



Equine-assisted activities and the impact on perceived social support, self-esteem and self-efficacy among adolescents – an intervention study

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In this project, we examined the effect of a 4-month intervention with horses on perceived social support, self-esteem and general self-efficacy among Norwegian adolescents aged 12–15 years. The intervention took place at farm-based stables and included work with the horses and riding. A waiting-list crossover design was used and the participants answered questionnaires at three time periods. Study I ($N = 49$) examined the effect of the intervention compared with the control group. Study II ($N = 41$) examined the relationship between the same psychological variables and change in mastering skills with horse. The intervention group reported a significant increase in perceived social support compared with the control group. There were no differences in self-esteem and general self-efficacy between the groups. The results from study II showed that a lower level of perceived social support prior to the intervention predicted an increase in mastering skills with the horse during the intervention.

Keywords: adolescents; horses; intervention; social support; equine-assisted activities

Introduction

Several studies have shown that both equine-assisted therapy (EAT) and equine-assisted activities (EAAs) may contribute to the development of social skills, mainly for adolescents with different physiological and mental problems (Burgon, 2011; Forsberg & Tebelius, 2011; Keino et al., 2009; Trotter, Chandler, Goodwin-Bond, & Casey, 2008). The indication that the interaction between horses and young people may have positive physiological, physical and psychological effects opens up for the possibility of using horse-assisted activities for promoting health and preventing illness. However, most research on the subject is focused on at-risk adolescents (Schultz, Remick-Barlow, & Robbins, 2007; Smith-Osborne & Selby, 2010; Trotter et al., 2008). Relatively little is known as to which extent work and contact with horses may affect psychological development of adolescents without specific psychological or behavioural problems. Furthermore, there is a lack of quantitative data and controlled intervention studies involving activities with horses for adolescents.

This study thus focuses on the relationship between basic psychological mechanisms and horse-assisted activities for an ordinary group of adolescents. We investigated the

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effects of activities with horses on perceived social support, self-esteem and general self-efficacy for the adolescents, and whether these psychological measurements were related to mastering of skills with the horse during the intervention period.

The horse in activities and therapy

EAA, like other animal-assisted activities, provide opportunities for motivational, educational, recreational and/or therapeutic benefits to enhance quality of life, self-efficacy, improvement in school subjects or social behaviour (Ewing, MacDonald, Taylor, & Bowers, 2007; Kaiser, Smith, Heleski, & Spence, 2006; Trotter et al., 2008). EAA is in contrast to EAT, which is a treatment of physical or mental disabilities working with the horse as a co-therapist (Fine, 2010). The horse may also be specifically included in psychotherapy (equine-assisted psychotherapy, EAP) with the aim to trigger a behavioural change and help solve emotional problems (Braat, 2008; Burgon, 2011; Forsling, 2001; Kaiser et al., 2006; Trotter et al., 2008; Selby, 2009).

EAA holds elements that can influence the development of adolescents positively; several studies have shown that interaction with the horse may contribute to development of self and social skills (Burgon, 2011; Forsberg & Tebelius, 2011; Keino et al., 2009; Traeen & Wang, 2006; Trotter et al., 2008). Forsberg (2007) studied young girls (14–16 years) experience of riding as a leisure activity. She followed the girls over time as they took part in stable work, horse-related tasks and social interactions. The social aspect and mastering tasks with the horse were important for the adolescent's experience of development during the activity.

To ensure a positive experience during EAAs and EATs, the welfare of the horse needs to be considered. Social interaction with other horses and the ability to move freely are factors found to be important for the welfare and the behaviour of the horse. This might have an influence on the interaction between horse and human, as horses kept in group housing show calmer responses to human contact (Hartmann, Sondergaard, & Keeling, 2012; Lesimple, Fureix, LeScolan, Richard-Yris, & Hausberger, 2011; Søndergaard & Ladewig, 2004).

The farm may be used as a venue for health-promoting activities termed 'Green Care'. The farmer and the farm provide an environment with nature and animals with farm-related activities for a diversity of people to promote health and well-being (Sempik, Hine, & Wilcos, 2010).

The intervention in this study consists of activities with horses together with another peer and an instructor on a farm. This study thus focuses on adolescents' experience of activities with horses in a social environment on a farm, providing a natural setting with physical activities which holds elements of task achievement, all potentially important for adolescent development (Barber, Eccles, & Stone, 2001; Dodge & Lambert, 2009; Moote & Wodarski, 1997).

Psychological variables in relation to EAA

Adolescence is a period of change and development by which certain skills and abilities required for adulthood should be obtained (Feldman & Elliott, 2000). Peer interactions have great influence in this period and a change of social network due to transition to secondary school might be challenging (Kvalem & Wichstrom, 2007). In this period of transition, activities providing positive experiences may be particularly beneficial (Major et al., 2011).

Psychological mechanisms such as perceived social support, self-esteem and self-efficacy have all shown to affect health, quality of life and coping (Westmaas, Gil-Rivas &

Silver, 2011). Elements present in activities with horses, such as experience of mastery in a supportive social setting, might be valuable in the period of adolescence (Barber et al., 2001; Dodge & Lambert, 2009).

