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► To cite this version:

Maria Melchior, Abdelkrim Ziad, Émilie Courtin, Marcel Goldberg, Marie Zins, et al.. Intergenerational socioeconomic mobility and adult depression: the CONSTANCES study. *American Journal of Epidemiology*, 2017, 10.1093/aje/kwx252 . hal-01557298

HAL Id: hal-01557298

<https://hal.sorbonne-universite.fr/hal-01557298>

Submitted on 6 Jul 2017

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Intergenerational social mobility and depression

Intergenerational socioeconomic mobility and adult depression: the CONSTANCES study

Maria Melchior, Abdelkrim Ziad, Emilie Courtin, Marcel Goldberg, Marie Zins and Judith van der Waerden

Correspondence: Maria Melchior, IPLESP INSERM UMR_S 1136, 27 rue de Chaligny, 75012 Paris, France (e-mail: maria.melchior@inserm.fr).

Author affiliations: Sorbonne Université, UPMC Université Paris 06, Inserm, Institut Pierre Louis d'Epidémiologie et de Santé Publique (IPLESP UMRS 1136), Paris, France (Maria Melchior and Judith van der Waerden); Population-based Epidemiological Cohorts Unit, INSERM UMS 11, Villejuif, France (Abdelkrim Ziad, Marcel Goldberg and Marie Zins); London School of Economics and Political Science, LSE Health and Social Care, Department of Social Policy, Houghton Street, London WC2A 2AE, UK (Emilie Courtin); 4) King's College London, Department of Social Science, Health and Medicine, London WC2R 2LS, UK (Emilie Courtin).

Funding: The CONSTANCES cohort is supported by the Caisse Nationale d'Assurance Maladie des travailleurs salariés-CNAMTS, and was funded in its pilot phase by the *Direction générale de la santé* of the Ministry of Health (CPO 2007–2009), by the *Institut de Recherche en Santé Publique-Institut Thématique Santé Publique*, and the following sponsors : *Ministère de la santé et des sports, Ministère délégué à la recherche, Institut national de la santé et de la recherche médicale, Institut national du cancer et Caisse nationale de solidarité pour l'autonomie* (AMC10003LSA). CONSTANCES is accredited as a 'National Infrastructure for Biology and health' by the governmental *Investissements d'avenir* programme and was funded by the *Agence nationale de la recherche* (ANR-11-INBS-0002 grant). CONSTANCES also receives funding from MSD, AstraZeneca and Lundbeck managed by INSERM-Transfert. CONSTANCES is conducted in partnership with the National Health Insurance Fund

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administered by CNAMTS, and with the National Retirement Insurance Fund administered by the *Caisse nationale d'assurance vieillesse-CNAV*. Quality control procedures are conducted by ClinSearch.

This research was conducted in the framework of the Lifepath consortium (European Union's Horizon 2020 Research and Innovation Programme, Grant Agreement No. 633666).

Conflict of interest: The authors report no conflict of interest.

Running head: Intergenerational social mobility and depression.

Abbreviations: CES-D: Center for Epidemiological Studies Depression Scale ; OR : Odds Ratio ;

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Socioeconomic mobility from childhood onwards may predict depression risk in adulthood. Using data from the nationally representative CONSTANCES study in France (2012-2014, n=67,057), we assessed the relationship between intergenerational socioeconomic mobility and adult depression (Center for Epidemiological Studies-Depression scale, ≥ 16 in men, ≥ 20 in women) and antidepressant use. Socioeconomic position was ascertained by occupational grade (childhood: maternal and paternal measures prior to age 15 years combined; adult: participant own). Data were analyzed using logistic regression models adjusted for sociodemographic characteristics, parental history of psychiatric disorders and suicide, health behaviors and chronic health problems. Compared to participants who had persistently high socioeconomic circumstances, those who experienced other socioeconomic trajectories had elevated levels of depression (multivariate Odds Ratios: upward mobility: 1.21, intermediate socioeconomic position: 1.28, downward mobility: 1.66, persistently low socioeconomic position: 1.82). Downward mobility and persistently low socioeconomic position were also associated with elevated odds of antidepressant use (multivariate Odds Ratios: 1.24 and 1.36 respectively). In supplementary analyses, socioeconomic mobility was more strongly associated with depression in women than in men and in younger participants (18-29 years) than other age groups. Factors that contribute to depression risk and socioeconomic inequalities in this area appear at play already in childhood; this should be acknowledged by clinicians and policymakers.

Keywords: depression; socioeconomic inequality; socioeconomic mobility; lifecourse epidemiology; childhood

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Globally, depression affects approximately 5% of individuals each year, and is a leading cause of morbidity and burden of disease in many countries (1-4). In addition to its direct toll on quality of life and longevity, depression also has indirect effects on long-term health via the elevated risk of several somatic disorders (e.g. diabetes, cardiovascular disorder)(5).

Depression generally onsets in young adulthood (that is in the mid-twenties) and is associated with female sex, lack of a romantic partner, low socioeconomic position (ascertained via income, educational level, employment status, or subjective financial difficulties) (1, 6-8). Yet risk factors of adult depression can be present earlier in life. In particular, childhood adverse experiences such as violence, neglect or maltreatment (9, 10) but also less severe and more frequent events such as parental separation (11, 12) predict the occurrence of depression later in life.

