

ADOLESCENTS RIDING MOPEDS COMPARED TO ADOLESCENTS RIDING LIGHT MOTORCYCLES

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ABSTRACT

Powered two wheelers (PTW) are categorised into mopeds, light and heavy motorcycles, whereof the two first categories are denoted light PTWs. Light PTWs are mainly transport tools for adolescents in the age of 16 – 18 years. This paper presents results from a survey of Norwegian adolescents' views of their riding, their vehicles and the meaning of riding PTW in a socio-cultural perspective. Licensed moped riders (n=1017) are compared to light motorcycle riders (n=147), which do have a much more comprehensive training prior to entering the traffic. Light motorcycle riders differs most from moped riders in their personal and social interest for the PTW riding, rather than perceiving the vehicles as means for transport. Their self reported accident proneness did not differ significantly, albeit light motorcycle riders have the speed potential. Both groups have a high confidence level regarding their traffic involvement, which should be further scrutinized in order to develop targeted safety measures.

Keywords: Moped, light motorcycle, socio-cultural factors, traffic behaviour, adolescents

INTRODUCTION

Light PTWs became increasingly popular in the period from 1998 until 2005, especially amongst younger people in Norway. Both the number of mopeds, encompassing PTWs with cylinder volume less than 50 cm³ and maximum speed within 45 km/h, and light motorcycles, encompassing PTWs with cylinder volume within 125 cm³ and motor effect within 11 kW, have increased significantly. From the year 2000 the number of registered mopeds in Norway has increased from 118.000 to approx. 140.000 in 2003. And, since 1997 the number of light motorcycles has tripled (from approx. 4.000 in 1996 to approx. 11.500 in 2003). This increment is probably due to the changes in taxes, making this category vehicle more favourable (Bjørnskau 2004).

In Norwegian politics the vision zero principle has been adopted since 2002. This principle entails that special considerations shall be made to reduce the number of casualties and serious injuries in the road traffic. Thus, vulnerable groups are emphasised in the traffic safety work, such as motorcyclists. In Norway the accident rate for mopeds and light motorcycles has concurred and stabilised since 2001. Table 1 depicts the accident rates, which is to be understood as number of accidents per million personkm. travelled.

Table 1. Accident rate¹

	2001	2002	2003	2004	2005
<i>Light motorcycle</i>	1.27	1.33	1.26	1.45	1.30
<i>Moped</i>	0.99	1.27	1.27	1.48	1.27

¹The accident rate is defined as the number of recorded accidents with injuries to persons¹ divided with the estimated number of person kilometres obtained from Rideng (2006)

Accident rates for both light PTW categories increased remarkably in 2004. The increment for mopeds yielded more serious injuries, while the increment for light motorcycles was related to less serious injuries. However, even though the accident and exposure data related to light PTWs are dubious, Bjørnskau (2004) emphasises that the death risk, measured as number of deaths per personkm., has decreased remarkably. Bjørnskau hypothesises that the risk picture can be explained by an increased use of light PTWs amongst urban adolescents, which have resulted in another driving behaviour than has been seen amongst the typical rural “motor interested” adolescents. In later studies the picture has changed (Bjørnskau, 2009; Bjørnskau, Nævestad, & Akhtar, 2010), to which it is claimed that more accurate exposure data worsen the accident rate for light motorcyclists to an average of 3.08. Especially for light PTW drivers aged 16-17 the picture is bad, with the estimated accident rate of 13.05.

A large group of riders of light motorcycles and mopeds are adolescents, who are inexperienced riders. Their experiences with powered vehicles are normally limited to the PTW licensure and their practical use, which is often within the limits of two years². They are socially and culturally driven between different sets of values and established norms. And not least, they are economic weak and they are often struggling to find their position in life. These rather turbulent situations for the adolescents call for an analysis of socio cultural factors. However, socio cultural factors have not been given much attention in the research literature on adolescents riding PTWs, and even more seldom in relation to safety and accident risks. How can we explain the traffic behaviour of adolescents either riding a moped or light motorcycle? What circumstances influences the different behaviour observed? And, when does the traffic situation exceed the competence limits of the riders and riders involved, such that an accident occurs?

This paper presents adolescents views of different issues related to the riding of moped or light motorcycle. The purpose has been to catch a wide overview in order to identify which factors that are regarded important, and in which aspects the two groups of adolescent differs. The overall goal has been to clarify factors that influences accident risk, how these factors can be combined and to which extent safety measures could become related. As for this paper the general picture is the target issue. The paper is organised as follows: First, the theoretical basis for the development of the questionnaire is outlined. Second, the method applied is presented, followed by the survey results. Finally the study results are discussed in light of earlier studies with a socio cultural perspective.

