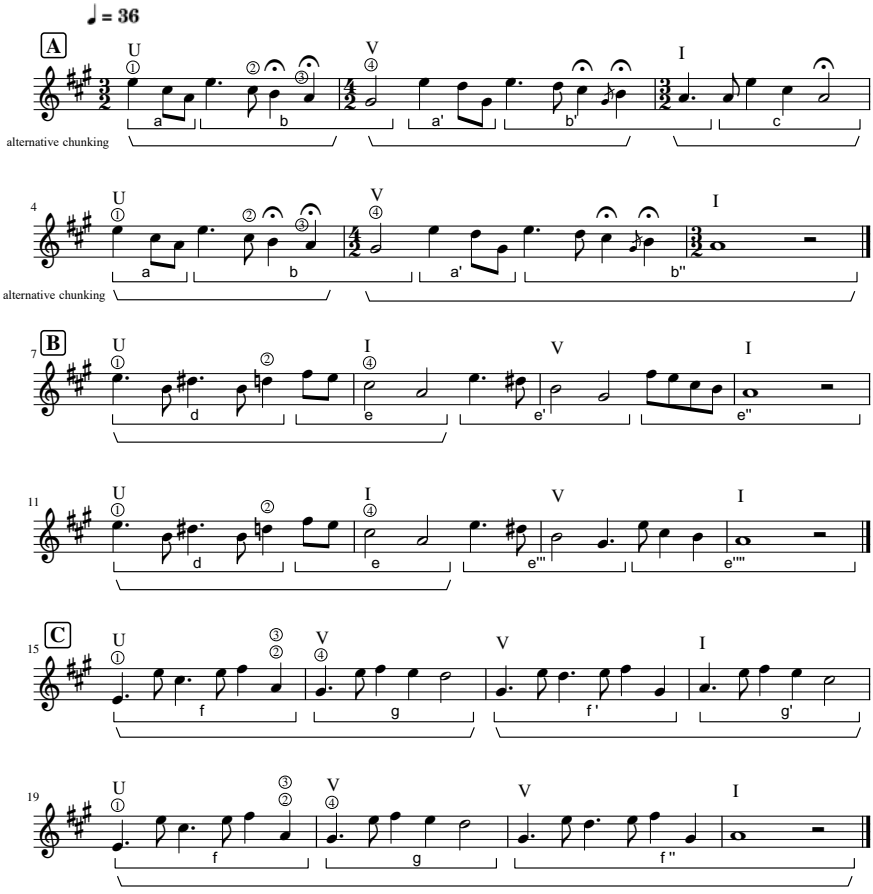
Am Jock sim silbrige Hochzig



U: Unaccompanied
Bars 1, 5 and 9: Possible harmonization with degree V.
Bar 13: Possible harmonization with degree I.