Childhood adverse experiences are especially frequent among children growing up in families with low socioeconomic position, leading to the question of the role of socioeconomic circumstances early on in life with regard to adult depression risk. Moreover, childhood adversity predicts academic achievement and educational attainment, which in turn are associated with adult labor force integration and income (13, 14). Research suggests that family socioeconomic circumstances primarily predict adult depression via multiple risk factors as well as adult socioeconomic attainment (15-18). This points to the possibility that the risk of adult depression is shaped by individuals' socioeconomic trajectory from childhood onwards (19). Yet to date, research on this topic has been limited.

As specified by the lifecourse theory, individuals' lifelong socioeconomic position could influence health via exposure to negative circumstances in periods that are critical in terms

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of health or social development (e.g. children growing up in poverty may experience high levels of violence and family conflict, which influence their long-term psychological development) as well as through the accumulation of disadvantage (e.g. individuals from less advantaged families have lower educational attainment and employment levels than those who come from a more favorable background, which contribute to repeated negative life experiences) (20). Additionally, socioeconomic attainment can be influenced by mental health difficulties via a phenomenon of ‘health selection’, although this has primarily been observed among persons who have severe mental illness (e.g. psychotic disorder) (21). Finally, upward mobility could protect from later mental health problems, by helping individuals acquire material and psychological resources which favor well-being (22). With regard to long-term depression risk, exposure to disadvantage in critical periods of development, lifelong accumulation of disadvantage as well as upward mobility could be especially relevant.

In the present study, we examine associations between individuals’ intergenerational socioeconomic mobility and adult depression using data from the French CONSTANCES study, a large community based survey of people residing in France (23). We hypothesize that compared to individuals with persistently high socioeconomic position, those who experience persistently low socioeconomic position or downward mobility have higher levels of depression, while upward mobility is associated with a more favorable pattern of mental health. Our study is novel in that we ascertain depression using not only participants’ self-reported symptoms but also register-based antidepressant use, which is indicative of symptoms that are severe enough to be picked up by health professionals and require treatment. Additionally, with the notable exception of studies which combined measures of maternal and paternal occupational grade (17, 24-26), most investigations considered

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paternal occupation (14), parental educational attainment (4, 18), or perceived financial situation (27, 28) as measures of childhood socioeconomic position; in the present study we specifically take into account the role of maternal and paternal occupational grade, including participants whose mother was out of the labor force.

METHODS

Study population

CONSTANCES is a large prospective community-based cohort study, designed to be nationally representative of the population of France aged 18-64 years and affiliated with the National Health Insurance scheme (Sécurité Sociale) which covers 85% of the population (farmers, individuals who are self-employed, and undocumented migrants are not included) (23). The study aims to recruit 200,000 participants over a period of 6 years. It was launched in 2012 and recruitment is ongoing. Participants are randomly selected and invited to undergo a health examination at one of the 22 Health Screening Centers run by the National Health Insurance throughout the country. During this day-long baseline visit rich medical data (blood, respiratory, physical and cognitive tests) are collected; respondents are also asked to complete questionnaires regarding their health, health behaviors, socioeconomic characteristics and occupational trajectory. In addition, data on participants' healthcare use (purchased medications, medical consultations, hospitalizations) are obtained directly from the National Health Insurance system.

By September 2016, approximately 112,000 persons had already been enrolled in the CONSTANCES study (29), and data had been compiled and cleaned for 67,057 participants who accepted to take part in CONSTANCES in 2012, 2013 and 2014. Overall, the geographical distribution of CONSTANCES study participants matches the national distribution of Health

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Screening Centers were they are recruited (29). Compared to non-participants, participants were more likely to be male, to be older than 40 years of age, to have high occupational grade, to be out of the labor force, to earn more than average income (2400 euros/month), to have regular medical follow-up, and to have no chronic health problems.

The CONSTANCES study was approved by bodies regulating ethical data collection in France (CCTIRS: Comité Consultatif pour le Traitement des Informations Relatives à la Santé; CNIL-Commission Nationale Informatique et Liberté) and all participants signed an informed consent.

Measures

Intergenerational socioeconomic mobility Participants' socioeconomic mobility was ascertained based on: a) childhood socioeconomic position (maternal and paternal occupational grade at age 15 years, which were combined following the algorithm described in **Table 1**), b) adult socioeconomic position (as assessed by occupational grade at the time of inclusion in the CONSTANCES cohort). Using the standard occupational grade classification used in France, which includes 8 response categories, we created 3 groups: high (e.g. manager, lawyer, engineer), intermediate (e.g. technician, administrative associate professional), or low occupational grade (e.g. manual worker or clerk). This occupational category is very similar to those used in other countries (30-32). Participants who reported that their father (0.5%) or mother (36.1%) did not work, or that they did not know their parents (father: 2.3%, mother: 0.7%) had levels of depression comparable to those whose parents had low socioeconomic position; they were included in the low childhood socioeconomic position. Combining both childhood and adult socioeconomic position, we obtained 5 intergenerational mobility groups: a) persistent high socioeconomic position, b)

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upward mobility, c) persistent intermediate socioeconomic position, d) downward mobility, e) persistent low socioeconomic position.

Adult depression was ascertained with the CES-D questionnaire (a 20-item questionnaire which identifies the presence of common symptoms of depressive symptoms such as sad mood, loss of pleasure and interest, difficulties with sleep or appetite, range 0-60, Cronbach's alpha: 0.71, a higher score indicating higher depressive symptoms levels) (33). In the present study, to identify participants who had elevated levels of depressive symptoms, potentially of clinical significance, we used the cut-offs of 16 for men and 20 for women which were previously validated in France (34)

Additionally, information on the use of antidepressant medication (n=40,369) was ascertained directly from the French National Health Insurance databases for the period ranging from 2010 to 2013. Among participants who purchased at antidepressants least once, 53.5% bought treatment for at least 6 months. Elevated symptoms of depression were associated with antidepressant use ($p < 0.0001$).

