

University of Tartu
Institute of Psychology

Ares Hubel

**CLOSENESS INTERACTIONS SCALE ESTONIAN VERSION (CIS-EST)
DEVELOPMENT PHASE 1**

Master's thesis

Supervisors: Alan Voodla, Kariina Laas

Running head: Closeness interactions scale development

Tartu 2020

Closeness Interactions Scale Estonian version (CIS-Est) development Phase 1**Abstract**

Humans have a basic need to experience social and physical connections, but in our increasingly technology-focused and socially disconnected world, these connections grow more distant. Even though research implies that social connectedness and physical touch are very important for physical and mental health, there are very few psychometric tools that measure closeness satisfaction and the amount of different expressions of closeness. The aim of the present research was to develop items for a comprehensive and psychometrically valid interaction-based closeness scale - Closeness Interactions Scale (CIS). Item generation phase (N = 48) yielded a 114 item scale which was then reduced to a 32-item preliminary closeness scale in item reduction phase (N = 320). The 32-item scale measured 9 dimensions and demonstrated good internal consistency for both the overall scale ($\alpha = 0.89$) and for each of the 9 subscales. The scale will measure closeness satisfaction in behaviour-related interactions and activities and quantifies both their amount and subjective importance. Preliminary results confirm the subjective and multidimensional structure of closeness, but need to be validated in the next phases of scale construction.

Keywords: closeness, social connectedness, intimacy, physical touch, affective touch, loneliness, interactions, scale development

Tegevuste ja interaktsiooni spetsiifilise läheduse skaala eestikeelse versiooni (CIS-Est) loomise esimene etapp

Kokkuvõte

Sotsiaalse ja füüsilise seotuse kogemine on inimese baasvajadus, kuid tänapäeva tehnoloogilises ja sotsiaalselt distantseerunud maailmas on nende vajaduste täitmine aina raskem. Vaatamata sellele, et uuringute järgi on sotsiaalne seotus ja füüsiline puudutus väga olulised vaimse ja füüsilise tervise jaoks, on väga vähe psühhomeetrisi vahendeid, mis mõõdaksid nii rahulolu lähedusega kui ka erinevate lähedusväljenduste sagedust. Uuringu eesmärgiks oli luua lähedust kirjeldavaid tegevusi uue psühhomeetriselt valiitse ning interaktsioonidel ja tegevustel põhineva läheduse skaala (CIS-Est) jaoks. Tegevuste genereerimise etapi (N = 48) tulemusel saadi 114 elemendiga skaala, mis lühendati tegevuste vähendamise etapis (N = 320) 32-elementiliseks esialgseks läheduse skaalaks. Skaalal tuvastati 9 aladimensiooni, sisereliaablus oli hea nii skaalal üldiselt ($\alpha = 0.89$) kui ka alaskaaladel. Skaala mõõdab lähedusega rahulolu läbi käitumuslike interaktsioonide ja tegevuste ning võtab arvesse nii nende koguse kui ka subjektiivse olulisuse. Esialgsed tulemused näitavad läheduse subjektiivset ja mitmedimensionaalset struktuuri, kuid see vajab kinnitust skaala loomise järgmistes etappides.

Märksõnad: lähedus, sotsiaalne seotus, intiimsus, füüsiline puudutus, afektiivne puudutus, üksildus, interaktsioonid, skaala loomine

Introduction

Just as humans have a basic need for food and shelter, we also have a basic need to belong to a group, form relationships and experience physical contact with other people. We are wired to have social connections and to be touched. These connections come in different forms and vary in closeness – families, romantic relationships, friends, coworkers, social groups, activity groups, the person you see each time you go to your favorite bar or coffee shop, and the strangers we interact with during our daily lives. Most people have at least some of those connections, but as we live in an increasingly technology-focused and socially disconnected world, these connections grow more distant, both physically and mentally. We have fewer long term relationships, less children (United Nations, 2019) and we have fewer and fewer close friends with whom we share the intimate details of our lives (McPherson, Smith-Lovin & Brashears, 2006). While our social isolation has increased, intimate connections have decreased and rates of suicide and depression multiplied (Twenge et al. 2019).

The effects of various degrees of distance in physical contact and social connections on a person's mental and physical health is relatively well known. Social connections have positive influence on psychological and emotional well-being (Cruwys et al. 2013; Kawachi & Berkman, 2001; Perkins et al., 2015; Yu et al., 2015), physical health (Cruwys et al., 2014a; Uchino, 2006) and overall longevity (Holt-Lunstad et al., 2010, 2015; House, Landis, & Umberson, 1988; Patterson and Veenstra, 2010; Shor, Roelfs, & Yogeve, 2013). Social connections also reduce suicide risk (Heikkinen et al., 1993; Kaminski et al., 2010) and depression (Cruwys et al., 2014a). Both loneliness and social isolation are associated with poorer health behaviors including smoking, physical inactivity, sleep problems and poorer mental health (Cacioppo & Hawkley, 2009; Cacioppo et al., 2002; Theeke, 2010; Hawkley, Thisted, & Cacioppo, 2009; Vaillant et al., 1998). Social connectedness has also been found to be a stronger and more consistent predictor of mental health than mental health is of social connectedness (Ding et al., 2015; Saeri, 2018), implicating that having more social connections is good for mental health, while good mental health doesn't necessarily mean more social connections.

Recent meta-analysis (Field, 2019) has shown that there is also extensive research on physical touch (social touch, CT touch (lightest form of touch) and massage) being a crucial factor for both physical and psychological well-being. Tactile affection deprivation (lack of affectionate touch such as hugging, hand-holding, kissing, and other forms of tactile affection) correlates positively with loneliness, depression, mood and anxiety disorders, stress, alexithymia, dysfunctional attachment styles, some personality disorders, and secondary immune disorders (Floyd, 2014). Moreover, even gentle touch from a stranger has been shown to reduce feelings of social exclusion (von Mohr et al. 2017) and imagined touch can reduce stress compared to control imaginations or verbal support (Jakubiak & Feeney, 2016).

Considering how important social connectedness and physical touch are for mental and physical well-being, there are very few tools that could be considered to measure a person's social and physical connections or activities and even less of those that would measure both at the same time. It seems that measuring social and physical connections is a complicated task that is also evident in the amount of well cited and relevant scales. Most widely known, used and cited scales that include at least some items that measure either feelings of emotional closeness, social connections, physical closeness or some other forms of intimacy can be found in Table 1.

Table 1. *Overview of existing closeness scales*

Name	Author(s)	Citations (14.02.2020)
Inclusion of the Other in the Self (IOS) Scale	Aron, Aron & Smollan (1992)	4136
Social Support Questionnaire (SSQ/SSQ3/SSQ6)	Sarason (1983)	4022
Family Assessment Device (FAD)	Epstein, Baldwin & Bishop (1983)	3667
Loving and Liking Scale	Rubin (1973)	1156
Relationship Closeness Inventory (RCI)	Berscheid, Snyder & Omoto (1989)	1084
Personal Assessment of Intimacy in Relationships (PAIR)	Schaefer & Olson, (1981)	940

Family Assessment Measure (FAM)	Skinner, Steinhauer & Santa-Barbara (2009)	578
Miller Social Intimacy Scale (MSIS)	Miller & Lefcourt (1982)	527
ENRICH Marital Inventory	Fowers & Olson (1989)	377
Fear of Intimacy Scale	Descutner & Thelen (1991)	366
Significant Others Scale (SOS)	Power et al. (1988)	266
Waring Intimacy Questionnaire (WIQ)	Waring & Reddon (1983)	183
Unidimensional Relationship Closeness Scale (URCS)	Dibble, Levine & Park (2012)	140
Personal Acquaintance Measure (PAM)	Starzyk et al. (2006)	86
Sternberg Triangular Love Scale	Chojnacki & Walsh (1990)	61
Perceived Interpersonal Closeness Scale (PICS)	Popovic, Milne & Barrett (2003)	51
Marital Intimacy Questionnaire (MIQ)	Van den Broucke, Vertommen & Vandereycken (1995)	41
PAIR-Modified (PAIR-M)	Thériault (1998)	25
Touch Experiences and Attitudes Questionnaire (TEAQ)	Trotter et al. (2018)	8

All of the scales listed in Table 1 have at least some of the following problems that have also been indicated in other studies:

- Limited to specific relationship types (e.g. married couples, family, friends) and/or designed to only measure closeness between two specific people. This leaves no room for individual preferences and neglects everyone who doesn't fit to very traditional pre-specified parameters.
- Limited to one type of closeness (e.g. social connections, physical touch, intimacy) even though closeness is a multidimensional concept (Kardan-Souraki et al., 2016; Berry and Welsh, 2010; Hook et. al., 2003)

- Do not take into account the subjective nature of closeness - same activities and interactions can be seen very differently by people with different closeness preferences. (Berry and Welsh, 2010; Holt-Lunstad et al., 2010; Luo et al., 2012; Malouf, 2010)
- Limited to one type of measures (e.g how many friends you have, but not the quality and satisfaction with these connections), but should include both objective and subjective components, where the latter is more associated with psychological health (Berry and Welsh, 2010; Holt-Lunstad et al., 2010; Luo et al., 2012)
- Have overly simplified or unreasonably grouped categories and items without transparent scale development process (e.g. one item - IOS scale (Aron, Aron & Smollan, 1992), 3 item SSQ3 Scale (Sarason, 1983))
- Closeness has not been conceptualized as social interaction or activity specific, even though feelings of closeness just like emotions (Russell, 2003) need a target, be it a person, an object, or a social and physical environment.