Siglum: AR 09

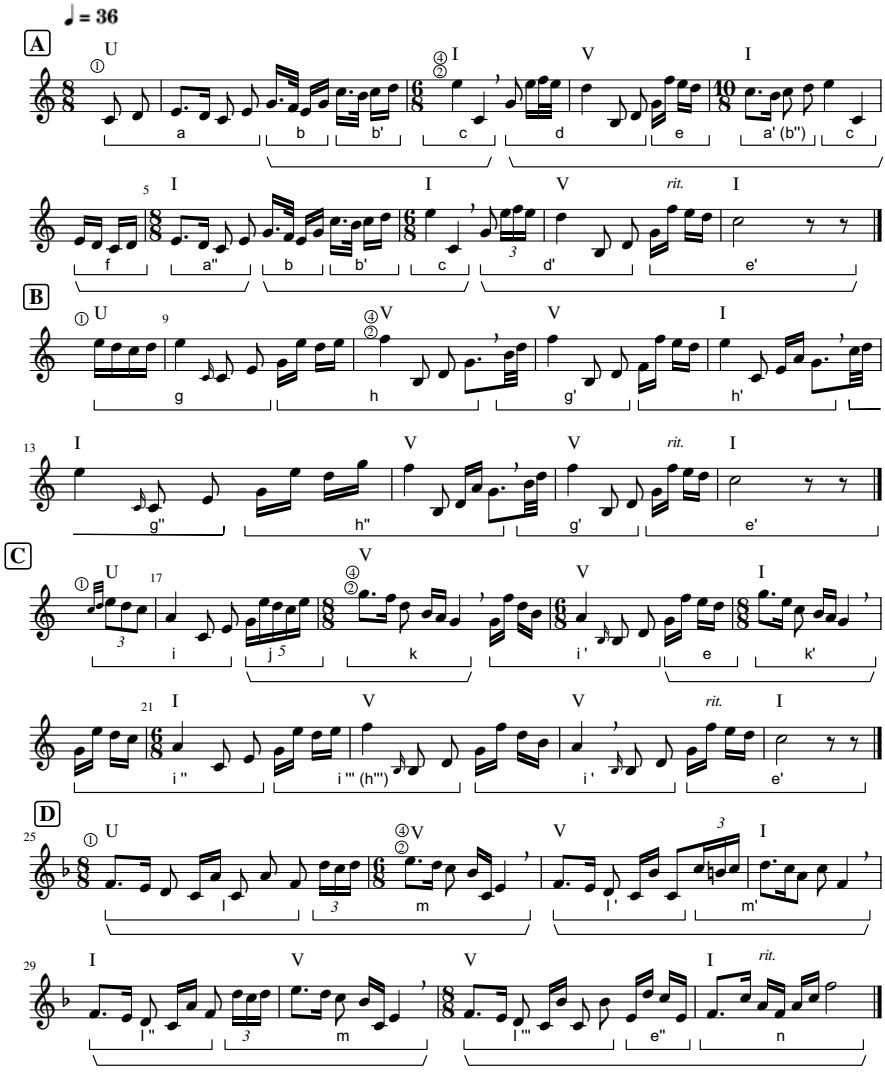
I de Kantonsgrenze z'Herisau



U: Unaccompanied
Bars 1, 4, 15 and 19: Possible harmonization with degree I.
Bars 7 and 11: Possible harmonization with degree V, although also harmonically foreign tones are sung.

Siglum: AR 10

De Looser

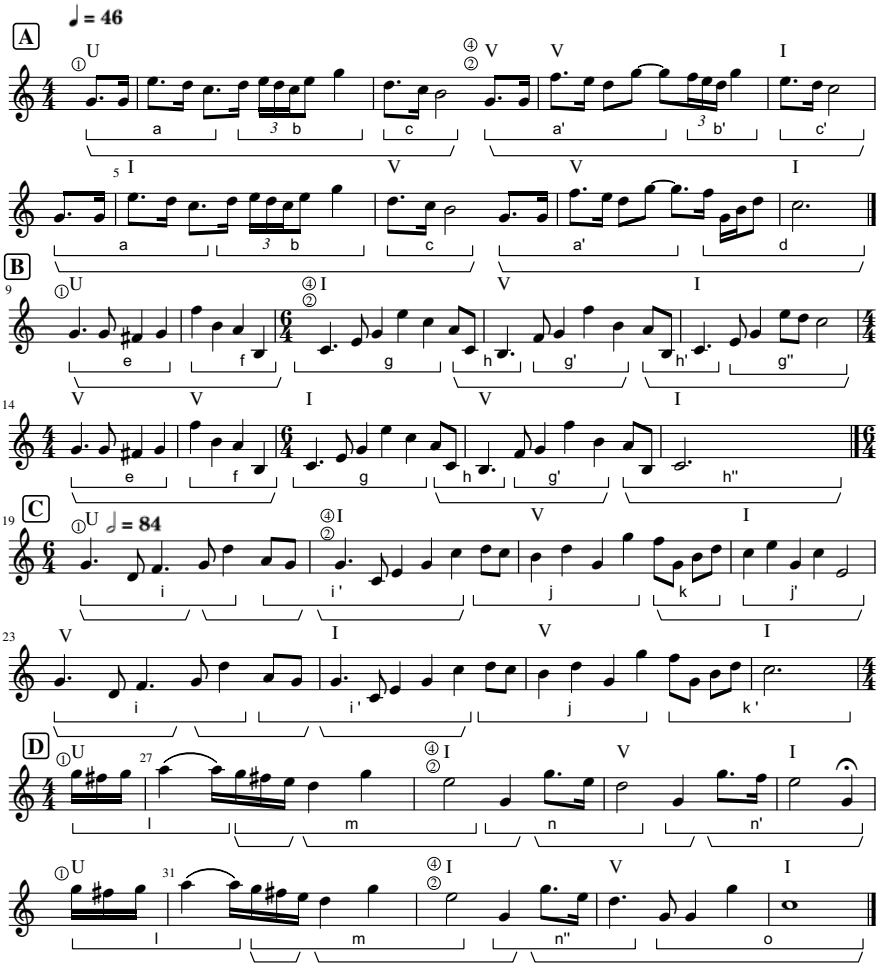


U: Unaccompanied
Possible harmonization with degree I of all bars designated with U.