THEORETICAL FRAMEWORK: THE SOCIO-CULTURAL PERSPECTIVE

Attention is drawn to adolescents’ PTW riding and the importance of socio-cultural factors as premises for riding behaviour and accident proneness. The theoretical outline is presented in Njå and Nesvåg (2007), based on ideas from (Freilich 1970; Geertz 1973; Schein 1985; Turner 1977; Strauss 1992; Strauss 1997). It consists of a three dimensional analytical framework of PTW riding; *transition vs. integration, individual vs. social, and regulative vs. transbounding*. These dimensions construct the holistic socio-cultural framework, which we can denote as the socio-cultural space. The purpose has been to obtain an understanding of the meaning of riding light motorcycles and mopeds, attaining a richer and more comprehensive description of PTW riding and factors influencing accident proneness that is seen elsewhere.

Is the riding ritual either being dominated by transition or integration? The meaning of riding moped and light motorcycle could be viewed as a ritual to demonstrate a transition from one condition in life to another. For example riding a motorcycle at the age of sixteen would indicate that you have become an adult. Furthermore, in more common settings a specific riding behaviour could demonstrate the transition from being in a structured context at school or at work, to a liberated leisure context. On the other hand the meaning of riding could be viewed as an integration ritual, in which the riding demonstrates integration into an established group or community (Lave & Wenger, 1991). The activity is then regarded to maintain something valuable, a hierarchy or a belonging to a specific unit in order to become a full member.

Is the riding influenced by individuality or collectivistic values, and how are the values balanced? At the one extreme the light PTW riding behaviour could be seen as a result of the individual oriented understanding and at the opposite is the collective oriented understanding. A collective is in this context a stable group in which the

¹ Norway statistics (SSB), <http://www.ssb.no>

² From the populations of the study reported in this paper the average number of months holding the license is: moped - 13 months; and light motorcycle - 11 months

members have strong opinions of their characteristics (for example motorcycle clubs). Even though there is a very strong discipline and clearly defined rules in some motorcycle clubs, most of them are loosely coupled. In those “normal cases” the creation of the social and cultural community could have been based on many different cross sectional values without clearly defined boundaries of which and who belongs to the community or not. The collectives could also be temporary and some even created just for specific situations, and afterwards broken up. “In this sense, community as belonging is constructed in communicative processes rather than in institutional structures, spaces, or even in symbolic forms of meaning” (Delanty, 2003).

The depth of the socio cultural perspective is created by the relationship between riding in a regulating context or as transbounding activity (Elmeland, 1996). The instrumental context of meaning is being characterised by conventional and clear signs. The actions are goal oriented and the time perspective is “clockwise”. This could be understood as “business travel”, for example to school, to work or going shopping. Secondly, the context of meaning could be a search for the overall feeling or unity in the diversity, dominated by rich metaphors. The actions are dominated by imaginations and the time perspective is “right now”, an “action time”. This perspective is for the most connected with leisure time and playing around. These two contexts of meaning could also be distinguished by static and dynamic characteristics (Turner, 1977). The instrumental meaning is static in its contents of reproduction and regulation of identities, roles, relations and behaviours. The other context is dominated by transbounding actions and innovation. Could we say that the riding is dominated by maintaining stable roles or is the riding predominated by a strive for achieving better positions in a network implying transbounding riding behaviour? Are there really goals and explicit purposes with the riding beyond the need to get from location A to location B? The reproduction of the meaning of riding behaviour will take place in the relations between communities and situations predominated by these two kinds of social interactions; *the structural/regulative and the anti-structural/transbounding*.

METHOD

The questionnaire was developed from the holistic socio cultural framework presented above, by relating questions to one extreme value at the time. For example under the theme “transbounding”, questions like “I like to test the maximum speed”, and “I try out turning techniques in some defined curves” were developed. The questionnaire consisted of 188 items spanning from questions about facts, for example responses to demographic variables, to questions about personal views, for example friends impact on riding behaviour. The statistical analysis of accident data involving light PTWs in Norway, carried out by the Institute of Transport Economics (Bjørnskau 2004) was also important for the design of the questionnaire. Bjørnskau found that the adolescents are the major group of light PTW riders involved in accidents, the accident occur in the afternoons weekdays, no effect of trimming is seen in the accident data, and the increments in accident rates are only related to some counties in Norway. Our first step was then to try to reveal tendencies or patterns in the adolescents assumptions, values, beliefs and norms related to their involvement with PTWs. In order to have a possibility to obtain geographical differences we selected five counties for the survey. The questionnaires were sent to 23 upper secondary schools in the counties of Rogaland, Hordaland, Nord-Trøndelag, Akershus and Buskerud. Rogaland and Hordaland were in the upper region of accident frequencies, Akershus in the middle, and Nord-Trøndelag and Buskerud had the lowest numbers.

