



Public Health
England

How healthy behaviour supports children's wellbeing



August 2013

Contents

Introduction	4
Key findings	5
Life satisfaction and health	5
Overall wellbeing	5
What is wellbeing?	5
Health behaviour and wellbeing	6
1. Screen time	6
2. Physical activity	7
3. Healthy eating and diet	7
Protective factors	8
Risk factors	8
Implications for practice	9
Implications for parents	10
References	11
Appendix	13

About this briefing

This briefing aims to provide a useful resource for a range of agencies, including local authority public health teams, children's commissioners and providers of children's services, schools, children's centres, youth workers and parents/carers.

The content of this briefing draws on:

- an analysis of how the UK compares internationally on key indicators of health behaviour and wellbeing among children^{3,4,5}
- key themes from a secondary analysis of existing datasets⁶ focused specifically on children aged seven (using data from the Millennium Cohort Study⁷) and young people aged ten to 15 (using data from Understanding Society⁸) to explore associations and predictors of wellbeing
- a complementary academic literature search that examined associations between the behaviours of healthy eating (including eating breakfast), physical activity and reducing screen time, and the following outcomes: concentration, social relationships, truancy and wellbeing among children under the age of 11.

The focus of the academic literature search was children under the age of 11 in order to identify key messages to inform one of Public Health England's major social marketing campaigns, Change4Life, which targets families of children aged five to 11 years.

Limitations of the research

The complexity of wellbeing and the interrelationship of outcomes makes it difficult to draw firm conclusions. For example, unhappy children may find friendships difficult and might withdraw to screen activities (including non-homework computer use, watching television, DVDs and videos) that make them feel better in the short term but worse in the long run. The variables used to define aspects of wellbeing in the analyses make it difficult to determine their association with the identified outcomes. Some of the cost effectiveness data cited is from US studies.

The scope of the complementary academic research considered means these findings present only a partial picture of what makes a difference to child wellbeing. There is a lack of research on under 11s and much of the research is from North America. Causal links cannot be established from the vast majority of studies. There may also be substantive evidence for adolescents (12 years and older) but this has not been included. This points to the need for more research on children's wellbeing across the UK.

How healthy behaviour supports children's wellbeing



INTRODUCTION

The wellbeing and health of children in England is of paramount importance now and into the future, but compared to other Organisation for Economic Cooperation and Development (OECD) countries we could be doing better. A recent report from the Children's Society¹ says that child wellbeing has dipped since 2008 after a period of improvement from 1994. It found that while four-fifths of children are 'flourishing', meaning they are satisfied as a whole and find their lives worthwhile, 10%, or half a million, are 'languishing' and score poorly on measures of wellbeing.

We know there is a relationship between wellbeing and health behaviour and health outcomes in adults.² This briefing focuses on the association between health behaviour and wellbeing in children, drawing on a new analysis of two existing datasets, and findings from the wider academic literature.

The evidence has found links between physical activity, screen time, healthy eating, and wellbeing. However, children and young people's wellbeing is complex, long term, and more strongly associated with the wider environment they live in (the quality of family relationships, having choice and control, enough money for the family to live on¹) than health behaviour alone.

This briefing draws these new insights to people's attention. Public Health England

(PHE) will work with local government and other partners to provide advice, information, intelligence and expert help to support action that improves children's health and wellbeing.

The findings in this briefing provide part of the picture on what influences children's health and wellbeing. PHE is updating an overview of the evidence of effective interventions that promote mental wellbeing and prevent mental ill health across all ages, including evidence for effective interventions for children's and young people's mental wellbeing. It will include the broader factors that influence children's social, emotional and cognitive development, and the interventions that can improve them – such as parenting support, emotional health and wellbeing programmes in schools, access to green space, and opportunities to be active. This work is due to be published in autumn 2013.

Another excellent source of data, evidence and practice related to children's and young people's health is PHE's Child and Maternal Health Observatory (ChiMat) (www.chimat.org.uk). ChiMat also provides monthly bulletins on children's emotional and mental health.

