

Imitating the Risky Decision-Making of Peers: An Experimental Study Among Emerging Adults

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Abstract

This experiment examined whether emerging adults imitate the risky decision-making of peers and whether peer susceptibility functions as a moderator. Overall, 63 emerging adults participated with a confederate of the same gender. The participants were randomly assigned to the experimental (confederate engaged in risky decision-making) or control (confederate did not engage in risky decision-making) condition. Risky decision-making was measured with the Stop-Light Game task, and peer susceptibility was measured with a questionnaire. Linear regression analyses showed that the participants engaged in more risky decision-making when the peer displayed risky decision-making. Peer susceptibility was not found to be a significant moderator of this relationship. The findings showed that health education programs need to consider imitation to reduce the risky decision-making of emerging adults more effectively.

Keywords

risky decision-making, peer influence, peer susceptibility, imitation, emerging adults

Adolescence and emerging adulthood are periods in which individuals are more prone to make risky decisions (Steinberg, 2008). Risky decision-making (also referred to as risk-taking) is defined as “engaging in and carrying out decisions in one particular moment that could potentially have a negative outcome for the individual” (Defoe et al., 2014, p. 49); on the spot, individuals choose and subsequently carry out the riskiest of the available choice options (the option with the highest uncertainty about the outcome; see review of Defoe et al., 2014, for more information). Risky decision-making has been shown to be positively correlated with various risk behaviors, such as cigarette smoking, unprotected sex, and drug use (Bornovalova, Daughters, Hernandez, Richards, & Lejuez, 2005; Lejuez et al., 2003; Lejuez, Simmons, Aklin, Daughters, & Dvir, 2004). Unlike risky decision-making, which seems more impulsive (e.g., Lejuez et al., 2002, 2003), risk behaviors consist of motivational and/or learning components, and they endanger the physical health and well-being of the individual as well as the physical health and well-being of bystanders (Schonberg et al., 2011). To understand the circumstances in which emerging adults make and carry out risky decisions, which may manifest in these (future) risk behaviors, it is important to gain more insight into the social contexts in which emerging adults engage in risky decision-making.

Peers are an important social context to consider, as individuals spend an increasing amount of time with their peers during adolescence and emerging adulthood (e.g., Brown, Dolcini, & Leventhal, 1997). Previous experimental studies that focused predominantly on adolescents showed that young people are more likely to engage in risky decision-making in the presence of familiar peers (e.g., Chein, Albert, O’Brien, Uckert, & Steinberg, 2011; Gardner & Steinberg, 2005). However, the question of *how* peers contribute to more risky decision-making has hardly been studied. A possible underlying mechanism can be derived from Bandura’s (1977) Social Learning Theory. According to this theory, young people pay attention to the behavior of significant others around them, called role models, and subsequently may imitate this observed behavior. As young people are more likely to observe and imitate behavior of individuals that are similar to themselves, peers are seen as important influential role models (Bandura, 1977).

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Moreover, young people may imitate the behavior of not only familiar peers (e.g., friends) but also unfamiliar peers (Chartrand & Bargh, 1999). This study built on previous experiments on risky decision-making in that it did not test the unique effect of peer presence of familiar peers among adolescents but rather the effect of peer influence (i.e., imitation mechanism) of an unfamiliar peer on emerging adults. Moreover, it is important to identify individuals who are more likely to imitate peers, that is, experience more peer susceptibility. Most studies used self-reports to measure peer susceptibility and showed that individuals seem to vary in their reported peer susceptibility (Meldrum, Miller, & Flexon, 2013). Therefore, in this present experimental study, we investigated whether emerging adults imitate peer risky decision-making and whether peer susceptibility moderates this behavior. It is important to gain more insight into imitation, as a possible underlying mechanism, to develop effective health education programs to decrease or discourage risky decision-making among emerging adults.

Imitation of Peer's Risky Decision-Making

Most experimental studies on risky decision-making used various computer tasks, such as the Stop-Light Game and the Balloon Analogue Risk Task (BART). Risky decision-making is usually assessed with computer tasks in which one has to make (risky) decisions quickly with the aim to receive a higher reward (e.g., earning more money; getting a high-score). These rewards are based on the participant's choices. Many risky decision-making tasks offer a number of trials in which individuals have to choose between two options. One option is the *safe option* that has only one outcome. Therefore, the participant knows exactly what the outcome will be when he or she chooses that option. For example, in the Stop-Light Game, the goal is to arrive at the destination as soon as possible while approaching intersections with a changing traffic light; the sooner, the bigger the reward. Although the outcome of the safe option to stop the car when confronted with a yellow light consists of a small time delay, the possibility of a crash that would double the time delay is eliminated. In the BART, as another example, the aim is to inflate a balloon without exploding it; the bigger the balloon, the more money is earned. Although the outcome of a low number of pumps is a small inflated balloon and less money, the certainty of receiving at least some monetary incentive increases, since a smaller balloon is less likely to explode. The other option is a *risky option* with a wider range of possible outcomes, which means that the actual outcome of that option is uncertain. Hence, the outcome might be positive when it leads to a higher reward or negative when the reward is reduced or lost. In other words, when the risky decision is followed by a positive outcome (i.e., crossing a yellow light without crashing in the Stop-Light Game task; entering a larger number of pumps to blow up a balloon without exploding in the BART task), the reward is higher. However, when the risky decision is followed by a negative outcome (i.e., the car crashes in the Stop-Light Game task; the balloon explodes in the BART task), the reward is reduced or lost.