The County Executives of Education were contacted and the schools identified on the basis of a uniform distribution of rural and urban areas. Furthermore contacts with the schools’ headmasters were made, and the headmaster coordinated the data gathering within his/her school. The coordination work varied, and some schools did only collect data from a few number of the total school classes. However, no systematic selection was experienced, rather practical difficulties made it impossible to obtain responses from all school classes. Within each class the schoolteacher handed out the questionnaires to the pupils, who responded in the lesson, sealed the envelope and handed the questionnaire back to the teacher. With this procedure the response rates were close to 100%, and no one reported less than 80%. The response rates were not systematically recorded, but estimated by the class teacher.

We received 1017 responses from moped riders and 147 responses from light motorcycle riders. The relative level of light motorcycles to mopeds (0.14) is higher than the official statistics (Norway Statistics - 0.08). This can partly be explained by the adolescents preferences for light motorcycles, and that moped are distributed over all groups of ages. However Bjørnskau (2004) postulated that a major increment in mopeds has been seen in urban areas, as of which the cities of Oslo and Bergen would strongly contribute. This effect is not covered in the distribution of the questionnaires.

The respondents were from 16 years old to 24 years, average 17 years and 1 month. 25% of the moped riders were female and the portion was 14% of the motorcycle riders. Approximately 50% came from urban areas

(towns with more than 10.000 inhabitants). 13% of the moped riders did have driving licence for another powered vehicle, and 63% of the light motorcyclists. The distribution of motorcycle styles is: 6% Scooter, 26% Custom, 19% Offroad, 7% Sport and 42% Racer. The distribution of mopeds is: 41% Scooter, 36% Offroad, and 23% Racer/Sport. Average time that the vehicle has been in possession is 1,3 years for both PTW categories. 66% of the motorcyclists only ride in the summer period, while 51% of the moped riders ride all year round. The self reported average mileage driven per year is estimated to 3.500 km (moped) and 7.500 km (light motorcycle).

The questionnaire was tested on ten respondents (moped and light motorcycle drivers) in order to clarify the contents of the questions (how they were perceived), the measuring scale and estimate the time needed for answering. A five point Likert scale was regarded appropriate for the respondents' abilities to nuance their responses. The analytical approach of this study was descriptive statistics and comparisons of means for all the ordinal variables examining personal views of the riders. The data is analysed by use SPSS, (statistical software system), and comprises descriptive statistics and comparison of means by employing an independent-samples *t* test. Significance levels $p < 0.05$ was recorded. Carrying out multiple testing on large samples could imply false significant differences, and rejecting the null hypotheses. However we have chosen to pursue all differences, shedding light upon the riders underlying comprehensions.

RESULTS

Factors influencing the adolescents' provisions of bikes

The most important factors for choosing the bike are the outlook and price, cf. table 2. The friends seem to have little impact on the choice, and neither is it important that the bike is trimmed. However trimming is more important for moped riders than motorcyclists. Motorcyclist is significantly more concerned about the outlook and style than moped riders. In general the artefacts seem more important for the motorcyclists.

Table 2. What was important for you when you provided the bike you possess now?

Items		Descriptives		Differences		
		Mean	SD	t	Mean diff. (95% conf.int)	p
IMPORTANT FOR PROVISION OF BIKE						
The outlook	Light mc	1.76	.87	-4.02	-.36 (-.53, -.18)	<. 001
	Moped	2.11	1.01			
The style	Light mc	2.10	.92	-4.00	-.33 (-.51, -.17)	<. 001
	Moped	2.44	1.04			
Bike being trimmed	Light mc	3.51	1.21	2.72	.34 (.09, .58)	<. 01
	Moped	3.18	1.39			
The price	Light mc	2.01	1.02	.77	.08	
	Moped	1.94	1.10			

The scale reads from (1) *Very important*, to (4) *Not important*

Riders' perceptions of education, training and motives for riding

Table 3 presents the PTW riders' views on education details. The riders are satisfied with the teachers' performances, and the training is considered appropriate. However the respondents were rather ambivalent to questions about how and to what degree the training had influenced on their riding behaviour. The motorcyclists are significantly more satisfied with the riding teacher than the moped riders. This is understandable since the driving licence requirements are much more comprehensive for motorcyclists. The moped drivers differs significantly in their views on accepting more training hours and they admit that they did not learn very much at the moped rider training.

Table 3 also depicts motives for riding. The most important factors for riding light PTWs is in ranked order: "fun", "independence" and "economy", which is in accordance with the study carried out by Hobbs, Galer & Stroud (1986). The social importance of friends is downgraded. However friends are significantly more

important to moped riders than to motorcyclists. Moped riders are more concerned about the economic situation, while motorcyclists enjoy riding most.