Social support

Social support is related to one or more of the following aspects: information leading to the subject believing that she is cared for and loved, esteemed and valued and belonging to a network of communication and mutual understanding (Cobb, 1976). These are protective factors that may buffer the negative impact of difficulties (Noble & McGrath, 2012). Support from family, peers and other adults is important for satisfaction at school and positive academic development (Wang & Eccles, 2012). An experience of a connection with other peers is important. Interaction with other persons similar to oneself which one feels related creates a safe setting (Baumeister & Vohs, 2012). One close friend may serve the purpose of support needed for experiencing positive relationships with others. Teachers encouraging children to make them feel valuable are also a form of social support (Brown, 1998). In a qualitative study of after-school activities, the relationship with adult staff was pointed out as important for learning skills and involvement in activities for adolescents (Jones & Deutsch, 2011).

Social support is derived from relationships. Within a relationship, basic needs are fulfilled such as a sense of emotional closeness and safety, social integration, a sense of belonging, guidance and the opportunity for nurturance (Weiss, 1974). Since a specific relationship cannot fulfil all basic needs, people need more relationships with different supportive functions. That some basic needs are fulfilled in human–animal relationships and provided ‘social support’ has been found by Enders-Slegers (2000) and discussed by Pachana, Massavelli & Robleda-Gomez (2011) among others. If the animal creates a sense of connectedness and belonging, an experience of social support similar to that of a peer in human–human relationships may be happening (Serpell, 1996). Animals may also act as social facilitators and serve as a catalyst to human–human contact (Black, 2010, 2012).

The horse can fulfil some basic needs, e.g. emotional closeness and safety, the opportunity for nurturance through caring for and grooming of a horse and a reliable alliance (Burgon, 2011). The horse is unambiguous in its behaviour and reacts on the feelings presented through body language, thereby giving a direct response on the emotional state of the person (Birke et al., 2011; Krueger, Flauger, Farmer, & Maros, 2011; Lentini & Knox, 2008). This might lead to a feeling of intimacy which is part of an experience of social support. Connectedness with the horse might therefore be important for perceived social support. Social support is not necessarily an available support, but what the individual perceives as available (Baumeister & Vohs, 2012). The perceived experience of an interaction with the horse is important, not the actual behaviour of the animal (Brown, 2007).

A supporting network includes feedback from peers, teachers or others outside of the family supporting the individual in mastering challenges (Hjemdal, Friberg, Stiles, Martinussen, & Rosenvinge, 2006). In human–animal interventions such as EAA, several factors such as the instructor, the environment and other participants may be important for the outcome of the intervention in addition to the animal (Kazdin, 2011). Working with a horse in a stable with peers and an instructor requires cooperation and provides an extended social network. The components in EAA are difficult to differentiate and the experience itself must therefore be evaluated as a whole, seeing all factors as important for the outcome. Besides the human–human relationships and the human–horse relationship,

nature may also influence the experience. Nature may have a calming effect and act as a restorative environment that buffers stress (Kaplan, 1995). Studies of young people and nature environments show that access to nature is positive for coping with life stresses (Corraliza, Collado, & Bethelmy, 2012). The environment on the farm might therefore also be important for the experience.

Self-esteem

Self-esteem may be defined as the affections and feelings towards oneself. Self-esteem may be specific or general, self-worth capturing the way people generally feel about themselves (Brown, 1998). In the period of adolescence, self-esteem is especially liable to fluctuation and small changes (Bolognini, Plancherel, Bettschart, & Halfon, 1996). Self-esteem is related to social relationships, positive perception by peers and supportive adults, improvement in coping skills and well-being (Baumeister & Vohs, 2003, 2012; Brown, 1998; Dumont & Provost, 1999; Harter, 1990, 1993).

In other fields, there is research supporting that acquiring skills or abilities through sport is associated with developing a positive sense of self (Dodge & Lambert, 2009). Mastering skills related to handling and interaction with a large animal may give a feeling of accomplishment and competence important for self-esteem (Karol, 2007; Levinson, 1978).

Self-efficacy

Self-efficacy is described as a person's belief that one can successfully produce the desired outcome by own actions (Bandura, 1997). It is the belief that one can use one's abilities and skills in a certain situation to reach a specific goal (Maddux, 1995). Self-efficacy is influenced by own experience of mastery, seeing other persons similar to oneself succeed or being supported and encouraged by others. Feeling safe and secure is important in developing self-efficacy (Scholz, Dona, Sud, & Schwarzer, 2002).

In both qualitative and observational studies of EAAs and leisure activities with horses, the participants have reported an increased belief in success and feeling of mastery through learning to handle and interact with the horse. This has been interpreted as an indication that mastering of horse-related skills had an impact on self-efficacy beliefs (Burgon, 2011; Forsberg, 2007; Forsberg & Tebelius, 2011). Although studies that measured general self-efficacy by standardised measurement did not find any change, the participants in these studies showed a positive change in problem behaviour during mastering of skills with the horse (Ewing et al., 2007; Kaiser et al., 2006).

Psychological variables in relation to mastering of skills with the horse

Besides investigating the effect of the intervention on psychological factors as social support, self-esteem and self-efficacy, this study also investigates how far the same psychological factors are associated with the adolescents' experience of mastering skills with the horse.