As all of the scales mentioned in Table 1 have problems with points mentioned above, the list provides a starting point for the development of a new closeness scale that would address these problems. The goal of this paper is to do the groundwork for developing a new closeness scale and find the necessary social and physical interactions and activities that contribute to the satisfaction with social connectedness, physical closeness and intimacy. The scale development is based on the assumption that closeness is multidimensional, subjective, and based on both objective and subjective measures. The development process is based on the best practices of scale development (Boateng et.a 2018). The outcome of the current study is a list of rated, categorized and grouped social and physical interactions that form the basis for developing a brief, comprehensive and psychometrically valid interaction-based closeness scale. More precisely, the aim of the current work is to answer the following questions:

1. What are the different activities and interactions that people find most relevant to their closeness satisfaction?
2. What are the dimensions for these activities and interactions?
3. Which activity and interaction items are relevant for measuring these dimensions?

Method

Sample and Design

The development of the Closeness Interactions Scale Estonian version (CIS-Est) follows the guidelines of scale construction best practices (Boateng et.a 2018). In the current study, first two phases of scale construction out of four were conducted: item generation and item reduction. Scale validation and reliability testing will be done in future studies. In the item generation phase, 48 participants (mean age = 31.2, SD = 11.3; 14 (29.2%) male) answered interview questions (7 in a structured interview and 41 anonymously online). In the item reduction phase, a questionnaire consisting of the items generated in the first phase was completed by 320 participants (mean age = 30.7, SD = 9.7; 58 (18.3%) male). An invitation for both item generation interviews and item reduction questionnaire was distributed through Facebook and mailing lists of University of Tartu. The invitation also contained a possibility to win a 10 euro gift card (total of 10 gift cards) for participation. Item reduction questionnaire was anonymous and a link to gift card participation was displayed at the end of questionnaire and forwarded to a separate question form. Questionnaires were implemented on the Google Forms platform. Out of an initial item reduction survey sample of 320, three participants were excluded due to inadequate response patterns detected.

Measures

Phase 1: Item generation interview and questionnaire

Structured item creation interview and questionnaire consisted of 9 open-ended questions. The goal was to map different physical and social activities or situations that people perceive as inducing closeness or reducing loneliness. There were also questions that asked people to define closeness, list different sexual activities and describe if and how can virtual connection, animals and inanimate objects reduce loneliness. Full list of questions can be found in Appendix 1. The interviews were conducted in conditions fit for normal therapy situation (private room, minimal outside interference, casual atmosphere, pre-interview explanation of expectations).

Phase 2: Item reduction questionnaire

The questionnaire for item reduction consisted of 114 closeness inducing or loneliness reducing activities and interactions generated in the first phase. Questions were divided into three sections (physical/social, mental/verbal and loneliness reducing activities and interactions) with slightly differing instructions based on the specific dimension. The aim of the second phase was to filter out questions that are most important for measuring interactive closeness. Participants were asked to express the importance of different closeness inducing or loneliness reducing activities and interactions on a 5-point likert scale (0 - Not at all important, 1 - Somewhat important, 2 - Moderately important, 3 - Important 4 - Very important). Some examples of the activities and interactions included in the questionnaire were: “Short light hug”, “Publicly holding hands or arm around the waist”, “Long and/or passionate kissing”, “Sex, genital contact for sexual satisfaction and/or penetration”, “Group sports (eg. football, basketball, hockey, etc.)”, “Cooking together”, “Dancing alone”, “Listening music alone”, “Video call with an important person”, “Interacting with pets or taking care of them (eg. dogs, cats, hamster, etc.)”, “Talking about mental health problems (eg. anxiety, depression, panic attacks, etc.)”, “Talking about mutual future plans”. A full list of items and instructions can be found in Appendix 2.

Participant age, sex, education level, relationship status, total time spent in close relationships and Big-5 personality dimensions were included as control variables to aid item reduction phase when looking at group differences. Big-5 personality was measured with the Estonian language version of the 30-item Extra Short Five questionnaire (XS5; Konstabel et al., 2017), which describes personality on a five-factor model: openness, conscientiousness, extraversion, agreeableness and neuroticism.

Statistical analyses

All the analyses were conducted using RStudio statistical computing environment. Descriptive statistics were used to characterize the demographic data and for the first step of item reduction when comparing possible group differences. For statistical analyses participant age was collapsed into four groups (18-25, 26-35, 36-45, 45+), relationship status into two groups (in some kind close relationship, single), relationship length into four groups (up to 1 year, 1 to 3 years, 3 to 10 years, 10+ years), education into two groups (higher education, basic/high/vocational school) and personality variables into three groups (high,

middle, low). Many methods of item-reduction were used separately at first: means, median, variation based item-reduction, item-total correlations, Rasch analysis, Principal Components Analysis (PCA), Exploratory Factor Analysis (EFA). None of these methods alone gave a satisfactory end result, as most assume that the scale is unidimensional and/or deleted too many highly rated items. Eventually, a concept-retention method (Beaton et al., 2005) with mean based exclusion for the first and EFA for the second step of item reduction gave the best empirical and conceptual fit to the data. The KMO index (0.88) and Bartlett's test of sphericity ($p < 0.001$) indicated that the data satisfied the criteria for factor analysis. Parallel analysis and scree plot was used to determine the number of factors because EFA with eigenvalue 1 resulted in a 6 factor model that excluded too many important items.

The R code for data cleaning, the final statistical analyses and the data file can be retrieved at: <https://drive.google.com/open?id=1KUdg4h3PZsIIIGiiHxeTK61gb0xxjZnk>

Results

Phase 1: Item generation

The initial item pool was generated through a combination of deductive (literature review, assessment of existing scales) and inductive methods (pre-survey cognitive interviews, structured item creation interviews, item creation questionnaire). Item generation criteria for interviews and item creation questionnaire was that an activity or interaction had to be mentioned at least twice to be included. Five reviewers examined the final item pool for overlap and redundancy, which reduced the item pool to a final set of 114 items that formed the questionnaire to be used in the item reduction phase. The examination was done according to scale construction best practices, that advises to keep items that could be unrelated to the final construct as successive evaluation will eliminate undesirable items anyway (Boateng et al., 2018).

Phase 2: Item reduction

The 114-item questionnaire generated in phase 1 was administered to a new sample of 320 participants. Full list of 114 items used can be found in Appendix 2. Table 2 provides a complete description of the demographic characteristics of the sample.

Table 2. *Demographic characteristics of Phase 2 sample (N=317)*

Variable	n	%
Age (yr)		
18-25	120	37.9
26-35	117	36.9
36-45	44	13.9
46+	36	11.4
Gender		
Female	259	81.7
Male	58	18.3
Education		
Primary school	6	1.9
High school	87	27.4
Vocational university	21	6.6
Bachelor's degree	106	33.4
Master's or PhD degree	97	30.6
Relationship status		
Married	50	15.8
In a relationship	147	46.4
Single	102	32.2
Other	18	5.7
Close relationship length		
0-1 years	62	19.6
1-3 years	61	19.2
3-10 years	126	39.8
10+ years	68	21.5

Primary goal of the item reduction analysis was to identify items for deletion or modification and obtain 15-30 usable items through multiple criteria and methods. First step was to remove items that were relatively unimportant for everyone. For every item an average total score and average score in all control variable groups (sex, age, education, relationship status, relationship length, personality type) was calculated. Items with an average score less than 2 and average score less than 2.5 in all control variable groups were excluded. That excluded a total of 48 items and retained 66 items for the next step of item reduction.