KEY FINDINGS

Life satisfaction and health – international comparisons

- According to the most recent surveys, the UK ranks mid-table on comparisons of health and wellbeing for young people in OECD and EU countries.^{3,4,5} Over 85% of UK children rated their life satisfaction highly, placing the UK 14th in a comparison of 29 countries. The Netherlands was highest, with just under 95% of children reporting high life satisfaction⁵
- In England, 84% of children reported that their health was good or very good. This is below average for the 38 OECD countries assessed. Macedonia scores highest on this indicator with 96% of children rating their health as good or very good.³

Overall wellbeing

- Children's wellbeing is strongly associated with the wider neighbourhood they live in. Throughout childhood, social relationships at home and school are important predictors of wellbeing. A secure school environment, without bullying or conflict, and a supportive family that spends time together are the foundations of good child wellbeing
- Children's development is also affected by their parent's resources, health, geographical environment, housing conditions, social network and parenting knowledge. Children living in less affluent areas have lower levels of wellbeing than those in affluent areas.^{3,6} However, the relative risk is small, as individual child and family factors may be more influential than poverty. It is important to take the widest approach possible, as targeting

WHAT IS WELLBEING?

Wellbeing is more than the absence of illness and goes beyond life satisfaction. It is linked with an individual's physical health, health behaviours and resilience (the ability to cope with adverse circumstances).

The Foresight Report (2008) defines wellbeing as 'a dynamic state, in which the individual is able to develop their potential, work productively and creatively, build strong and positive relationships with others, and contribute to their community. It is enhanced when an individual is able to fulfil their personal and social goals and achieve a sense of purpose in society'.⁹ It is a complex concept, with many potential measures.

The analysis in this briefing selected the following measures of wellbeing from the Millennium Cohort Study⁷:

- How often children report feeling happy (all the time, some of the time, never)
- How often children report feeling worried (all the time, some of the time, never)
- Parent's perception of child's unhappiness (extent of agreement with the statement 'my child is often unhappy, downhearted or tearful').

The new analysis also takes wellbeing measures from Understanding Society,⁸ which defines it as a composite score of satisfaction across six areas of young people's lives. Young people were asked how happy they felt about these areas of their lives, and to rate each from one (completely happy) to seven (not at all happy). The areas were:

- School work
- Appearance
- Family
- Friends
- The school they attend
- Life as a whole.

interventions only at those perceived most at risk means missing all those who may have poor wellbeing in the rest of the population

- Young people's wellbeing decreases with age: between the ages of 11 and 15, the proportion of young people with low wellbeing almost doubles.⁶ The Children's Society report found that when studies were extended to include young people age 16 and 17, this downward trend may be halted and reversed¹
- At age seven, girls were happier than boys, but boys worried less than girls. However, by adolescence boys reported higher subjective wellbeing than girls.⁶

Health behaviour and wellbeing

As well as addressing the social and environmental aspects of children's wellbeing, it is useful to examine their health behaviour to see how these might relate to individual wellbeing.

These themes arise through the academic literature search and the data analysis from the Millennium Cohort Study and Understanding Society survey:

1. Screen time (including computer use for non-homework, watching television, DVDs and videos)

Time spent playing computer games was significantly and negatively associated with young people's wellbeing.⁶

Television viewing has been associated with teachers'²⁰ and parents'²¹ reports of children's attention difficulties, and with children self-reporting attention problems.^{15, 22} Long-term research suggests TV viewing at younger ages (one to three years old) predicts later attention and hyperactivity difficulties (among

seven-year olds) taking into account baseline level of difficulties.²³

Increased screen time and exposure to media (such as bedroom TVs) is consistently associated with reduced feelings of social acceptance, and increased feelings of loneliness, conduct problems and aggression.^{15 22, 24 ,25, 26, 27}



Increased TV viewing is associated with lower self-worth and self-esteem^{16, 19, 27, 28} and lower levels of self-reported happiness.¹⁹ The odds of children not worrying were highest in those who watched less than an hour on weekdays.⁶ Parents were also more likely to regard their child as unhappy if they watched a very large amount of TV.⁶ Specific types of internet activity (social networking sites, multi-player online games) have been associated with lower levels of wellbeing among children.¹⁹

Children who spend more time on computers, watching TV and playing video games tend to experience higher levels of

emotional distress, anxiety and depression.^{15, 17, 26, 29, 30} This relationship is particularly negative among those who engage in high levels of screen use (more than four hours a day).^{17, 26, 30}

The evidence suggests a 'dose-response' relationship, where each additional hour of viewing increases children's likelihood of experiencing socio-emotional problems^{26, 28, 29} and the risk of lower self-esteem.²⁸