Table 3; Views on training/education, improvements and motives for riding

Items		Descriptives		Differences		
		Mean	SD	<i>t</i>	Mean diff. (95% conf.int)	<i>p</i>
TRAINING/EDUCATION AND IMPROVEMENTS						
Practical guidance from teacher	Light mc	1.59	1.04	-2.93	-.30 (-.51, -.10)	<. 01
	Moped	1.90	1.18			
More mandatory training hours	Light mc	4.26	1.18	6.72	.73 (.48, .98)	<. 001
	Moped	3.53	1.48			
I will be a better biker.... ...if the training become improved	Light mc	3.70	1.31	5.07	.66 (.41, .92)	<. 001
	Moped	3.04	1.43			
...if the sentence for traffic violations become stricter	Light mc	4.03	1.19	2.12	.26 (.02, .50)	<. 05
	Moped	3.77	1.33			
...if my friends improve their riding behaviour	Light mc	3.63	1.31	-.20		.00
	Moped	3.63	1.25			
...if more traffic controls were introduced	Light mc	4.14	1.26	.59		.07
	Moped	4.07	1.24			
...if the car drivers showed more consideration for PTW riders	Light mc	1.74	1.24	.56		.06
	Moped	1.68	1.15			
...if my parents or guardians criticized more my riding behaviour	Light mc	3.73	1.25	1.56		.18
	Moped	3.55	1.29			
...if road maintenance become improved	Light mc	1.60	1.05	-3.76	-.40 (-.61, -.19)	<. 001
	Moped	2.00	1.16			
...if the requirements to protective gear become strengtened	Light mc	3.04	1.41	-2.37	-.29 (-.52, -.05)	<. 05
	Moped	3.32	1.29			
MOTIVES FOR RIDING						
Need for independence	Light mc	1.31	.87	-1.53	-.12	
	Moped	1.43	.84			
My friends ride	Light mc	3.21	1.41	3.06	.38 (.14, .62)	<. 01
	Moped	2.83	1.36			
It is fun	Light mc	1.19	.604	-5.23	-.47 (-.64, -.29)	<. 001
	Moped	1.66	1.048			
It is cheap	Light mc	2.43	1.31	3.61	.39 (.18, .60)	<. 001
	Moped	2.04	1.19			

The scale reads from (1) *Totally agree*, to (5) *Totally disagree*

Riding habits

Table 4 outlines the driving habits as responded by the riders. The general impression is that there exists a great deal of indifference or an attitude that the subject do not matter one way or the other, but it could also be interpreted as ambivalence across the groups indicating a huge variation in habits.

Table 4; My riding habits

Items		Descriptives		Differences		
		Mean	SD	<i>t</i>	Mean diff. (95% conf.int)	<i>p</i>
RIDING HABITS						
I listen to music when riding	Light mc	3.57	1.28	2.33	.30 (.05, .55)	<. 05
	Moped	3.28	1.37			
I do not like to ride behind others	Light mc	2.69	1.14	-4.17	-.49 (-.72, -.26)	<. 001
	Moped	3.18	1.31			
In daylight I ride with the lights switched off	Light mc	4.65	.86	2.37	.26 (.04, .47)	<. 01
	Moped	4.39	1.16			
Riding is funniest when I feel excitement and thrills	Light mc	2.04	1.10	-2.31	-.26 (-.48, -.04)	<. 05
	Moped	2.30	1.26			
To ride makes me feel free	Light mc	1.36	.61	-5.78	-.54 (-.73, -.36)	<. 001
	Moped	1.91	1.09			
I go riding if I do not have anything else to do	Light mc	1.88	1.05	-5.35	-.68 (-.93, -.43)	<. 001
	Moped	2.56	1.45			
The riding itself doesn't mean anything, it is to arrive at the planned location that counts	Light mc	3.50	1.25	7.71	.93 (.69, 1.16)	<. 001
	Moped	2.57	1.33			
Keeping fastest speed as possible is important to me	Light mc	3.19	1.38	5.49	.65 (.42, .88)	<. 001
	Moped	2.54	1.30			
I am never uncertain when riding	Light mc	2.38	1.11	1.59	.17	
	Moped	2.21	1.19			
I do not change riding behaviour when it is raining	Light mc	3.89	1.23	3.24	.40 (.16, .65)	<. 001
	Moped	3.49	1.39			
I like to test the maximum speed	Light mc	2.16	1.23	1.25	.14	
	Moped	2.02	1.26			
It is ok to overtake other vehicles because it is always space for the bike	Light mc	2.70	1.31	-.84	-.10	
	Moped	2.80	1.34			
My riding has made me scared	Light mc	3.05	1.49	-2.86	-.37 (-.62, -.11)	<. 01
	Moped	3.42	1.40			
I try out turning techniques in some defined curves	Light mc	2.24	1.19	-3.82	-.48 (-.73, -.23)	<. 001
	Moped	2.72	1.41			
Cars driving up behind me don't keep the correct distance	Light mc	2.14	1.13	2.96	.29 (.10, .48)	<. 01
	Moped	1.85	1.05			