As a second step in item reduction an Exploratory Factor Analysis (EFA - minimum residuals extraction) was used. Parallel analysis was used to determine the number of factors. A total of 3 models was compared because according to parallel analysis it was equally

important to try 8, 10 and 11 factor models. The main purpose of EFA was to further reduce items and find possible items that could be combined. The 10-factor model was chosen because it resulted in the best empirical and conceptual fit to the data (RMSEA = 0.051, RMSR = 0.03), accounting for 37.5% of the variance with adequate number of items with significant loadings on each conceptually consistent factor. EFA outcome with <0.5 factor loading cutoff was 32 items loading on 9 factors, a total of 34 items among which 1 factor was excluded due to having no items after <0.5 factor loading cutoff was applied. Cronbach alpha coefficients for reliability were 0.89 for the entire scale and ranged from 0.64 to 0.87 for the subscales. Remaining 32 items with their loadings, reliability statistics and dimensions can be found in Table 3. Full factor table, loadings and correlations between factors can be found in Appendix 3.

The chosen factor model indicated that some of the discovered factors were based on a couple of highly correlated and context wise very similar items (e.g Men1 - “Mental health problems (e.g anxiety, depression, panic attacks etc) and Men2 - “Physical health problems and coping”). This would allow the creation of an even shorter version of the scale. Depending on the goal, the scale could be reduced according to content similarity, inter-item correlations or by dimensional grouping. For example, items could be combined if they load on the same factor, have statistically important high inter-item correlation (>0.5), their content is very similar and the wording could be modified to retain the essence of both items. It would also be possible to create new items based on dimensions as most of the dimensions contain only two to three items. All of these suggestions are preliminary and would have to be validated in the next steps of scale development.

Table 3: *Results of Exploratory Factor Analysis*

Factor / Items	m	sd	load	α
				0.89
9. <i>Perceived passive physical proximity</i>				0.70
7. Koos magamine ilma kaisutamata	2.31	1.25	0.51	
8. Füüsiliselt lähestikku olemine (tajud teise keha lähedust või soojust) ilma puudutuseta	2.50	1.14	0.76	
9. Külge-külje vastas kehakontaktis olemine (lihtsalt oled teise inimese keha vastas mingi aja otseselt midagi tegemata)	2.46	1.16	0.62	
2. <i>Long and personal physical contacts</i>				0.83
4. Pikem sensuaalsem silitamine või puudutamine (nt. pea, näo, juuste, käte silitamine jms.)	2.82	1.19	0.60	

5.	Kaisutamine, kaisus olemine või lebamine (nt. filmi, teleka vaatamise ajal jms.)	3.25	0.98	0.72	
13.	Musi või põgus suudlus	2.81	1.07	0.56	
14.	Pikk ja/või kirglik suudlemine	2.72	1.20	0.54	
20.	Pikem hoidev kallistus	3.18	1.01	0.55	
<i>4. Intimate closeness and sexual satisfaction</i>					0.81
21.	Seks, genitaalide kontakt rahulduse saamise eesmärgil ja/või penetratsioon	3.08	0.96	0.59	
23.	Suuseks, keele või suuga rahulduse saamine või pakkumine	2.20	1.30	0.75	
24.	Käega seksuaalpartneri rahuldamine või rahuldatud saamine	2.20	1.12	0.72	
32.	Seksuaalse alatooni ja/või puudutusega koos duši all, vannis või saunas käimine	2.18	1.23	0.53	
33.	Seksuaalse tegevuse ajal mõnu või soovide kommunikeerimine	2.56	1.21	0.53	
35.	Eelmäng - suudlemine, silitamine, rindade katsumine jne. - sihipärane tegevus erutuse suurendamiseks	3.33	0.94	0.53	
<i>3. Social recreational activities</i>					0.77
44.	Üksteise abistamine ja koos tegutsemine ühise eesmärgi saavutamiseks (nt. koos koristamine jms.)	2.65	1.15	0.53	
45.	Ühised rekreatiivsed tegevused (ühine meelelahutus, reisimine, hobid, koos mängimine, laulmine)	3.18	0.98	0.73	
46.	Koos jalutamine, metsas-looduses viibimine	3.17	0.97	0.69	
<i>5. Talking about day-to-day topics</i>					0.64
67.	Töö, raha, töösuhted ja tööalane tulevik	2.49	1.15	0.63	
74.	Argielu teemad ja päevased juhtumised	2.51	1.10	0.61	
<i>7. Stimulating intellectual conversations</i>					0.71
70.	Väärtused, hoiakud ja maailmavaade, religioon	3.19	1.02	0.57	
71.	Intellektuaalsed, filosoofilised, eksistentsiaalsed ja/või abstraktsed teemad	3.00	1.07	0.66	
<i>1. Talking about personal and potentially shameful topics</i>					0.87
57.	Vaimse tervise probleemid (nt. ärevus, depressioon, paanikahood jms.)	2.70	1.23	0.80	
58.	Füüsilise tervise probleemid ja toimetulek	2.49	1.14	0.76	
59.	Surm ja/või raske haigus	2.27	1.31	0.76	
60.	Mineviku traumad, valusad kogemused/läbielamised ja mälestused	2.63	1.22	0.70	
61.	Veidrad ja sotsiaalselt mitte aktsepteeritud mõtted	2.34	1.29	0.51	
62.	Keha ja sellega seotud piinlikud teemad	2.09	1.23	0.57	
<i>8. Being active alone</i>					0.74
90.	Üksinda trenni tegemine (nt. jooksmine, jooga, rattasõit jms.)	2.28	1.33	0.60	
91.	Üksinda jalutamine, matkamine, looduses viibimine	2.45	1.25	0.79	
<i>6. Solitary entertainment and media consumption</i>					0.71
98.	Üksinda muusika kuulamine	2.66	1.28	0.51	
99.	Üksinda videote vaatamine Youtubes või mõnes muus keskkonnas	2.17	1.39	0.64	
100.	Üksinda filmide, televiisori vaatamine	2.18	1.30	0.51	

Note. 'Minimum residual' extraction method was used in combination with a 'oblimin' rotation, Cronbach α at the top refers to the overall scale and others respectively to the subscales

Discussion

The aim of the current thesis was to develop items for a comprehensive and psychometrically sound scale to measure interaction and activity specific closeness satisfaction. Items for the Closeness Interactions Scale Estonian version (CIS-Est) were developed according to the best practices of scale development (Boateng et al., 2018) and this paper covers the item creation and reduction phases. In the item creation phase we reviewed the psychological literature on closeness, loneliness, intimacy and social connectedness and created an initial item pool, which was further expanded through interviews ($n = 7$) and a preliminary questionnaire ($n = 41$). In the item reduction phase, 317 participants evaluated the importance of proposed 114 items for their closeness satisfaction. Through combinations of data reduction analyses we obtained a 32 item scale that measured 9 factors. The scale demonstrated good internal consistency for both the overall scale ($\alpha = 0.89$) and for each of the 9 subscales (see Table 3). We interpreted the 32 items to measure the following 9 dimensions of closeness interactions: Perceived passive physical proximity, Long and personal physical contacts, Intimate closeness and sexual satisfaction, Social recreational activities, Talking about day-to-day topics, Talking about personal and potentially shameful topics, Stimulating intellectual conversations, Being active alone, Solitary entertainment and media consumption. Preliminary results show that it is possible to create a meaningful 32-item scale and also a shorter scale based only on factor dimensions (one generalised item per dimension) to measure closeness through interactions and activities. The strength of this scale is that it takes into account both the quantitative amount and subjective importance of these interactions and activities. These are preliminary results and should be validated in the next phases of scale construction: dimensional testing, reliability testing and validity testing (Boateng et.a 2018).

These results support the idea that closeness is a multidimensional construct, for which people discern different activity groups that make up their personal closeness preferences. Although there is not much consensus in the literature on how many different types of closeness there are (e.g. eleven (Kardan-Souraki, 2016), five (Schaefer & Olson, 1981) or three (Tolstedt & Stokes, 1983)), all the models include some forms of physical-sexual, verbal and social dimensions. These dimensions are also supported by the structure of this scale. Loneliness reducing activities formed a separate dimension but are usually not included in closeness models even though literature points to a tight relationship

between closeness and loneliness. Increasing closeness has similar effect on mental (Cruwys et al. 2013, 2014a; Kawachi & Berkman, 2001; Perkins et al., 2015; Yu et al., 2015) and physical health (Cruwys et al., 2014a; Field, 2019; Uchino, 2006) as reducing loneliness (Cacioppo et al., 2002; Hawkley & Cacioppo, 2009, 2010; Theeke, 2010). This implies that loneliness reducing activities dimension should be included in the development of closeness scales.