Covariates. To study the relationship between participants' intergenerational socioeconomic mobility and depression, we controlled for several covariates potentially associated with the study outcome: socio-demographic characteristics: sex (male vs. female), age (18-29, 30-44, 45-59, vs. ≥ 60 years), marital life (yes vs. no), number of children (≥ 1 vs. 0), country of birth (other vs. France), father's country of birth (other vs. France), mother's country of birth (other vs. France); parental history of psychiatric disorders and suicide (yes vs. no); health behaviors: tobacco smoking (yes vs. no), alcohol abuse assessed using the AUDIT(35) (yes vs. no); chronic health problems : diabetes (yes vs. no), cancer (yes vs. no), functional limitations (yes vs. no).

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Statistical analyses. To test associations between participants' intergenerational socioeconomic mobility and adult depression, we used the following approach for each outcome. First, we tested bivariate relations. Second, using persistently high socioeconomic position as the reference group, we used logistic regression analyses that were successively adjusted for participants' a) socio-demographic characteristics, b) history of parental psychiatric disorder or suicide, c) health behaviors, d) chronic health problems. In additional analyses, because of secular differences in socioeconomic mobility across generations and gender groups, we tested for interactions between participants' intergenerational mobility and a) sex and b) age. All analyses were conducted using the SAS V9 software (Cary, NC).

RESULTS

Table 2 describes characteristics of our study population in relation to adult depression. Overall, 17.3% of men and 19.0% of women had high levels of depressive symptoms. In terms of intergenerational socioeconomic mobility, 12.5% of men and 12.2% of women were in the 'high socioeconomic position' group, respectively 14.6% and 13.8% experienced upward mobility, 16.0% and 15.5% had intermediate socioeconomic position, 21.8% and 18.3% experienced downward mobility and 24.2% and 20.3% were in the group with persistently low socioeconomic position. Factors associated with depression included: female sex, young age (18-29 years), absence of marital life, absence of children, own and parental birth in a country other than France, parental history of psychiatric disorder, tobacco smoking, alcohol abuse, co-occurring diabetes, cancer or functional limitations, as well as intergenerational socioeconomic mobility.

11.7% of men and 20.2% of women used antidepressants during the course of the study period; associated factors included: age over 45 years, absence of marital life, presence of

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children, parental birth in France, parental and own history of psychiatric disorder, tobacco smoking, alcohol abuse, co-occurring diabetes, cancer or functional limitations, as well as intergenerational mobility.

As shown in **Table 3**, participants' intergenerational mobility was associated with elevated depressive symptoms and antidepressant use. Specifically, compared to individuals with persistently high socioeconomic position, we observed higher levels of depressive symptoms in all other groups (p-value for trend<0.0001), with Odds Ratios (ORs) ranging from 1.19 among participants who experienced upward mobility to 2.23 among those who experienced persistently low socioeconomic position. This association decreased after controlling for covariates, but in the fully-adjusted model, participants with a socioeconomic trajectory other than persistently high socioeconomic level had higher odds of depression (ranging from 1.21 among those who experienced upward mobility to 1.82 among those who had persistently low socioeconomic position).

With regard to antidepressant use, we also observed a graded association with intergenerational mobility (p-value for trend<0.0001). Compared to participants with persistently high socioeconomic position, ORs of antidepressant use ranged from 1.15 among participants who experienced upward mobility to 1.84 among those with persistently low socioeconomic position. In a fully-adjusted regression model, only associations between downward mobility (OR=1.24) and persistently low socioeconomic position (OR=1.36) and antidepressant use remained elevated and statistically significant.

In additional analyses, we found statistically significant interactions between participants intergenerational socioeconomic mobility and sex and age with regard to depression (respectively p-values: 0.0018 and 0.0243) but not antidepressant use (respectively p-values:

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0.6128 and 0.2782). Therefore, our stratified analyses were limited to elevated depressive symptoms (**Table 4**). Overall, the association between intergenerational socioeconomic mobility and elevated symptoms of depression appeared stronger in women (ORs ranging from 1.14 to 1.88) than in men (ORs ranging from 1.22 to 1.53) and among younger participants (18-29 years; ORs ranging from 1.69-2.51) than among those who were older (age 30 and above).

DISCUSSION

Main findings

Our study, conducted in a large, community-based sample in France, shows that intergenerational socioeconomic mobility is associated with adult depression. Associations with both elevated symptoms of depression and antidepressant use followed a gradient that is the odds gradually increased along the socioeconomic trajectory spectrum. Among participants with persistently low socioeconomic position, the likelihood of being depressed in adulthood, taking into account all relevant covariates, was 1.82 times higher than among participants with persistently high socioeconomic position. These results suggest that adult depression reflects long-term processes that are shaped by lifelong socioeconomic factors and are consistent both with the hypothesis of critical periods of development and detrimental consequences of an accumulation of disadvantage. Importantly, the elevated likelihood of depression is not confined to individuals who belong to the most disadvantaged socioeconomic groups.

