Stress and the immune response

Kiecolt-Glaser et al. (1984)

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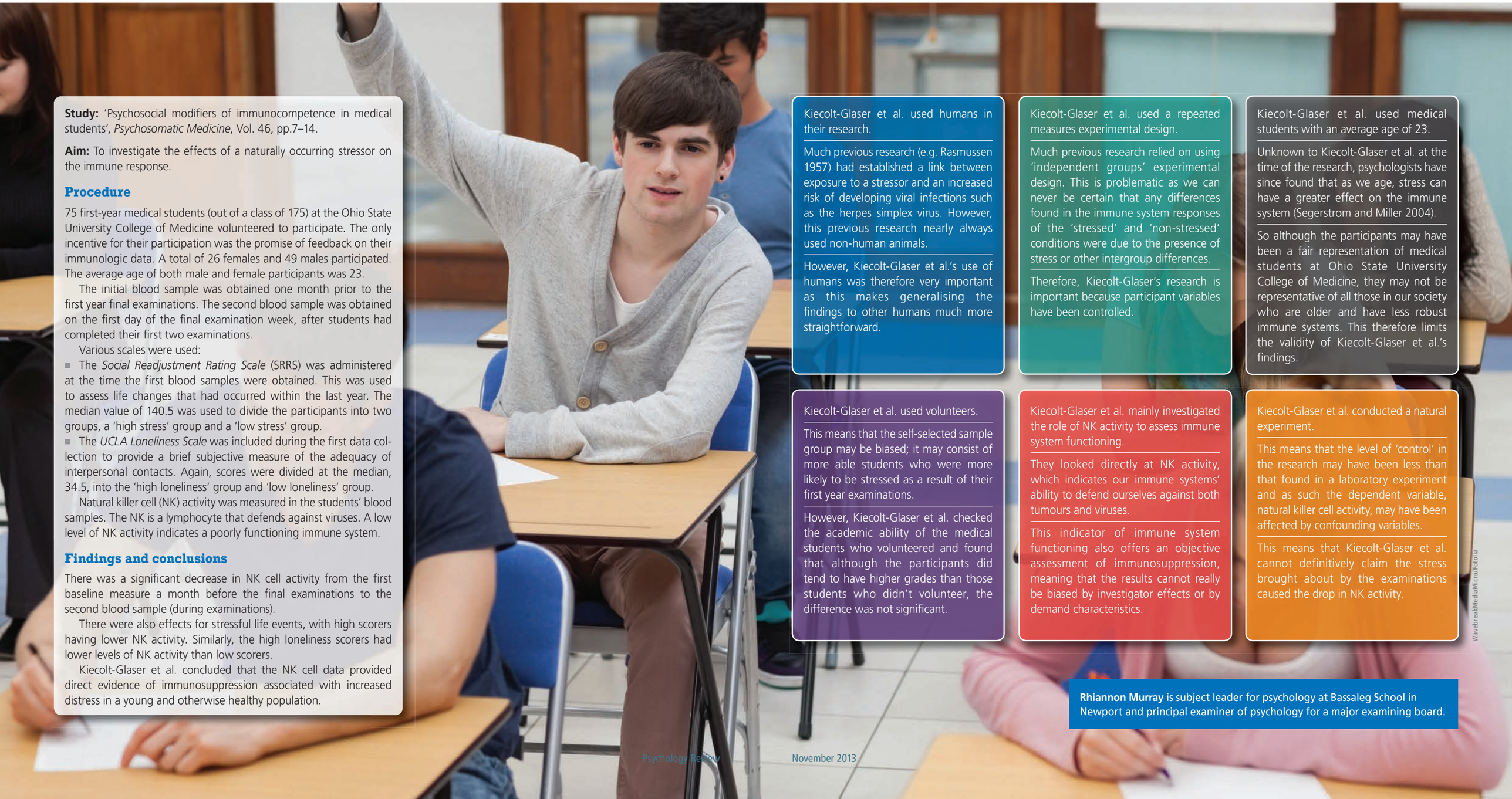

Study: 'Psychosocial modifiers of immunocompetence in medical students', *Psychosomatic Medicine*, Vol. 46, pp.7–14.