In the item creation interviews and questionnaire, people defined “closeness” as meaningful mental and physical connection, but when asked if closeness and loneliness are opposites then about 50% say no, explaining that loneliness is not physical. This might be due to the fact that the estonian word for loneliness “*üksildus*” is also understood as “*being alone*” but not necessarily “*feeling lonely*”. Therefore when describing the lack of physical and mental closeness a different word or phrase in estonian than “*üksildus*” should be used for the sake of clarity. Another way of getting some insight into the differences between increased closeness and decreased loneliness is analyzing the data on closeness inducing and loneliness reducing activities separately.

Limitations

The current findings should be interpreted considering that this paper is a report of the first two phases of scale development out of four. For more reliable and coherent conclusions, the remaining scale development phases should also be completed. The main limitation of the sample is that even though the age range was 18-67, the average age of participants was 30 and the percentage of people with higher education was higher than population average. The percentage of women in the sample was also proportionally higher than men, which could limit the validity of the scale in male populations. It is also worth noting the time period the data was collected. The interviews and interview questionnaire were done in the beginning of February 2020, which is before the Coronavirus crisis and national lockdown in Estonia. The item reduction questionnaire was made available one month into the lockdown which may have had an effect on the answers people gave. Namely, a period of crisis might systematically influence people’s perceived safety and need for closeness, which might be reflected in their importance ratings. It could also be argued that the 114-item questionnaire was biased towards romantic or very close relationships as the more intimate interactions were in the first part of questionnaire and the invitation flyer

depicted an intimate couple. A picture of an intimate couple could mentally prepare people to only think in the context of intimate relationships. Questionnaires were distributed through Facebook and mailing lists and therefore share the general limitations of these approaches like answer bias and sample representativeness.

Although group differences were addressed through mean based comparison in the item reduction phase, a more thorough analysis on these differences should be considered. This analysis was left out from current research for the sheer amount of additional statistical tests needed to properly address this problem. Statistically important group differences definitely exist in this data, but as the sample is not entirely representative they are better left for the next steps of scale development with additional samples. Group differences become more important when interactions are very specific but are less important with dimension based shorter scale. For example if there are enough statistically important differences between men and women, then it should be considered to create two sets of important closeness interactions differentiated by sex and then combining them as a last step.

Final conclusions and future directions

Even though the current sample is not representative, the main outcome of the study is an internally consistent 32-item scale with significant loadings on 9 conceptually and empirically consistent factors. The data gathered during this research will also be used in the next steps of scale development. A second sample should be gathered to statistically evaluate construct validity through factor structure with a combined use of EFA and CFA. Extra steps should be taken so that the second sample is more representative. The questionnaire should be advertised with a less focus on intimate relationships, constructed in a different way (mix up the order of items so, that the most intimate items aren't presented first) and with slightly different instructions (less focus on intimate relationships). Once the preliminary items from both samples have been analyzed, modified when necessary, and reduced to an optimal number per scale, these revised items can then be administered to a further sample of participants. The new scale should be compared with other existing scales measuring conceptually related (e.g. mental and physical health) variables and validated on samples of different languages and cultures.

Acknowledgements

I want to thank my supervisors Alan and Kariina for giving feedback when it was needed even though the coronavirus pandemic made the process very difficult for everyone involved. I would also like to thank Teili, Karl-Erik, Kärt, Alan and Helen for stimulating conversations about closeness and giving feedback to my half-baked ideas.

References

- Aron, A., Aron, E. N., & Smollan, D. (1992). Inclusion of other in the self scale and the structure of interpersonal closeness. *Journal of personality and social psychology*, 63(4), 596.
- Beaton, D. E., Wright, J. G., Katz, J. N., & Upper Extremity Collaborative Group. (2005). Development of the QuickDASH: comparison of three item-reduction approaches. *JBJS*, 87(5), 1038-1046.
- Berry, HL, Welsh, JA (2010) Social capital and health in Australia: An overview from the household, income and labour dynamics in Australia survey. *Social Science & Medicine* 70: 588–596.
- Boateng, G. O., Neilands, T. B., Frongillo, E. A., Melgar-Quiñonez, H. R., & Young, S. L. (2018). Best practices for developing and validating scales for health, social, and behavioral research: a primer. *Frontiers in public health*, 6, 149.
- Cacioppo, J. T., & Hawkley, L. C. (2009). Perceived social isolation and cognition. *Trends in cognitive sciences*, 13(10), 447-454.
- Cacioppo, J. T., Hawkley, L. C., Crawford, L. E., Ernst, J. M., Burleson, M. H., Kowalewski, R. B., . . . Berntson, G. G. (2002). Loneliness and health: Potential mechanisms. *Psychosomatic Medicine*, 64, 407–417.
- Chojnacki, J. T., & Walsh, W. B. (1990). Reliability and concurrent validity of the Sternberg Triangular Love Scale. *Psychological Reports*, 67(1), 219-224.
- Cruwys, T, Dingle, GA, Haslam, C. (2013) Social group memberships protect against future depression, alleviate depression symptoms and prevent depression relapse. *Social Science & Medicine* 98: 179–186.
- Cruwys, T, Haslam, SA, Dingle, GA. (2014a) Depression and social identity: An integrative review. *Personality and Social Psychology Review* 18: 215–238.
- Dibble, J. L., Levine, T. R., & Park, H. S. (2012). The Unidimensional Relationship Closeness Scale (URCS): Reliability and validity evidence for a new measure of relationship closeness. *Psychological assessment*, 24(3), 565.
- Ding, N, Berry, HL, O'Brien, LV (2015) One-year reciprocal relationship between community participation and mental wellbeing in Australia: A panel analysis. *Social Science & Medicine* 128: 246–254.

- Epstein, N. B., Baldwin, L. M., & Bishop, D. S. (1983). The McMaster family assessment device. *Journal of marital and family therapy*, *9*(2), 171-180.
- Field, T. (2019). Social touch, CT touch and massage therapy: A narrative review. *Developmental Review*, *51*, 123–145.
- Floyd, K. (2014). Relational and health correlates of affection deprivation. *Western Journal of Communication*, *78*(4), 383-403.
- Fowers, B. J., & Olson, D. H. (1989). ENRICH Marital Inventory: A discriminant validity and cross-validation assessment. *Journal of marital and family therapy*, *15*(1), 65-79.
- Hawkey, L. C., & Cacioppo, J. T. (2010). Loneliness matters: A theoretical and empirical review of consequences and mechanisms. *Annals of behavioral medicine*, *40*(2), 218-227.
- Hawkey, L. C., Thisted, R. A., Cacioppo, J. T. (2009). Loneliness predicts reduced physical activity: Cross-sectional & longitudinal analyses. *Health Psychology*, *28*, 354–363. doi:10.1037/a0014400
- Heikkinen, M., Aro, H., & Lönnqvist, J. (1993). Life events and social support in suicide. *Suicide and Life-Threatening Behavior*, *23*(4), 343-358.
- Holt-Lunstad, J., Smith, T. B., Layton, J. B. (2010). Social relationships and mortality risk: A meta-analytic review. *PLoS Medicine*, *7*(7), e1000316. doi:10.1371/journal.pmed.1000316
- Holt-Lunstad, J., Smith, T. B., Baker, M., Harris, T., & Stephenson, D. (2015). Loneliness and social isolation as risk factors for mortality: a meta-analytic review. *Perspectives on psychological science*, *10*(2), 227-237.
- Hook, M. K., Gerstein, L. H., Detterich, L., & Gridley, B. (2003). How close are we? Measuring intimacy and examining gender differences. *Journal of Counseling & Development*, *81*(4), 462-472.
- House, J. S., Landis, K. R., Umberson, D. (1988). Social relationships and health. *Science*, *241*, 540–545.
- Kaminski, J. W., Puddy, R. W., Hall, D. M., Cashman, S. Y., Crosby, A. E., & Ortega, L. A. (2010). The relative influence of different domains of social connectedness on self-directed violence in adolescence. *Journal of youth and adolescence*, *39*(5), 460-473.
- Kardan-Souraki, M., Hamzehgardeshi, Z., Asadpour, I., Mohammadpour, R. A., & Khani, S.

