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Self-disclosure during adolescence: exploring the means, targets, and types of personal exchanges

Nandita Vijayakumar¹, Jennifer H Pfeifer²

¹School of Psychology, Deakin University, Melbourne, Australia

²Department of Psychology, University of Oregon, Eugene, USA

Abstract

Sharing information about oneself, or *self-disclosing*, is a fundamental interpersonal process that facilitates the attainment of key developmental milestones during adolescence. Changes in self-disclosure behaviors may reflect or support the social reorientation that sees children become increasingly reliant on peers for social and emotional support. Neuroimaging research has highlighted protracted maturation of the structure and function of brain regions that support social cognitive and reward processes underlying self-disclosure during adolescence. This review explores behavioral and neural trends in self-disclosure during adolescence, including research that uses novel experimental paradigms to extend the field beyond self-report measures. Findings show that certain aspects of self-disclosure behavior have adapted to changing social environments, but they remain intrinsically valued across the adolescent period and are essential for relationship development, identity formation and overall self-worth and well-being.

Adolescence is characterized by marked psychosocial changes that support the transition from parental reliance during childhood to autonomy and independence as young adults. Foundational to this developmental process is the changing nature of communication; relationships that are often based around shared activities during childhood evolve to be characterized by greater time spent in *conversation* with one another during adolescence [1]. This is exemplified by current use of social networking sites [2], but is also characteristic of ‘offline’ behaviors [3]. An important aspect of these conversations is that they often involve sharing information about the self or *self-disclosing*. This review explores the behavioral trends in self-disclosure during adolescence, as well as the underlying neurobiological development that supports these psychosocial changes.

Self-disclosure is a fundamental interpersonal process that is influenced by a range of factors, such as the targets of disclosure (e.g. parents versus peers), depth or type of information to be conveyed (e.g. intimacy and/or valence of personal exchanges), as well as breadth or amount of information (e.g. the number of topics that are disclosed) [4]. A number of theories on self-disclosure have been proposed, including its role in supporting self-expression, social validation and/or control, and relationship development [5–8].

Corresponding author: Vijayakumar, Nandita (nvijaya@deakin.edu.au).

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Adolescents need to articulate their sense of self when sharing personal information, and feedback from others not only helps them validate the appropriateness of their feelings, thoughts and behaviors, but also supports the development of close relationships through building patterns of reciprocity [9,10]. These goals, while relevant across the lifespan, are particularly important in the context of adolescence as they are essential to forming a coherent sense of self or *self-identity* and developing intimate connections with peers and romantic partners [11,12]. Consequently, self-disclosure during adolescence has also been associated with positive developmental outcomes such as well-being [13–15].

A small set of studies have gone beyond self-report and parent-report questionnaires to highlight the intrinsic value of self-disclosure using experimental paradigms. Using adaptations of the ‘pay-per-view’ or monetary choice task, pioneering research in adults showed that humans are willing to forfeit monetary rewards in order to share information about themselves with others [16,17]. We have found that adolescents exhibit similar behavioral valuation of disclosure to adults, suggesting that sharing self-referential information may be a form of subjective reward across development [18**,19**]. Moreover, value for certain types of disclosure is also associated with greater self-worth in adolescents [19**], highlighting some degree of convergence across different methods in self-disclosure research.

Behavioral trends of adolescent self-disclosure

One important moderator of self-disclosure behavior during adolescence is the target audience. It is often postulated that adolescence is a period of social reorientation, characterized by decreased reliance on, and increased independence from, parental figures [20,21]. However, the self-disclosure literature provides equivocal support for the changing role of parents as targets of disclosure, with some research indicating reductions in the amount of information that is shared with parents during adolescence (specifically age 12–18 years) [22,23] but others suggesting consistent amounts of sharing [24–26]. Disclosure to parents is also moderated by gender, with female adolescents disclosing more than males [22,26], and particularly for disclosure to mothers [24].