Most of these studies have focused on the effect of peer presence on risky decision-making. The results of these studies have consistently shown that adolescents decide to take more risks in the presence of peers (see reviews by Albert, Chein, & Steinberg, 2013; Defoe et al., 2014). For example, Gardner and Steinberg (2005) assessed risky decision-making with a simulated driving task and found that adolescents decided to take substantially more risks (ran more yellow lights) in the presence of two familiar peers compared to when they were alone. These studies have focused primarily on early adolescents in the presence of familiar peers (i.e., friends and classmates) and investigated only the effect of peer presence. Thus, with respect to risky decision-making, little is known about (1) the role of peers in the risky decision-making of emerging adults, (2) the effect of unfamiliar peers on individual's risky decision-making, and (3) the possible underlying peer influence mechanisms, that is, *how* peers influence risky decision-making.

Some scholars state that adolescents engage in more risky decision-making than adults (Steinberg, 2008). They have also shown that resistance to peer influence increases linearly between ages 14 and 18 and that the impact of peers declines strongly after the age of 20 and may even disappear as individuals become increasingly resistant to peer influence (e.g., Monahan, Steinberg, & Cauffman, 2009; Steinberg & Monahan, 2007). They suggest that peer influence is more profound in middle adolescence and therefore emphasize the importance to study younger age-groups. However, other scholars have shown that emerging adults (age 18–25) also engage in high rates of risky decision-making (e.g., MacLean, Geier, Henry, & Wilson, 2013) and further state that emerging adults are just as prone to peer influence as are adolescents (see review of Borsari & Carey, 2001), suggesting that emerging adults might also imitate peer's risky decision-making. As little is known about risky decision-making in emerging adulthood, we focused on this target group. Furthermore, peers have been operationalized in the literature in various ways, for example, as (best)friends, classmates, acquaintances, peer groups, group of closest friends, and even total strangers (Avenevoli & Merikangas, 2003). To further understand the strength of peer influence, it is important to examine the effect of unfamiliar peers. Young people are likely to imitate the behavior of those they like (e.g., friends), as they anticipate positive outcomes (i.e., social rewards) with certain actions (Bandura, 1977). However, young people might also imitate the behavior of complete strangers (Chartrand & Bargh, 1999) although the potential for social rewards is rather low.

As already mentioned, the Social Learning Theory of Bandura (1977) could provide more insight into the underlying mechanisms of peer influence. In line with this theory, young people may observe and imitate risky decision-making of peers. This imitation mechanism has rarely been examined in risky decision-making. To the best of our knowledge, only one experiment examined the effect of imitation on risky decision-making of emerging adults. Risky decision-making was assessed on the computer with the BART, where the emerging adult interacted digitally with an unfamiliar peer (MacLean et al., 2013). During this computer task, the participants

inflated digital balloons by entering the number of pumps (risks) they wanted to give. The higher the number they entered, the more money they earned, but when the balloon exploded, the money was lost (MacLean et al., 2013). Four conditions were examined: (1) control (neutral), (2) computer, (3) peer observe (imitation), and (4) peer observe and peer pressure. In the peer-observe condition, emerging adults could see high scores on risky decision-making (i.e., number of pumps to inflate the balloon) of an unfamiliar peer (e-confederate) on the computer screen. The results did not support the imitation hypothesis, as the participants did not take more risk in the peer-observe condition compared to the control condition. However, in MacLean, Geier, Henry, and Wilson's (2013) study, the peer was not physically present, which leaves us with the question of whether the same results would be found whenever a peer is physically present. We think that in a real-life interaction with a peer, emerging adults perceive the consequences of their decision (i.e., whether or not to imitate) to be larger compared to a digital interaction, as the latter is more distant (Paek, 2009).