In the UK, 62% of 11-year olds, 71% of 13-year olds and 68% of 15-year olds report watching more than two hours of TV a day on weekdays, compared to Switzerland where the figure is less than 35% across all three age groups.⁵

In England the proportion of young people playing computer games for two hours or more a night during the week increased from 42% to 55% among boys and 14% to 20% among girls between 2006 and 2010.¹⁰

2. Physical activity

Physical activity is associated with improved concentration levels,^{11,12,13} more positive social behaviour, such as being kind to class mates and attempting to resolve disputes,¹⁵ and children feeling liked by peers and that they have enough friends.^{14,15,16,17}

Physical activity is also associated with lower levels of anxiety and depression,^{16,18} with children being happier with their appearance,¹⁹ and reporting higher levels of self-esteem, happiness and satisfaction with their lives.¹⁹

Enjoying physical activity is also associated with happiness and lower levels of worry.⁶

Just over 20% of children in the UK engage in more than an hour of moderate-to-vigorous

physical activity per day, placing the UK 10th out of 29 OECD countries.⁵

In England, most young people (over 70%) aged 11, 13 and 15 do not meet the recommended levels of physical activity (at least one hour a day of moderate activity). Boys are more likely than girls to meet the recommendations. Reported activity levels decrease with age. More boys met the daily recommendations for physical activity in 2010 than 2006.¹⁰

3. Healthy eating and diet

Eating breakfast compared to skipping it has a positive impact on short-term cognition and memory, but these effects may depend on the type of assessment.^{32, 33, 34, 35, 36}

Family meal times appear to be important to young people's wellbeing.⁶

England has the highest level of sugary soft drink consumption among 38 OECD countries, with just under 40% of 11 to 15-year olds reporting they drink soft drinks at least once a day. In Finland less than 5% of children report drinking soft drinks daily.³

In the UK, just over 60% of 11 to 15-year olds report eating breakfast daily (17th out of 29 OECD countries – the highest is the Netherlands, with more than 80%) while just under 40% of 11 to 15-year olds report eating fresh fruit daily (15th on the UNICEF report card – Denmark ranks highest with just under 50%).⁵

In England, between a third (34%) and just under half (47%) of young people aged 11, 13 and 15 reported eating fruit and/or vegetables every day. Girls reported higher levels of consumption than boys. Young people from the highest Financial Affluence Score (FAS) group were more likely to report eating

fruit than those from lower groups (48% versus 26%). Reported levels of fruit eating have decreased across all ages since 2006 when up to just over half of young people reported eating fruit every day.¹⁰

Boys were more likely to report eating breakfast every day (56% versus 46% of girls). The numbers of young people who reported eating breakfast decreased with age and young people in the lowest FAS group were less likely to report eating breakfast than those in higher groups. Slightly fewer young people in 2010 compared to 2006 reported eating breakfast every day during the week.¹⁰

Protective factors

As well as physical activity, a number of factors emerged from the new analysis that might protect or buffer against poor wellbeing and promote more positive outcomes. These included:

- Maternal wellbeing – young people's wellbeing was associated positively with their mother's wellbeing⁶ (this is not to say the influence of paternal wellbeing is less important, but in the context of the analysis there was limited data that specifically related to the wellbeing of fathers)
- Wellbeing within families and family relationships – getting on well with siblings is associated with high levels of happiness and less worry in children, and perceived by parents to be key to their child's wellbeing. Having fun with the family at weekends is strongly associated with children's happiness, and is also associated with less worry. Family meals and feeling supported by the family are important contributory factors to young people's wellbeing. Although lone parents are more likely to report their children as unhappy, the children themselves are no more likely to

self-report lower levels of wellbeing. Parents who smack or shout at their children are more likely to report their child as unhappy⁶

- Having lots of friends at school – this was associated with children's happiness at the age of seven. For young people aged 11 to 15, negative social interactions at school were associated with lower wellbeing.⁶

Risk factors

The data analysis identified bullying and negative behaviour at school as two factors associated with lower levels of wellbeing:

- Bullying others and being bullied were associated with lower wellbeing (less likely to not worry). Children who were 'horrible' to others were less likely to be happy themselves. Those who were never bullied at school were more likely to report being happy⁶
- Negative social interactions at school were associated with lower wellbeing – young people in classes with others who were disruptive reported lower wellbeing, as did those who misbehaved.⁶