Original key of the audio recording: D-flat major

Siglum: TO 01

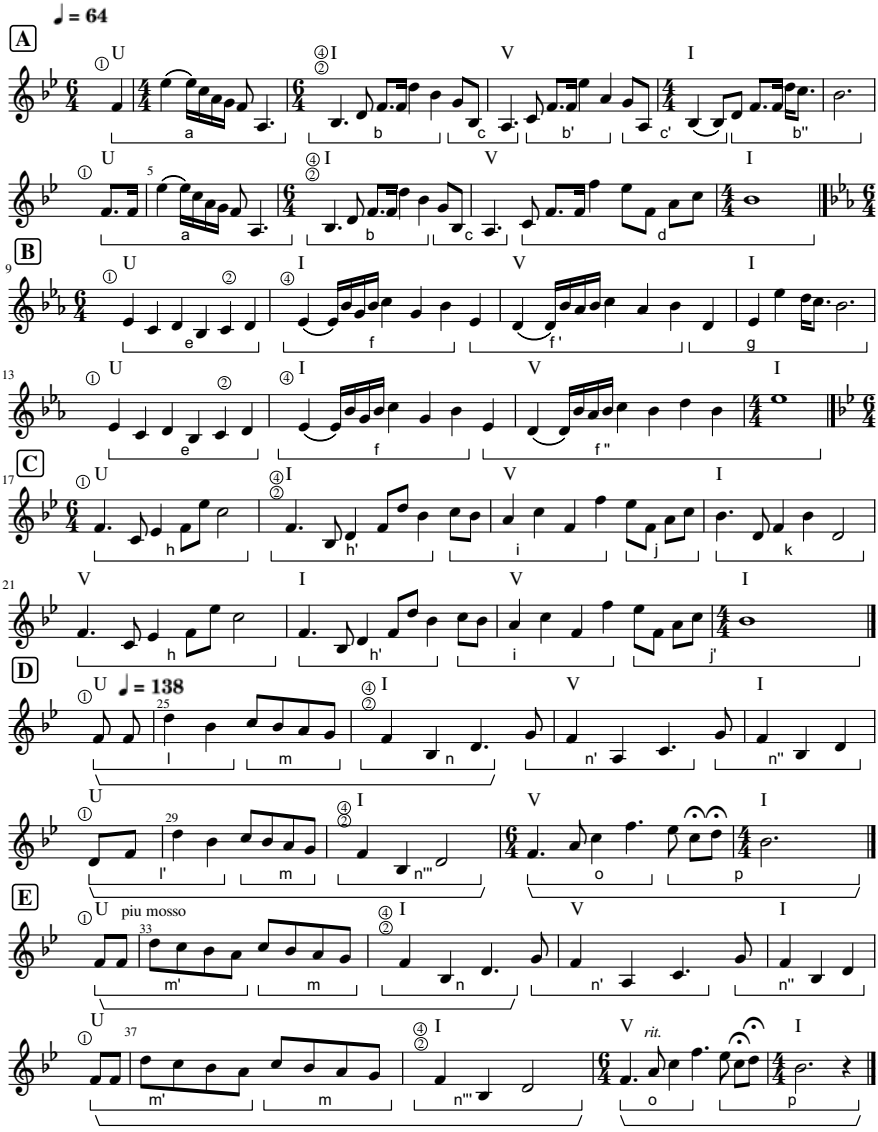
De Haas



U: Unaccompanied
Bar 1: Possible harmonization with degree I.
Bars 2, 9, 10, 14, 19 and 23: Possible harmonization with degree V.
Bars 27 and 31: Possible harmonization with degree V (alternatively with I).

The breath pauses in part B determine the divisions of the motifs.