- (2016). A review of marital intimacy-enhancing interventions among married individuals. *Global journal of health science*, 8(8), 74.
- Kawachi, I, Berkman, LF (2001) Social ties and mental health. *Journal of Urban Health* 78: 458–467.
- Konstabel, K., Lönnqvist, J. E., Leikas, S., Velazquez, R. G., Qin, H., Verkasalo, M., & Walkowitz, G. (2017). Measuring single constructs by single items: Constructing an even shorter version of the “Short Five” personality inventory. *PloS one*, 12(8).
- Luo, Y, Hawkley, LC, Waite, LJ. (2012) Loneliness, health, and mortality in old age: A national longitudinal study. *Social Science & Medicine* 74: 907–914.
- Malouff, J. M., Thorsteinsson, E. B., Schutte, N. S., Bhullar, N., & Rooke, S. E. (2010). The five-factor model of personality and relationship satisfaction of intimate partners: A meta-analysis. *Journal of Research in Personality*, 44(1), 124-127.
- McPherson, M., Smith-Lovin, L., & Brashears, M. E. (2006). Social isolation in America: Changes in core discussion networks over two decades. *American sociological review*, 71(3), 353-375.
- von Mohr, M., Kirsch, L. P., & Fotopoulou, A. (2017). The soothing function of touch: affective touch reduces feelings of social exclusion. *Scientific reports*, 7(1), 1-9.
- Patterson, AC, Veenstra, G (2010) Loneliness and risk of mortality: A longitudinal investigation in Alameda County, California. *Social Science & Medicine* 71: 181–186.
- Perkins, JM, Subramanian, SV, Christakis, NA (2015) Social networks and health: A systematic review of sociocentric network studies in low- and middle-income countries. *Social Science & Medicine* 125: 60–78.
- Popovic, M., Milne, D., & Barrett, P. (2003). The scale of perceived interpersonal closeness (PICS). *Clinical Psychology & Psychotherapy: An International Journal of Theory & Practice*, 10(5), 286-301.
- Rubin, Z. (1973). Liking and loving: An invitation to social psychology. *Holt, Rinehart & Winston*.
- Russell, J. A. (2003). Core affect and the psychological construction of emotion. *Psychological review*, 110(1), 145.
- Saeri, A. K., Cruwys, T., Barlow, F. K., Stronge, S., & Sibley, C. G. (2018). Social connectedness improves public mental health: Investigating bidirectional relationships

- in the New Zealand attitudes and values survey. *Australian & New Zealand Journal of Psychiatry*, 52(4), 365-374.
- Sarason, I. G., Levine, H. M., Basham, R. B., & Sarason, B. R. (1983). Assessing social support: The social support questionnaire. *Journal of personality and social psychology*, 44(1), 127.
- Schaefer, M. T., & Olson, D. H. (1981). Assessing intimacy: The PAIR inventory. *Journal of marital and family therapy*, 7(1), 47-60.
- Shor, E., Roelfs, D. J., Yogeve, T. (2013). The strength of family ties: A meta-analysis and meta-regression of self-reported social support and mortality. *Social Networks*, 35, 626–638. doi:10.1016/j.socnet.2013.08.004
- Skinner, H. A., Steinhauer, P. D., & Santa-Barbara, J. (2009). The family assessment measure. *Canadian Journal of Community Mental Health*, 2(2), 91-103.
- Starzyk, K. B., Holden, R. R., Fabrigar, L. R., & MacDonald, T. K. (2006). The Personal Acquaintance Measure: a tool for appraising one's acquaintance with any person. *Journal of personality and social psychology*, 90(5), 833.
- Theeke, L. A. (2010). Sociodemographic and health-related risks for loneliness and outcome differences by loneliness status in a sample of U.S. older adults. *Research in Gerontological Nursing*, 3, 113–125. doi:10.3928/19404921-20091103-99
- Thériault, J. (1998). Assessing intimacy with the best friend and the sexual partner during adolescence: The PAIR-M inventory. *The Journal of psychology*, 132(5), 493-506.
- Tolstedt, B. E., & Stokes, J. P. (1983). Relation of verbal, affective, and physical intimacy to marital satisfaction. *Journal of counseling psychology*, 30(4), 573.
- Trotter, P. D., McGlone, F., Reniers, R. L. E. P., & Deakin, J. F. W. (2018). Construction and validation of the Touch Experiences and Attitudes Questionnaire (TEAQ): a self-report measure to determine attitudes toward and experiences of positive touch. *Journal of nonverbal behavior*, 42(4), 379-416.
- Twenge, J. M., Cooper, A. B., Joiner, T. E., Duffy, M. E., & Binau, S. G. (2019). Age, period, and cohort trends in mood disorder indicators and suicide-related outcomes in a nationally representative dataset, 2005–2017. *Journal of Abnormal Psychology*.
- Uchino, B. N. (2006). Social support and health: A review of physiological processes potentially underlying links to disease outcomes. *Journal of Behavioral Medicine*, 29, 377–387. doi:10.1007/s10865-006-9056-5

- United Nations Entity for Gender Equality and the Empowerment of Women (2019). *Progress of the worlds women 2019-2020* [PDF file]. Retrieved from <https://www.unwomen.org/-/media/headquarters/attachments/sections/library/publications/2019/progress-of-the-worlds-women-2019-2020-en.pdf>
- Vaillant, G. E., Meyer, S. E., Mukamal, K., & Soldz, S. (1998). Are social supports in late midlife a cause or a result of successful physical ageing?. *Psychological Medicine*, 28(5), 1159-1168.
- Van den Broucke, S., Vertommen, H., & Vandereycken, W. (1995). Construction and validation of a marital intimacy questionnaire. *Family Relations*, 285-290.
- Waring, E. M., & Reddon, J. R. (1983). The measurement of intimacy in marriage: The Waring Intimacy Questionnaire. *Journal of Clinical Psychology*, 39(1), 53-57.
- Yu, G, Sessions, JG, Fu, Y. (2015) A multilevel cross-lagged structural equation analysis for reciprocal relationship between social capital and health. *Social Science & Medicine* 142: 1-8.

Appendix 1. Interview questions and questionnaire

1. What does closeness mean to you? How would you define it?
 - a. Mida tähendab sinu jaoks lähedus? Kuidas sina seda defineeriksid?
2. Is closeness the opposite of loneliness? If not, then why?
 - a. Kas lähedus on üksilduse vastand? Kui ei ole, siis miks?
3. Name in your opinion important physical closeness activities that you like to either receive or do to others.
 - a. Nimeta sinu arvates olulisi füüsilise läheduse tegevusi, mida sulle meeldib saada või teistele teha.
4. Name in your opinion important mental closeness activities or conversation topics that create closeness
 - a. Nimeta sinu arvates olulisi vaimse läheduse tegevusi või teemasid, millest rääkimine tekitab lähedust.
5. Into which different closeness activities would you divide sex? Name in your opinion important sexual activities.
 - a. Millisteks erinevateks lähedustegevusteks sa jagaksid seksi? Nimeta erinevaid sinu arvates olulisi seksuaalseid tegevusi.
6. Can you think of any other physical or mental closeness expressions that are not important for you, but could be for others?
 - a. Kas sul tuleb meelde veel mõni vaimse või füüsilise läheduse väljendus, mis ei ole sinu jaoks oluline, aga võib teistele olla?
7. In your opinion, which virtual communication forms can be closeness inducing and loneliness reducing? What are the important virtual communication properties that create closeness?
 - a. Millised virtuaalse suhtluse vormid on sinu arvates lähedust tekitavad ja üksildustunnet vähendavad? Millised on need olulised omadused, mis teevad konkreetse virtuaalse suhtluse lähedust tekitavaks?
8. Can pets or inanimate objects reduce loneliness and create closeness? What are the important characteristics for them to have that effect?
 - a. Kas koduloomad või mingid elutud objektid võivad leevendada üksildust ja tekitada lähedustunnet? Mis on need olulised omadused, et nad selliselt mõjuksid?
9. Can you think of any other situations or activities that reduce loneliness but do not contain physical or social connection with another person?
 - a. Kas sinu arvates on olemas veel mingisuguseid olukordi või tegevusi, mis leevendavad üksildustunnet, aga kus puudub füüsiline ja sotsiaalne kontakt teise inimesega?