Limitations and strengths

Our study has several limitations which need to be acknowledged. First, CONSTANCES is a longitudinal cohort study based on voluntary participation, and as in other cohort study,

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participants tend to be healthier and have higher socioeconomic position than non-participants (36). This implies that associations between socioeconomic position and mobility in the general population may actually be stronger than we report. Second, participants' childhood socioeconomic position was obtained retrospectively, which may result in information bias. However, there is no reason to believe that participants systematically under or over reported their parents' occupational grade, and the degree of error in this measure should be limited. Third, data on depressive symptoms were self-reported which may have led to an overestimation of the number of cases compared to a clinical diagnosis. However the strength of the association with intergenerational socioeconomic mobility that we report is consistent with studies that examined social inequalities with regard to depression using clinical measures (37). Moreover, the results we obtained studying antidepressant use are comparable, indicating that among most individuals reporting high depressive symptom levels, a health professional also identified psychological difficulties and prescribed treatment. Fourth, for administrative reasons, data on antidepressant use were only available for a subsample of participants and did not cover the exact same period as data on self-reported depressive symptoms. Nevertheless, it is unlikely that the disparity in timing between the two measures of depression in our study, due to administrative delays in obtaining health care use data matched with CONSTANCES identifiers, induced systematic bias. Fifth, some participants may have purchased antidepressants and not taken them, while others may have used treatment that they purchased in the past or that was purchased by another member of their household. Such error may induce classification bias of unknown direction, most likely introducing some noise within our analyses.

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Our study also has strengths which deserve to be highlighted: first, the use of data collected in a large, community based sample of people living throughout France, which makes our results broadly generalizable to the population (with the exception of farmers and people who are self-employed); second, access to different measures of depression known to be complementary, including externally validated antidepressant use; third, data on participants' adult socioeconomic position as well as both their parents' occupational characteristics and country of origin, which allowed us to investigate intergenerational socioeconomic mobility in a thorough way.

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Our study is in line with other research showing that socioeconomic circumstances across the lifecourse predict depression risk (25-28, 38). Unsurprisingly, we found an especially high likelihood of depression among individuals belonging to the most unfavorable socioeconomic group in adulthood, that is those who experienced persistent low socioeconomic position (multivariate ORs: elevated symptoms of depression: 1.82, antidepressant use: 1.36) and downward mobility (multivariate ORs: elevated symptoms of depression: 1.68, antidepressant use: 1.24). The association between adult socioeconomic circumstances and depression may reflect the direct consequences of unfavorable living conditions on individuals' mental health (37, 39), but also the 'social drift' that may accompany mental health difficulties (40). In other words, different mechanisms may be at work and future investigations based on a longer follow-up will need to examine concurrent changes in socioeconomic position and depressive symptomatology over time.

Interestingly, we also found that compared to persons in the most favorable socioeconomic circumstances, those who had an intermediate socioeconomic position were more likely to

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have high levels of depressive symptoms (multivariate OR=1.28). Hence, as other investigations conducted in our group and by other researchers, we observed a social gradient in depression (41-43), which may result from higher levels of stressful experiences and lower levels of material well-being than among persons in the most favorable socioeconomic circumstances. Importantly, this suggests that the population global burden of depression primarily lies among individuals who are in intermediate rather than most disadvantaged situations.

Finally, participants who experienced upward mobility also had elevated levels of depressive symptoms (multivariate OR=1.22). This indicates that childhood socioeconomic circumstances continue to influence mental health above and beyond the role of adult achievement. Importantly, in our study participants' socioeconomic position was ascertained via occupational grade, and our data are consistent with secular changes in labor market characteristics (increases in women's participation in the labor force and in the share of non-manual jobs when participants' occupational grade is compared to their parents'). Moreover, we were confronted with lack of information regarding parental occupation among a minority of participants who reported not knowing their mother or father. Nevertheless, our composite measure of childhood socioeconomic position is a reflection of the family background which study participants experienced before age 15 years.

Childhood is a period when individuals' lasting personality (44) and style of interpersonal relations (12) are defined. The experience of maltreatment (45), negative life events (12), and poor parenting (46), disproportionately frequent among families with low socioeconomic position, during this sensitive developmental period can have lasting effects on emotional development into adulthood. Moreover, it may also be that upward mobility,

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which implies a change in social environment, is a source of stress and can result in social isolation, both of which contribute to the risk of psychological difficulties (4). Clearly, depression is a multifactorial disorder and the mechanisms through which intergenerational mobility influences lifelong risk require further study, particularly in studies where changes in socioeconomic position depend on external rather than individual circumstances (47).

Age and sex specificities

In our study, the association between intergenerational socioeconomic mobility and adult depression followed a similar pattern in both sexes, however in women the association between downward mobility and persistently low socioeconomic position and depressive symptoms was stronger than in men (multivariate ORs respectively: 1.60 vs. 1.53 and 1.88 vs. 1.53). There is evidence showing that women experience longer and more severe episodes of depression than men (48). Additionally, women are less likely to have stable employment and when they are employed earn lower income than men, which has been shown to contribute to lasting depression (49). Finally, women are also largely responsible for caring for young children and elderly parents, and this family burden could also contribute to depression risk (50). Overall, women probably experience higher levels of socioeconomic disadvantage, which translates to multiple stressors, and have more severe and chronic depressions - altogether these phenomena could contribute to wider socioeconomic inequalities in depression than in men (37, 51).