I ride differently now than I did in the riding training	Light mc	2.01	1.14	-2.53	-.29 (-.52, -.07)	<. 01
	Moped	2.30	1.31			
The road quality is good for us bikers	Light mc	3.31	1.48	3.63	.46 (.21, .71)	<. 01
	Moped	2.85	1.37			
When I ride, I think of difficult situations that can occur	Light mc	2.14	1.06	-2.71	-.30 (-.52, -.08)	<. 01
	Moped	2.44	1.24			

The scale reads from (1) *Totally agree*, to (5) *Totally disagree*

The groups' riding habits differ significantly regarding listening to music while riding, riding behind others, acceptance of headlights switched off, and reducing speed in the dark. Moped riders listen more frequently to music and are more likely to accept headlights switched off. Motorcyclists are more prone to reduce speed in darkness and they do not like riding behind other vehicles.

Social conditions and PTW-riding

Table 5 presents the influence friends have on riding behaviour and to what extent the circle of friends are part of choices made with regards to the bike.

The respondents place little weight onto the influence from friends. Neither the style nor how the bike is treated seem to mean much to which status the person would achieve in his/her circle of friends, and most of the respondents strongly agree that bikes is not requested to be part of the circle of friends. However, over 70% of the moped riders have more than 7 friends riding light PTWs and 93 % have more than 3 friends riding moped. The number of friends riding light motorcycles is significant smaller, but to them the influences from friends is regarded higher on their riding behaviour than for moped riders.

Table 5; The social conditions with friends and PTW riding

Items		Descriptives		Differences		
		Mean	SD	t	Mean diff. (95% conf.int)	p
ME AND MY FRIENDS						
The bike ensures high status in my circle of friends	Light mc	3.35	1.35	-6.14	-.69 (-.92, -.47)	<. 001
	Moped	4.05	1.24			
My friends give me comments if my bike is dirty	Light mc	3.42	1.39	-4.49	.54 (-.77, -.30)	<. 001
	Moped	3.96	1.32			
It is not necessary to have bike in my circle of friends	Light mc	1.67	1.23	-1.76	-.20	
	Moped	1.87	1.40			
I ride differently with friends	Light mc	2.75	1.22	-1.81	-.22	
	Moped	2.98	1.33			
I like riding on serpentine rural roads	Light mc	2.03	1.10	-2.84	-.34 (-.57, -.11)	<. 01
	Moped	2.37	1.30			
Who I ride with is important for my riding behaviour	Light mc	2.62	1.34	-3.86	-.50 (-.75, -.25)	<. 001
	Moped	3.12	1.39			
I take more chances when riding with my friends	Light mc	3.30	1.30	.39	.05	
	Moped	3.25	1.34			
We think it is important to talk about events and occurrences after the trips with my friends	Light mc	2.67	1.28	-2.76	-.35 (-.59, -.10)	<. 01
	Moped	3.02	1.38			

I ride faster when I ride with friends	Light mc	3.14	1.26	-.72	-.10	
	Moped	3.23	1.34			
Some of my friends ride careless in curves	Light mc	2.46	1.38	-1.47	-.18	
	Moped	2.65	1.44			
My friends consciously violates traffic rules	Light mc	2.94	1.37	-.81	-.10	
	Moped	3.04	1.47			
My friends sometimes make shortcuts, riding on footpath, pavement and so on	Light mc	2.67	1.49	2.69	.35 (.10, .61)	<. 01
	Moped	2.32	1.39			
My friends think it is ok to not wear helmet when riding short trips	Light mc	3.54	1.52	1.70	.26	
	Moped	3.29	1.53			
It is important to have a trimmed bike amongst my friends	Light mc	3.60	1.40	2.34	.33 (.05, .61)	<. 05
	Moped	3.27	1.49			
It is important to be able to work on the bike amongst my friends	Light mc	2.97	1.33	-.76	-.10	
	Moped	3.07	1.49			
I am one of the two best riders in my circle of friends	Light mc	2.25	1.15	-.30	-.03	
	Moped	2.29	1.15			