An experience of a social supportive network may influence competence beliefs and the level of performing at a given activity (Ahmed, Minnaert, van der Werf, & Kuyper, 2010; Noble & McGrath, 2012; Sale, Bellamy, Springer, & Wang, 2008). Perceived support from the instructor, another peer and the horse might influence how the adolescents experience mastery when learning skills with the horse; positive and calm support creating a safe setting for the intervention. A high level of social support may

contribute to academic performance by decreasing the perceived stress of academic life (Cohen & Lakey, 2000). The level of support at the start of an intervention might thus have an impact on the ability to learn skills with the horse.

Self-esteem is an internal perception of self which is related to experiences of social support and the ability to cope in challenging situations (Dumont & Provost, 1999). Self-esteem is in particular related to relationships with peers and supportive adults, a high level of support related to a high level of self-esteem (Harter, 1990, 1993). Feeling supported may influence the belief in oneself in mastering challenges with the horse. High self-esteem is associated with persistence and with motivated behaviour in physical activities settings (Dodge & Lambert, 2009; Hein & Hagger, 2007), a high level of self-esteem at the start of the intervention might thus influence development of mastering skills with the horse during the intervention.

Self-efficacy determines whether a person thinks in a positive or negative way about overcoming a task and how well they motivate themselves (Baumeister, Vohs, & Tice, 2007). General self-efficacy is not related to one specific task or activity, but people with high self-efficacy might be better suited to overcome obstacles and challenges during specific situations (Luszczynska et al., 2005, Scholz, Dona, Sud, & Schwarzer, 2002). Confidence in interacting with a horse is important to succeed in getting it to cooperate (Burgon, 2011), and communication skills such as being clear and unambiguous are required (Traeen & Wang, 2006). Confidence in oneself might help in learning skills related to handling the horse. A high level of self-efficacy before the intervention may therefore influence the belief of being able to master relational and task-specific skills with the horse during the intervention.

Aims

The first aim is to test whether an intervention consisting of activities with horses on a farm with an adult instructor and another peer has an effect on perceived social support, self-esteem and self-efficacy, as compared with a control group.

The second aim is to investigate whether perceived social support, self-esteem and self-efficacy at the start of the intervention predict changes in the experience of mastering relational and task-specific skills with the horse during the intervention.

Methods

Participants

The participants were Norwegian adolescents between 12 and 15 years with an average age of 13.5 years (86% girls). They all attended lower secondary school in their first or second year, with 67% being in their first year. The project aimed at having 80 participants, which was accomplished.

The horses used for the project were of Norwegian breeds or Icelandic horses, all cold-blooded horses. These were chosen due to their good temperament. All horses were kept in a flock, allowed social interaction with other horses and were able to move freely over a large area.

Sampling procedures

Farms were selected by criteria related to the farm size, the country surroundings, closeness to the school and the competence of the farmer. The farms should be small (<25 acres), with less than 10 horses, situated in the countryside less than 5 km from a secondary

school. The criteria for the farmer functioning as the instructor conducting the intervention was having worked with adolescents and horses during the past year, good knowledge of horses and education in health or pedagogics. Thirteen farms in eastern Norway from the counties of Hedmark, Oppland, Buskerud and Vestfold were selected to be part of the project. All the farmers had good knowledge of horses and were riding instructors ranging from self-taught experience to education at national level. In addition, all the farmers had some kind of education in social work or pedagogics, ranging from fully educated teacher or health practitioner to minor courses in psychology or pedagogics. The farmers had 1–10 years of experience with horse activities for adolescents. They all owned the farm and the horses that were used in the intervention. Most of the farms had some sort of small animals such as cats, dogs, laying hens, goats or sheep in addition to the horses.

After the farms were selected, the schools nearby were contacted. Ten schools took part in the project. All classes at the first and second year at the selected schools were approached. The researcher presented the project to the class and handed out an information brochure. Students were also given an information letter with a detailed consent, which had to be filled by both the student and their parent/guardian, made by guidelines from The Regional Committee for Medical Research Ethics (REK).

All students selected for the project were given a reference number. The connection code was kept in a locked office. The questionnaires were answered anonymously using only the reference number on the forms. The questionnaire was sent by email and filled in electronically with the reference number sent in a separate email. The survey was conducted through Quest Back which is a password-based online questionnaire system not tracking any information, which is often used in research. Answering the questionnaires was voluntary, and the participants were free to drop out of the project if they wanted to.

Ethical considerations

The project was approved by The Regional Committee for Medical Research Ethics (REK) and the Norwegian Data Protection Official for Research. The committee was particularly aware of the vulnerable population of adolescents. Therefore, certain criteria were established. The principal or selected teacher at each school functioned as a contact person for the project, and all the adolescents had access to the health support system at their school if they found any of the experiences with the project difficult.

Sample

All 80 students who consented to participate were offered an intervention with horses either in the spring or in the fall during 2008, 2009 or 2010. Five of the adolescents dropped out before the intervention started. However, none of the adolescents dropped out during the intervention.