We also found that the relationship between intergenerational socioeconomic mobility and depression was stronger among participants aged 18-29 years than in older age groups (multivariate ORs: upward mobility: 1.63; intermediate socioeconomic position: 1.59; downward mobility: 2.16; upward mobility: 2.51). This age group includes young people

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transitioning to the labor market, who are most likely to experience unemployment and job instability (52), which may influence their mental health. Furthermore, individuals who experience psychological difficulties may be least likely to obtain employment that matches their qualifications, thereby leading to a social drift. Importantly, we did not specifically examine the impact of unemployment on depression, but future research will need to address this issue studying sex and age specificities in detail. Since the peak age for depression incidence is between 20 and 30 years (53), particular attention should be paid to young people's socioeconomic circumstances and employment opportunities, in order to favor long-term mental health.

Conclusion

Adult depression reflects individuals' intergenerational socioeconomic mobility, with both childhood and adulthood circumstances playing a role. Upward mobility and intermediate socioeconomic position do not protect from depressive symptoms to the same extent as persistently favorable socioeconomic circumstances. The relationship between socioeconomic mobility and adult depression appears stronger in women and young people, which suggests that specific efforts to promote favorable labor force integration in these groups would yield mental health benefits. Overall, these findings suggest that factors that contribute to depression risk and socioeconomic inequalities in this area are at play during the entire lifecourse; policies aiming to reduce poverty and promote educational attainment and employment opportunities across the population could help reduce levels of depression later in life. By ascertaining their patients' past and present socioeconomic circumstances, clinicians may gain precision in identifying persons at high risk of depression that is likely to be severe and lasting.

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Acknowledgements/Conflict of interest: the authors declare no conflict of interest.

References

1. Kessler RC, Bromet EJ. The epidemiology of depression across cultures. *Ann Rev Public Health*. 2013;34:119-138.
2. Marcus M, Yasamy T, van Ommeren M, Chisholm D, Saxena S. Depression: a global public health concern, 2012. [http://www.who.int/mental_health/management/depression/who_paper_depression_wfmh_2012.pdf]
3. Ferrari AJ, Charlson FJ, Norman RE, Patten SB, Freedman G, Murray CJ, et al. Burden of depressive disorders by country, sex, age, and year: findings from the global burden of disease study 2010. *PLoS Med*. 2013;10:e1001547.
4. Ward JB, Haan MN, Garcia ME, Lee A, To TM, Aiello AE. Intergenerational education mobility and depressive symptoms in a population of Mexican origin. *Ann Epidemiol*. 2016;26(7):461-466.
5. Hackett RA, Steptoe A. Psychosocial Factors in Diabetes and Cardiovascular Risk. *Curr Cardiol Reports*. 2016;18(10):95.
6. Pulkki-Raback L, Ahola K, Elovainio M, Kivimaki M, Hintsanen M, Isometsa E, et al. Socio-economic position and mental disorders in a working-age Finnish population: the health 2000 study. *Eur J Public Health*. 2012;22(3):327-332.
7. Bromberger JT, Matthews KA. Employment status and depressive symptoms in middle-aged women: a longitudinal investigation. *Am J Public Health*. 1994;84(2):202-206.
8. Skapinakis P, Weich S, Lewis G, Singleton N, Araya R. Socio-economic position and common mental disorders. Longitudinal study in the general population in the UK. *Br J Psychiatry*. 2006;189:109-117.
9. Roustit C, Renahy E, Guernec G, Lesieur S, Parizot I, Chauvin P. Exposure to interparental violence and psychosocial maladjustment in the adult life course: advocacy for early prevention. *J Epidemiol Community Health*. 2009;63(7):563-568.
10. Li M, D'Arcy C, Meng X. Maltreatment in childhood substantially increases the risk of adult depression and anxiety in prospective cohort studies: systematic review, meta-analysis, and proportional attributable fractions. *Psychol Med*. 2016;46(4):717-730.
11. Otowa T, York TP, Gardner CO, Kendler KS, Hetttema JM. The impact of childhood parental loss on risk for mood, anxiety and substance use disorders in a population-based sample of male twins. *Psychiatry Res*. 2014;220(1-2):404-409.
12. Melchior M, Touchette E, Prokofyeva E, Chollet A, Fombonne E, Elidemir G, et al. Negative events in childhood predict trajectories of internalizing symptoms up to young adulthood: an 18-year longitudinal study. *PLoS One*. 2014;9:e114526.
13. Ratcliffe C. Child poverty and adult success. 2015. [<http://www.urban.org/sites/default/files/publication/65766/2000369-Child-Poverty-and-Adult-Success.pdf>]
14. Power C, Stansfeld SA, Matthews S, Manor O, Hope S. Childhood and adulthood risk factors for socio-economic differentials in psychological distress: evidence from the 1958 British birth cohort. *Soc Sci Med*. 2002;55(11):1989-2004.
15. Melchior M, Moffitt TE, Milne BJ, Poulton R, Caspi A. Why do children from socioeconomically-disadvantaged families suffer from poor health when they reach adulthood? A lifecourse study. *Am J Epidemiol*. 2007;166(8):966-974.
16. Quesnel-Vallee A, Taylor M. Socioeconomic pathways to depressive symptoms in adulthood: evidence from the National Longitudinal Survey of Youth 1979. *Soc Sci Med*. 2012;74(5):734-743.
17. Johnson JG, Cohen P, Dohrenwend BP, Link BG, Brook JS. A longitudinal investigation of social causation and social selection processes involved in the association between socioeconomic status and psychiatric disorders. *J Abnorm Psychol*. 1999;108(3):490-499.
18. Ritscher JE, Warner V, Johnson JG, Dohrenwend BP. Inter-generational longitudinal study of social class and depression: a test of social causation and social selection models. *Br J Psychiatry*. 2001;40:s84-90.