Adolescence also places increased reliance on peers and romantic partners for emotional support [27]. Consistently, self-report on disclosure behaviors suggests that peers increasingly become the targets of disclosure over adolescence [1,28,29,30**]. While romantic partners play a lesser role during adolescence (either due to lack or instability of such relationships), they appear to replace parents as the primary targets of disclosures by young adulthood [25]. Disclosure to peers (as with parents) is moderated by gender, with female adolescents engaging in greater self-disclosure than their male counterparts [1]. Taken together, there appears to be some support (again, from research utilizing self-report measures) for the notion that the targets of disclosure transition from parents during childhood to peers and romantic partners over the course of adolescence. However, our experimental research suggests that the intrinsic *value* of disclosing to both parents and close friends remains stable between early and late adolescence [18]. Thus although the *frequency* of disclosure to parents may decrease over this period, they likely continue to remain an important source of emotional support. Interestingly, we also found that mid-adolescents,

and particularly males in this age range, preferentially disclose to unfamiliar peers compared to either parents or close friends [18]. There are likely to be a number of influences on preferences for disclosing to unfamiliar peers, including the importance of peer groups and 'crowd' affiliation [31]. We also speculate that these results may be influenced by digital technology that has changed both the medium and targets of disclosure in recent decades.

Indeed, while a long history of research highlights increased engagement in peer-directed self-disclosure during adolescence, the medium of communication has drastically changed over time. Social networking sites (SNS) play a prominent role, with adolescents engaging in online self-disclosure more than the past [32]. While adolescents are exposed to a larger network of unfamiliar peers through SNS, they primarily use SNS to communicate with offline friends and maintain existing relationships [1], and as such, online social networks often reflect offline networks [33,34]. In fact, interactive engagement with SNS (i.e. texting or instant messaging a specific person) is the preferred method of communicating with friends [32], and has been shown to produce better quality friendships via engagement in intimate self-disclosure [35**,36]. While early studies suggested negative consequences of online disclosure and SNS use more broadly, for example [37], recent studies predominantly find positive functional outcomes, similar to offline disclosure. This includes increased initiation of relationships, better friendship quality, and greater perceived social support, social self-esteem, and feelings of belonging [38–41,42**]. Moreover, the benefits of online disclosure extend to offline relationships, with longitudinal data showing that it increases the initiation of offline friendships [43**]. The greater ease and controllability of communicating personal or potentially embarrassing information online is thought to underlie the relationship between online disclosure and social connectedness [10,40]. This is particularly true for adolescents who are shy or experience social anxiety [44]. While findings are mixed regarding the impact of social media use more broadly on adolescent outcomes [45,46], engaging in self-disclosure through online venues appears to facilitate the development and maintenance of positive social relationships during adolescence.

Another important factor in the decision process for self-disclosure is the type of information that is communicated. Social penetration theory argues that the breadth of disclosure (range of topics shared) often increases early in relationship initiation, while the depth of disclosure (intimacy of shared information) increases later and helps form closer bonds. For emerging adult samples in the family context, increased depth and breadth of communication with siblings has been associated with relationship closeness [47], while increased depth and frequency of communication with parents has been associated with stronger bonds [48]. Meanwhile, in samples including but not limited to adolescents, a recent meta-analysis revealed that offline communication is generally characterized by greater depth of intimacy compared to online communication [49**], yet increased depth (but not breadth) in online communication is still associated with closer friendships [41].

We have also found important behavioral differences in the valuation of disclosure based on the depth of exchanges during adolescence. Not only do early adolescents disclose superficial information more often than intimate information with close friends, they are willing to give up more money to do so [19]. This finding may be driven by superficial disclosure being the prototypic form of personal exchanges during the transition from

childhood to adolescence [50,51], but differences may also suggest a potential ‘cost’ of communicating personal and affectively charged information, even to close friends, which may reflect the increased risk of embarrassment and rejection [4]. Increased rates of gossiping and spreading of rumors during early adolescence is also likely to engender caution when sharing such intimate information [52]. This may be further compounded by rising peer sensitivity and anxiety regarding negative social evaluations during this period [53,54]. However, similar cost-benefit analyses may be engaged by adults during disclosure [4], and further research is needed to understand which developmental trends and features in valuation of intimate and superficial self-disclosures may be unique to adolescence.