In order to describe the sample, 75 participants were given two questionnaires together with the test instruments when entering the project ($N = 71$). The first questionnaire asked about their previous experience with horses and other companion animals. Sixty-three of the participants had experience with pets (dogs, cats, rabbits). Forty-two of the participants had little or no experience with horses, whereas 29 had been riding before. The second questionnaire was the 'Strength and Difficulties Questionnaire' for adolescents (Ronning, Handegaard, Sourander, & Mørch, 2004), which measures the self-reported level of pro-social, emotional, peer-related, conduct and hyperactivity problems. The mean total score was 12.23, which is at the same level as the results of other studies conducted on random

Table 1. Sample for Study I, total number of participants and number of participants answering all questionnaires at various time spots as well as at both T1 and T2, for groups 1 (intervention) and 2 (control).

	Total	Questionnaires T1	Questionnaires T2	Questionnaires both T1 and T2
Group 1 (intervention)	42	38	27	24
Group 2 (control)	33	33	25	25
Total	75	71	52	49

samples of Norwegian adolescents (Obel et al., 2004; Ronning et al., 2004; Van Roy, Groholt, Heyerdahl, & Clench-Aas, 2006). This indicates that our sample was representative of an ordinary group of Norwegian adolescents, but assumedly with more prior contact with companion animals than the average population.

The participants were randomised into intervention (group 1) and control (group 2). The two groups did not vary in experience with horses or any of the psychological measurements at the beginning of the project. Group 1 started their 4-month intervention immediately, whereas group 2 started their intervention 4 months later.

The participants were given questionnaires before and after their intervention, and group 2 was given questionnaires four months prior to their intervention. Group 2 thus functioned as a waiting-list control group. Seventy-five participants attended the intervention, but even after several reminders, some did not return completed questionnaires at all time spots.

In order to answer the research questions, we used two different samples. In the first study, the effect of the intervention was tested by comparing the differences between group 1 (intervention) and group 2 (control) at T1 (first answering point of questionnaires for both groups) and T2 (second answering point of questionnaires for both groups) (Table 1). In the second study, we wanted to investigate the experience of the intervention in relation to psychological factors. The two groups were merged into one sample to analyse the level of perceived social support, self-esteem and self-efficacy at the start of the intervention in relation to the development of mastering skills with the horse during the intervention for all participants (Table 2).

The intervention

The adolescents were randomised into pairs of two in their own session when at the farm. The adolescents in the pair went to the same school but did not know each other very well prior to the project. The adolescents were given a session once a week for approximately 4 months, each session lasting for 2 hours. The interventions were designed particularly for

Table 2. Sample for Study II, number of participants answering all questionnaires before and after the intervention and number of participants answering at both time spots.

	Questionnaires before intervention	Questionnaires after intervention	Questionnaires both before and after intervention
Group 1 (intervention)	38	27	27
Group 2 (intervention)	25	17	14
Total	63	44	41

the project, and no other activities with horses and adolescents took place at the farm for the period the adolescents were present. To avoid the performance pressure often found at riding schools, small farms were used. The instructors were responsible for conducting the intervention guided by the researcher through an instruction letter with examples of activities for each session, visits and several conversations to make sure that they understood how the intervention should be carried out. The instructors were then allowed their own planning of each session.

The adolescents were taught both relational and task-specific skills with the horse. Relational skills consisted of being able to handle and communicate with the horse both from the ground and through riding. Task-specific skills consisted of putting on a halter, tacking up for riding, picking up and cleaning feet, getting the horse from the field, stopping the horse and different task-specific exercises during riding. The adolescents also groomed the horse and did other activities related to stable work as mucking out, tidying the stable and feeding the horses. Riding lessons and instructions on how to conduct the activities were provided by the instructors. The instructors told the adolescents what to do and applied help and support during the intervention when needed. The adolescents were given time to try by themselves as the intervention was all about the experience with the horse and not about performance.

The instructors were told to adapt the intervention to the adolescents with the least experience, and to give all adolescents challenges they could master at their own level. The adolescents who had been riding prior to the project often had little experience with handling the horse in other settings such as putting on the tack. The adolescents conducted the same type of tasks with the horse during the whole intervention, but the tasks could vary in grade of difficulty. As they progressed, they were given more responsibility, so the tasks were in relation to their level of competence.

Measures

The instruments consisted of scales measuring perceived social-support, self-esteem and general self-efficacy, and the adolescents' experience of the intervention.

Social support

Perceived social support was measured using the subscale 'Social support' from the *Resilience Scale for Adolescents (READ)* (Hjemdal, Aune, Reinfjell, Stiles, & Friborg, 2007). The subscale consists of five items: (1) – 'I have some friends/family members that cheer me up when I need it', (2) – 'My friends always stick together', (3) – 'I have some close friends/family members who really care about me', (4) 'I always have someone that is there for me when I need it' and (5) – 'I have some close friends/family members who appreciate my personal qualities'. The response categories were a 5-point Likert scale from 'totally disagree' (1) till 'totally agree' (5). A high-mean total score indicates high-perceived external social support. The inter-item reliability was calculated due to the items being fewer than 10. The inter-item correlation was 0.21, which is acceptable according to Briggs and Cheek (1986).