IMPLICATIONS FOR PRACTICE

A number of these findings corroborate and complement the wider evidence base on the factors that influence child wellbeing, meaning they potentially inform public health action to improve child wellbeing. They include the:

- Negative effects of excessive screen time and its link to conduct problems
- Significance of family relationships and the positive influence that meaningful family activity (including regular meal times together) can have on the wellbeing of children and families
- Significance of friendships and relationships between children at school and the negative influence of poor behaviour and bullying
- Positive impact of physical activity across children's wellbeing
- Integrated nature of lifestyle behaviour and wellbeing.

Although focussed on older children (ten to 15 years old), the Children's Society report found that those with low wellbeing are eight times as likely to feel their families do not get along, almost five times as likely to have been recently bullied, and three times as likely to feel they do not have enough friends. This mirrors the importance of social relationships as key influences on child wellbeing.

We know from a review of the wider literature that health behaviour established in childhood influences health and wellbeing outcomes in later life. For example, the diet of many children and young people includes too much salt, saturated fat, and sugar.³⁷ Between one in three and one in six is overweight or obese.³⁸ These patterns are associated

with poor health for children and young people and increase their future risk of being overweight/obese, cardiovascular disease, diabetes and some cancers. Obesity is also associated with poor mental health in teenagers and increases the likelihood of low self-esteem.⁴⁰ Helping children achieve and maintain a healthy diet will have lasting health benefits. Establishing healthy habits during childhood provides the potential for short-term and long-term improvements, including better wellbeing and family health.

Local authorities and their partners can use low-cost interventions to improve child wellbeing. They can provide healthier school food, restrict snacks and sugary drinks, and ensure children have access to spaces to play. They can also promote sources of support to parents, facilitate mentoring between parents, and commission parenting programmes. Health and wellbeing strategies should focus on improving children's wellbeing in the broadest sense, with policies and interventions that enhance the built environment, improve housing quality, and provide opportunities for good social connections. Local Joint Strategic Needs Assessments should support this by including local data and knowledge about child wellbeing.

Services cost money, but there is also an economic cost to not providing them. Indeed, the economic returns of early childhood interventions exceed their costs by an average of six to one.³¹

PHE will work with local government and other partners to help them develop suitable interventions to meet local need. To this end we have prioritised giving children a good start in life and promoting place-based public health systems during 2013-14.

IMPLICATIONS FOR PARENTS

Parents will be rightly concerned to do all they can to increase their children's wellbeing. While many factors that correlate with wellbeing may be beyond the control of individual families, the analyses indicate that making time to spend together as a family, eating meals together, ensuring children are physically active, rationing children's non-homework screen time and ensuring children eat a healthy breakfast, may all have the potential to improve children's wellbeing.