The imitation mechanism has been examined frequently in risk behaviors, such as cigarette smoking and alcohol consumption, rather than in risky decision-making. Although these risk behaviors differ from risky decision-making assessed through a computer task (earning more money and getting a high score), previous studies have shown that this risky decision-making was correlated positively with risk behaviors (Bornovalova et al., 2005; Lejuez et al., 2003, 2004). Therefore, describing the findings of the existing experimental studies that focused on smoking and drinking may also help us understand regarding risky decision-making. The findings of these studies have shown that imitation plays a large role in the smoking behavior of emerging adults who adjust their smoking rate to the smoking rate of an unfamiliar but physically present peer model (e.g., Antonuccio & Lichtenstein, 1980; Harakeh, Engels, Van Baaren, & Scholte, 2007; Harakeh & Vollebergh, 2012a). Similar results were also found for alcohol consumption, showing that emerging adults imitated the drinking behavior of unfamiliar peer models (Borsari & Carey, 2001; Collins & Marlatt, 1981; Larsen, Engels, Granic, & Overbeek, 2009; Quigley & Collins, 1999). These findings underline the importance of imitation as an underlying mechanism of peer influence and support the substantial effect of an unfamiliar peer that is physically present. Based on these findings, we proposed that imitation would also occur in risky decision-making when the peer is physically present.

Peer Susceptibility

Although the Social Learning Theory can be used to explain peers' influence on young people's risky decision-making, individual-level traits that might identify individuals who are more likely to imitate the risky decision-making of peers have received virtually no attention (Miller, 2010). The experiments regarding imitation of risk behaviors (smoking and drinking) have so far focused more on the traits of the confederate,

including sociability or gender, or on the demographic variables of the participant, including gender, age, or drinking/smoking history (see review by Borsari & Carey, 2001; Harakeh et al., 2007; Larsen, Overbeek, Granic, & Engels, 2010; see review by Quigley & Collins, 1999). The existing social network studies on risk behaviors (smoking, drinking, and antisocial behavior) have focused on individual characteristics of the participants (e.g., personality characteristics, and social status) as moderators, showing that friends' risk behavior influences individuals with certain characteristics more strongly (see review by Veenstra, Dijkstra, Steglich, & Van Zalk, 2013). However, these studies did not focus specifically on peer imitation. They presumed that the specific individual characteristics, examined as moderators, alter an individual peer's susceptibility. Nevertheless, the results of these studies are inconsistent (Meldrum et al., 2013), suggesting a need for more theoretically informed questions (Brechwald & Prinstein, 2011). Instead of focusing on specific individual factors, a more direct approach would be to study peer susceptibility as one general construct (Brechwald & Prinstein, 2011). This way, peer susceptibility would reflect as the general tendency to conform to the attitudes and behaviors of peers (Allen, Porter, & McFarland, 2006; Miller, 2010).

Empirical research has used mostly self-reports to measure peer susceptibility (Meldrum et al., 2013; Miller, 2010). Cross-sectional and longitudinal studies, unlike studies on risky decision-making, have examined the moderating effect of peer susceptibility on the relationship between peer risk behavior and adolescent risk behavior (e.g., delinquent behavior and drug use; Allen et al., 2006; Miller, 2010; Monahan et al., 2009). The results of these studies showed that peer susceptibility moderates the relationship between the risk behavior of peers and the self-reported risk behavior of young people. However, the moderating effect of peer susceptibility has only been examined using young people's self-reports of risk behavior. Since alternative explanations, like selection, could not be excluded, causal effects could not be determined. Additionally, adolescents reported their peers' risk behavior in these studies. These reports have been shown to exaggerate the degree of similarity between adolescents and their friends, which is known as the "false consensus effect" (Arnett, 2007). Thus, whether peer susceptibility moderates the imitation effect of risky decision-making in experimental designs remains unclear.

Current Study

In the present study, we examined the effect of risky decision-making of an unfamiliar peer on the risky decision-making of emerging adults, that is, we investigated whether emerging adults imitate risky decision-making of unfamiliar peers. Furthermore, we tested whether emerging adults who report being susceptible to peer influences imitate their peers more compared to those who report being less susceptible. It was expected that emerging adults imitate the risky decision-making of peers and thus show more

risky decision-making when observing a peer who decides to take many risks compared to a peer who decides to take no risks. We also expected peer susceptibility to moderate peer influence, suggesting that emerging adults imitate peers more when they report higher peer susceptibility than when they report lower peer susceptibility.

Method

Design and Participants

An experimental design with a single between-subjects factor design was used with an experimental condition (confederate engaged in risky decision-making) and control condition (confederate did not engage in risky decision-making). Two undergraduates (one female and one male) of the same age-group and the same gender as the participants acted as confederates in the sessions. The confederates were instructed and trained beforehand. In addition, peer susceptibility, assessed via a survey, was included as a moderator. Of the 66 emerging adults who participated in the study, 63 were included in the analyses. Two participants were dropped from the analyses due to computer failure and one participant suspected that the undergraduate peer was a confederate in the study. The sample of 63 emerging adults, 34 females (54%) and 29 males (46%), with a mean age of 21.57 years ($SD = 1.63$, range 18–24 years) were recruited from the University campus of Utrecht in the Netherlands. The sample comprised 45 bachelor's students and 18 master's students primarily from the social sciences. The experimenter drew lots stratified by gender to randomly assign the participants to one of the two conditions, which resulted in 17 females and 16 males in the experimental condition (risky decision-making) and 17 females and 13 males in the control condition (no risky decision-making). No significant differences were found between the two conditions in age, gender, level of education, educational program, and peer susceptibility, which suggests that randomization was successful.