Self-esteem

Self-esteem was measured using the subscale 'Global self-worth' from 'Susan Harter's self-perception profile for adolescents'. This measures the adolescents' overall satisfaction

with the self-esteem (Rudasill & Callahan, 2008; Wichstrom, 1995) on a 4-point Likert scale from 'very correct' till 'not correct at all'. The subscale consists of five items related to satisfaction with self and life in general: (1) 'I am often disappointed with myself', (2) 'I do not like the way I live my life', (3) 'I am mostly satisfied with myself', (4) 'I am happy with myself just the way I am', (5) 'I am very happy with myself'. Items 3, 4 and 5 were reversed before the total mean score was calculated, resulting in a high score being equal to high self-esteem. The inter-item reliability was calculated due to the items being fewer than 10. The inter-item correlation was 0.49.

General self-efficacy

General self-efficacy was measured using a short version of the General Self Efficacy scale for adolescents used in UNGHUBRO, a Norwegian study of adolescents (Luszczynska et al., 2005). This scale measures the belief of being able to master difficult situations in general, is adapted to adolescents and consists of five items: (1) 'I am always able to solve difficult problems if I try hard enough', (2) 'If someone is making things difficult for me I am always able to find a way or methods to achieve what I want', (3) 'If I have a problem and get stuck with it, I am always able to find a way of solving it', (4) 'I am confident that I will be able to handle unexpected events effectively', (5) 'I stay calm when I am faced with difficulties, because I have trust in my own abilities to master and achieve things'. The items are rated on a 4-point Likert scale, whereby 1 corresponds to 'Completely wrong' and 4 signifies 'Completely correct'. A mean score was computed, a high score being equal to a high level of self-efficacy. The inter-item reliability was calculated due to the items being fewer than 10. The inter-item correlation was 0.27.

Mastering relational and task-specific skills with the horse

The experience of learning handling of the horse was measured using 'Questionnaires for the intervention in relation to activities with horses', developed by Traeen and Wang (2006). These questionnaires consisted of two different scales with a total of 12 items on a 4-point Likert scale and 10 items measured on a 3-point Likert scale. The two different scales consisting of statements on self-perceived mastery of the horse through riding, handling and grooming were entered into an exploratory factor analysis which yielded three factors. Factor 1 used in this study was labelled 'mastering relational and task-specific skills with the horse' and consisted of a total of 13 items about the belief of being able to handle the horse, such as 'I believe I can control the horse when riding', 'I think I can get the horse to do what I want', 'I believe it will be easy to lead the horse' and 'I believe it will be easy to groom the horse', and items related to the experience of being with the horse such as 'I will be able to find a solution if unexpected events occur'. The nine remaining items yield two factors not related to mastering of skills with the horse and were therefore excluded in the further analysis. These factors were labelled 'Experience with the farm environment' and 'Interaction with the horse' according to the items involved. These items were questions such as 'being on the farm will provide relaxation from everyday stressors' and 'it will be easier to get the horse to do what I want if I am nice to the horse'.

As one of the scales used the 4-point and the other 3-point Likert categories, the items were standardised (with a mean of 0 and a standard deviation of 1) before a mean total score was calculated. A high score indicates a high sense of mastering relational and task-specific skills with the horses. The difference in this score between start and end of the

intervention for both groups was used as a measure of the development of skills with the horse during the intervention.

This scale consisted of more than 10 items, therefore, the Cronbach's α was used to test the reliability. The questionnaire had a Cronbach's α of 0.83.

Results

Study I

Research question

Does the intervention consisting of activities with horses on a farm with an adult instructor and another peer have an effect on perceived social support, self-esteem and general self-efficacy?

Method

Participants were given an intervention of EAAs consisting of interaction with the horse, an instructor and another peer. The activities included handling of the horse from the ground and through riding, grooming and putting on tack as well as doing stable work. The intervention was given weekly for a period of 4 months to 75 participants. In this study, a sample of 49 participants was used.

To investigate the effect of the intervention on the psychological variables, their change from start (T1) to end (T2) was compared between the intervention and control groups. Forty-nine participants answered the questionnaires at both T1 and T2, 24 in group 1 (intervention) and 25 in group 2 (control) (Table 1). All participants completed their intervention, but those who did not answer the questionnaire at both T1 and T2 were excluded from the analysis (14 in the intervention group and 8 in the control group). No attrition effects on the study variables were found. At T1, no differences in the study variables were found between the groups. The differences between T1 and T2 scores for the three psychological variables perceived social support, self-esteem and general self-efficacy were calculated separately for the intervention and control groups. The difference between the groups was tested with an independent sample *t*-test.

Results

The descriptive statistics for the study variables for both intervention and control groups are presented in Table 3 together with the *t*-tests on the group differences. Table 3 shows that the intervention with horses had an effect on perceived social support. At T1, no

Table 3. Social support, self-esteem and general self-efficacy at pre-test (T1) and post-test (T2) for the intervention group ('I', $n = 24$) compared with the control group ('C', $n = 25$).