References

1. The Children's Society (2013) The Good Childhood Report 2013, www.childrenssociety.org.uk/well-being
2. HM Government (2009) Confident Communities, Brighter Futures, Department of Health
3. Currie C et al., e. (2012) Social determinants of health and well-being among young people. Health Behaviour in School-aged Children (HBSC) study: international report from the 2009/2010 survey. Copenhagen, Denmark: WHO Regional Office for Europe.
4. Hibell et al. (2012) The 2011 ESPAD Report: Substance Use Among Students in 36 European Countries. Stockholm, Sweden: Swedish Council for Information on Alcohol and Other Drugs.
5. UNICEF. (2013). Child Wellbeing in Rich Countries: A comparative overview, Innocenti Report Card 11. Florence, Italy: UNICEF Office of Research.
6. NatCen Social Research (2013). Predictors of Wellbeing. Commissioned by the Department of Health. www.natcen.ac.uk/study/predictors-of-wellbeing
7. Centre for Longitudinal Studies (2013) Millennium Cohort Study www.cls.ioe.ac.uk
8. Understanding Society The UK Household Study – www.understandingsociety.ac.uk
9. The Foresight Mental Capital and Wellbeing Project (2008) Final report – Executive summary, The Government Office for Science, London
10. World Health Organization (2011), Health Behaviours in School Aged Children (HBSC), World Health Organization Collaborative Cross-National Study – findings from the 2010 HBSC Study in England
11. Sibley, B.A., & Etnier, J.L., 2003, The relationship between physical activity and cognition in children: A meta-analysis, *Pediatric Exercise Science*, 15, pp.243-256
12. Hillman, C.H., Erickson, K.I., & Kramer, 2008, Be smart, exercise your heart: exercise effects on brain and cognition, *Nature Reviews Neuroscience*, 9, pp. 58-65
13. Fedewa A.L., Ahn S., (2011) The effects of physical activity and physical fitness on children's achievement and cognitive outcomes: a meta-analysis, *Research Quarterly for Exercise and Sport*, American Alliance for Health, Physical Education, Recreation and Dance, vol 82, No.3., pp 521-535.
14. Sebire, S.J., Jago, R., Fox, K. R., Page, A.S., Brockman, R., & Thompson, J.L., 2013, Associations between children's social functioning and physical activity participation are not mediated by social acceptance: a cross-sectional study, *International Journal of Behavioral Nutrition and Physical Activity*, 8, pp. 106-114
15. Broderson, N.H., Steptoe, A., Williamson, S., & Wardle, J., 2005, Sociodemographic, developmental, environmental, and psychological correlates of physical activity and sedentary behaviour at age 11 to 12, *Annals of Behavioural Medicine*, 29(1), pp.2-11
16. Parfitt, G., Pavey, T., & Rowlands, A.V., 2009, Children's physical activity and psychological health: the relevance of intensity, *Acta Paediatrica*, 98, pp. 1037-1043
17. Page, A.S., Cooper, A.R., Griew, P., Jago, R., 2010, children's screen viewing is related to psychological difficulties irrespective of physical activity, *Pediatrics*, 126(5), pp. e1101-e1107
18. McHale, S. M., Crouter, A.C., & Tucker, C.J., 2001, Free-time activities in middle childhood: Links with adjustment in early adolescence, *Child Development*, 72(6), pp.1764-1778
19. Holder, M.D., Coleman, B., & Sehn, Z.L., 2009, The contribution of active and passive leisure to children's well-being, *Journal of Health Psychology*, 14(3), pp.378-386
20. Levine, L.E. & Waite, B.M., 2001, Television viewing and attentional abilities in fourth and fifth grade children, *Journal of Applied Developmental Psychology*, 21(6), pp.667-679
21. Ebenegger, V., Marques-Vidal, P-M., Munsch, S., Quartier, V., Nydegger, A., Barral, J., Hartmann, T., Dubnov-Raz, G., Kriemler, S., & Puder, J.J., 2012, Relationship of hyperactivity/inattention with adiposity and lifestyle characteristics in preschool children, *Journal of Child Neurology*, 27(7), pp.852-858
22. Ozmert, E., toyran, M., & Yurdakok, K., 2002, Behavioral correlates of television viewing in primary school children evaluated by the child behaviour checklist, *Archives of Pediatric and Adolescent Medicine*, 156(9), pp. 910-914