Procedure

Students on the University campus were asked whether they wanted to participate in a study on how emerging adults make decisions. This cover story was inspired by Kretsch and Harden (2013) to prevent the participants from adjusting their behavior to the study's expectations. The emerging adults could have no prior knowledge of the actual aim, since this would have distorted the results. Prior to the session, the participants had to sign the consent form in which they were informed that the real aim of the study would not be disclosed to them. They were fully debriefed afterward via e-mail, using the blind carbon copy (bcc) option. The e-mail addresses of the participants were retrieved during each session and entered into a separate excel sheet so that these could not be traced back to their data and the results, guaranteeing their anonymity and privacy. The Ethical Committee of the Faculty of Social Sciences at Utrecht University approved this study.

The participants were invited to the living room lab at Utrecht University in April 2014 for one 20-min session. Two persons, the observed emerging adult participant and the confederate who acted as a participant, participated in each session. The participant and the confederate were always of the same gender to avoid the confounding effects of attraction (Van Straaten, Engels, Finkenauer, & Holland, 2008).

When the participant arrived, the experimenter explained that she or he had to do a computer task and complete a questionnaire afterward. The experimenter also explained (as a cover story) that since many participants were needed in a very short period, they were sometimes scheduled very tightly. Each participant was told that she or he had to be squeezed into the schedule, as a colleague just started a session with another participant and another one would be arriving soon. She or he was then asked to wait until the other participant (the confederate) finished the task. She or he was told to watch the confederate do the task so that she or he would not need many further instructions. This way, the session would finish in time for the next participating emerging adult. This cover story was used to convince the participants that the predecessor was also a participant rather than a confederate. To enhance the confederate's credibility, the observed emerging adult was asked not to disturb the other participant (the confederate) who worked on the task. Subsequently, she or he was brought to the lab where the confederate was performing the task. Because the confederate acted as a participant, he looked up when the experimenter entered the room with the observed emerging adult. The experimenter quickly said that the confederate should continue the task and asked the participant to observe him or her while working on the task. The observed emerging adult was seated next to the confederate and observed the confederate taking either many risks in the experimental condition or no risks in the control condition. When the experimenter left the room, the confederate said, "So you have to watch along? I just started." This comment was used to once again clarify that the participant had to watch the confederate doing the task. After that, no further contact was made during the task.

The experimenter observed with camera whether the emerging adult looked at the confederate doing the task to ensure that she or he received the manipulation. To double check, a manipulation check was also added by including a question in the questionnaire in which the observed emerging adult had to state how many yellow lights the confederate crossed. The experimenter returned to the lab when the confederate finished the task, asked the confederate to make space for the new participant (the confederate then sat next to the participant) and asked the confederate to complete a questionnaire. The experimenter then immediately turned to the participating emerging adult and summarized the instructions regarding the task, thereby ensuring that the participants did not miss any instructions on (1) the goal of the task to arrive at the destination as soon as possible and (2) how the task works. In this way, the confederate was still present while the participant was doing the computer task; thus, the peer presence condition remained. The experimenter went back to the observer room when the

observed emerging adult started the task. The confederate always finished the questionnaire a few moments after the participant finished the task. The experimenter thanked the confederate for participating. Afterward, the confederate left and upon his or her departure, the participant was asked to complete the questionnaire. When the participant finished, the experimenter thanked him or her for participation and offered a small gift (a candy bar).

Measures

Risky decision-making was measured with the Stop-Light Game, which is a simple driving task that is frequently used to measure risky decision-making (Chein et al., 2011; Kretsch & Harden, 2013). The main goal of this task was to arrive at the destination as soon as possible. The task consisted of a track with 20 intersections (treated as separate trials), which took under 6 min to traverse (dependent on subjects' choices and the following consequences). At each intersection, subjects had to decide (by button press) whether to brake as the vehicle approached a changing traffic signal. As the vehicle approached the intersection, the traffic signal turned yellow, and the subject decided whether to risk a possible crash at the intersection (GO decision) or to brake and wait for the light to turn green. Importantly, both the timing of the traffic signals and the probability of a crash in the associated intersections were manipulated to be unpredictable. Traveling through an intersection successfully without braking saved time, whereas braking and waiting for the signal to turn green implied a delay. However, if the participant did not push the brake and a crash followed, the loss of time was even greater than when the participant stopped the car and waited for the green light (for more information, see Chein et al., 2011). Risky decision-making was measured by both the frequency with which the participant did not stop for the yellow lights, reported in percentages, and the number of caused crashes (Chein et al., 2011).