	Group	T1	T2	<i>t</i> -value	<i>p</i> -value
Social support	I	4.56 (0.36)	4.67 (0.34)	2.32	<0.05
	C	4.55 (0.33)	4.43 (0.49)		
Self-esteem	I	2.94 (0.45)	3.02 (0.52)	1.27	0.21
	C	2.96 (0.45)	2.96 (0.42)		
General self-efficacy	I	2.91 (0.55)	3.02 (0.73)	0.29	0.77
	C	2.78 (0.71)	2.78 (0.81)		

Notes: T1 and T2 values are represented as mean (SD). The degree of change from T1 to T2 between the intervention and the control group is tested with an independent-sample *t*-test.

difference in the study variables was found between the groups, whereas at T2, the level of perceived social support differed between the groups. Those who participated in the 4-month intervention with horses reported a significant increase in perceived social support compared with the control group. No intervention effect was found for self-esteem and general self-efficacy (Table 3).

Conclusion

The intervention consisting of experience of social contact with the horse, the instructor and other adolescents at the farm increased the participants' perception of social support during the intervention period when compared with a control group.

Study II

Research question

Do perceived social support, self-esteem and general self-efficacy before the intervention consisting of activities with horses on a farm with an adult instructor and another peer predict development of mastering relational and task-specific skills with the horse during the intervention?

Method

Participants were given an intervention of EAAs consisting of interaction with the horse, an instructor and another peer. The activities included handling of the horse from the ground and through riding, grooming and putting on tack as well as doing stable work. Learning relational skills with the horse consisted of getting the horse to cooperate during the activities and being able to communicate with the horse. Task-related skills consisted in learning to put on a halter, tacking up for riding and learning how to steer and lead the horse. The intervention was given weekly for a period of 4 months to 75 participants. In this study, a sample of 63 participants measuring psychological factors before the intervention and 41 of these measuring the development of skills with the horse during the intervention was used. The questionnaire used to measure relational and task-specific skills with the horse investigated the adolescents' own experience of their mastery of such skills.

There were no differences between the two intervention groups in the experience with horses immediately before the intervention (at T1 for the first intervention group and T2 for the second intervention group). As the second intervention group functioned as a waiting-list control group and started their intervention 4 months later, it was also confirmed that their experience level had not changed while waiting for the intervention. Therefore, the two intervention groups were combined in order to study the development of skills with the horse during the intervention period. The three psychological instruments, i.e. perceived social support, self-esteem and general self-efficacy, measured before the intervention, were used as independent variables. Sixty-three of the participants answered the questionnaire before the intervention, whereas 41 answered questions about skills with the horse both at pre- and post-intervention, thus constituting the sample used in the analyses (Table 2).

Beside descriptive statistics, a correlation analysis was carried out on the study variables. The three independent variables were entered into a multiple linear regression analysis in order to examine the unique contribution of each variable on the development of skills with the horse during the intervention.

Table 4. Correlations between social support, self-esteem, general self-efficacy and development of skills with the horse.

	Social support	Self-esteem	General self-efficacy	Development of horse-skills	Mean	SD	<i>N</i>
Social support	–				4.51	0.42	62
Self-esteem	0.33*	–			2.86	0.67	63
General self-efficacy	0.36**	0.34*	–		2.95	0.44	63
Development of horse-skills	–0.35*	–0.12	0.01	–			

* $p < 0.05$; ** $p < 0.01$.

Results

The descriptive statistics and correlations are presented in Table 4. A significant correlation between a lower level of perceived social support prior to the intervention and increase in skills with the horse during the intervention was found (Table 4). No association was found for self-esteem or self-efficacy and change in mastering skills with the horse. There were medium-high correlations between the psychological variables social support, self-esteem and self-efficacy. The linear regression model explained 14% of the variance. Social support was a unique contributor to the development of skills with the horse, controlled for self-efficacy and self-esteem. A low level of social support predicted an increased development of learning skills with the horses during the intervention ($\beta (41) = -0.38$, $t = -2.04$, $p < 0.05$). Self-efficacy ($\beta (41) = 0.10$, $t = -0.50$, $p = 0.62$) and self-esteem ($\beta (41) = -0.10$, $t = -0.54$, $p = 0.60$) did not predict to which extent the adolescents developed skills with the horse.

Conclusion

Perceived social support is correlated to the change in developing skills with the horse. A low level of social support predicts a higher increase in mastering of relational and task-specific skills with the horse during the intervention.

Discussion

The results of both studies indicate that in this intervention, perceived social support was linked to activities with the horses. In the two studies, social support predicted how well adolescents learned to handle the horse, and activities with horses were shown to enhance perceived social support. Perceived social support emerged as the main psychological factor in both studies.

The intervention study

Social support

This intervention with horses had an effect on perceived social support. Due to the experimental design, it is possible to assess the effect of the intervention. The only difference between the groups was the intervention, controlled by checking that social

support was similar between groups before the intervention. The results showed that adolescents who were randomly assigned to an intervention with horses showed an increase in perceived social support than the control group. In a period of adolescence, many factors influence such a variable as social support. It is therefore interesting that a short-term intervention contributed to a significant difference between the groups. The intervention group experiencing an increase in social support might indicate that the intervention gave them an extra social supportive network not experienced by the control group. We did not measure the impact of each component in the intervention on social support. The result is therefore related to the total experience of the intervention including interaction with the horse, another peer and the instructor.