23. Christakis, D.A., Zimmerman, F.J., diGiuseppe, D.L., & McCarty, C.A., 2004, Early television exposure and subsequent attentional problems in children, *Pediatrics*, 113(4), pp.708-713
24. Pea, R., Nass, C., Meheula, L., Rance, M., Kumar, A., Bamford, H., Nass, M., Simha, A., Stillerman, B., Yang, S., & Zhou, M., 2012, Media use, face-to-face communication, media multitasking, and social well-being among 8-to 12 year old girls, *Developmental Psychology*, 48(2), pp.327-336
25. Sisson, S.B., Broyles, S. T., Newton, R.L., Baker, B. L., & Chernausk, S.D., 2011, TVs in the bedrooms of children: Does it impact health and behavior?, *Preventive Medicine*, 52, pp.104-108
26. Yang, F., Helgason, A.R., Sigfusdottir, I. D., & Kristjansson, A.L., 2013, Electronic screen use and mental well-being of 10-12 year old children, *European Journal of Public Health*, 23(3), pp.492-498
27. Tremblay, M.S., LeBlanc, A.G., Kho, M.E., Saunders, T.J., Larouche, R., Colley, R.C., Goldfield, G., & Connor Gorber, S., 2011, Systematic review of sedentary behaviour and health indicators in school-aged children and youth, *International Journal of Behavioral Nutrition and Physical Activity*, 8, pp.98-119
28. Russ, S.A, Larson, K., Franke, T.M., & Halfon, N., 2009, Associations between media use and health in US children, *Academic Pediatrics*, 9(5), pp.300-306.
29. Hamer, M., Stamatakis, E., & Mishra, G., 2009, Psychological distress, television viewing, and physical activity in children aged 4 to 12 year, *Pediatrics*, 123(5), pp.1263-1268
30. Singer, M.I., Slovak, K., Frierson, T., & York, P., 1998, viewing preferences, symptoms of psychological trauma, and violent behaviors among children who watch television, *Journal of American Academy of Child and Adolescent Psychiatry*, 37(10), pp. 1041-1048
31. NICE Clinical Guidelines No 77, Antisocial Personality Disorder: Treatment, Management and Prevention
32. Ells LJ, Hillier FC and Summerbell CD., 2006, A systematic review of the effect of nutrition, diet and dietary change on learning, education and performance of children of relevance to UK schools, Food Standards Agency
33. Hoyland A, Dye L and Lawton CL., 2009, A systematic review of the effect of breakfast on the cognitive performance of children and adolescents. *Nutrition Research Reviews* 22:220 -243. 29 Widenhorn-Muller K, Hille K and Weiland U., 2008 Influence of having breakfast on cognitive performance and mood in 13 to 20 year old high-school students. *Pediatrics* 122:279-284.
34. Pivik RT, Tennal KB, Chapman SD and Gu Y., 2012, Eating breakfast enhances the efficiency of neural networks engaged during mental arithmetic in school-aged children. *Physiology and Behaviour* 106: 548 – 555 (2012).
35. Gajre NS, Fernandez S, Balakrishna N and Vazir S., 2008, Breakfast eating habit and its influence on attention-concentration, immediate memory and school achievement. *Indian Pediatrics* 45: 824 – 828.
36. Ask A.S., Hernes S, Aarek I, Johannessen G and Haugen M., 2006, Changes in dietary pattern in 15 year old adolescents following a 4 month dietary intervention with school breakfast – a pilot study. *Nutrition Journal* 5: 1475 – 2891 (2006)
37. Bates B, Lennox A, Bates C, Swan G. (eds) 2011, National Diet and Nutrition Survey: Headline results from Years 1 and 2 (combined) of the Rolling Programme (2008/09 – 2009/10), Department of Health. Available online: www.gov.uk/government/publications/national-diet-and-nutrition-survey-headline-results-from-years-1-and-2-combined-of-the-rolling-programme-2008-9-2009-10
38. National Child Measurement Programme 2011/12.
39. www.nhs.uk/Livewell/Goodfood/Pages/eatwell-plate.aspx
40. National Obesity Observatory (2011), Obesity and mental health
41. Knapp et al (2011), Mental health promotion and mental illness prevention: The economic case, LSE/PSSRU, Centre for Mental Health, Institute of Psychiatric, King's College London

Appendix

A note on the analyses of Understanding Society and the Millennium Cohort Study undertaken by NatGen Social Research

The datasets analysed – Understanding Society and the Millennium Cohort Study – are large samples, collected in the UK and nationally representative, which means they are more locally relevant than the predominantly North American studies found in the literature review.

The analyses are multivariate: they use a wide range of personal, social, economic and lifestyle factors to predict children and young people's wellbeing. Many of these factors are strongly associated with one another (such as parental social class and family income), and by using these factors simultaneously to predict wellbeing it is possible to isolate which ones are really associated with wellbeing, rather than those that appear to be as a result of their relationships with other factors.

As a final note, the analysis of 11 to 15-year olds' wellbeing in Understanding Society is longitudinal: the analysis tests whether young people's wellbeing is predicted by events from the year before. This allows more certainty that it is these factors influencing wellbeing rather than the other way round. However, it does not allow total certainty as proof of causation could only come from research where these factors were manipulated (as in an experiment or randomised control trial).

Produced by the Health & Wellbeing Directorate, Public Health England

Suggested citation: Public Health England (2013) How healthy behaviour supports children's wellbeing

Public Health England
Wellington House
133-155 Waterloo Road
London SE1 8UG
www.gov.uk/phe
Twitter: @PHE_uk

PHE publications gateway number: 2013146
August 2013
© Crown Copyright 2013