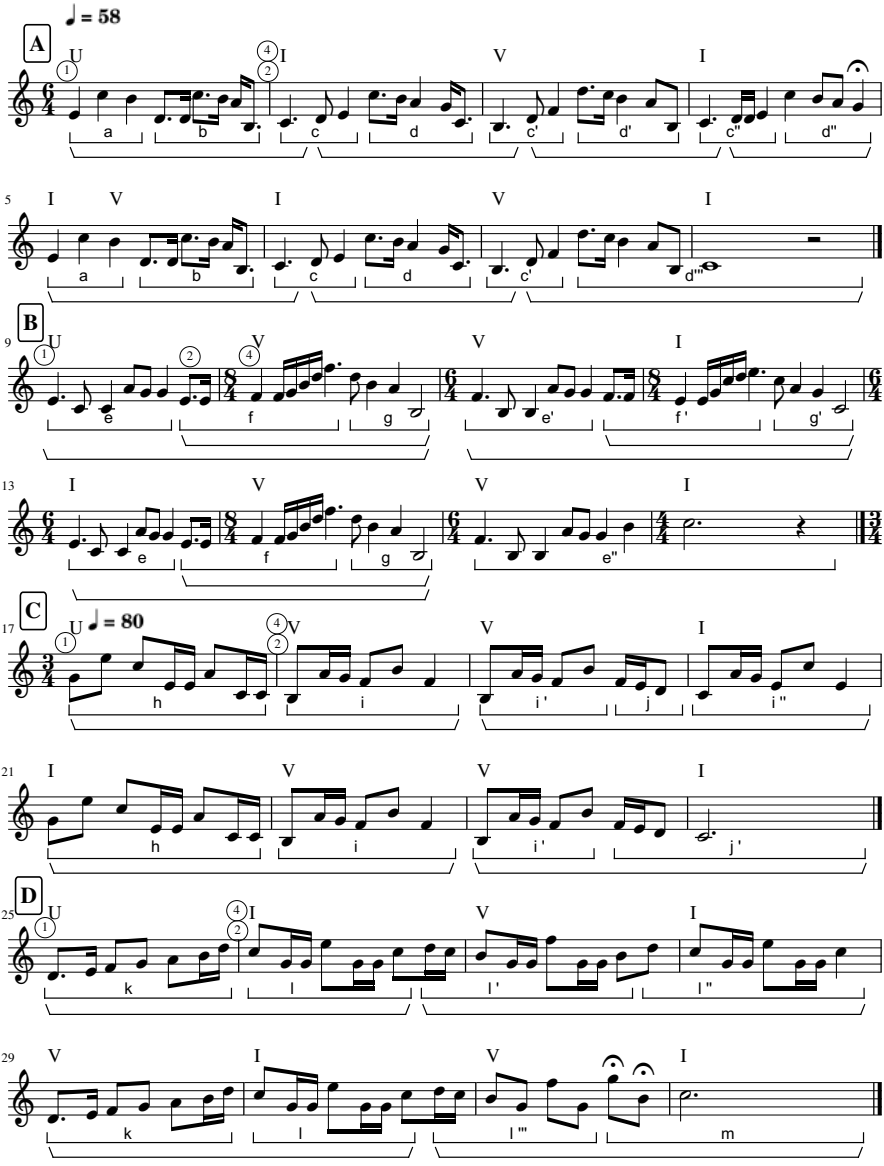
De Churer



U: Unaccompanied
Bars 1, 5, 17: Possible harmonization with degree V.
Bars 9 and 13: Possible harmonization with degree I (alternatively with I and V).
Bars 25, 29, 33 and 37: Possible harmonization with degree I.

Siglum: TO 03

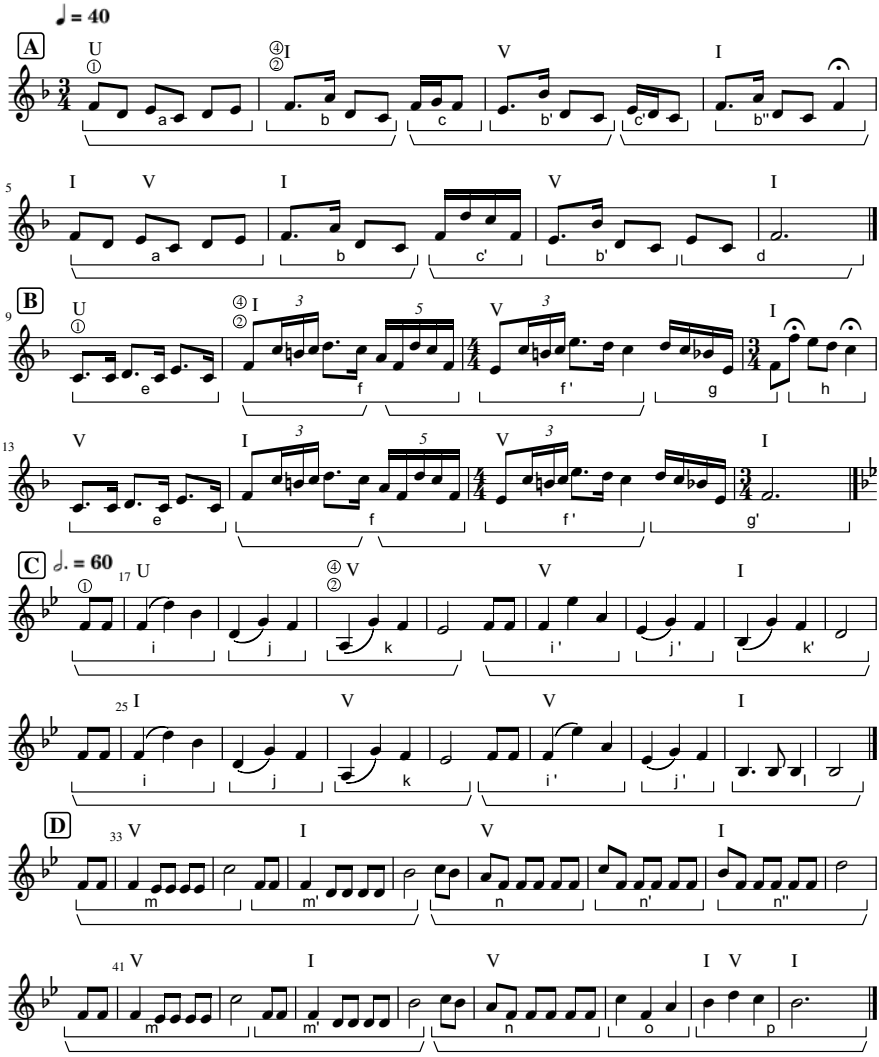
De Bühler



U: Unaccompanied
Bar 1: Possible harmonization with degrees I and V.
Bars 9 and 17: Possible harmonization with degree I.
Bar 25: Possible harmonization with degree V.