The change in perceived social support is most likely due to the external resources experienced during the intervention. Research involving the horse in activities and therapies indicates that it is the total experience of the intervention which gives the outcome (Bizub et al., 2003; Burgon, 2011; Forsberg & Tebelius, 2011). A relaxing environment with supportive adults and peers with animals that are calm and friendly seem to be important factors. This may also explain the change we obtained in perceived social support as the whole setting on the farm induced different elements of social support: peers, a supportive adult, a calm environment and the horse as a mediator for the contact.

Social support being influenced through activities with horses is in accordance with observations from qualitative studies on at-risk adolescents (Burgon, 2011; Hayden, 2005), who found that activities with the horse in a social setting with others gave a positive experience for adolescents. A change in perceived social support for a normal group of adolescents indicates that activities with horses have a function not only in treatment, but also in basic psychological processes.

The horse

Studies have shown that social support experienced from animals was stronger when a bond with the animals was established (Antonacopoulos & Pychyl, 2008). Caring for and feeling connected to someone are important aspects for the experience of social support (Cobb, 1976). Social support is linked to a feeling of intimacy which may be experienced through having contact with the horse. Emotional bond is created through closeness, petting and grooming the animal (Bachi, Terkel, & Teichman, 2012; Crawford, Worsham, & Swinehart, 2006). Throughout this intervention, the adolescents were therefore given time to groom and handle the horse. The adolescents in this study showed a large interest in having contact with the horse and had the same horse each time (Hauge, Kvalem, Pedersen, & Braastad, submitted). A feeling of connectedness with an animal might happen without owning the animal (Endenburg & van Lith, 2011), indicating that this was not a hinder for the adolescents experiencing connectedness with the horse. The adolescents having the same horse during their intervention might have been of importance. The level of attachment was not measured, but one might consider that a bond with the horse could have developed, important for the experience of social support. The experience of acceptance by the animal may induce a sense of worth and lovability which is important experience in the period of adolescence (Levinson, 1978).

The behaviour of the horse is important for the outcome. Ensuring good horse welfare is a prerequisite for providing safe and positive human–animal interactions. A calm horse will induce a feeling of protection and reassurance more than a reactive horse (Brown, 2007). The horses in this project showed only positive or calm responses (Hauge et al., submitted), which may have been important for the experience of social support by the

adolescents. This created a safe setting in which the adolescents were able to feel secure during challenging tasks with the horse.

The environment

An environment perceived to be safe and relaxed is important for receiving a positive experience of an activity (Gano-Overway et al., 2009). In EAT the environment is often chosen as part of the treatment process to influence aspects different from a clinical setting (Bachi et al., 2012). The social setting was limited to few people and the adolescents had contact with the instructor all the time they were on the farm. This created a safe setting in which support was available if needed, important for development of social support (Baumeister & Vohs, 2012).

The support from the farmer may influence the experience of an intervention on a farm (Pedersen, Ihlebæk & Kirkevold, 2012). The instructors in our study acted as a supportive leader, allowing the adolescents to try by themselves. The activities conducted on the farm were focused around the horse, creating an object of common interest which might have induced human–human interaction (Black, 2012). Seven of our participants were interviewed about the impact of the environment on the experience of the intervention (Flatekval & Berge, 2010). The authors concluded that, in addition to the interaction with the horse, the natural environment, the surroundings and the social setting were important for the adolescents.

The activities conducted on the farm were focused around the horse, creating an object of common interest which might have induced human–human interaction (Black, 2012). The social setting was limited to few people, creating a supportive environment, which is found to be important for perceived social support (Baumeister & Vohs, 2012). The adolescents in the intervention did not necessarily know each other before they started the intervention, but adolescents from the same school were at the same farm together. The period of the intervention being in transition to secondary school, a supportive network of peers may be particularly important (Kvalem & Wichstrom, 2007). The experience of social support on the farm might have given the adolescents who were in the intervention together a common element also in the school setting.

Social support captures the whole experience of EAAs, including elements of support from the animal, other participants and the instructor. The combination of factors in this intervention: the horse, the instructor, the other peer and the nature surroundings might all be important for the results.

Self-esteem

Self-esteem is related to social support. As the intervention had an impact on social support, one might think that self-esteem could be influenced over time, but overall the results of this study showed no significant change in self-esteem with this measurement. This is in accordance with other studies which did not find a change in a broad measurement of self-esteem during interventions with horses (Ewing et al., 2007; Holmes, Goodwin, Redhead, & Goymour, 2011; Kaiser et al., 2006). Although Bachi et al. (2012) reported an increase in self-image for adolescents participating in EAP; the increase was also found in the control group, without any significant difference between the groups. Cawley, Cawley, and Retter (1994) also reported an increase in self-esteem through EAT, but without a control group. This indicates that further research is needed on self-esteem in relation to activities and therapy with horses. Holmes et al. (2011), who found no change

in self-esteem during an intervention with horses, suggested that the intervention was related to well-being more than a general development of self. Holmes suggests that a broader measurement of well-being or quality of life could capture the outcome of such an intervention more clearly.

The adolescents in this study had normal levels of self-esteem comparable with Norwegian adolescents in general (Wichstrom, 1995). Having a normal level of self-esteem before the intervention limits the possible increase an intervention might have over such a short time period.