The scale reads from (1) *Fully agree*, to (5) *Fully disagree*

Self reported accidents and near accidents, risk mitigation and attitudes

No clear tendencies are seen in the respondents views on accidents or their self experienced near accidents. Table 6 shows that the respondents generally agree that they fear accidents, and they think that having experienced an accident, it will impact their riding behaviour. Motorcycle riders think that they are more prone to become involved in an accident than moped riders think. The self-reported involvement in accidents is 46% of the motorcycle riders (involved in one accident or more), and 48% of the moped riders. The distributions over type of accident resembled very much between the two groups. This indicates that the accident frequencies for the vehicles with higher speed do not show other tendencies than the slower mopeds. Bjørnskau (2004) did not find that trimmed³ mopeds were more frequently involved in accidents than not trimmed mopeds. Thus, it could be hypothesized that trimming has no adverse effect on safety. Motorcyclists are significantly more afraid to become involved in accidents than moped riders and they are more convinced that their riding behaviour would be changed if they ever became involved in one.

Table 6: The views on accidents and near accident

Items		Descriptives		Differences		
		Mean	SD	t	Mean diff. (95% conf.int)	p
ACCIDENTS AND NEAR ACCIDENTS						
I don't think I will become involved in accidents	Light mc	3.09	1.32	3.13	.39 (.15, .64)	<. 001
	Moped	2.70	1.39			

³ Trimming is erroneously connected to two different aspects. First the effects of the original resources are reduced by for example sealing the exhaust system in order to obtain the speed limit (45 km/h), which is not trimming. Second the effect of the engine is increased beyond the original resources by changing for example carburettor, which is trimming. Bjørnskau (2004) include both aspects.

I seldom hear about accidents wit PTWs	Light mc	3.71	1.24	-.34	-.04	
	Moped	3.75	1.27			
I fear to become involved in an accident with my bike	Light mc	2.10	1.18	-2.19	-.27 (-.51, -.03)	<. 05
	Moped	2.37	1.34			
I would be more careful if my friends had been involved in a PTW accident	Light mc	2.33	1.15	-.79	-.09	
	Moped	2.41	1.32			
If I had been into a PTW accident I would expect to be more careful afterwards	Light mc	2.04	1.10	-1.85	-.19	
	Moped	2.23	1.31			
More police controls will decrease number of PTW accidents	Light mc	3.65	1.43	-1.22	-.15	
	Moped	3.80	1.32			
After watching or read about PTW accidents in the mass media I have become more careful in traffic	Light mc	3.13	1.21	-.51	-.06	
	Moped	3.19	1.30			
My friends often talk about PTW-accidents	Light mc	3.28	1.28	-2.20	-.25 (-.48, -.03)	<. 05
	Moped	3.53	1.26			
I often think of my experienced near accidents when I ride my bike	Light mc	2.79	1.29	-1.99	-.24 (-.49, .00)	<. 05
	Moped	3.04	1.34			

The scale reads from (1) *Totally agree*, to (5) *Totally disagree*

Table 7 presents which kind of measures the PTW riders would choose if money were not a limitation. Again it is no clear tendency in their preferences, and thus, further provisions of safety measures were not regarded necessary. This could either mean that their bikes are well equipped with safety measures, or that safety is not a predominating value. The data shows that motorcycle riders are significantly more concerned with the bikes' expression, having another exhaust system to improve the noise conditions.

Table 7: If you have had money, which measures would you prioritise for your bike?

Items	Descriptives		Differences			
	Mean	SD	t	Mean diff. (95% conf.int)	p	
WISHES FOR BIKE IMPROVEMENTS						
Improve outlook	Light mc	1.94	1.15	-1.69	-.17	
	Moped	2.12	1.16			
Trimming	Light mc	2.17	1.16	.68	.11	
	Moped	2.10	1.20			
Better brakes	Light mc	2.11	1.15	.68	.07	
	Moped	2.05	1.07			
Change exhaust system to obtain better noise effects	Light mc	2.10	1.16	-3.83	-.42 (-.64, -.21)	<. 001
	Moped	2.53	1.24			

The scale reads from (1) *Very interesting*, to (4) *Out of question*

Table 8 presents the PTW riders' view on wearing protective clothing and their relations to the vehicle itself. In Norway motorcyclists wear more protective gear than moped riders. Both groups wear helmets and gloves, but the motorcycle riders additionally wear riding jackets or full suits.