Siglum: TO 04

De Scherrer

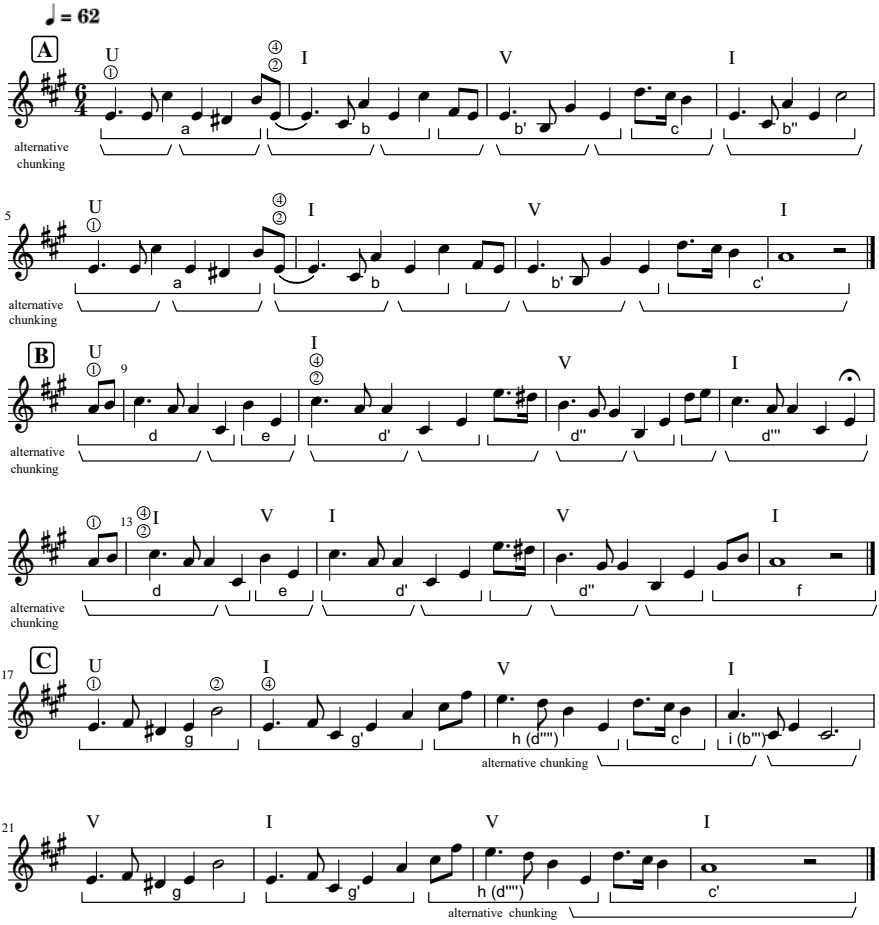


U: Unaccompanied

Bar 1: Possible harmonization with degrees I and V (alternatively with I).
Bar 9: Possible harmonization with degree V.
Bar 5: The bass line I-V-V/VI-V/VII is heard. Harmonics I-I/V-I/VI -I/VII or I-V-IV-V are also possible.
Bar 13: The bass line V-V/IV-V/II is heard. Harmonics I-IV-V are also possible.
Bars 17 and 18: Possible harmonization with degree I.

Siglum: TO 05

Toggenburger Naturjodel

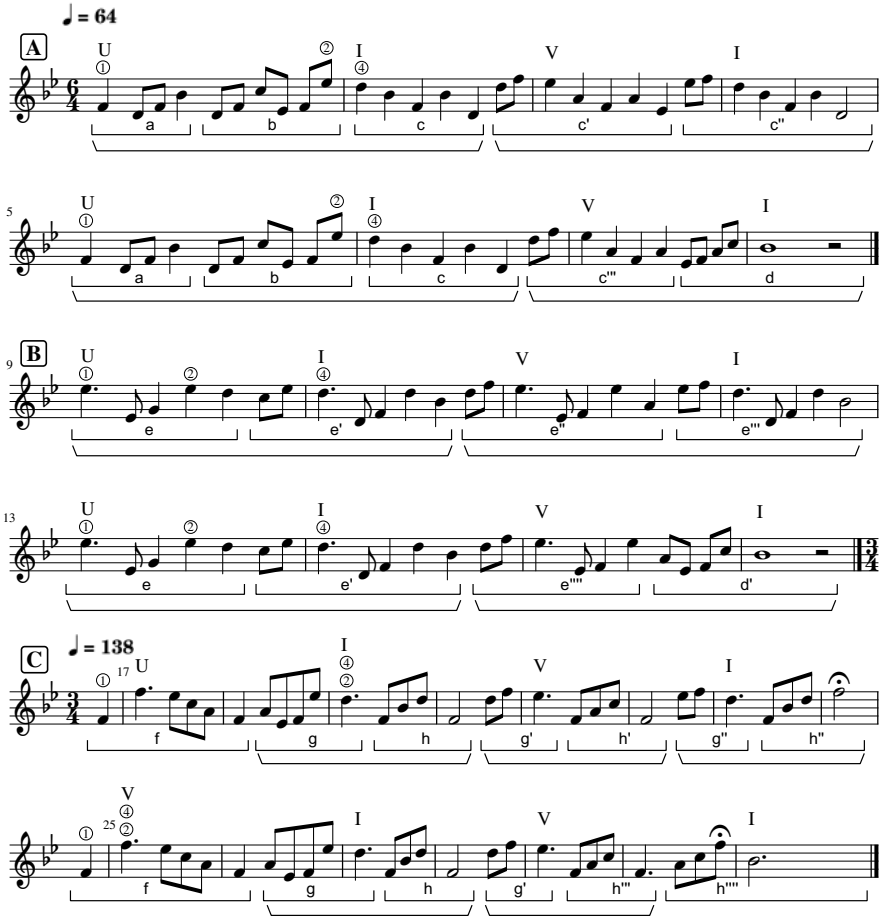


The entire piece is accompanied with taler bowls.