Peer risky decision-making referred to the risky decision-making of the confederate. In the experimental condition, the confederate showed risky decision-making by crossing 17 of 20 yellow lights and causing 5 of 8 crashes. In the control condition, the confederate showed no risky decision-making by crossing only 3 of 20 yellow lights and causing no crashes.

Peer susceptibility was measured with a 10-item scale adapted from Steinberg and Monahan (2007) with four response categories ranging from *not true at all* (= 1) to *very true* (= 4). The items used in this study differed from the Steinberg and Monahan's (2007) items, in that instead of the third-person format, the items were written in the first-person format. This adaptation was done in the study of Meldrum, Miller, and Flexon (2013) as well. Examples of items are "I go along with my friends just to keep them happy" and "I take more risks when I am with my friends than when I am alone." Some questions were reverse-coded so that higher scores reflected greater peer susceptibility. The items were averaged, and the Cronbach's α was .65.

Data Analysis Plan

Using a Kendall's tau-b correlation in SPSS 21, we first checked whether the manipulation of risky decision-making in the experimental condition versus no risky decision-making in the control condition succeeded by asking the participant how many yellow lights the confederate crossed (on an ordinal scale). Additionally, both the female and the male confederate had to be assessed as equally friendly. In that way, the circumstances would be the same for all participants and would not distort the results. Thus, using an independent sample *t*-test, we checked whether the female and male confederates were perceived as equally friendly. At the end of the session, the participants were asked to answer a question on how friendly she or he thought the other participant (the confederate) was. This question was measured on a scale from 1 (= *very unfriendly*) to 4 (= *very friendly*). Higher scores indicated more friendliness. A score of 3 or higher indicated that the confederate was seen as friendly. Subsequently, we tested the research questions using a multiple linear regression analysis with the percentage of crossed yellow lights and number of crashes as the dependent variables while controlling for gender. Besides gender (female as a reference category) as the control variable, peer risky decision-making as the independent variable, peer susceptibility as the subject variable, and the interaction between Peer Risky Decision-Making \times Peer Susceptibility were added in the stepwise analyses.

Results

Manipulation Check

To check whether the participants assessed the confederate's risky decision-making accurately, the participants were asked to indicate how many intersections with yellow traffic lights the peer crossed. They had to select one of three options: (1) few, (2) 50-50, and (3) most. Kendall's tau-b, a correlation that handles ordinal data, indicated that the correlation between the reported behavior of the confederate and peer risky decision-making was strong and positive, $\tau = .97, p < .001$. Thus, the manipulation was successful. Subsequently, with an independent *t*-test, we tested whether the participants evaluated the female and male confederates as equally friendly. The results showed no significant difference between the evaluation of the female ($M = 3.03, SD = 0.17$) and male confederate ($M = 3.03, SD = 0.19$), $t(61) = -.11, p = .91$, indicating that the female and male confederates were in fact evaluated as equally friendly.

Descriptive Statistics

The participants generally scored low on peer susceptibility ($M = 1.94, SD = 0.30$) measured on a scale from 1 to 4. Table 1 shows the means and standard deviations for the percentage of crossed yellow lights and the number of crashes in total and per each group. On average, the participants crossed 44.7% of the yellow lights and had 3.03 crashes. Those in the

Table 1. Means and Standard Deviations of Risky Decision-Making in Total ($N = 63$), in the Control Condition ($n = 33$), and in the Experimental Condition ($n = 30$).

Risky Decision-Making	Total		Control Condition		Experimental Condition	
	M	SD	M	SD	M	SD
Crossed yellow lights (%)	44.65	22.71	26.88	13.07	64.20	12.61
Number of crashes	3.03	2.11	1.61	1.54	4.60	1.43

Table 2. Multiple Linear Regression analyses of Percentage of Crossed Yellow Lights and Number of Crashes.

Predictor	Percentage of Crossed Yellow Lights				Number of Crashes			
	B	SD	β	R^2 Change	B	SD	β	R^2 Change
Sex (ref = female)	4.71	3.27	.10	.002	.76	.37	.18*	.015
Peer risky decision-making (ref = control condition)	37.67	3.22	.84***	.691	3.05	.37	.73***	.521
Peer susceptibility	2.04	1.64	.09	.008	.27	.19	.13	.015

Note. R^2 Percentage of crossed yellow lights: 70.1%. R^2 Number of crashes: 55.1%.
* $p < .05$. ** $p < .01$. *** $p < .001$.

experimental group crossed 64.2% of the yellow lights and had 4.60 crashes, while those in the control group crossed 26.9% of the yellow lights and had 1.61 crashes.