Intergenerational social mobility and depression

19. Muntaner C, Eaton WW, Miech R, O'Campo P. Socioeconomic position and major mental disorders. *Epidemiol Rev.* 2004;26:53-62.
20. Kuh D, Ben Shlomo Y, Lynch J, Hallqvist J, Power C. Life course epidemiology. *J Epidemiol Community Health.* 2003;57(10):778-783.
21. Dohrenwend BP, Levav I, Shrout PE, Schwartz S, Naveh G, Link BG, et al. Socioeconomic status and psychiatric disorders: the causation-selection issue. *Science.* 1992;255(5047):946-952.
22. Costello EJ, Erkanli A, Copeland W, Angold A. Association of family income supplements in adolescence with development of psychiatric and substance use disorders in adulthood among an American Indian population. *JAMA.* 2010;303(19):1954-1960.
23. Zins M, Goldberg M. The French CONSTANCES population-based cohort: design, inclusion and follow-up. *Europ J Epidemiol.* 2015;30(12):1317-1328.
24. Melchior M, Lert F, Martin M, Ville I. Socioeconomic position in childhood and in adulthood and functional limitations in midlife: Data from a nationally-representative survey of French men and women. *Soc Sci Med.* 2006;63(11):2813-2824.
25. Gilman SE, Kawachi I, Fitzmaurice GM, Buka SL. Socioeconomic status in childhood and the lifetime risk of major depression. *Int J Epidemiol.* 2002;31(2):359-367.
26. McLaughlin KA, Breslau J, Green J, Lakoma M, Sampson N, Zaslavsky AM, et al. Childhood socioeconomic status and the onset, persistence, and severity of DSM-IV mental disorders in a US national sample. *Soc Sci Med.* 2011;73(7):1088-1096.
27. Tani Y, Fujiwara T, Kondo N, Noma H, Sasaki Y, Kondo K. Childhood socioeconomic status and onset of depression among Japanese older adults: the JAGES prospective cohort study. *Am J Geriatr Psychiatry.* 2016;24(9):717-726.
28. Kim W, Kim TH, Lee TH, Ju YJ, Park EC. The effect of childhood and current economic status on depressive symptoms in South Korean individuals: a longitudinal study. *Int J Equity Health.* 2016;15(1):111.
29. Goldberg M, Carton M, Descatha A, Leclerc A, Roquelaure Y, Santin G, et al. CONSTANCES: a general prospective population-based cohort for occupational and environmental epidemiology: cohort profile. *Occup Environ Med.* 2016;74(1):66-71.
30. Hiyoshi A, Fukuda Y, Shipley MJ, Bartley M, Brunner EJ. A new theory-based social classification in Japan and its validation using historically collected information. *Soc Sci Med.* 2013;87:84-92.
31. Lynch J, Kaplan GA. Socioeconomic position. In: Berkman LF, Kawachi I, eds. *Social Epidemiology.* New York, NY: Oxford Press; 2000. p. 13-35.
32. Galobardes B, Shaw M, Lawlor DA, Lynch JW, Davey Smith G. Indicators of socioeconomic position (part 1). *J Epidemiol Community Health.* 2006;60(1):7-12.
33. Radloff LS. The CES-D scale : a self report depression scale for research in the general population. *Appl Psychol Measurement.* 1977;1:385-401.
34. Morin AJ, Moullec G, Maiano C, Layet L, Just J, Ninot G. Psychometric properties of the Center for Epidemiologic Studies Depression Scale (CES-D) in French clinical and nonclinical adults. *Rev Epidémiol Santé Publique.* 2011;59(5):327-340.
35. World Health Organization. *AUDIT: the Alcohol Use Disorders Identification Test.* Geneva, Switzerland; 2007.
36. Goldberg M, Chastang J-F, Leclerc A, Zins M, Bonenfant S, Bugel I. Socioeconomic, demographic, occupational and health factors associated with participation in a long-term epidemiological survey. A prospective study of the French Gazel cohort and its target population. *Am J Epidemiol.* 2001;154(4):373-384.
37. Lorant V, Deliege D, Eaton W, Robert A, Philippot P, Ansseau M. Socioeconomic inequalities in depression: a meta-analysis. *Am J Epidemiol.* 2003;157(2):98-112.
38. Gilman SE, Kawachi I, Fitzmaurice GM, Buka L. Socio-economic status, family disruption and residential stability in childhood: relation to onset, recurrence and remission of major depression. *Psychol Med.* 2003;33(8):1341-1355.
39. Lorant V, Croux C, Weich S, Deliege D, Mackenbach J, Ansseau M. Depression and socio-economic risk factors: 7-year longitudinal population study. *Br J Psychiatry.* 2007;190:293-298.