Table 8: Protective clothing

Items	Descriptives		Differences		
	Mean	SD		Mean diff. (95% conf.int)	p
USE OF PROTECTIVE CLOTHES					
Helmet	Light mc	1.15	.68	-.59	-.03
	Moped	1.18	.59		
Gloves	Light mc	1.54	.91	-6.05	-.55 (-.73, -.37)
	Moped	2.09	1.04		
Suit	Light mc	2.71	1.42	-13.43	-1.52 (-1.74, -1.30)
	Moped	4.23	1.24		

The scale reads from (1) *Always*, to (5) *Never*

With respect to the vehicle itself, cf. table 9, all parties strongly agree that it is important to know the bike's characteristics, such as speed, break effects, suspension, acceleration and behaviour in curves. It is also regarded important to have the vehicle "shipshape" and maintained properly. In general the adolescents take interest in powered vehicles. Riding the day after drinking is to a certain extent accepted, and parental advices are less important with regards to riding behaviour. There are a lot of significant differences between motorcycle and moped riders regarding their relation to the vehicles.

The motorcycle riders are far more interested in the vehicle and its outlook, they read more motor magazines and watch TV programs, they feel more grown up and they eager to provide heavy motorcycles when old enough.

The moped riders are more convinced that trimming increases safety, lack of money is a bigger problem to them, and it is more important to become a licensed driver when they are 16 years old. The moped riding is a temporary phase for the adolescents, waiting for the car driving licence.

Table 9: Relations to riding, the bike and the gear

Items		Descriptives		Differences		
		Mean	SD		Mean diff. (95% conf.int)	p
RELATIONS TO THE BIKE AND GEAR						
Everyone should know the bike's characteristics	Light mc	1.69	.98	-1.85	-.18	
	Moped	1.87	1.08			
I don't mind if the lights have failed	Light mc	4.27	1.18	2.37	.27 (.05, .49)	<. 05
	Moped	4.00	1.29			
It is ok to drive the day after drinking alcohol	Light mc	3.54	1.44	1.69	.23	
	Moped	3.31	1.50			
I can't afford maintenance	Light mc	3.95	1.19	2.10	.24 (.02, .47)	<. 05
	Moped	3.71	1.32			
The bike makes me feel grown up	Light mc	3.43	1.46	-2.60	-.31 (-.55, -.08)	<. 05
	Moped	3.74	1.34			
It was important for me to have the riding licence at my 16 th birthday	Light mc	2.63	1.48	2.54	.33 (.08, .59)	<. 05
	Moped	2.30	1.48			
I am going to have heavy motorcycle when old enough	Light mc	1.42	.76	-9.17	-1.21 (-1.47, -.95)	<. 001
	Moped	2.63	1.56			
Car is my passion, the PTW is only a middle phase	Light mc	3.10	1.27	6.35	.77 (.53, 1.00)	<. 001
	Moped	2.33	1.37			
I would not have been in accordance with the values of my circle of friends if I hadn't trimmed my bike	Light mc	4.23	1.31	2.46	.30 (.06, .54)	<. 01
	Moped	3.93	1.38			
The outlook of the riding gear is important	Light mc	2.20	1.27	-4.51	-.56 (-.80, -.32)	<. 001
	Moped	2.76	1.40			
A trimmed bike increases safety	Light mc	3.16	1.50	5.88	.77 (.51, 1.03)	<. 001
	Moped	2.39	1.47			
I often read magazines about bikes	Light mc	2.54	1.36	-8.58	-1.09 (-1.34, -.84)	<. 001
	Moped	3.63	1.44			

The scale reads from (1) *Totally agree*, to (5) *Totally disagree*

DISCUSSION AND CONCLUSIONS

The findings from this study indicate that motorcycle riders and moped riders are different in many aspects. There are several indicators that the light motorcycle riders have a quite different relationship to their bikes and riding than moped riders. Moped riders' main reason for riding is for mobility and practical transportation, while the recreational factor is much more prominent with the motorcycle riders. They enjoy riding, which is plausible due to their abilities to explore the roads with higher speeds, being part of the regular traffic dynamics.

The major goal of the study has been to present a coarse comparison picture of the data material. We agree with Reeder et al. (1997) in their conclusion that young riders are not a homogenous group. The spread in responses pinpoints the differences Reeder et. al. also found that initiation into motorcycling occurs at a very early age, well before the age of licensure (Reeder, Chalmers and Langley 1992), and that the social context had

importance for the initiation (Reeder et al. 1992). These conclusions correspond mostly to our data on motorcyclists, who have developed clear self images, covering the styles of bikes, the riding behaviour, the outlook of equipment and the relationship to their friends. In general the spread of responses is large and thus it can be concluded that the adolescents are conclusive about most of the themes presented.

As an initial analysis of the results, the three main dimensions; riding as a transition or integration activity; riding predominated by individual or social contexts; and riding corresponding to regulative or transbounding behaviour, is applied to monitor the differences between the two groups of light PTW riders. Given that a significant difference is observed, in all aspects the motorcycle riders are being the most extreme party. However, in a majority of issues from the questionnaire, no significant difference is observed.