Appendix 2. 114 item questionnaire used in Phase 2: Item reduction

nr	Item	m	sd
<i>Füüsiline lähedus</i>			
<i>Siin on võimalikult kõikehõlmav nimekiri füüsilistest lähedustegevustest. Osad neist võivad olla sinu jaoks olulised ja teised täiesti ebaolulised.</i>			
<i>Vastates ära keskendu sellele, kellega seda teha soovid, vaid mõtle selle tegevuse olulisusele juhul, kui sa teeksid seda ENDALE SOOVITUD VIISIL ja inimesega.</i>			
<i>Kui oluline on see tegevus sinu lähedusvajaduse täitmisel?</i>			
1	Phy1 Lühike põgus kallistus	2.55	1.18
2	Phy2 Tervitavad, hüvastijätvad kultuurirituaalid (nt. kätlemine, põsemusi, fistbump, highfive jms.)	1.96	1.39
3	Phy3 Empaatiat/hoolivust/positiivset tunnustust väljendavad lühiajalised puudutused (nt lühike pai, käsi korraks õlal, jalal, seljal jms.)	2.79	1.16
4	Phy4 Pikem sensuaalsem silitamine või puudutamine (nt. pea, näo, juuste, käte silitamine jms.)	2.82	1.19
5	Phy5 Kaisutamine, kaisus olemine või lebamine (nt. filmi, teleka vaatamise ajal jms.)	3.25	0.98
6	Phy6 Kaisus magamine või magama jäämine	2.56	1.33
7	Phy7 Koos magamine ilma kaisutamata	2.31	1.25
8	Phy8 Füüsiliselt lähestikku olemine (tajud teise keha lähedust või soojust) ilma puudutusega	2.50	1.14
9	Phy9 Külge-külge vastas kehakontaktis olemine (lihtsalt oled teise inimese keha vastas mingi aja otseselt midagi tegemata)	2.46	1.17
10	Phy10 Üksteisele toetumine (nt. süles istumine, pea/jalad süles, õlal)	2.40	1.21
11	Phy11 Avalikus ruumis toimuvad juhuslikud füüsilised kontaktid (nt. ühistransport, auto, kontsert, pidu, järjekord jms.)	1.19	1.26
12	Phy12 Avalikult käest või ümbert kinni hoidmine	2.10	1.26
13	Phy13 Musi või põgus suudlus	2.81	1.07
14	Phy14 Pikk ja/või kirglik suudlemine	2.72	1.20
15	Phy15 Põgus füüsiline kontakt spetsialistiga teenuse osutamise käigus (arst, füsioterapeut, juuksur, maniküür-pediküür, treener jms.)	0.53	0.81
16	Phy16 Massaaži saamine teenusena	1.23	1.25
17	Phy17 Massaaži tegemine lähedasele inimesele	1.92	1.15
18	Phy18 Massaaži saamine lähedaselt inimeselt	2.26	1.25
19	Phy19 Pikem silmside ja/või naeratamine	2.90	1.01
20	Phy20 Pikem hoidev kallistus	3.18	1.01
<i>Kui oluline on see tegevus sinu lähedusvajaduse täitmisel?</i>			
21	Sex1 Seks, genitaalide kontakt rahulduse saamise eesmärgil ja/või penetratsioon	3.08	0.96

22	Sex2	Anaalseks, anaalne penetratsioon	0.44	0.84
23	Sex3	Suuseks, keele või suuga rahulduse saamine või pakkumine	2.20	1.30
24	Sex4	Käega seksuaalpartneri rahuldamine või rahuldatud saamine	2.20	1.12
25	Sex5	Eneserahuldamine, masturbatsioon	1.97	1.36
26	Sex6	Eneserahuldamine kellegagi koos, kas siis vahetult või virtuaalsel vahendusel	0.74	1.08
27	Sex7	Sekslelude ja muude sarnaste abivahenditega rahulduse saamine või pakkumine	0.93	1.12
28	Sex8	S&M, sidumismängud, tugevalt domineeriv või alluv seksuaalne tegevus	0.61	0.98
29	Sex9	Seksuaalfantaasiatest ja fetišitest rääkimine	1.33	1.30
30	Sex10	Seksuaalfantaasiate, fetišite ja rollimängude realiseerimine	1.05	1.16
31	Sex11	Üksteisel riiete seljast ära võtmine/lahtiriietamine, striptiis	1.72	1.25
32	Sex12	Seksuaalse alatooni ja/või puudutusega koos duši all, vannis või saunas käimine	2.18	1.23
33	Sex13	Seksuaalse tegevuse ajal mõnu või soovide kommunikeerimine	2.56	1.21
34	Sex14	Flirtimine, seksuaalse alatooniga väljendite ja huumori kasutamine	2.83	1.16
35	Sex15	Eelmäng - suudlemine, silitamine, rindade katsumine jne. - sihipärane tegevus erutuse suurendamiseks	3.33	0.94
36	Sex16	Koos erootilise filmi ja/või porno vaatamine	0.98	1.05
37	Sex17	Rohkem kui kahe inimese vaheline samaaegne seksuaalne tegevus (nt. grupiseks, swingimine, kolmekas jms.)	0.27	0.64
<i>Kui oluline on see tegevus sinu lähedusvajaduse täitmisel?</i>				
38	Soc1	Lihtsalt inimestega koos pesemine (nt. ühine duširuum, saun, ujumine jms.)	0.54	0.98
39	Soc2	Meeskonnasport (nt jalgpall, korvpall, hoki jms.)	0.69	1.03
40	Soc3	Füüsiliselt aktiivsed tegevused, mis eeldavad kehakontakti teise inimesega (nt acrojooga, maadlus, võitluskunstid jms.)	0.50	0.97
41	Soc4	Paaristantsu treeningud	1.15	1.28
42	Soc5	Spordiklubi rühmatreeningud (nt. jooga, bodypump, pilates, jms.)	0.80	1.13
43	Soc6	Ööklubis või peol tantsimine	1.35	1.26
44	Soc7	Üksteise abistamine ja koos tegutsemine ühise eesmärgi saavutamiseks (nt. koos koristamine jms.)	2.65	1.15
45	Soc8	Ühised rekreatiivsed tegevused (ühine meelelahutus, reisimine, hobid, koos mängimine, laulmine)	3.18	0.98
46	Soc9	Koos jalutamine, metsas-looduses viibimine	3.17	0.97
47	Soc10	Koos lemmikartistide kuulamine suurest rahvamassist eraldi olles (nt. kõrvaklappidest)	1.59	1.29
48	Soc11	Koos uute asjade tegemine, mida varem kogetud ei ole	2.94	1.02
49	Soc12	Kellegi õpetamine või juhendamine	1.77	1.18
50	Soc13	Komplimentide, tunnustuse ja toetuse saamine ja andmine	3.12	1.06
51	Soc14	Koos vaikimine	2.74	1.23
52	Soc15	Koos söögi tegemine	2.53	1.12
53	Soc16	Koos väljas söömine (nt. restoran jms.)	2.66	1.14

54	Soc17	Lihtsalt seltskonnas viibimine ja inimeste jälgimine (nt. kohvikus/restoranis viibimine, inimeste vaatlemine jms.)	2.24	1.29
55	Soc18	Kontakt abistamise eesmärgil (nt. lastega, vanuritega, erivajadustega inimestega, tuttavatega)	1.63	1.19
56	Soc19	Koos alkoholi ja/või muude mõnuainete tarbimine (nt. kanep, seened)	1.36	1.29

Vaimne lähedus

Siin on võimalikult kõikehõlmav nimekiri vestlusteemadest ja vaimse läheduse väljendustest. Osad neist võivad olla sinu jaoks olulised ja teised täiesti ebaolulised.

Vastates ära keskendu sellele, kellega seda teha soovid, vaid mõtle selle tegevuse olulisusele juhul, kui sa teeksid seda ENDALE SOOVITUD VIISIL ja inimesega.

Kui oluline on see vestlusteema sinu lähedusvajaduse täitmisel?