Multiple Linear Regression Analyses

A stepwise multiple linear regression analysis was conducted on risky decision-making in terms of both percentage of crossed yellow lights and the number of crashes, as described in the Data Analysis Plan (see Table 2). First, the control variable gender did not significantly affect risky decision-making in terms of the percentage of crossed yellow lights. Peer risky decision-making strongly predicted the percentage of crossed yellow lights. When emerging adults were exposed to a risky decision-making peer (i.e. confederate), they crossed more yellow lights compared to emerging adults who were exposed to a nonrisky decision-making peer. Peer susceptibility was not a significant predictor. Peer susceptibility did not moderate the effect of peer risky decision-making on the risky decision-making of emerging adults. The interaction between peer risky decision-making and peer susceptibility was not significant ($B = -3.23$, $SD = 3.36$, $\beta = -.10$, $p = .341$). The model without interaction effect (see Table 2) explained 69.1% of the variance in the percentage of crossed yellow lights, with 69% being explained by peer risky decision-making only.

Second, considering risky decision-making in terms of the number of crashes, the same results were found except for the control variable gender. Gender was found to be a significant predictor of the number of crashes; specifically, males caused more crashes compared to females. Peer risky decision-making strongly predicted the number of crashes. When emerging adults were exposed to a peer (i.e., confederate) who made risky decisions, the emerging adults crashed more often. Again, peer susceptibility was not significant. The interaction between peer risky decision-making and peer susceptibility was also not significant when considering the number of crashes ($B = -.15$, $SD = .39$, $\beta = -.05$,

$p = .703$). The model without interaction effect (see Table 2) explained 55.1% of the variance in the number of crashes, with 52.1% being explained by peer risky decision-making only.

Discussion

The present experimental study examined whether emerging adults imitate the risky decision-making of an unfamiliar peer and whether peer susceptibility is a moderator. The findings showed that emerging adults who were exposed to a single unfamiliar risky decision-making peer (i.e., a situation with limited potential for social reward) took more risky decisions compared to emerging adults exposed to an unfamiliar peer who did not show risky decision-making. No significant effect was found regarding the peer susceptibility as a moderator.

Imitation and Peer Susceptibility

The findings of this study showed that even when the prospect of a social reward was low, emerging adults imitated the risky decision-making of complete strangers after only a short period of time. Previous studies indicate that peer influence is more profound in adolescence when compared to emerging adults (e.g., Monahan et al., 2009; Steinberg & Monahan, 2007). Although we could not compare peer influence between adolescents and emerging adults, our results indicate that peer influence persists into emerging adulthood. This underlines the importance to examine peer influence among emerging adults as well. Our findings showed that, in dyads, imitation of peer risky decision-making explained a large amount of the variance in emerging adults' risky decision-making. According to the Social Impact Theory of Latané (1981), the strength of the influence depends on the number of sources of influence in that more sources of influence exert stronger influence. Based on this theory, one would expect that one peer would not exert much influence. However, the present study showed that emerging adults

strongly imitated the risky decision-making of only one peer, even if they were complete strangers. Our findings showed that the confederate's risky decision-making, rather than merely his or her presence, increased the emerging adults' risky decision-making. The results supported the Social Learning Theory (Bandura, 1977), which states that young people imitate the behavior of important role models, such as peers. Our findings are in line with the results of previous experimental studies, which showed that emerging adults imitate the risk behaviors (i.e., smoking and drinking) of peers (e.g., Harakeh et al., 2007; Larsen et al., 2009) as well as with an experimental study that focused on online imitation of peer smoking (Harakeh & Vollebergh, 2012b). Thus, imitation seems to be an underlying mechanism not only for emerging adults' risk behaviors but also for their risky decision-making. However, our findings are in contrast with the findings of MacLean et al. (2013). Their results showed that the participants did not make more risky decisions in the peer-observe condition compared to the control condition, whereas our study showed a substantial effect. A possible explanation is that emerging adults imitate the risky decision-making of peers only when the peer has been physically introduced to the participant and/or is physically present during the task.

Unexpectedly, our results showed that peer susceptibility did not moderate the effect of imitation of peers. This means that emerging adults who reported to be less susceptible to peers' influence imitated the risky decision-making of an unfamiliar just as strong as emerging adults who reported a higher peer susceptibility. In combination with the generally low score on peer susceptibility within the sample, this implies that the emerging adults severely underestimated their own susceptibility to peer influence. Although this moderator has not been examined before in an experimental design and with emerging adults, the absence of a moderation effect is inconsistent with prior cross-sectional and longitudinal survey studies concerning peer susceptibility among adolescents. In these studies, peer susceptibility moderated the relationship between risky behavior of peers and risky behavior of adolescents. A possible explanation for the absence of a significant moderating effect of peer susceptibility could be that emerging adults, contrary to adolescents, (incorrectly) reported not to be susceptible to peer influences (Monahan et al., 2009), while our study showed that this was clearly not the case, as emerging adults were influenced strongly by peers. Research concerning age differences in reports of resistance to peer influence showed that this resistance increased linearly between the ages of 14 and 18 years and remained stable after the age of 18 (Steinberg & Monahan, 2007; Sumter, Bokhorst, Steinberg, & Westenberg, 2009). These results suggest that adolescents emerging into adulthood gain more autonomy from their peers and avoid their influence due to their increased psychosocial maturity (Sumter et al., 2009), which could explain why the present study failed to find both a direct effect and a moderation effect of peer susceptibility. However, although emerging adults reported not to be susceptible to peer influences, they were still strongly influenced by peers via imitation. Therefore, the reported peer susceptibility of emerging adults did not match their behavioral outcomes

in this study. A possible methodological explanation could be that the effect of imitation was so strong that it perhaps overruled the moderating effect of peer susceptibility. The lack of a moderating effect of peer susceptibility implied that imitation could be quite powerful.