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40. Link B, Lennon MC, Dohrenwend BP. Socioeconomic status and depression: the role of occupations involving direction, control, and planning. *Am J Sociol.* 1993;98:1351-1387.
41. Stansfeld SA, Head J, Fuhrer R, Wardle J, Cattell V. Social inequalities in depressive symptoms and physical functioning in the Whitehall II study: exploring a common cause explanation. *J Epidemiol Community Health.* 2003;57(5):361-367.
42. Andersen I, Thielen K, Nygaard E, Diderichsen F. Social inequality in the prevalence of depressive disorders. *J Epidemiol Community Health.* 2009;63(7):575-581.
43. Melchior M, Chastang J-F, Head J, Goldberg M, Zins M, Nabi H, et al. Socioeconomic position predicts long-term depression trajectory: a 13-year follow-up of the GAZEL cohort study. *Mol Psychiatry.* 2013;18(1):112-121.
44. Caspi A, Moffitt TE, Newman DL, Silva PA. Behavioral observations at age 3 years predict adult psychiatric disorders. Longitudinal evidence from a birth cohort. *Arch Gen Psychiatry.* 1996;53(11):1033-1039.
45. Hussey JM, Chang JJ, Kotch JB. Child maltreatment in the United States: prevalence, risk factors, and adolescent health consequences. *Pediatrics.* 2006;118(3):933-942.
46. Belsky J, Bell B, Bradley RH, Stallard N, Stewart-Brown SL. Socioeconomic risk, parenting during the preschool years and child health age 6 years. *Europ J Public Health.* 2007;17(5):508-513.
47. Berkman LF. Seeing the forest and the trees: new visions in social epidemiology. *Am J Epidemiol* 2004;160(1):1-2.
48. Bracke P. Sex differences in the course of depression: evidence from a longitudinal study of a representative sample of the Belgian population. *Soc Psychiatry Psychiatr Epidemiol* 1998(9);33:420-429.
49. Bracke P. The three-year persistence of depressive symptoms in men and women. *Soc Sci Med* 2000;51(1):51-64.
50. Melchior M, Berkman LF, Niedhammer I, Zins M, Goldberg M. Multiple work and family demands and mental health: a prospective study of psychiatric sickness absence in the French GAZEL study. *Soc Psychiatry Psychiatr Epidemiol* 2007;42(7):573-582.
51. Cambois E, Garrouste C, Pailé A. Gender career divide and women's disadvantage in depressive symptoms and physical limitations in France. *Soc Sci Med - Population Health.* 2017;7:81-88.
52. INSEE. Chômage selon le sexe et l'âge en 2015. 2016. [<https://www.insee.fr/fr/statistiques/2489498>]
53. Kessler RC, Berglund P, Demler O, Jin R, Merikangas KR, Walters EE. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry.* 2005;62(7):593-602.

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Table 1: Definition of Childhood Socioeconomic Position Based on Maternal and Paternal Occupational Grade Prior to Age 15 Years: CONSTANCES - CONSulTants des Centres d'Examens de Santé - Cohort Study (France, 2012-2014).

Paternal occupational grade	Maternal occupational grade			
	High	Intermediate	Low	Out of the labor force
High	High	High	Intermediate	Intermediate
Intermediate	High	Intermediate	Intermediate	Intermediate
Low	Intermediate	Intermediate	Low	Low

Table 2: Participant Characteristics and Adult Depression in the CONSTANCES - CONSulTants des Centres d'Examens de Santé - Cohort Study (France, 2012-2014, n, % prevalence of depression, p-value).

Variables	Elevated depressive symptoms (n=67,057/12,179 cases)			Antidepressant treatment (n= 40,369/ 6,575 cases)		
	No.	%	P. value	No.	%	P. value
Sociodemographic characteristics						
Sex			<0.0001			<0.0001
Male	30,972	17.3		18,704	11.7	
Female	36,085	19.0		21,665	20.2	
Age			<0.0001			<0.0001
18-19	8,668	20.6		3,844	8.4	
30-44	18,857	18.4		11,376	14.3	
45-59	23,375	19.5		14,387	19,7	
>=60	16,157	14.7		10,762	16,8	
Lives with a partner			<0.0001			<0.0001
Yes	47,911	14,5		29,176	14,2	
No	18,270	27,5		10,203	21,9	
Children			<0.0001			0.0510
Yes	38,075	15,9		23,402	16,6	
No	28,982	21,1		16,967	15,9	
Country of birth			<0.0001			0.1039
France	59,253	17,3		35,170	16,3	
Other	6,933	24,4		4,295	15,3	
Father's country of birth			<0.0001			0.0176
France	54,576	16,9		32,589	16,4	
Other	11,490	23,7		6,786	15,2	
Mother's country of birth			<0.0001			0.0007
France	55,681	17,0		33,171	16,5	
Other	10,712	23,7		6,394	14,8	
Parental history of psychiatric disorder:			<0.0001			0.0001
No	65,297	18,0		39,325	16,0	

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Yes	1,760	22,7		1,044	25,5	
Health behaviors						
Tobacco smoking:			<0.0001			<0.0001
No	34,736	16,4		20,228	14,4	
Yes	31,732	20,0		19,420	18,0	
Alcohol abuse			<0.0001			<0.0001
No	49,892	15,5		29,801	15,1	
Yes	9,785	25,1		5,542	17,7	
Chronic health problems						
Diabetes:			<0.0001			<0.0001
No	63,544	17,9		38,308	16,0	
Yes	1,457	25,3		969	23,4	
Cancer:			0,0029			<0.0001
No	61,517	18,0		37,059	15,8	
Yes	5,540	19,6		3,310	21,3	
Functional limitations:			<0.0001			<0.0001
No	44,406	11,6		25,976	11,0	
Yes	21,597	31,3		13,253	26,2	
Intergenerational socioeconomic mobility:						
High socioeconomic position	3,057	12,5	<0.0001	1,789	12,2	<0.0001
Upward mobility	21,501	14,6		13,080	13,8	
Intermediate socioeconomic position	13,098	16,0		7,466	15,5	
Downward mobility	12,242	21,8		7,359	18,3	
Low socioeconomic position	10,036	24,2		6,309	20,3	

Table 3. Intergenerational Socioeconomic Mobility and Adult Depression (CONSTANCES - CONSULTAnts des Centres d'Examens de Santé -Cohort Study, 2012-2014, ORs, 95% CI, p-value for trend)