Neural correlates of adolescent self-disclosure

Research in adults using monetary choice paradigms has shown that self-disclosure activates regions involved in reward processes, such as the ventral striatum [VS], ventral tegmental area [VTA], and ventromedial [vm] PFC, as well as those involved in social cognitive processes, such as the dorsomedial [dm]PFC, precuneus, posterior cingulate cortex [PCC], and anterior temporal cortex [ATC] [16,17,55]. An extensive literature highlights structural maturation of these brain regions during adolescence [56–58], which are implicated in perspective-taking skills [59], increased consideration of others’ intentions [60], and the quality of peer relationships [61]. Interestingly, the size of the vmPFC [62], ATC [63] and superior temporal sulcus [STS] [64] has been found to correlate with the size of social networks in adults, further supporting the association between brain structure and social behaviors.

A growing body of research also highlights activation changes in these regions during adolescence, using a number of different social and affective functional neuroimaging paradigms. Age-related changes in the dmPFC, inferior frontal gyrus, STS and other regions in the social cognitive network have been identified when engaging in peer interactions [65,66], responding to peer feedback [67–70], and making attributions about others’ emotional states [71,72]. Reward-related activity in the VS also changes during adolescence [73,74], with longitudinal research supporting a mid-adolescent peak [75,76]. There is also increased neural activation when engaging in self-evaluative processes (particularly within the vmPFC and VS) [77–79] as well as self-conscious processes (in the rostromedial PFC) [80] during adolescence. Increased engagement of the VS has also been identified in late adolescents and emerging adults when viewing self versus other images on a virtual social medial platform, suggesting that self-presentation is rewarding [81,82*]. Taken together, these neuroimaging studies suggest that adolescence is characterized by extensive changes in the structure and function of brain regions that have been associated with self-disclosure, with important implications for social and affective behavior.

However, minimal research has specifically examined the neural correlates of self-disclosure during adolescence; to our knowledge, this is limited to two studies by our group. Focusing on self-disclosure of superficial information to different target groups (i.e. parents and peers) in a sample of late adolescents (college freshmen), we found greater activation of the VS when sharing information relative to keeping it private, across different target audiences [83]. Activation of the vmPFC, precuneus and PCC was strongest when sharing information

with a friend, followed by a parent, while keeping answers private elicited the weakest response [83]. Thus consistent with adult studies, self-disclosure by late adolescents engages regions implicated in reward, social cognitive and self-evaluative processes, but findings also highlight heightened peer sensitivity in certain regions during this phase of development. A similar pattern of response was also identified in the perigenual ACC, which suggests an affective response in adolescents that is strongest when sharing with friends.

Our next study extended this research by examining whether the neural correlates of self-disclosure differed as a function of the depth of information that is shared, specifically comparing superficial and intimate types of self-disclosure [19**]. Findings revealed more extensive engagement of the dmPFC, precuneus, bilateral ATC and temporoparietal junction, and left posterior STS when engaging in intimate relative to superficial disclosure to friends. Intimate disclosure also uniquely recruited the left ventrolateral PFC and bilateral dorsolateral PFC. Overall, these results suggest greater engagement of social cognitive and emotion regulatory processes when sharing intimate information with peers, consistent with more extensive processing of the subjective utility and risk of sharing sensitive and potentially embarrassing information [4]. However, important individual differences in neural response were also identified, as adolescents with closer friendships (with the target of the disclosure) exhibited greater recruitment of reward regions (i.e. VS and vmPFC) when engaging in intimate disclosure [19**]. Overall, these studies confirm the intrinsic value of self-disclosure during adolescence using neural indices instead of self report; importantly, they also suggest that the targets and types of disclosure alter the potential intrinsic value, thereby impacting the likelihood of sharing information about oneself.

Conclusion

While self-disclosure is important across the lifespan, we suggest it is fundamental during adolescence for the attainment of key developmental goals. Changes in self-disclosure behaviors support the social reorientation that sees children dependent on their parents become increasingly reliant on peers for social and emotional support. Certain aspects of self-disclosure behavior have evolved over time in adaptation to changing social environments, but it remains essential for relationship development, identity formation and overall self-worth and well-being. A growing body of neuroimaging studies also highlight protracted maturation of relevant brain regions during adolescence, including reward and social cognitive systems. Moreover, novel functional paradigms are revealing neurodevelopmental processes that directly support changes in self-disclosure behavior, as well as providing unique indices of valuation of disclosure and moving the field beyond a reliance on self-report measures. Adaptations of these paradigms provide the opportunity to further investigate developmental changes in the valuation of different aspects of self-disclosure behavior, as well as their importance for positive adolescent outcomes.

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