Future Directions

Although our study showed that emerging adults imitated the risky decision-making of unfamiliar peers, the question of whether this imitation takes place consciously or unconsciously remains. According to the Social Learning Theory (Bandura, 1977), young people imitate the risky decision-making of peers consciously to receive a reward, such as a positive attention of peers. However, according to the perception-behavior link, imitation of risky decision-making might occur more spontaneously without any consciousness, also called mimicry or the chameleon effect (Chartrand & Bargh, 1999; Lakin, Jefferis, Cheng, & Chartrand, 2003). The fact that the participants in this study were influenced by an unfamiliar same-gendered peer (and thus experienced limited potential for social reward) as well as the fact that the participants were influenced although they reported not to be susceptible to peer influences strengthens this latter possibility. Future research should distinguish more explicitly between conscious and unconscious imitation and examine our tentative hypothesis that imitation operates more subconsciously when confronted with unfamiliar peers and operates more consciously when confronted with familiar peers.

Another explanation of our findings could be that risky decision-making of the participants is the result of peer norms. Perhaps the participants in our study thought that it was the norm to make risky decisions in this task because they saw the peer making risky decisions as well. Steinberg and Monahan (2007) referred to this process of norm regulation as a type of peer influence of reference groups on the individuals within that group to maintain a group identity that distinguishes them from others. As young people start to identify themselves with specific groups, they experience pressure to adopt the behavior and values (i.e., norms) of their friends to feel accepted (Brown, 2000; Steinberg & Monahan, 2007). These peer norms can be descriptive norms (i.e., the perception of peers showing certain behavior), injunctive norms (i.e., whether peers approve to certain behavior; Borsari & Carey, 2001), and popularity norms (i.e., the extent to which certain behaviors are associated with popularity; Laninga-Wijnen, Harakeh, Dijkstra, Veenstra, & Vollebergh, 2016). Descriptive, injunctive, and popularity norms of the reference group help the emerging adult determine acceptable and unacceptable group behavior (Cialdini, Kallgren, & Reno, 1991).

Norm regulation could have been the case in our study as well, as the risky decision-making of the confederate could have been viewed as normative. However, the question remains whether only one unfamiliar person whom participants would probably never see again can set such a strong norm, as norms are usually set by larger crowds or reference groups (Brown, 2000). As we did not include this possibility in our study, future

research should examine the effect of peer norms on risky decision-making. Furthermore, we also presumed that besides imitation and possibly norm setting (i.e., passive peer influences), more active peer influences, like peer pressure, may play a part in the risky decision-making of young people. The few existing experimental studies have shown inconsistent results regarding active peer influences (Harakeh & Vollebergh, 2012a). Future research could examine the effects of various types of peer influences on risky decision-making.

Additionally, although we showed that peers still largely influence emerging adults, we do not know whether this peer influence effect is equally strong for middle adolescents or if it declines. Future research should include different age-groups to be able to answer this question.

Although peer susceptibility was not a significant moderator in this study, other individual factors might still explain why some individuals are more likely to imitate peers compared to others. For example, it has been shown that Caucasian adolescents are significantly more influenced by friends' smoking compared to any other ethnic group, except for multiethnic adolescents (Unger, Rohrbach, & Cruz, 2001). Moreover, social anxiety has been shown to be an important moderator of peer contagion effects among adolescents, both in an experimental study on aggression and health risk behavior using e-confederates (Cohen & Prinstein, 2006) and in a longitudinal study on depression contagion between best friends (Prinstein, 2007). Thus, it is important for future experimental research on imitation of peers to account for individual factors, since they can identify young people who are more prone to imitate their peers.

To further build on the insights of our present study, future research should incorporate a 2×2 between- or within-subject design, where peer presence and peer influence (i.e. peer risky decision-making) are manipulated. This would result into four conditions, namely:

- (1) peer present, but no peer risky decision-making (i.e. solely peer presence),
- (2) peer present and peer risky decision-making.
- (3) no peer present and no peer risky decision-making,
- (4) no peer present and peer risky decision-making (peer engages in risky decision-making but is not present when the participant is performing the risky decision-making task).

Our design included Conditions 1 and 2, but Condition 3 needs to be included and compared to Condition 1 to show whether peer presence alone contributes to emerging adults' risky decision-making.

