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The audience effect in adolescence depends on who's looking over your shoulder

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ABSTRACT

Adolescents have been shown to be particularly sensitive to peer influence. However, the data supporting these findings have been mostly limited to the impact of peers on risk-taking behaviours. Here, we investigated the influence of peers on performance of a high-level cognitive task (relational reasoning) during adolescence. We further assessed whether this effect on performance was dependent on the identity of the audience, either a friend (peer) or the experimenter (non-peer). We tested 24 younger adolescent (10.6–14.2 years), 20 older adolescent (14.9–17.8 years) and 20 adult (21.8–34.9 years) female participants. The presence of an audience affected adolescent, but not adult, relational reasoning performance. This audience effect on adolescent performance was influenced by the participants' age, task difficulty and the identity of the audience. These findings may have implications for education, where adolescents often do classwork or homework in the presence of others.

Introduction

There is a long history of social psychology studies on the effects of the presence of another person on performance – predominantly in adults (Aiello & Douthitt, 2001; Zajonc, 1965). These effects, known as social facilitation, or more specifically, audience effects, describe the influence of an audience on performance measures, such as accuracy and response time (RT). However, few developmental studies have investigated the audience effect (Meddock, Parsons, & Hill, 1971; Newman, Dickstein, & Gargan, 1978; Quarter & Marcus, 1971). Social information is thought to have particularly high salience during adolescence, in particular in the context of relationships with peers (Blakemore & Mills, 2014). The aim of the current study was to investigate the development of the audience effect between adolescence and adulthood, and to examine to what extent the audience effect was influenced by the identity of the observer (peer versus non-peer), and the difficulty of the task.

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Peer influence during adolescence

During the transition from childhood to adolescence, relationships with peers become increasingly elaborate, more personal and emotional (Brown, 2004) and interactions with peers dominate adolescents' social environment, with American adolescents spending more than half of their awake-time with peers (Csikszentmihalyi & Larson, 1984). Adolescent decision-making is also particularly influenced by their peers (Brechwald & Prinstein, 2011; Brown, 2004). Evidence of increased sensitivity to peer influence during adolescence comes from both experimental and questionnaire data. Experimental studies have demonstrated that adolescents are particularly sensitive to the presence of peers when making risky and reward-related choices (Chein, Albert, O'Brien, Uckert, & Steinberg, 2011; O'Brien, Albert, Chein, & Steinberg, 2011; Reynolds, MacPherson, Schwartz, Fox, & Lejuez, 2013; Smith, Steinberg, Strang, & Chein, 2014). For example, when performing a driving video game, adolescents (13–16 years) took more risks when being observed by peers relative to when alone, while adults' risk-taking was not affected by the presence of peers (Gardner & Steinberg, 2005). If the increased sensitivity to the presence of peers found in risky and reward-related decision-making extends to other domains, adolescents might also display greater sensitivity to audience effects than adults in cognitive task performance.

Peer influence may change within the period of adolescence: in an experimental study adolescents (aged 11.9–15.8), and in particular younger adolescents (aged 11.9–13.9), were shown to be hypersensitive to social exclusion (Sebastian, Viding, Williams, & Blakemore, 2010), suggesting a greater sensitivity of younger adolescents to the social context. Research using the resistance to peer influence (RPI) questionnaire has demonstrated that resistance to peer influence is greater in adults than in younger adolescents, with the most pronounced increase occurring between 14 and 18 years (Steinberg & Monahan, 2007). Consistent with the experimental data described above, this suggests younger adolescents might be more influenced by the presence of a peer. However, results from another questionnaire-based study demonstrated that 15–18 year-olds reported increased levels of fear of social evaluation relative to 12–14 year-olds and 8–11 year-olds (Westenberg, Drewes, Goedhart, Siebelink, & Treffers, 2004), suggesting older adolescents might be more concerned about being evaluated by their peers. The present study included participants aged 10–17 years, enabling us to investigate potential developmental differences within adolescence, although, based on mixed evidence from previous research; it was unclear whether younger or older adolescents would show greater audience effects. As participants with lower resistance to peer influence may be more sensitive to the presence of a peer audience, we also investigated whether greater audience effects were associated with lower self-reported resistance to peer influence.

Adolescent sensitivity to a peer audience

In a recent neuroimaging study, participants aged 8–22 years were told they would sometimes be watched by a peer via a camera while lying in the scanner (Somerville et al., 2013). When adolescents thought they were being observed by a peer, they showed higher autonomic arousal as measured by skin conductance, relative to both children and adults. Self-reported embarrassment and activation in the medial prefrontal cortex - a key region of the social brain (Frith & Frith, 2007) – were also elevated in adolescence relative to late childhood (Somerville et al., 2013). In accordance with findings from peer influence studies, this suggests that adolescents may be particular sensitive to being observed by a peer audience.

In an electroencephalography study, Kim, Iwaki, Uno, and Fujita (2005) investigated whether the presence of a friend influenced performance and error-related negativity (ERN; a negative deflection occurring shortly after an error has been committed) in a go/no-go task in 7–11 year-olds. There was no effect on behaviour, however participants showed increased ERN-amplitudes in the presence of a friend, relative to being alone, indicating that 7–11 year-olds are already sensitive to the presence of peers when performing a cognitively demanding task. There is little experimental research on how peer influence affects cognitive performance, particularly during adolescence. In a sample of 9–14 year-olds with behavioural problems, performance in a relational reasoning task decreased in the presence of a classmate (Bevington & Wishart, 1999). However, in this sample it is difficult to disentangle the effects of the presence of the peer on performance from the effects of disruptive behaviour. Previous studies have not investigated whether typically developing adolescents show increased sensitivity to the presence of a peer audience during cognitive task performance.

Influence of the identity of the observer

Previous peer influence studies have compared peer observation with no observation (Gardner & Steinberg, 2005; O'Brien et al., 2011), making it impossible to attribute effects to the specific presence of a peer rather than to general effects of the presence of another person. The present study manipulated audience across three levels: peer audience (the participant's friend), non-peer audience (the experimenter) and no audience. By comparing peer versus non-peer observation conditions, we were attempting to control for any general (e.g. distracting) effects of having someone present while performing a task. With this design we tested the hypothesis that adolescents would be particularly sensitive to being observed by a peer relative to being observed by a non-peer. In addition, friendship quality between the participant and their friend may differ between age groups and thus we collected self-reported measures of friendship to control for potential developmental differences.