The motorcycle riders are significantly more in a *transition mode* regarding their riding due to their view on becoming an adult, on being attractive and to their preference of heavy PTWs. The moped riders were more concerned about having the ability to ride when they were 16 years old, but their economic situation were more of concern than motorcycle riders.

Motorcycle riders did also regard *integration indicators* higher than moped riders, such as the bikes role within the circle of friends, riding amongst friends, and the importance of having all in order to satisfy friends.

The level of *individuality* seems to correspond with the bike characteristics, and thus, motorcycle riders differ from moped riders in their weight placed onto the feeling of excitement and the driving for recreational purposes. They are more aggressive in traffic, meaning eagerness to overtake, speed and testing limits. When they ride, the motorcycle riders do also consider possible dangerous situations that might occur more frequently than moped riders. Moped riders do have higher acceptance for listening to music while riding.

The differences in the *sociality of riding* is characterised by the influence particular friends has on the riding behaviour, and that motorcyclists more often talk about events and experiences from the riding afterwards. It is plausible that accidents and near accident become part of the discussion. Motorcycle riders are more considerate of accident events than moped riders. However, we do agree with the studies showing that safety is not a predominant value for motorcyclists' choices in traffic (Conrad et. al 1996; Reeder et. al. 1996; Natalier 2001), and risk is rather regarded a positive value (Rutter, Quine, Alberey 1998). Adolescents riding light motorcycles are more prone than moped riders to stretch limits, having a *transbounding behaviour*. Even though the differences are related to the bike characteristics, such as testing turn techniques in curves, which is dependent on higher speeds capacities, motorcyclist do also report more often that their riding has made them scared.

Based on these observations we think that motorcyclists learn by observing and interacting with other motorcyclists, and they have a richer experience material than moped riders. Natalier claims that the riders' own knowledge of their abilities within the system are predominating driving behaviour, and that the motorcyclists purely rely on themselves. "*For the motorcyclist, the most significant source of information is experience. Theory does not save them in the event of an accident*" (Natalier 2001). An interesting question that has not been raised in the research literature is; how does the knowledge and experience evolve, and in what way does the *group* play a decisive role in the founding of opinion and perception? And how does the experience influence accident risk?

These questions are vital in order to understand effectiveness of safety measures targeted to adolescents riding light PTWs. The self reported accidental events are interesting in this respect. 59.9% of the light motorcycle riders' friends have been involved in one accident or more, while the proportion of moped riders' friends is 72.9%. Self reported accident involvements are 35.8% of light motorcycle riders and 38.1% moped riders. The distribution over accident types (head on, fall in road lane, driving off the road, etc.) shows similar patterns. The percentages related to self-experienced near accidents are higher, respectively 68.4% light motorcycle riders and 63.1% moped riders. Even though the differences are not significant, it is interesting that riders of light motorcycles have a higher frequency of near accidents but lower frequency of real accidents. Thus, their extremities regarding socio cultural factors could be interpreted as safety enhancing rather than risky.

Checking the groups' relations to *norms and rules* in the road traffic, the motorcycle riders are significantly more concerned with the rules of headlights and drink driving. They are less tolerant than the moped riders with regards to violating the rules. The moped riders are dissatisfied with the drivers of other vehicles, which do not respect norms of distances between the moped and the other vehicle. This is also evident in the light PTW riders' views on how to become a safer rider. Both groups ask for more considerate traffic behaviour, addressing car drivers.

Is it possible to conclude on effective safety measures that would reduce the numbers of accidents significantly? So far, no specific measure seems evident. The adolescents ask for better roads and more

considerate car drivers in order to become a better motorcycle rider, consequently improving others than themselves. They were critical to measures entailing reduced freedom of action, more controls and increased sentences for violations. Even though these points of views are not surprising, some fundamental questions could be raised. Say if the authorities would focus on the role of the single rider, what principles should form the development of safety measures. Do we need our knowledge about light PTW riding to “nail” those who do not adhere to the rules? Or, should increased knowledge become employed to recognise the perceived effects of PTW riding amongst the riders and motivate to changed behaviour? Reeder et al. (1996) envisaged a tightened authority involvement in the adolescent PTW riding activities in New Zealand. The Norwegian case seems rather different, in which the general impression is that rules are recognised and to a lesser degree than in New Zealand violated. However, the adolescents seem to be confident in traffic. 66% agrees or partly agrees that they are never uncertain when they ride PTW. We also interviewed involved parties in five different accidents (Njå and Nesvåg 2007). The adolescents gave the same impression in the interviews.

At this stage we conclude that a major issue for improving the adolescent safety precautionary behaviour is to increase their ability to critically reflect upon their own behaviour and to develop methods for gathering, recognising and learn from experience. More specific recommendations to safety measures need to be based on further analyses of the data.

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