57	Men1	Vaimse tervise probleemid (nt. ärevus, depressioon, paanikahood jms.)	2.70	1.23
58	Men2	Füüsilise tervise probleemid ja toimetulek	2.49	1.14
59	Men3	Surm ja/või raske haigus	2.27	1.31
60	Men4	Mineviku traumad, valusad kogemused/läbielamised ja mälestused	2.63	1.22
61	Men5	Veidrad ja sotsiaalselt mitte aktsepteeritud mõtted	2.34	1.29
62	Men6	Keha ja sellega seotud piinlikud teemad	2.09	1.23
63	Men7	Mineviku saladused ja häbi põhjustavad teod	1.71	1.23
64	Men8	Romantilised või partnerlussuhted	2.67	1.16
65	Men9	Pere- ja sõbrasuhted	2.99	0.99
66	Men10	Seks ja seksuaalsus	2.75	1.14
67	Men11	Töö, raha, töösuhted ja tööalane tulevik	2.49	1.15
68	Men12	Kool ja koolisuhted	2.03	1.19
69	Men13	Isiklik areng, eneseteostus, unistused ja soovid	3.38	0.90
70	Men14	Väärtused, hoiakud ja maailmavaade, religioon	3.19	1.02
71	Men15	Intellektuaalsed, filosoofilised, eksistentsiaalsed ja/või abstraktsed teemad	3.00	1.07
72	Men16	Poliitika ja sündmused maailmas	1.89	1.15
73	Men17	Enese või teiste käitumine ja teod	2.45	1.12
74	Men18	Argielu teemad ja päevased juhtumised	2.51	1.10
75	Men19	Viisakusvestlused või konkreetse situatsiooni poolt sunnitud vestlused	0.86	1.03
76	Men20	Ühised tulevikuplaanid	3.21	0.96
77	Men21	Huvid, hobid, harrastused, trenn	2.78	0.96
78	Men22	Kultuur (nt. muusika, kunst, raamatud, filmid jms.)	2.83	1.02
79	Men23	Ühine minevik, kogemused ja mälestused	3.04	0.99
80	Men24	Naljad ja huumor	3.55	0.80

Kui oluline on see tegevus sinu lähedusvajaduse täitmisel?

81	Vir1	Email, pikemate ja ka isiklike e-mailide kirjutamine	1.07	1.16
82	Vir2	Messengeris vahetu ja aktiivne suhtlus olulistel teemadel	2.63	1.21

83	Vir3	Videokõne olulise inimesega	2.23	1.36
84	Vir4	Helistamine olulise inimesega	2.92	1.13
85	Vir5	Sõnumite (SMS, MMS) saatmine	1.62	1.28
86	Vir6	Teistega koos arvutimängude mängimine	0.56	1.07
87	Vir7	Kohtinguäpid ja -veebilehed, Tinder, Flirtic, date24 jms.	0.32	0.75
88	Vir8	Sotsiaalmeedia gruppides kirjutamine, liikumine jms (nt. Facebook, Instagram, Twitter, foorumid jms.)	1.19	1.19
89	Vir9	Meedia, TV, uudiste lugemine ja/või saadete vaatamine	1.43	1.23

Lähedustegevused, mis on suunatud pigem üksilduse leevendusele.

Siin on võimalikult kõikehõlmav nimekiri üksildust leevendavatest tegevustest. Osad neist võivad olla sinu jaoks olulised ja teised täiesti ebaolulised.

Vastates ära keskendu sellele, kellega seda teha soovid, vaid mõtle selle tegevuse olulisusele juhul, kui sa teeksid seda ENDALE SOOVITUD VIISIL.

Kui oluline on see tegevus sinu lähedusvajaduse leevendamisel?

90	Lon1	Üksinda trenni tegemine (nt. jooksmine, jooga, rattasõit jms.)	2.28	1.33
91	Lon2	Üksinda jalutamine, matkamine, looduses viibimine	2.45	1.25
92	Lon3	Üksinda asjalik/produktiivne olemine (nt. kodune koristamine, millegi parandamine, õmblemine, aia hooldamine jms.)	2.83	1.13
93	Lon4	Üksinda hobide või loometööga tegelemine (nt. maalimine, fotograafia, käsitöö, muusika loome jms.)	2.61	1.26
94	Lon5	Üksinda tantsimine	1.43	1.41
95	Lon6	Üksinda reisimine	1.31	1.36
96	Lon7	Üksinda raamatute lugemine	2.74	1.28
97	Lon8	Üksinda podcastide, audiobookide, raadio kuulamine	1.93	1.49
98	Lon9	Üksinda muusika kuulamine	2.66	1.28
99	Lon10	Üksinda videote vaatamine Youtubes või mõnes muus keskkonnas	2.17	1.39
100	Lon11	Üksinda filmide, televiisori vaatamine	2.18	1.30
101	Lon12	Sotsiaalmeedias (Facebook, Instagram, Twitter jms) teiste inimeste piltide ja tegevuste jälgimine	1.55	1.20
102	Lon13	Mediteerimine, teadveloleku praktiseerimine	1.32	1.36
103	Lon14	Palvetamine, religioossed rituaalid	0.35	0.84
104	Lon15	Blogi, päeviku, luule jms kirjutamine	0.90	1.24
105	Lon16	Üksinda mängitavad arvutimängud	0.62	1.08
106	Lon17	Üksinda alkoholi ja/või muude mõnuainete tarbimine (nt. kanep, seemed)	0.57	0.95
107	Lon18	Inimeste peale mõtlemine, inimeste unenägudes nägemine	2.09	1.31

Kui oluline on see tegevus või objekt sinu lähedusvajaduse leevendamisel?

108	Pet1	Lemmikloomadega tegelemine, nende eest hoolitsemine (nt. koerad, kassid, hamster jne.)	2.37	1.51
-----	------	--	------	------

109	Pet2	Koduloomadega tegelemine, nende eest hoolitsemine (nt. lehmad, lambad, kanad jne.)	0.71	1.24
110	AI1	Tehisintellekt, arvutiprogramm, mis suhtleb inimlikult kas virtuaalselt või tavakeskkonnas (nt. alexa, siri, google assistant).	0.07	0.30
111	Obj1	Emotsioone ja mälestusi aktiveerivad pildid ja video	2.05	1.25
112	Obj2	Emotsionaalse väärtusega ja mälestustega seotud esemed (v.a. pildid)	1.78	1.27
113	Obj3	Meeldivat füüsilist aistingut ja turvatunnet tekitavad isiklikud esemed (nt. kaisuloom, padi, pehme tekk, mugavad riided)	1.97	1.33
114	Obj4	Toataimed	1.51	1.39

Note. Bold indicates items removed in the first phase of item reduction

Appendix 3. Factor table and correlations between factors for Phase 2: Item reduction

Item	Factor									
	1	2	3	4	5	6	7	8	9	10
57. Men1	0.796	0.077	-0.012	0.012	-0.095	0.061	-0.032	0.087	-0.023	0.040
58. Men2	0.765	-0.105	0.033	0.062	0.135	-0.073	-0.120	0.048	0.061	0.059
59. Men3	0.762	-0.074	0.100	-0.025	0.067	-0.023	-0.007	-0.057	0.060	-0.020
60. Men4	0.700	0.168	0.040	-0.037	0.027	0.011	0.162	-0.008	-0.044	-0.130
61. Men5	0.512	0.023	-0.095	0.085	-0.159	0.073	0.374	-0.033	0.030	0.037
62. Men6	0.571	-0.015	-0.110	0.106	0.035	0.078	0.168	-0.035	0.001	0.089
4. Phy4	0.092	0.598	0.021	0.103	-0.115	0.056	0.077	0.079	0.082	0.070
5. Phy5	0.038	0.721	-0.020	0.024	-0.034	-0.052	0.133	0.023	0.103	-0.153
13. Phy13	-0.032	0.558	0.064	0.100	0.205	0.055	-0.128	-0.060	0.134	0.100
14. Phy14	-0.086	0.537	0.030	0.294	-0.039	0.077	-0.034	-0.025	0.026	0.087
20. Phy20	0.047	0.550	0.123	0.072	0.002	-0.181	-0.060	0.140	0.081	0.095
44. Soc7	0.122	-0.064	0.525	0.011	0.069	-0.102	0.045	0.070	0.022	-0.007
45. Soc8	-0.022	0.041	0.729	0.086	-0.035	-0.065	0.038	-0.029	0.018	0.026
46. Soc9	0.006	0.006	0.688	-0.016	0.016	-0.045	0.024	0.078	0.107	-0.020
21. Sex1	-0.118	0.022	-0.033	0.594	0.134	-0.076	-0.016	0.038	0.111	-0.008
23. Sex3	0.012	-0.033	-0.033	0.750	-0.052	0.066	0.047	-0.112	0.046	-0.022
24. Sex4	0.026	-0.092	0.018	0.718	0.031	0.024	-0.007	-0.011	-0.085	-0.025
32. Sex12	0.033	0.134	0.047	0.533	-0.055	-0.023	-0.064	0.108	-0.011	-0.002
33. Sex13	0.083	0.118	0.093	0.529	-0.092	-0.122	-0.005	0.189	0.086	0.016
35. Sex15	0.012	0.171	0.169	0.534	0.076	0.013	0.001	0.056	-0.032	-0.017
67. Men11	0.085	-0.034	-0.066	0.105	0.629	0.012	0.126	-0.010	0.043	0.188
74. Men18	0.026	-0.016	0.152	-0.097	0.608	0.096	0.017	0.028	0.169	-0.159
98. Lon9	0.099	-0.049	-0.029	0.132	-0.073	0.513	-0.026	0.251	0.009	0.119
99. Lon10	0.059	0.036	-0.068	0.065	-0.046	0.642	-0.045	0.144	0.016	-0.042
100. Lon11	-0.107	-0.034	-0.147	-0.003	0.234	0.507	-0.045	0.120	0.110	0.029
70. Men14	0.140	0.062	0.051	0.022	0.215	-0.058	0.566	0.077	-0.054	-0.069
71. Men15	0.036	0.013	0.091	0.049	-0.040	-0.049	0.662	0.119	0.047	0.026
90. Lon1	-0.053	-0.018	-0.023	0.065	0.158	0.063	0.035	0.598	-0.061	0.063
91. Lon2	0.056	0.049	0.000	-0.024	-0.033	0.045	0.022	0.789	-0.008	0.017
7. Phy7	-0.007	-0.004	-0.051	0.086	0.101	0.023	0.003	-0.039	0.513	-0.192
8. Phy8	0.044	0.038	0.023	-0.027	0.034	-0.032	-0.030	0.002	0.759	-0.008
9. Phy9	-0.033	0.199	0.023	0.013	-0.021	0.062	0.055	-0.073	0.619	0.105
1. Phy1	-0.012	0.226	0.088	-0.023	0.227	-0.008	-0.204	0.012	0.108	0.171