Aim: To investigate the effects of a naturally occurring stressor on the immune response.

Procedure

75 first-year medical students (out of a class of 175) at the Ohio State University College of Medicine volunteered to participate. The only incentive for their participation was the promise of feedback on their immunologic data. A total of 26 females and 49 males participated. The average age of both male and female participants was 23.

The initial blood sample was obtained one month prior to the first year final examinations. The second blood sample was obtained on the first day of the final examination week, after students had completed their first two examinations.

Various scales were used:

- The *Social Readjustment Rating Scale* (SRRS) was administered at the time the first blood samples were obtained. This was used to assess life changes that had occurred within the last year. The median value of 140.5 was used to divide the participants into two groups, a 'high stress' group and a 'low stress' group.
- The *UCLA Loneliness Scale* was included during the first data collection to provide a brief subjective measure of the adequacy of interpersonal contacts. Again, scores were divided at the median, 34.5, into the 'high loneliness' group and 'low loneliness' group.

Natural killer cell (NK) activity was measured in the students' blood samples. The NK is a lymphocyte that defends against viruses. A low level of NK activity indicates a poorly functioning immune system.

Findings and conclusions

There was a significant decrease in NK cell activity from the first baseline measure a month before the final examinations to the second blood sample (during examinations).

There were also effects for stressful life events, with high scorers having lower NK activity. Similarly, the high loneliness scorers had lower levels of NK activity than low scorers.

Kiecolt-Glaser et al. concluded that the NK cell data provided direct evidence of immunosuppression associated with increased distress in a young and otherwise healthy population.

Kiecolt-Glaser et al. used humans in their research.

Much previous research (e.g. Rasmussen 1957) had established a link between exposure to a stressor and an increased risk of developing viral infections such as the herpes simplex virus. However, this previous research nearly always used non-human animals.

However, Kiecolt-Glaser et al.'s use of humans was therefore very important as this makes generalising the findings to other humans much more straightforward.

Kiecolt-Glaser et al. used a repeated measures experimental design.

Much previous research relied on using 'independent groups' experimental design. This is problematic as we can never be certain that any differences found in the immune system responses of the 'stressed' and 'non-stressed' conditions were due to the presence of stress or other intergroup differences.

Therefore, Kiecolt-Glaser's research is important because participant variables have been controlled.

Kiecolt-Glaser et al. used medical students with an average age of 23.

Unknown to Kiecolt-Glaser et al. at the time of the research, psychologists have since found that as we age, stress can have a greater effect on the immune system (Segerstrom and Miller 2004).

So although the participants may have been a fair representation of medical students at Ohio State University College of Medicine, they may not be representative of all those in our society who are older and have less robust immune systems. This therefore limits the validity of Kiecolt-Glaser et al.'s findings.

Kiecolt-Glaser et al. used volunteers.

This means that the self-selected sample group may be biased; it may consist of more able students who were more likely to be stressed as a result of their first year examinations.

However, Kiecolt-Glaser et al. checked the academic ability of the medical students who volunteered and found that although the participants did tend to have higher grades than those students who didn't volunteer, the difference was not significant.

Kiecolt-Glaser et al. mainly investigated the role of NK activity to assess immune system functioning.

They looked directly at NK activity, which indicates our immune systems' ability to defend ourselves against both tumours and viruses.

This indicator of immune system functioning also offers an objective assessment of immunosuppression, meaning that the results cannot really be biased by investigator effects or by demand characteristics.

Kiecolt-Glaser et al. conducted a natural experiment.

This means that the level of 'control' in the research may have been less than that found in a laboratory experiment and as such the dependent variable, natural killer cell activity, may have been affected by confounding variables.

This means that Kiecolt-Glaser et al. cannot definitively claim the stress brought about by the examinations caused the drop in NK activity.

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