U: Unaccompanied (without choir accompaniment, only taler bowls)
Bars 1 and 5: Possible harmonization with degree I or with I and II-major.
Bar 9: Possible harmonization with degrees I and V.
Bar 17: Possible harmonization with degree V.

Siglum: TO 06

Gante-Jodel

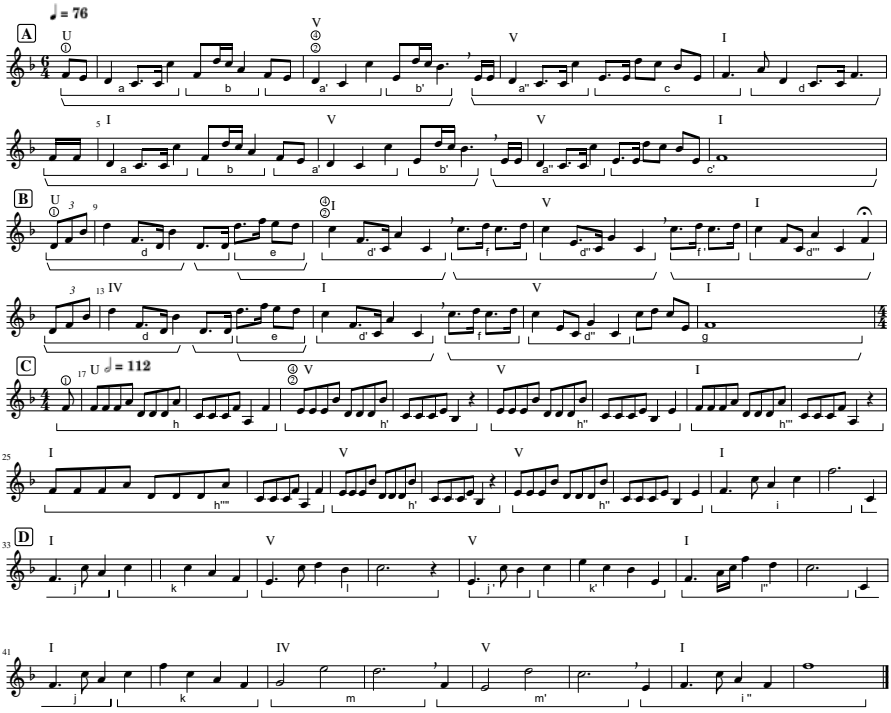


U: Unaccompanied

Bars 1 and 5: Possible harmonization with degree I.
Bars 9 and 13: Possible harmonization with degree IV.
Bars 17 and 18: Possible harmonization with degree V.

Siglum: TO 07

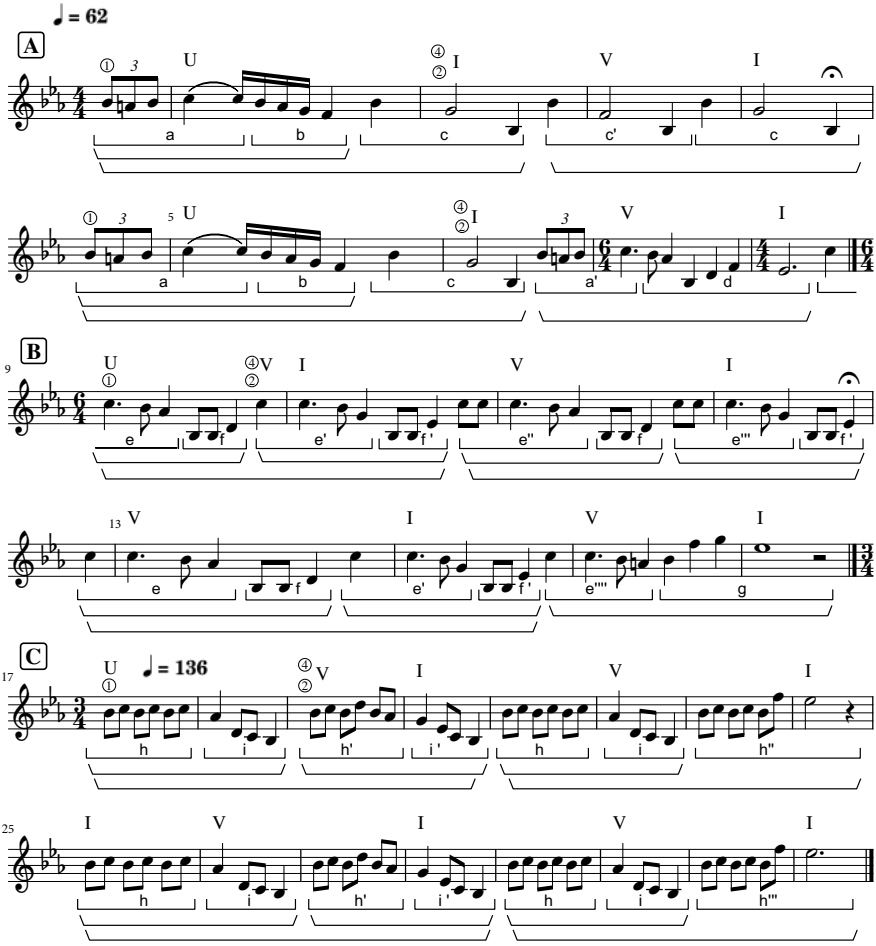
De Stadelwendeler



U: Unaccompanied (without choir accompaniment, only taler bowls)
Bars 1, 17 and 18: Possible harmonization with degree I.
Bar 9: Possible harmonization with degree IV.