Strengths and Limitations

The present study has several strengths. In addition to utilizing an experimental design, the study is innovative for two reasons. First, this study did not test the effect of the frequently examined concept of peer presence; rather it tested peer imitation as an underlying mechanism. Second, we examined whether

peer susceptibility moderated the effect of imitation. Prior to this study, it was unknown whether peer susceptibility moderates the actual imitation-effect of risky decision-making, since it has only been examined using young people's self-reports of their risk behavior and the risk behavior of their peers.

Nevertheless, this study also had some limitations. First, although the Stop-Light Game can approximate a real-life situation well, as it was also performed in a lab decorated as a living room, the ecological validity of this task remains unclear. However, no computer task is a perfect real-life simulation, and as realistic as the task can be, it is difficult to determine whether the behavior of the participants in the task is an accurate representation of their behavior in real life. Performance on the Stop-Light Game was previously found to be correlated with self-reported sensation seeking and risky decision-making as well as self-reported resistance to peer influence (Chein et al., 2011; Kretsch & Harden, 2013) providing some evidence of convergent validity. However, whether self-report measures and/or behavioral analogue measures reflect real-world behavior remains an important question.

Second, the sample consisted only of highly educated students. This limits the generalizability of the results, since it is not clear whether the results could be applied to a larger population. Future research should replicate these results with less educated individuals.

Third, the reliability of the scale that was used to measure peer susceptibility was not very high ($\alpha = .65$). This could have led to the absence of significant effects. However, this is unlikely, since the scale had a reliability comparable to that reported in prior studies, which did find significant (moderating) effects among adolescents (Meldrum et al., 2013; Miller, 2010). Furthermore, between-group differences in peer susceptibility were nonsignificant. To be consistent with the previous studies, this study measured peer susceptibility using a questionnaire that assessed emerging adults' perception of their peer susceptibility, assuming the participants were aware of its existence. The absence of significant results regarding peer susceptibility could suggest that peer susceptibility might operate outside of consciousness. Alternatively, emerging adults may not have wanted to admit that peers are influencing them, thus providing socially desirable answers. Arnett (2007) and Michell and West (1996) also questioned whether surveys lead to valid outcomes. Therefore, measuring peer susceptibility with a laboratory-based assessment, like Allen, Porter, and McFarland (2006) did, could be more efficient. In their study, a pair of adolescents had to make decisions about hypothetical dilemma's first separately and then together. Peer susceptibility was then measured as the percentage of instances in which the target adolescent initially disagreed with the other adolescent but then changed his or her initial answer to match the answer of his or her peer (Allen et al., 2006). By using measurements like this, we could perhaps reach a more objective representation of real-life peer susceptibility. Either way, future research should focus on finding a more reliable way to measure peer susceptibility. As scholars stating that emerging adults are less prone to peer influence used a questionnaire to compare

adolescents with emerging adults as well, using a more reliable assessment of peer susceptibility could also resolve the issue of whether emerging adults are less or equally susceptible to peer influence.

Conclusion

The present experiment provides evidence that emerging adults strongly imitate the risky decision-making of a single same-gendered unfamiliar peer, even in the prospect that their behavior is not likely to be socially rewarded. Furthermore, emerging adults severely underestimated their own susceptibility to peer influence in this study. Even when emerging adults perceived themselves not to be susceptible to peers, they still imitated the risky decision-making of peers. The results of this study emphasize the importance of studying peer influences (like imitation) instead of only peer presence to understand increase in risky decision-making among peers. Additionally, our findings showed that peer influence on emerging adults is strong. The finding that emerging adults imitate the risky decision-making of a complete stranger after only a short period also offers important information for the development of health education programs focused on deterring and decreasing the risky decision-making of emerging adults. Current prevention programs focus mainly on teaching adolescents to resist active peer pressure to conform to the behavior of peers. However, the evidence of the effectiveness of these programs is inconsistent. Some studies have provided evidence of the positive benefits of these programs (e.g., Botvin, Giffin, Diaz, Miller, & Ifill-Williams, 1999), while others have suggested that benefits, if any, are only moderate, short-lived, or nonexistent (e.g., Peterson, Kealey, Mann, Marek, & Sarason, 2000). Still other studies have indicated that such programs even had iatrogenic effects (e.g., Dishion, McCord, & Poulin, 1999). The research suggests that these programs have a positive effect only when they incorporate elements that focus on the ability to resist passive peer influence, such as modeling (e.g., Donaldson, 1995). These suggestions in combination with the results of the present study indicate that these programs need to focus more on peer imitation and need to target emerging adults.

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Author Contributions

L. Riedijk contributed to conception and design; contributed to data collection, analysis, and interpretation; drafted and critically revised the manuscript; gave final approval; and agrees to be accountable for all aspects of work ensuring integrity and accuracy. Z. Harakeh contributed to conception and design; contributed to interpretation; critically revised the manuscript; gave final

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