3. Phy3	0.044	0.456	0.086	-0.098	0.150	-0.045	-0.019	0.104	0.114	0.118
6. Phy6	0.051	0.486	-0.081	0.116	0.007	-0.039	0.073	0.024	0.140	-0.251
10. Phy10	0.094	0.461	0.121	0.078	-0.149	0.059	0.023	-0.036	0.268	-0.085
12. Phy12	-0.010	0.478	0.134	0.032	0.118	0.192	-0.119	-0.274	0.015	0.122
18. Phy18	0.133	0.186	0.194	0.173	0.003	-0.037	-0.121	0.057	0.024	-0.021
19. Phy19	0.025	0.233	0.213	0.072	0.081	-0.201	-0.073	0.235	0.134	0.287
34. Sex14	0.101	0.180	-0.025	0.426	-0.034	0.254	-0.006	0.042	-0.052	0.170
48. Soc11	0.088	0.126	0.496	0.069	-0.038	0.079	0.001	0.036	0.013	0.015
50. Soc13	0.198	0.250	0.346	-0.010	0.075	0.083	0.100	0.088	-0.134	0.139
51. Soc14	0.073	-0.142	0.330	-0.014	-0.049	0.047	0.174	0.102	0.279	0.258
52. Soc15	0.154	-0.069	0.387	0.079	0.022	0.099	-0.042	0.044	0.240	0.099
53. Soc16	0.056	0.016	0.308	0.088	0.161	0.336	-0.056	-0.180	0.044	0.121
54. Soc17	0.069	-0.157	0.217	0.050	-0.029	0.177	0.143	0.073	0.081	0.312
64. Men8	0.131	0.371	0.050	-0.026	0.195	0.051	0.199	-0.096	-0.189	0.304
65. Men9	0.172	0.126	0.203	-0.012	0.361	-0.015	0.240	-0.055	-0.025	0.128
66. Men10	0.270	0.116	-0.058	0.288	0.130	0.060	0.242	-0.022	0.019	0.097
68. Men12	0.215	-0.096	-0.070	0.168	0.450	-0.033	0.175	0.038	0.088	0.083
69. Men13	0.120	0.098	0.131	0.033	0.306	-0.112	0.412	0.073	-0.008	0.023
73. Men17	0.046	0.056	0.006	-0.064	0.346	0.100	0.381	0.009	0.053	0.142
76. Men20	0.010	0.212	0.259	0.085	0.350	0.048	0.082	-0.103	-0.019	-0.251
77. Men21	-0.060	0.016	0.316	0.111	0.308	0.096	0.178	0.064	0.023	-0.112
78. Men22	-0.057	-0.090	0.313	0.110	0.083	0.210	0.375	0.074	0.036	0.105
79. Men23	0.039	0.226	0.269	0.053	0.188	0.226	0.184	-0.132	0.020	-0.199
80. Men24	0.019	-0.057	0.244	0.231	0.030	0.303	0.160	0.018	-0.044	0.070
82. Vir2	0.150	0.169	-0.011	-0.037	0.278	0.223	-0.134	0.054	0.039	0.003
83. Vir3	0.134	0.060	0.162	0.070	0.342	-0.061	-0.142	0.130	-0.051	-0.083
84. Vir4	0.116	0.043	0.150	0.103	0.391	-0.080	-0.194	0.239	-0.120	-0.065
92. Lon3	0.006	-0.011	0.098	0.050	0.040	0.327	0.080	0.466	-0.028	-0.130
93. Lon4	-0.055	-0.054	0.145	0.009	-0.072	0.283	0.170	0.411	0.058	-0.091
96. Lon7	-0.135	-0.062	0.125	0.024	0.045	0.285	0.153	0.268	0.061	0.100
107. Lon18	0.147	0.027	0.014	0.022	-0.088	0.288	0.047	0.154	0.097	0.060
108. Pet1	0.329	-0.034	0.077	-0.056	0.046	0.297	-0.182	0.013	0.197	-0.116
111. Obj1	0.175	0.093	0.294	0.008	0.124	0.261	-0.201	-0.013	-0.084	-0.112

Note. N = 317. 'Minimum residual' extraction method was used in combination with an 'oblimin' rotation. Factor loadings above .50 are in bold

Correlations between factors

Factor	1	2	3	4	5	6	7	8	9	10
1	1.00	0.25	0.29	0.28	0.27	0.16	0.32	0.18	0.16	0.13
2	0.25	1.00	0.32	0.36	0.18	0.06	0.11	0.01	0.29	0.06
3	0.29	0.32	1.00	0.28	0.38	0.17	0.22	0.23	0.28	0.12
4	0.28	0.36	0.28	1.00	0.14	0.25	0.19	0.20	0.17	0.16
5	0.27	0.18	0.38	0.14	1.00	0.13	0.19	0.05	0.13	0.08
6	0.16	0.06	0.17	0.25	0.13	1.00	0.12	0.22	0.12	0.08
7	0.32	0.11	0.22	0.19	0.19	0.12	1.00	0.15	0.05	0.10
8	0.18	0.01	0.23	0.20	0.05	0.22	0.15	1.00	0.07	0.09
9	0.16	0.29	0.28	0.17	0.13	0.12	0.05	0.07	1.00	0.03
10	0.13	0.06	0.12	0.16	0.08	0.08	0.10	0.09	0.03	1.00

Non-exclusive licence to reproduce thesis and make thesis public

I, Ares Hubel,

1. herewith grant the University of Tartu a free permit (non-exclusive licence) to reproduce, for the purpose of preservation, including for adding to the DSpace digital archives until the expiry of the term of copyright, CLOSENESS INTERACTIONS SCALE ESTONIAN VERSION (CIS-EST) DEVELOPMENT PHASE 1, supervised by Alan Voodla and Kariina Laas.
2. I grant the University of Tartu a permit to make the work specified in p. 1 available to the public via the web environment of the University of Tartu, including via the DSpace digital archives, under the Creative Commons licence CC BY NC ND 3.0, which allows, by giving appropriate credit to the author, to reproduce, distribute the work and communicate it to the public, and prohibits the creation of derivative works and any commercial use of the work until the expiry of the term of copyright.
3. I am aware of the fact that the author retains the rights specified in p. 1 and 2.
4. I certify that granting the non-exclusive licence does not infringe other persons' intellectual property rights or rights arising from the personal data protection legislation.

Ares Hubel

18.05.2020