Siglum: TO 08

Bi de Chüene of der Alp

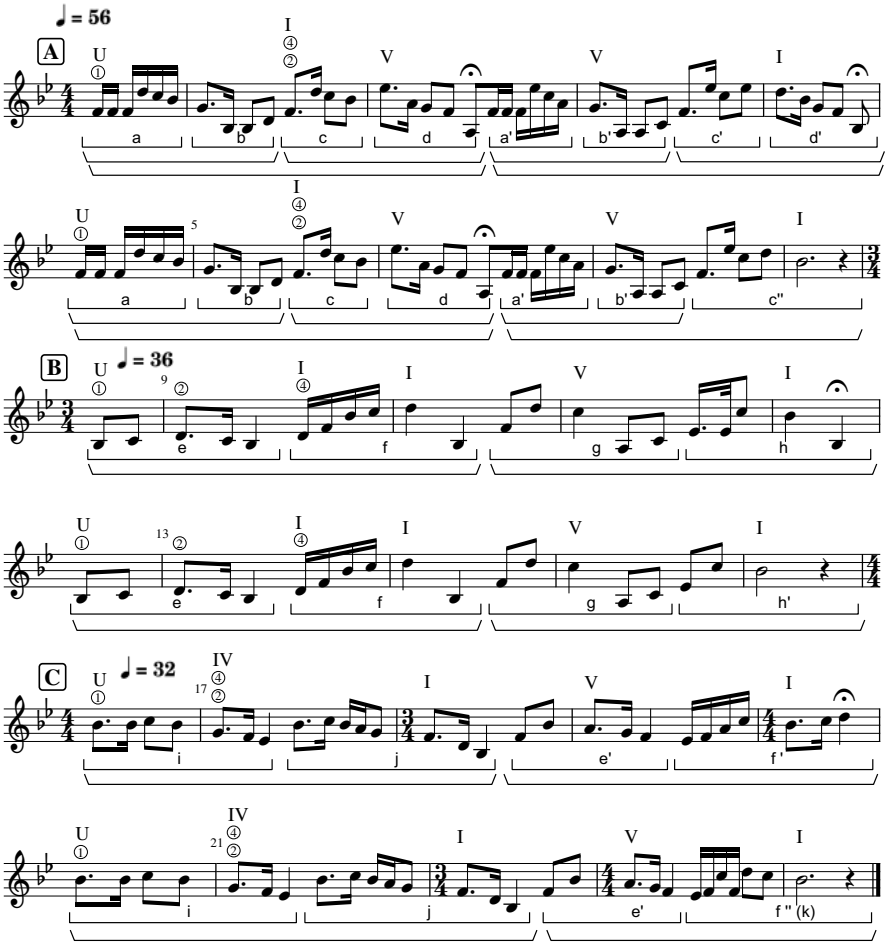


Sequence: A - B - C - B

U: Unaccompanied
Bars 1, 5, 9 and 18: Possible harmonization with degree V.
Bar 17: Possible harmonization with degree I.

Siglum: TO 09

Em Sepp syn



U: Unaccompanied
Possible harmonization with degree I of all bars designated with U.

Siglum: TO 10

Sources of the 30 Audio Recordings

Siglum	Title	Audio Recording
AI 01	*Anna-Koch-Jodel*	Interpreted by: Cäcilia Dähler-Koller ("Böld Cile") Recording: Frauengesang. Rugguusseli und Jodellieder aus Appenzell Innerrhoden, CD, 2010, Verlag Roothuus Gonten.
AI 02	*Rugguusseli Marie Sutter*	Interpreted by: Marie Sutter with yodel group, Teufen (1937) Recording: Frauengesang. Rugguusseli und Jodellieder aus Appenzell Innerrhoden, CD, 2010, Verlag Roothuus Gonten.
AI 03	*Innerrhoder Rugguusseli*	Interpreted by: Original Appenzeller Striichmusig Alder, Urnäsch; Geschwister Dörig, Gesang Recording: Heeweh nach em Appezöll. Orig. Appenzeller Striichmusig Alder, Urnäsch – Geschwister Dörig, Gesang, LP, 1975, EMI Records: E 062-33799.
AI 04	*Em Franze Johann sis*	Interpreted by: Hobby-Sänger Appenzell Recording: Der Ostschweizer Naturjodel, CD, 1997, Tell: 51 1110-2.
AI 05	*Rugguusseli* (Sepp Dobler sen.)	Interpreted by: Engel-Chörli Appenzell Recording: Der Ostschweizer Naturjodel, CD, 1997, Tell: 51 1110-2.
AI 06	*Am Jodlerfest z Rorschach*	Interpreted by: Landjugend-Chörli Appenzell Recording: Der Ostschweizer Naturjodel, CD, 1997, Tell: 51 1110-2.
AI 07	*Rugguserli* (trad.)	Interpreted by: Engel-Chörli Appenzell Recording: Der Ostschweizer Naturjodel, CD, 1997, Tell: 51 1110-2.
AI 08	*Rugguusseli* (trad.)	Interpreted by: Doppelquartett Pfiifestier Recording: 20 Jahre Pfiifestier Appenzell, CD, 2019, Hard Studios.
AI 09	*A de Vechschau* (Josef Rempfler)	Interpreted by: Doppelquartett Pfiifestier Recording: 20 Jahre Pfiifestier Appenzell, CD, 2019, Hard Studios.
AI 10	*En Alt's*	Interpreted by: Hobby-Sänger Appenzell Recording: Der Ostschweizer Naturjodel, CD, 1997, Tell: 51 1110-2.