Variables	Elevated depressive symptoms (n=67,057/12,179 cases)			Antidepressant treatment (n=40,369/6,575 cases)		
	OR	95% CI	P. value	OR	95% CI	P. value
Intergenerational socioeconomic mobility			<0.0001			<0.0001
High socioeconomic position	Ref.			Ref.		
Upward mobility	1.19	1.07,1.34		1.15	0.99,1.34	
Intermediate socioeconomic position	1.33	1.18,1.49		1.32	1.13,1.54	
Downward mobility	1.94	1.73,2.18		1.62	1.39,1.89	
Low socioeconomic position	2.23	1.98,2.50		1.84	1.58,2.14	
Intergenerational socioeconomic mobility + sociodemographic characteristics			<0.0001			<0.0001
High socioeconomic position	Ref			Ref		
Upward mobility	1.24	1.10,1.40		1.06	0.91,1.24	
Intermediate socioeconomic position	1.39	1.23, 1.57		1.10	0.93, 1.34	
Downward mobility	1.87	1.66, 2.11		1.38	1.17, 1.71	
Low socioeconomic position	2.11	1.87, 2.39		1.58	1.34, 1.87	
Intergenerational socioeconomic mobility + parental history of psychiatric disorders			<0.0001			<0.0001
High socioeconomic position	Ref			Ref		
Upward mobility	1.33	1.19, 1.50		1.07	0.92, 1.26	
Intermediate socioeconomic position	1.52	1.35, 1.71		1.14	0.97, 1.34	
Downward mobility	2.18	1.93, 2.45		1.46	1.25, 1.71	
Low socioeconomic position	2.53	2.24, 2.85		1.65	1.41, 1.94	
Intergenerational socioeconomic mobility + health behaviors			<0.0001			<0.0001
High socioeconomic position	Ref			Ref		
Upward mobility	1.32	1.17, 1.49		1.09	0.93, 1.29	

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Intermediate socioeconomic position	1.49	1.31, 1.69		1.13	0.95, 1.33	
Downward mobility	2.04	1.80, 2.31		1.39	1.17, 1.65	
Low socioeconomic position	2.39	2.11, 2.72		1.62	1.37, 1.92	
Intergenerational socioeconomic mobility + chronic health problems			<0.0001			<0.0001
High socioeconomic position	Ref			Ref		
Upward mobility	1.28	1.14, 1.45		1.03	0.88, 1.21	
Intermediate socioeconomic position	1.39	1.22, 1.57		1.02	0.87, 1.21	
Downward mobility	1.96	1.73, 2.22		1.30	1.10, 1.53	
Low socioeconomic position	2.16	1.90, 2.44		1.41	1.19, 1.66	
Intergenerational socioeconomic mobility + all covariates			<0.0001			<0.0001
High socioeconomic position	Ref			Ref		
Upward mobility	1.21	1.06, 1.38		1.03	0.87, 1.22	
Intermediate socioeconomic position	1.28	1.12, 1.46		1.00	0.84, 1.20	
Downward mobility	1.66	1.45, 1.90		1.24	1.04, 1.48	
Low socioeconomic position	1.82	1.58, 2.08		1.36	1.13, 1.62	

OR : Odds Ratio ; CI : Confidence Interval

Table 4. Intergenerational Socioeconomic Mobility and Adult Depression, Stratifying on Sex and Age (CONSTANCES – CONSulTants des Centres d'Examens de Santé - Cohort Study, 2012-2014, Multivariate ORs, 95% CI)

Variables	No	OR	95% CI
Intergenerational socioeconomic mobility + all covariates (except sex)			
Men	30,972		
High socioeconomic position		Ref.	
Upward mobility		1.22	1.02, 1.46
Intermediate socioeconomic position		1.30	1.08, 1.57
Downward mobility		1.53	1.27, 1.85
Low socioeconomic position		1.53	1.27, 1.85
Women	36,085		
High socioeconomic position		Ref.	
Upward mobility		1.14	0.95, 1.37
Intermediate socioeconomic position		1.17	0.97, 1.41
Downward mobility		1.60	1.33, 1.92
Low socioeconomic position		1.88	1.56, 2.27
Intergenerational socioeconomic mobility + all covariates (except age)			
18-29 years	8,668		
High socioeconomic position		Ref.	
Upward mobility		1.69	1.17, 2.45
Intermediate socioeconomic position		1.59	1.09, 2.33
Downward mobility		2.16	1.52, 3.07
Low socioeconomic position		2.51	1.74, 3.63

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30-45 years	18,857		
High socioeconomic position		Ref.	
Upward mobility		1.22	1.02, 1.48
Intermediate socioeconomic position		1.07	0.88, 1.32
Downward mobility		1.57	1.29, 1.91
Low socioeconomic position		1.75	1.43, 2.13
46-60 years	23,375		
High socioeconomic position		Ref.	
Upward mobility		0.98	0.78, 1.23
Intermediate socioeconomic position		1.08	0.85, 1.36
Downward mobility		1.28	1.01, 1.62
Low socioeconomic position		1.41	1.12, 1.79
>=60 years	16,157		
High socioeconomic position		Ref.	
Upward mobility		1.25	0.80, 1.96
Intermediate socioeconomic position		1.47	0.94, 2.31
Downward mobility		1.95	1.23, 3.08
Low socioeconomic position		1.85	1.17, 2.94

OR : Odds Ratio ; CI : Confidence Interval