Self-efficacy

The intervention did not have an impact on general self-efficacy. This might be due to the fact that general and not specific self-efficacy was measured. Hauge et al. (submitted) found in a video study that mastering of specific tasks in relation to the horse increased during the intervention. Self-efficacy in general may be influenced by several factors, for example academic achievements, and it might be difficult to detect a change in such a broad measurement. This is in accordance with other studies on horse-assisted activities and adolescents (Ewing et al., 2007; Kaiser et al., 2006). Ewing et al. (2007) found no effect on the general measurement of self-efficacy, but found an increase in specific self-efficacy beliefs in relation to activities with horses through qualitative studies.

Psychological variables in relation to learning of skills with the horse

Self-efficacy, self-esteem and social support have common elements as shown in the correlation analysis. Because self-efficacy is related to mastery of tasks in general, one would especially expect this variable to correlate with perceived increase in skills in mastering tasks with the horse. The analysis showed that only social support was associated with development of mastering skills with the horse during the intervention. Somewhat surprisingly, the results showed that development of skills with the horse was linked to a low level of social support before the start of the intervention. The questions used to measure development of mastering skills with the horse focused on the adolescents' own experience of mastering relational and task-specific skills with the horse in various settings. The adolescents with the lowest level of social support prior to the intervention might have experienced the highest increase in development of skills with the horse because they found an arena where they experienced the social support needed to actively participate. The perception of the environment being supportive may influence the self-confidence and achievement in an activity (Ahmed et al., 2010). This might indicate that activities with horses create an arena for mastering experiences in an environment perceived as supportive, and that such an intervention is particularly valuable for adolescents with a lower level of perceived social support.

Strengths and limitations

This research is an important contribution to the field because it is a randomised control trial. Using a control group to study the effect of an intervention with horses on a group of ordinary adolescents is scarcely done in this field. Another strength of the study was the possibility to include a larger number of participants than what is common in these types of interventions. No significant difference in relation to attrition was found; the participants who did not answer the questionnaires at all times were no different on any

measures at base level (T1) compared with the samples used in the analysis. The attrition may be due to the adolescents being mostly motivated for participating in the intervention with horses but then lacking interest to answer the post-intervention questionnaires.

The main aim of the intervention was to give the adolescents an experience of being on a farm with horses as close to a natural setting as possible. Despite that the farms were similar due to the number of horses, and the adolescents were told to do the same tasks, being in a natural setting, it was difficult to standardise the intervention completely. The intervention for each student was conducted either during fall/winter or during winter/spring. This meant that all students experienced both warm and cold weather during their intervention, half in the end and half in the beginning of the intervention.

The setting in our study varied with different animals and different instructors conducting the intervention. We consider this as the strength of our study, because the effects of the intervention we found were not dependent on the different settings and can therefore be seen separately from the conditions (Kazdin, 2011). A significant result across different farms and instructors indicate that this is applicable for an experience of activities with horses in a farm environment in various settings.

The intervention was not designed as a programme which is often the case in EAT. The goal was not to treat a problem but to analyse the experience ordinary adolescents had with EAAs. The experience of the intervention was thus in focus, all components working together to create a safe setting when interacting with horses. The goal was to evaluate the total experience; therefore, a measurement of each component of the intervention was not used.

In this study, we used the subscale of the READ (Hjemdal et al., 2007) to measure perceived social support. Although the subscale for social support had a good face validity related to other measurements of social support (Cutrona & Russel, 1978), the scale consisted of only five items. The subscale was obtained from a scale validated to measure a construct different from what is used in this study. Social support is important for resilience which relates the two constructs to each other, but this is a weakness for the results of this study. As social support was such an important factor in the study, a wider questionnaire measuring social support with more items would have been preferable. This also deprived us from being able to measure the impact of different experiences of social support during the intervention. We would therefore recommend using in future studies a questionnaire that is designed to measure social support in more detail than the measurement used in this study such as the Social Provisions Scale (Cutrona & Russel, 1978).

The question used to measure mastery of relational and task-specific skills with the horse during the intervention was developed from other studies investigating activities with horses. The questionnaire had a good Cronbach's α , but has not been validated. The questionnaire measured the experience the adolescents had with mastering skills with the horse and gave an indication of their experience of the intervention. The questionnaire was related to tasks with the horse during the intervention and was therefore easy to answer for the adolescents. The questionnaire seemed to be a good instrument for investigating the adolescents' experience of mastery during tasks with the horse, but could have included more elements related to the experience of the interaction in relation to aspects of social support.

Conclusion

Adolescents without any known behavioural problems, who were given the opportunity to work with horses and ride once a week for 4 months, showed an increase in perceived

social support during the intervention when than the control group. The adolescents with the lowest level of social support before start showed the highest increase in learning to handle the horse during the intervention. The group representing Norwegian adolescents without any specific diagnosis gave a study material different from other studies conducted on adolescents and horses. Most research on adolescents and horses has been on adolescents with psychological problems. Finding an increase in a psychological variable (social support) for a group of adolescents without serious problems is interesting. The results of this study represent basic psychological factors which might be important in horse-assisted activities for adolescents in general. The practical implication of our study is that offering stable work and riding to adolescents in an environment with a supportive adult and peers may benefit their psychological development. Using horse activities as a primary prevention strategy may be particularly valuable for adolescents with low prior perceived social support.

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