AR 01	*D' Striichmusig Alder zaured*	Interpreted by: Streichmusik Alder Recording: D' Striichmusig Alder macht uf!, LP, Philips: 825 107 QY.
AR 02	*Em Hansruedi si's*	Interpreted by: Kapelle Alderbuebe Recording: Berewegge, Chäs ond Brot mit de Alderbuebe, LP, 1978, Eugster CH-Record: 4323.
AR 03	*Bodezäuerli*	Interpreted by: Jodelchörli Urnäsch am Säntis Recording: Jodelchörli Urnäsch am Säntis, LP, Stereo Exklusiv: 30-847.
AR 04	*Heewehzäuerli*	Interpreted by: Saumchörli Herisau Recording: E schös Lose!, LP, 1981, Arve Records: 3208.
AR 05	*Chlausezäuerli*	Interpreted by: Schötze-Chörli Stein Recording: S' Appezeller Musigtröckli, LP, 1972, Philips: 6326020.
AR 06	*Vor em Ablooh*	Interpreted by: Schötze-Chörli Stein Recording: Bi öös obe, LP, 1975, Philips: 6326054.
AR 07	*Schwäberg-Zäuerli*	Interpreted by: Jodlerterzett Erwin Schoch, Hans Kunz, Ferdinand Fässler Recording: Mir sönd halt Appezeller, LP, Tell Records: TLP 5048.
AR 08	*Chlausezäuerli Buebe*	Interpreted by: Unbekannter Chlauseschuppel Recording: Alter Silvester Armin Fässler (private recording), CD, 1969, Datenbank Roothuus Gonten: #1027, ZLXXVII36.
AR 09	*Am Jock sim silbrige Hochzig*	Interpreted by: Schötze-Chörli Stein Recording: Zäuerli nach Hampi Schefer, CD, Eigenverlag.
AR 10	*I de Kantonsgrenze z'Herisau*	Interpreted by: Schötze-Chörli Stein Recording: Zäuerli nach Hampi Schefer, CD, Eigenverlag.
TO 01	*De Looser*	Interpreted by: Jodlerklub Männertreu Nesslau, Georg Kuratli Recording: Shellac record, 1930, Ultraphon: A 25035.
TO 02	*De Haas*	Interpreted by: Jodlerklub Männertreu Nesslau, Jakob Metzler Recording: Toggenburg, Chrüz und quer dur's Schwyzerland, Vol. 6, shellac record, Columbia: SEVZ 510.
TO 03	*De Churer*	Interpreted by: Jodlerklub Wattwil Recording: Private recording, LP, Disques ESSE Genève.
TO 04	*De Bühler*	Interpreted by: Jodlerklub Männertreu Nesslau Recording: Shellac record, 1930, Ultraphon: A 25035.

TO 05	*De Scherrer*	Interpreted by: Jodlerklub Männertreu Nesslau Recording: Shellac record, 1930, Ultraphon: A 25036.
TO 06	*Toggenburger Naturjodel*	Interpreted by: Jodlerklub Ebnat-Kappel, Lina Bösch-Lusti Recording: Toggeburger-Lüüt, LP, Tell Record: TLP 5047.
TO 07	*Gante-Jodel*	Interpreted by: Jodlerklub Ebnat-Kappel, Lina Bösch-Lusti Recording: Toggeburger-Lüüt, LP, Tell Record: TLP 5047.
TO 08	*De Stadelwendeler*	Interpreted by: Jodlerklub Männertreu Nesslau, Georg Kuratli Recording: Shellac record, Elite Record: M 5064.
TO 09	*Bi de Chüene of der Alp*	Interpreted by: Jodlerklub Ebnat-Kappel, Emil Hartmann Recording: Shellac record, 1929, Columbia: DZ 150.
TO 10	*Em Sepp syn*	Interpreted by: Jodlerklub Bergfründ Ennetbühl, Albert Ackermann, Ueli Wickli, Jakob Tischhauser Recording: 25 Jahre Jodlerklub Bergfründ Ennetbühl, LP, 1986, Helvetia: H 377.